مؤسسة محمد بن راشد آل مكتوم
Mohammed bin Rashid Al Maktoum Foundation

برنامج الأمم المتحدة الإنمائي
United Nations Development Programme

Arab Knowledge Report 2009

Towards Productive Intercommunication for Knowledge

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Foreword by the Chairman of the Board, Mohammed bin Rashid Al Maktoum Foundation

It gives me great pleasure to announce to you today the release of The Arab Knowledge Report 2009—Towards Productive Intercommunication for Knowledge, a fruit of the shared efforts of the Mohammed bin Rashid Al Maktoum Foundation and the United Nations Development Programme that lays the foundation of a strategic partnership that we hope will be both long lasting and of ongoing benefit for our Arab societies and their upcoming generations.

Given that analysis of the state of knowledge in the Arab homeland requires tireless effort and rigorous follow-up, this report can form no more than a first link in a continuing series of Arab Knowledge reports that will embody, from more than one perspective, the essential principles outlined by His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice-President, Prime Minister of the UAE and Ruler of Dubai, in his book *My Vision*, principles to which His Highness gave voice when he wrote, "I do wish for all my Arab brothers and sisters what I wish for my people of the UAE. I just want them to reach the same advanced levels achieved by developed countries. Moreover, I would like them to take control over their issues and proceed with accomplishing their goals, ambitions and aspirations"

The issuing of the Arab Knowledge reports falls within the framework of the more prominent initiative of the Mohammed bin Rashid Al Maktoum Foundation—the largest development initiative of its kind in the region—which aims to establish and develop a comprehensive knowledge base through the creation of a generation of future public and private sector leaders capable of seizing knowledge by the forelock and setting it to work on confronting the development challenges of their societies, while at the same time raising the standard of scholarly research and development, stimulating leadership in business, fostering innovation and creativity among youth, revitalizing the concept of productive culture, and strengthening ways of bringing different cultures closer together.

The Report now before us focuses on the organic relationship within the knowledge-society-development triad that is linked to modernisation, productive openness to both the inside and the outside, and all that contributes towards the strengthening of Arab human dignity. It views the current knowledge revolution as a point of entry capable of making development in the Arab homeland a reality. In the view of this report, knowledge, in both its enlightenment and developmental dimensions, is renaissance itself. It is also a road that requires a further sharpening of the tools of creative human intelligence in order to establish and reinforce the foundations of the knowledge economy in our region for the sake of the wellbeing and self-esteem of the Arab citizen.

The induction of knowledge concepts constitutes the cornerstone of any effective process of human development and as such makes a critical contribution to the escape from the vicious circles of poverty, unemployment, ignorance, and fear. It follows that the right to acquire, indigenise, and develop knowledge is beyond dispute.

This year's report may perhaps best be described as a thoroughgoing methodological and scholarly effort to study Arab knowledge in great detail, up to the point of its deployment in the service of the Arab individual. The aim is to furnish the Arab decision-maker, specialist, and citizen with a reference study that includes reliable indicators by which to measure the condition of knowledge in the Arab countries and thus assist with the development of plans and the assessment of performance and to kindle the spirit of competitiveness in a field in which this is of the essence.

The Report departs from the norm in formulating a daring proposed vision and work plan for the establishment of the knowledge society that embrace primary elements and required mechanisms likely to be of use in filling in the numerous gaps that dot the Arab knowledge landscape and in leading us through the portals of knowledge so that we may engage with its society and participate in its processes of production. The Report also opens for general discussion, critique, and review a proposed vision of work and action along three axes—the provision of enabling environments; the transfer, indigenisation and implantation of knowledge and then its deployment in the service of Arab human development.

The series of Arab Knowledge reports constitutes a cultural podium prepared by an elite of Arab specialists and intellectuals whose objective will be to ponder the state of Arab knowledge and suggest the methods most likely to succeed in establishing the desired knowledge society. We may not all agree on what is to be found in this report. The goal, however, is to instigate constructive discussion that will lead to adoption and application of policies and programmes that will translate its insights from the realm of reporting to that of effective actions on behalf of Arab societies capable of bringing about their wellbeing and self-esteem.

This work of ours will neither be completed nor born fruit without the cooperation of all—governments, civil society, and specialists from different parts of the Arab homeland. From this perspective, I sincerely call on all involved, and indeed on all concerned parties, to peruse these reports and subject them to discussion, critique, and fruitful debate, with the express goal of creating the means of putting into practice, whether at an Arab regional or an individual country level, the ideas resulting from this interactive process.

It also gives me great pleasure, in this context, to express my thanks and appreciation to the United Nations Development Programme's Regional Bureau for Arab States and in particular the report team in Dubai, as well as to all those—thinkers, writers, editors, and technical personnel—who participated in bringing this report into being. I look forward to further fruitful collaboration to reinforce the foundations of the intellectual edifice of knowledge in this region and secure the mainstays of the human development to which the Arab world aspires.

Sheikh Ahmed bin Mohammed bin Rashid Al Maktoum
Chairman of the Board
Mohammed bin Rashid Al Maktoum Foundation

Foreword by the Regional Director, UNDP Regional Bureau for Arab States

With the publication of this first report on knowledge in the Arab region, the United Nations Development Programme/ Regional Bureau for Arab States and the Mohammed bin Rashid Al Maktoum Foundation inaugurate what may be considered one of the most ambitious and competent projects to build and reinforce the knowledge society in the Arab region and to implant there its epistemological, intellectual, and cultural principles, in all their dimensions. This report represents a first step in a strategic partnership, of which we are proud, between our development programme and that pioneering enlightenment foundation established at the initiative of His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President, Prime Minister of the United Arab Emirates and Ruler of Dubai, and for which generous resources have been allocated.

While this report extends and goes deeper into the issues presented by the Arab Human Development Report 2003, which addressed the subject of knowledge as one of the most important of the three challenges facing the Arab region in addition to protection of freedoms and women empowerment; the co-publication of this series of reports on Arab knowledge demonstrates the harmoniousness and accord of the efforts of the United Nations Development Programme and the Mohammed bin Rashid Al Maktoum Foundation, their shared dedication to a single goal, and the exalted nature of their mission and objective. All of these form a part of the range of regional and global effort in this field.

The diagnostic analysis contained in this first report on Arab knowledge shows that some progress has been made in the outward forms of knowledge in the Arab world. It has also made plain, however, the existence of numerous gaps that must be addressed, seriously and resolutely, if we wish to establish a society capable of producing knowledge. We endorse the Report's assumption that the ground lost by the Arabs in the knowledge field can be made up, provided, first, that the aspiration to do so is there, along with the political will, supported by the allocation of the resources needed to build the enabling environments and the institutions capable of nurturing progress in knowledge and the conversion of the gains achieved into means to realise comprehensive human development.

The Report presents a number of important analyses of the conditions of knowledge in the Arab region. We agree that these must be dealt with urgently. It expatiates on monitoring the situation of the most important pillars of the hoped-for knowledge society and dedicated special attention to knowledge capital, making clear in so doing the large discrepancy in capital acquired through education, not only among the Arab countries themselves but within each individual Arab state and between males and females, as well as between young people and adults. On the question of Information and Communications Technology (ICT), which constitutes a central pillar for the knowledge society, a set of proposals and initiatives have been formulated that will help to improve the current situation of

ICT in the Arab countries and reinforce its importance in the health, economic, social, and fields of knowledge in general. The report also emphasises that a revitalisation of the Arabic language is required to make it capable of mastering Arabic epistemological and digital content. The writers of the Report focus on the fact that the tasks designed to provide the optimal investment of ICT in the building of the Arab knowledge society lie beyond the means of individual Arab states and make plain the necessity of mastering and deploying modern technology through cooperation both within Arab countries and with their regional and global partners.

The Report also touches on the subject of the innovation that, in reinforcing all that helps humankind transcend obstacles and constraints, enriches both the emotions and the mind. It is made clear that the concept of innovation sanctioned in the Report goes beyond the significations of the term "inventiveness," which is linked fundamentally to the purely technical field and its tools, to embrace the Arab particularities of innovation in the arts, literature, and the human and social sciences. The Report presents a set of proposals on how to instigate innovation and tie it in to the various fields of production.

The select group of thinkers and scholars from all parts of the Arab region who have participated in the writing of this report justly acknowledge that their various proposals, which encapsulate a vision for the building of the knowledge society in the Arab homeland, favour the spirit and the options of human development. Special weight is given in the Report to defence of the principle of intercommunication both inside and outside the region, through partnership and through productive and creative integration. This vision therefore suggests an achievable plan that includes markers along the route to an intercommunication that will lead to integration into spaces of knowledge that fly the flag of humanity and human intelligence, for the sake of partnership and creativity in the Arab societies.

The Arab Knowledge Report 2009– Towards Productive Intercommunication for Knowledge has laid the foundation for a practical treatment of this issue based on properly documented facts and a realistic view of the building of the knowledge society. We look forward to future reports that treat, through research and more profound study, the chief elements along the path to the building of the hoped-for knowledge society; from the firm grounding of enabling environments and the transfer and indigenisation of knowledge to its optimal deployment in the service of human development.

Space will allow me here to do no more than express my thanks and appreciation to all those who shared in the realisation of this report, including the writers, advisers, coordinators, and editing teams, as well as the work teams at both the United Nations Development Programme and the Mohammed bin Rashid Al Maktoum Foundation. It also gives me special pleasure to express my gratitude to His Highness Sheikh Mohammed bin Rashid Al Maktoum for his help and support for this series of reports on knowledge in the Arab region, and to declare my hope that the collaboration between us in all matters that enrich and deepen the Arab knowledge and cultural base and strengthen the outlook for sustainable human development in the Arab homeland and the world as a whole will continue.

Amat Al Alim Alsoswa
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PREAMBLE

Introduction

The Arab Knowledge Report 2009 examines the current state of Arab knowledge. It derives its legitimacy from the pressing need for information about knowledge performance in the region at a time when the importance of knowledge for the realisation of the many new prospects it has opened up for all areas of society is increasing.

An analytical approach to the evolution of knowledge and the knowledge revolution witnessed by the world at the end of the last and the beginning of this century is new to the agendas of the relevant national and international research institutions. Chief among the numerous reasons for the current Arab interest in the subject is the desire not to miss out on the anticipated effects of the knowledge revolution and to be alert to the roles it plays in generating progress, whether on the political, economic, or social level.

Today's knowledge revolution and the different material and symbolic effects it has generated have opened up new possibilities to develop human livelihoods and strengthen the efforts to increase forms of knowledge that contribute towards the achievement of human welfare.

This report on knowledge in the Arab region is one of a series whose object is to open up a diversity of avenues by which to approach the status of knowledge and speculate on the means and requirements for a renaissance in the Arab nation. Because the project is a large one, this first report offers a general introduction to the state of the Arab knowledge society and its components. It also attempts to sketch the major features of a vision of how some aspects of the knowledge gap in the Arab world may be overcome. Subsequent reports will cast further light, from other perspectives and analytical approaches, on the state of Arab knowledge with the aim of developing knowledge performance and so bringing about the realisation of the knowledge society in the Arab region.

The Report starts with the view that the literature of research into knowledge and its various trajectories is in its infancy. The approach thus targets two poles. The first is theoretical and provides the conceptual and philosophical foundations upon which the Report depends. The second concerns itself with some of the formative components of the different domains of knowledge in the Arab reality, thus permitting diagnosis and measurement of the size of the existing knowledge gaps. This preamble will summarise the major sections of the Report, namely, the preliminaries to the Report, the dialectical issues, and the topics of the Report.

Before considering the arrangement of the Report's content, we should point out that the task alternates between considering innovations associated with the knowledge society in countries that have already entered the latter's portals, and the state of knowledge in the Arab countries, with all its gaps and deficits. In all its chapters, the aim of the Report is to produce a diagnosis that reveals the status of Arab knowledge. At the same time, it attempts to sketch in general terms aspects of the triumphs and gains of knowledge and the horizons it has opened up for human societies. Given the dearth of data and absence of regional and national monitoring bodies issuing reliable information and statistics, the Report has scrutinised the data from international organisations and in so doing has generated

Chief among the reasons for the current Arab interest in establishing the knowledge society is the desire not to miss out on the anticipated effects of the knowledge revolution and to be alert to the roles it plays in generating progress, whether on the political, economic, or social level

an internal debate that aspires to build and develop Arab knowledge performance.

The Report has been careful to make use of available data and to evaluate the growth of the nuclei of an Arab knowledge society. It has also been keen to come to grips with the major problems that afflict knowledge in our societies, whether in research, education, or the use of the new technological mediums that underlie today's knowledge networks.

The knowledge field and revolution today form an avenue for reform in the Arab world

Crucial to the Report is the idea that the local and particular should be taken as the starting point for speculation about the universal and worldwide generalisation of gains in knowledge. This concern is not the result of any desire to deny the universal gains in knowledge but has been adopted because it supports the indigenisation and reproduction of these gains. The goal is to achieve creative participation in them and transcending the various aspects of knowledge commoditisation and consumption.

Another dominating idea forms part of this Report: that the knowledge field and revolution today form an avenue for reform in the Arab world. Hence, the Report's conception of knowledge has been broadened to include the spirit of knowledge, and thus its enlightenment and development dimensions. In doing so, it seeks to transcend those views of knowledge that emphasise technological and quantitative indicators, overlooking the fact that knowledge is freedom, and as such a path that requires further honing of the creative mechanisms of human intelligence.

Knowledge is freedom, and as such a path that requires further honing of the creative mechanisms of human intelligence

PRELIMINARIES TO THE REPORT

The Report's chapters are open-ended in structure and attempt to take stock of existing conditions. This supposes that subsequent reports will contemplate defined questions, a specific knowledge index, or one of the issues of the knowledge performance improvement in the Arab region.

> In the Name of God, the Merciful, the Compassionate
> Recite: In the name of thy Lord who created, created man of a blood-clot. Recite: And thy Lord is Most Generous, who taught by the pen, taught Man that which he knew not.
>
> The Holy Qur'an, Surat al-'Alaq (The Blood-clot)*

Given the novelty of the subject and of the horizons it is unceasingly opening up in the various fields of knowledge, the Report seeks to work on two fronts: a description of the state of knowledge in the Arab world and a sketch of some aspirations to overcome the flaws observed. The Report thus combines the identification of the faults in knowledge performance with the formulation of defined proposals, which, when implemented, will help to fill some of those gaps.

The Report starts with the principle of the right to knowledge, which it considers non-negotiable, especially in an Arab world most of which still suffers from knowledge and digital illiteracy. Knowledge is also perceived of as a tool and an outcome of development. The Report links the right to knowledge and development to hopes for renaissance and enlightenment. It takes innovation to be the means to reinforce all that may aid humanity to overcome the obstacles and constraints it faces. The linking of these principles allows some of the Report's chapters to take on a composite character. Taken together, the Report's chapters assume that the Arab historical regression in the domain of knowledge can be overcome, when the ambition to do so is present, and when there is the political will to provide the resources needed to build enabling environments and institutions capable of guiding knowledge evolution and transforming its gains into comprehensive human development.

THE DIALECTICS OF THE REPORT

The Report discusses a number of arguments, combining description and observation, and highlighting contradictions and paradoxes. At the same time, it exercises care in making judgements and adopting positions. The Report attempts to free itself from the purely economic perspective on

knowledge and from the consequences of a technologically determinist viewpoint. Equally, it tries to highlight the breadth of the concepts of both the knowledge society and innovation. In these choices, the Report is always conscious of the need–at times openly, at others implicitly, expressed–to seek a knowledge society that is in harmonious interaction with the Arab social environment, for the fundamental goal of knowledge is the service of humanity, its revitalisation, and the transcendence of the problems that limit its potential for self-liberation.

> Knowledge and the pen are far stronger than any other force.
>
> *Sheikh Mohammed bin Rashid Al Maktoum*

One of the chief points of contention that the Report strives to make apparent is that of knowledge's relationship to freedom, modernisation and the fostering of human dignity. When some of the Report's chapters defend the importance of freedom, institutions, and legislation, they have the aforesaid principles in mind as keys to the creation of a climate of rationality and proportionality. Such a climate should open the door to accountability, oversight, auditing, transparency, and all the other values needed to lay the foundations for a modern knowledge society.

The Report also reviews contentious issues linked to identity, such as language reform. In so doing, it seeks to highlight the pressing nature of this issue in the hope that the Arabic language will survive to provide an effective and responsive vehicle for the gains made by the new knowledge technologies. The Report also defends the principle of intercommunication with the world while not neglecting its original starting point of intercommunication with the self. This can only be achieved through the correction of the shortcomings of the self in such a way as to provide it with the capability for productive and effective intercommunication with the world. This argument falls under the heading of opening up to the gains accrued by the contemporary revolutions in knowledge.

THE TOPICS OF THE REPORT

The Report comprises a preamble and six chapters. The preamble examines the contextualisation of the Report, placing it among developments lately witnessed in the state of human development in the Arab region. It reviews the main challenges that have succeeded one another on the regional political and economic scene and highlights their pressures and impacts on Arab knowledge performance. It also deals with the global financial crisis that intensified at the end of 2008 and beginning of 2009 and its effects on the knowledge society and repercussions for the Arab situation. The preamble also offers a perspective on the outcome of reform in the region following the inception in Arab thinking, at the onset of the third millennium, of third-generation[1] concepts of reform.

The Report frees itself from the purely economic perspective on knowledge and from the consequences of a technologically determinist viewpoint

Because the task of the preamble goes no further than an indication of the most significant challenges in the Arab reality and their link to fields of knowledge, attention is given to the continuing US intervention in Iraq and the resulting situation within Iraqi society. The Report also examines the continuing Israeli occupation of the Palestinian Territories, shedding light on its negative implications for the establishment of the knowledge society.

Nor does the Report neglect to deal with the problems raised by extremist trends within Arab society and their relationship to knowledge, trends that are inclined not to recognise the Other and that give their stamp of approval to a one-dimensional and closed logic. These trends of thought have considerable impact on the climate of freedom, which is considered a reinforcing element necessary for the construction of the knowledge society.

The Report defends the principle of intercommunication with the world while not neglecting its original starting point of intercommunication with the self

The preamble also devotes a summary section to a rapid overview of the state of knowledge over recent years and presents

some of the knowledge indicators to be treated in detail in the following chapters. The Report's analyses and conclusions are based on events and available data and information up to the end of the first quarter of 2009.

The six topics of the Report are arranged as follows:

The literature on human rights places the discourse of the knowledge society at the heart of the calls for political modernisation

THE THEORETICAL FRAMEWORK: CONCEPTS AND PROBLEMATICS OF THE KNOWLEDGE SOCIETY (CHAPTER 1)

This chapter contains four main axes. The first treats the foundations and origins directing the mechanisms of understanding and imagination. The second axis treats the formulation of the concepts, scrutinising the concept of the knowledge society and attempting to delineate the boundaries that have been drawn up to delimit its various significations. This section also attempts to construct an operational definition based on the results of the various chapters of the Report. This should be seen as a first attempt to view the foundations of the concept from the perspective of the actual needs and ambitions of Arab society in the field of knowledge. The chapter examines the different significations of the concept in contemporary knowledge discourse, with special attention paid to those current in international reports. This process of constructing a specific definition aims to avoid a complacent acceptance of current wisdom. This is particularly necessary given the complex nature and the depth of the Arab knowledge gap, which requires us to draw upon the state of knowledge in the world and in the Arab region to formulate a definition that corresponds to, and harmonises with, Arab specificities and ambitions.

The third axis of the chapter examines the theoretical norms and frames of reference which form the starting point for the construction of concepts synonymous with the knowledge society, such as information and communications technology (ICT), the knowledge economy, and the networked society, with the object of highlighting the philosophical perspectives that stand behind these designations. Two primary frames of reference emerge as a result of these processes of investigation and construction. The first takes aspects of positivism, particularly in its most strident manifestation of technological determinism, as its reference. The second frame of reference is laid bare by the rights concepts that find their backing in the diverse literature on human rights, which places the discourse of the knowledge society at the heart of the calls for political modernisation.

The chapter concludes with a fourth axis which treats the chief problematics of the knowledge society, whether in its universal dimensions or in aspects specifically linked to the knowledge transformations underway in Arab society. This section develops a dialectic that alludes both to aspects of these problematics and at the same time to their potential horizons, in the context of the developments taking place in the knowledge society.

The oil boom has not boosted economic freedoms in the Arab region

ARAB KNOWLEDGE PERFORMANCE ENVIRONMENTS: EXPANDING FREEDOMS AND BUILDING INSTITUTIONS (CHAPTER 2)

While Chapter 1 is concerned with the general theoretical framework of the knowledge society, this chapter deals with the conditions needed to enable the development of knowledge in the Arab world. Thus the two chapters are complementary in more ways than one. Chapter 2, using a set of lines of inquiry or axes, and using examples from the political and economic, as well as the social, cultural, and media environments, highlights the pressures and restrictions that prevent the formation of a nurturing and holistic environment for the requirements of the knowledge society.

In the course of its speculation about the political environment framing knowledge, the chapter displays concern over the reversal of freedoms in the Arab region. Likewise, in its analysis of the economic environment, it touches upon the continuing absence of freedoms in the economic sphere, making clear that the oil boom has not boosted economic freedoms. The chapter also alludes to the situation regarding intellectual property rights, clarifying Arab progress and weakness in this field. In the area of culture, Chapter 2 deals with restrictions on knowledge and the rise of extremist religious tendencies. On the social level, it points out that continued poverty and social marginalisation exacerbate the shortcomings in the enabling environment, the supposed catalyst for knowledge. Using all these elements, the chapter works to shed light on many of the restraints and restrictions that lay siege to the hope for a renaissance in the Arab knowledge situation. In doing so, the chapter views freedom as an engine of knowledge whose absence leads to a deepening of the knowledge gaps.

On another axis, the chapter discusses the institutions, legislations, and various mechanisms for review, oversight, and accountability that ensure the guidance and support required to establish the knowledge society. On a final axis, the chapter then deals with the different trajectories of Arab enabling environments and makes it clear that the only way to enter the knowledge society and qualify Arab society to produce and create knowledge is by laying the foundations for these environments.

EDUCATION AND THE FORMATION OF KNOWLEDGE CAPITAL (CHAPTER 3)

Consideration of the relationship of education to the knowledge society raises many issues, given the link between education and upbringing on the one side and knowledge acquisition (followed by knowledge production and knowledge creation) on the other. The topic allows us to speculate about the role of education in the generalisation of knowledge. It also provides an opportunity to deal with educational tools and the function of education with regard to cognitive and social development and allows us to deal with broader relationship between education and knowledge capital and among that capital, the market, and the deployment of education in the service of liberation and development. Additionally, education occupies a special position in the lives of individuals and communities due to the length of time those individuals spend in educational institutions, to the ongoing regeneration and accumulation occurring in the various fields of knowledge and to the role played by education in preparing individuals to join the labor market equipped with productive and innovative skills.

In the knowledge society, the importance of education has grown thanks to the amazing technologies that have come to be deployed in that field. We have come to talk about distance learning, collective laboratories, educational technologies that create virtual spaces, and technologies that give lessons, examinations, and qualifications online. These may not, however, reflect very closely the reality of education in the Arab region, where, in many of these countries, universal education is yet to be achieved and where illiteracy rates for adults, children, and young people remain a challenge. The requirements of the knowledge society in terms of quality of education, the use of up-to-date technology in teaching, and the creation of networks for the new education are part of Arab reality in only some countries, where they exist in the shape of pioneering experiments that are difficult to generalise, at least for the moment. When we add to all the preceding the content of education, the training of manpower, the reality of the universities and their graduates, and the state of scientific research, we find ourselves faced with a range of complex topics that cannot easily be confronted all together.

Continued poverty and social marginalisation exacerbate the shortcomings in the enabling environment of the desired knowledge society

In several Arab countries illiteracy rates for adults, children, and young people remain a challenge

Arabic is technologically poor in comparison with the languages dominating the ICT field

Aware of the thorniness of the subject, the chapter pays attention to the pivotal issue of Arab knowledge capital as it is built up in and by schools and universities. In order to define the nature of this capital, the first part of the chapter reviews the general landscape of knowledge acquired through education in the Arab region. In its second part, which forms the main body of the chapter, it turns, through the study of a set of quantitative and qualitative indicators, to how knowledge capital is developed. These indicators are based on a three-part division into children, young people, and adults. Starting with the available data, the chapter presents a map which elucidates the nature, deficits, and paradoxes of knowledge capital and clarifies the areas of distinction, difference, and similarity between the Arab countries at the different stages of education. The third part of the chapter, while revealing the limitations of this capital and highlighting some gaps and barriers that still prevent it from attaining the knowledge society, deals with the kind of knowledge capital appropriate for entry into the knowledge society.

INFORMATION AND COMMUNICATIONS TECHNOLOGIES IN THE ARAB COUNTRIES: THE PILLARS AND TOOLS OF KNOWLEDGE (CHAPTER 4)

The Report intends to measure the degree to which the Arabs have entered the knowledge society taking as a starting point their levels of ICT access and acquisition

While Chapters 1 and 2 direct attention to the theoretical frameworks and preparatory and supportive environments for the knowledge society and Chapter 3 examines the subject of education (one of the most important of the latter's pillars), Chapter 4 is concerned with the technology pillar, which today occupies such a significant position in terms of knowledge development and information acquisition. The chapter intends to measure the degree to which the Arabs have entered the knowledge society, taking as a starting point their levels of ICT access and acquisition.

The chapter highlights the triumphs of ICT in assembling knowledge networks that have eliminated obstacles of time and place (for example, through internet services) and have become essential tools for the increased use and expansion of the various spheres of knowledge and their deployment. These technologies have become the convenient and easy way to obtain knowledge and have been widely applied in life's various realms, including the economy, management and education, thus demonstrating how far they have penetrated society.

The chapter thus deals with the presence of ICT in the Arab countries, by attempting to showcase current applications and their limits. It reviews examples from the fields of education, business, healthcare, and social development, clarifying the existing gaps in these applications, and highlighting gains achieved.

On another axis, the chapter devotes attention to the challenges confronting Arabic digital content by contemplating its comparative weakness in the global context. The chapter concerns itself with how the Arabic language can be developed in order to make it capable of acting as a vehicle and medium to produce knowledge that conforms to the requirements of Arab reality. On this point in particular, mention is made of the technological poverty of Arabic in comparison with the languages dominating the ICT field. Attention is also drawn to the importance of developing the tools of the language to render it capable of constructing digital content, which will expand Arab gains in this field. In conclusion, the chapter formulates initiatives to overcome some of the obstacles which, in the Arab environment, prevent widespread access to, and use and development of, ICT.

ARAB RESEARCH AND INNOVATION PERFORMANCE (CHAPTER 5)

In Chapter 5, the Report investigates the topic of innovation in Arab knowledge, starting with an attempt to broaden the indicators used in some international

reports, which equate this concept in general with technical scientific innovation. In these reports, levels of innovation are measured in terms of numbers of discoveries in the applied sciences and technology and quantity of patents applied for. Other areas of knowledge such as the humanities, the social sciences, and artistic creativity, are overlooked, despite their important role as a space for innovation and creative synthesis.

On its first axis, this chapter highlights science and technology policies in the Arab world through observations on the diffusion and production of scientific knowledge and consideration of the data on Arab research centres. The issue of scientific research funding in the Arab region is also addressed. The second axis of the chapter moves on to Arab policies towards the humanities, the social sciences, and artistic creativity, going here beyond current indicators to include research discoveries in the humanities and social sciences, as well as the role of the arts in synthesising innovations linked to imagination and affect. The plastic arts, and creative works in literature, the theatre, and cinema have in turn the capacity to produce creativity which enriches the emotions and fecundates the memory. This shifts the concept of innovation and scientific research from a quantitative and mathematical mindset to one characterised by imagination, affect, and values, which, while difficult to quantify are, equally and undeniably, loci of innovation.

The third axis of this chapter observes the manifestations of the creativity gap within the present Arab knowledge situation. It approaches this gap by examining the social and economic returns of innovation and the Arab brain drain, while also dealing forthrightly with the importance of intermediate migration within the Arab countries, which expands and contracts in the absence of any clear policy aimed at integration. The chapter demonstrates how the importance of Arab cooperation increases when acknowledgment is made of the differing levels of knowledge performance in the Arab countries. Any cooperative policy would have the power to deploy resources in diverse and complementary fashion among the Arab countries and thus strengthen the possibility of creating a common Arab enabling environment. However difficult this may look today in view of the absence of coordination and cooperation, the existence of a political will capable of developing an Arabic perspective on knowledge and creativity, once in place, will make it possible.

Imagination, affect, and values, are, loci of innovation

BUILDING THE KNOWLEDGE SOCIETY IN THE ARAB NATION: A VISION AND A PLAN (CHAPTER 6)

The previous chapters of the Report have aimed to describe, observe, and investigate the state of Arab knowledge and the nature of Arab knowledge performance. They have carried out this task using a two-pronged approach. The first prong outlines the current features of Arab knowledge based on available data and records major critical remarks related to the absence of an Arab monitoring body to monitor evolution in the state of Arab knowledge. The second prong introduces speculation on how to develop Arab knowledge performance with regard to the topics of the different chapters.

In its conclusion, the Report formulates a vision and action plan to respond to the knowledge gaps that have been identified. This plan creates a form of proposal that, if adopted, at least in spirit, will lead to the closing of some aspects of the knowledge gap and to the exploitation by Arab society of the knowledge gains needed to support its efforts for renaissance and development.

This chapter does not fall into the trap of sketching 'what must be done' and of resorting to fanciful exhortations that underplay the distance between the knowledge society in the advanced nations and the realities of knowledge

The Report formulates a vision and action plan to respond to the knowledge gaps that have been identified

Intercommunication with the self means accurate diagnosis of its shortcomings with regard to knowledge and of its flaws with regard to knowledge environments

Momentum towards entry into the knowledge society must begin with action in the area of the enabling environment

marginalisation in the Arab region. It prefers to sketch the major landmarks that must be passed and difficulties that must be transcended if obscurantism and knowledge poverty are to be overcome. This sketch takes the form of a specific proposal that clearly acknowledges the differences existing between the Arab countries in the field of knowledge and is conscious, at the same time, of the enormous gaps that exist and the difficulty of confronting them. Hence the plan promotes a step by step approach to the closure of knowledge gaps and works to prioritise short, medium, and long-term plans for action to enable the Arabs to communicate with the self and with the world on the basis of the gains that modern knowledge provides.

Intercommunication with the self means accurate diagnosis of its shortcomings with regard to knowledge and of its flaws with regard to knowledge environments, followed by courageous, ambitious intercommunication with the world, undertaken in the faith that partnership in knowledge production requires dialogue. Equally, the building of alliances requires the building of rational relationships that do not view the self from a fixed angle, but see it as the product of complex historical processes. This will give the Arabs the possibility of realising their plans to expand the spheres of knowledge and achieve the hoped-for Arab renaissance.

The concluding chapter takes the position that the proposed vision must conform to Arab ambitions and desires to overcome the gaps in knowledge from which they suffer. In this context, the chapter is concerned with articulating a plan, which rests on three foundations. The first is related to the necessary bases for the knowledge society, these bases are defined in terms of three principles: expansion of the scope of freedoms; harmonisation and correspondence with the needs of human development; and openness and intercommunication. The second foundation puts forward the axes of the vision, which are defined as the establishment of the enabling environment, the indigenisation of knowledge, and its deployment in the service of development and renaissance in the Arab nation. The third pillar of the plan sketches priorities for action. Here tasks are prioritised in terms of urgency according to the data on knowledge gaps in the Arab countries.

The chapter explains that momentum towards entry into the knowledge society must begin with action in the area of the enabling environment as a preliminary step towards transfer and indigenisation. Thereafter the chapter turns towards momentum in the deployment of knowledge in such a way as to ensure its engagement with knowledge creation and production. The chapter does not neglect to mention that this plan leaves the field open to any combinations of interaction, interconnection, and gradualism that may be required, bearing in mind that momentum, confrontation, and multiplicity of points of entry will always encourage entry into membership of the knowledge society.

This chapter also includes suggestions related to the pressing need for an Arab knowledge observatory. The latter could be included as a component on more than one of the axes of this proposed plan, to strengthen and provide launching power for it.

The Arab Knowledge Report 2009 initiates a series of reports that are to follow in the years to come with the aim of building a data base of information on and prescriptions and proposals for the improvement of Arab knowledge performance. It is assumed that the data and results included in this Report will support the possibility of approaches from other angles to the subjects of knowledge, freedom, and development. These are the axes linked to the epistemological change needed in society in order to open and broaden the road to the anticipated Arab renaissance.

THE ARAB NATION AND THE WORLD IN 2009

The second section of this preamble provides a set of data to place the Arab Knowledge Report 2009 in context. The state of knowledge and the developments within it cannot be approached without a general contextualisation that explains the evolution of the existing knowledge deficits and without careful observation of their interwoven relationships, whether these be with the changes underway in the world, with internal conflicts, or with the transformations occurring in the area of human development in the Arab region at the beginning of the twenty-first century. In this brief preamble, we shall follow the following axes of inquiry: the state of human development in the Arab region in 2009; the changes and pressures on the Arab knowledge scene; and the most important developments in the state of knowledge over the past decade. The data used and the events referred to extend to the end of March 2009.

THE STATE OF HUMAN DEVELOPMENT IN THE ARAB REGION

Knowledge is considered a central axis of human development, and its importance has multiplied thanks to the many transformations in its numerous forms.The same is true of the technology revolutions of recent decades. Knowledge today, by virtue of its role in the development process, constitutes an instrument of empowerment. Consideration of human development in the Arab region and its relationship to knowledge thus sheds light on some of the most important developmental issues and indicators linked to the establishment of the knowledge society.

CONCEPTS AND INDICATORS OF ARAB HUMAN DEVELOPMENT[2]

The Report views development as the means by which an individual expands his or her choices with regard to the life of dignity he or she wants (Sen, 1999). Development is equivalent to the expansion of choices, freedoms, and individual possibilities in various aspects of life. This vision starts from the view that the prosperity of an individual is not to be measured only by the goods and services he or she acquires, but depends in the first degree on the individual's capacity to choose the life he wants and can be proud of. Thus capacity is the freedom that enables the individual to transcend and overcome obstacles and attain various degrees of human welfare.

In this brief contextualisation we rely on the global measures that are best known and most pertinent to knowledge, as represented by the UNDP's Human Development Index and the Human Poverty Index. These two indexes consist of indicators such as the capacity to enjoy a long and healthy life and live at a reasonable economic level, as well as the capacity to acquire knowledge and to read and write, a capacity that forms one of the most important pillars of the knowledge society.

Knowledge is considered a central axis of human development, and its importance has multiplied thanks to the many transformations in its numerous forms

THE MOST IMPORTANT EVOLUTIONS IN ARAB HUMAN DEVELOPMENT

The latest data and indicators on human development in the Arab world show that the Arab states have made some slight progress in human development since

Table 1

Human development indicators for the Arab countries (2001 versus 2006)

Year	Life expectancy at birth (years)	GDP Per capita (PPP US $)	Life Expectancy index	Education index	GDP index	Human Development index
2001	66.0	5038	0.70	0.63	0.65	0.662
2006	67.8	7760	0.71	0.70	0.73	0.713

Source: UNDP website, www.hdr.undp.org on 13 April 2009

Table 2

Population and GDP per capita in Arab countries (2008, projections)

Country Group	Total Population (million)	Population Share (%)	GDP (PPP US$ billion)	GDP Share (%)	Per capita GDP (PPP US$)
Group 1: Oil economies	40.2	13.2	1117	45.9	27786
Group 2: Mixed oil economies	39.9	13.1	332	13.6	8313
Group 3: Diversified economies	156.4	51.5	833	34.2	5328
Group 4: Primary export economies	67.1	22.1	153	6.3	2277
Total	303.6	100	2435	100	8020

Group 1: Oil economies: the Gulf Cooperation Council states (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE).
Group 2: Mixed oil economies: Algeria and Libya.
Group 3: Diversified economies: Egypt, Jordan, Lebanon, Morocco, Syria, and Tunisia.
Group 4: Primary export economies: Comoros, Djibouti, Mauritania, Sudan, and Yemen.

Source: League of Arab States and UNDP, 2008, from the IMF and the CIA World Factbook

the beginning of the current decade, and that at the beginning of 2006 not a single Arab state fell into the category of low human development (see Table 1). For the most part, progress was basic, with, perhaps, the exception of advance in per capita GDP, which has risen from $5,038 in 2001 to $7,760 in 2006, and to more than $8,000 in 2008. However on the level of the Arab region, the significance of this improvement is reduced because of the great variation between the Arab states and the clear concentration of the increases in per capita GDP in the oil-exporting countries as opposed to others of the region (see Table 2). This variation also holds true for the overall Human Development Index, which shows that only seven Arab states (the Gulf Cooperation Council member states and Libya), making up 15 per cent of the population of the Arab region, fall within the high human development band (HDI of 0.8 or above).

Poverty in the Arab region is increasing despite all the efforts aimed at reducing it

While the Arab Gulf states have achieved the highest rates in terms of achievement of the Millennium Development Goals, particularly in the fields of health and universal education, some other Arab states are expected to fail to reach these goals by 2015, the year set by the Millennium Declaration. The list of Arab states unlikely to reach the Millennium Development Goals covers those that still fall within the category of least developed states (Comoros, Djibouti, Mauritania, Sudan, and Yemen), as well as states suffering from conflict, internal disputes, and occupation, such as Iraq, Palestine, and Somalia.

One of the most important negative phenomena to characterise development performance in many countries of the region is the dutiful compliance with the so-called economic and social reform programmes, which for the most part originate abroad. It is clear to an observer that most Arab societies, in the structure of authority and the state, depend on a paternalist social contract which holds the state responsible for the welfare of society and the provision of services in exchange for the political allegiance that imparts legitimacy to the state.

Economic and social, as well as demographic, changes on the Arab scene have, however, placed such systems and social contracts under intense pressures that may threaten their survival. Population growth, changes in ways of life within society, weak and falling incomes, and growing awareness among citizens are perhaps among the most significant of these changes. To deal with these pressures, at least on the economic level, many Arab states have engaged in economic and social structural reform programmes with clear encouragement from international institutions and the Western world. There is near consensus, however, that most of these corrective programmes, largely launched in the 1980s, have not produced the desired results and have exacerbated economic and social problems. Poverty in the Arab region is increasing despite all the efforts aimed at reducing it. In 2005,

Table 3

Incidence of extreme poverty in a sample of Arab countries[3]

Country Group	Survey Year	Poverty Incidence (%)	Number of Poor (million)	Survey Year	Poverty Incidence (%)	Number of Poor (million)
Diversified economy (six states)	1991-1999	14.7	18.4	2000-2005	16.8	22.8
Mixed oil economy (one state)	1995	14.1	4.1	2000	12.1	3.8
Primary export economy (two states)	1996-1998	41.3	8.0	2000-2006	36.2	8.1
Overall Average		**17.9**	**30.5**		**18.4**	**34.7**

Source: League of Arab States and UNDP, 2008

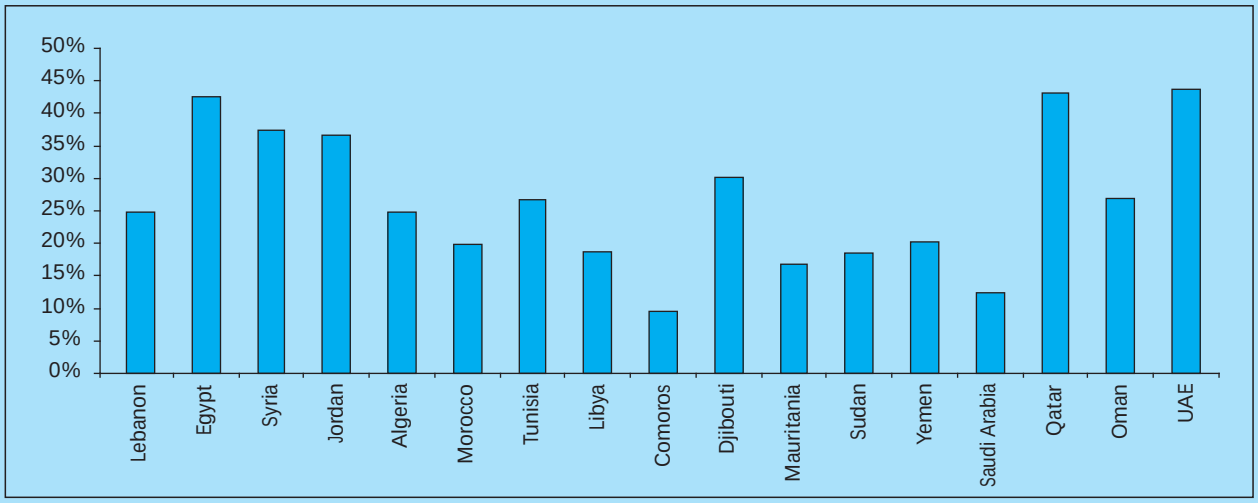
the proportion of people living below the lowest national income poverty line in the Arab region reached approximately 18.4 per cent. Wealth is also badly distributed, for rural areas suffer much more poverty than urban ones. In rural Egypt and Morocco, one in four people is poor, compared with one in ten in urban areas. Similarly, families supported by women are much more affected by poverty than those supported by men. Table 3, which is based on the results of field research in nine Arab countries, shows that there was a slight increase in the poor as a proportion of the population in the first decade of the millennium in comparison with the 1990s (18.4 and 17.9 per cent respectively).

Regarding the Human Poverty Index, we find an improvement in the Arab states from the end of the 1990s until 2007. Egypt, Syria, Tunisia, Jordan, Oman, Djibouti, Qatar, and the UAE have reduced their scores on the Human Poverty Index by at least 25 per cent over the first decade of

In rural Egypt and Morocco, one in four people is poor, compared with one in ten in urban areas, and families supported by women are much more affected by poverty than those supported by men

Figure 1

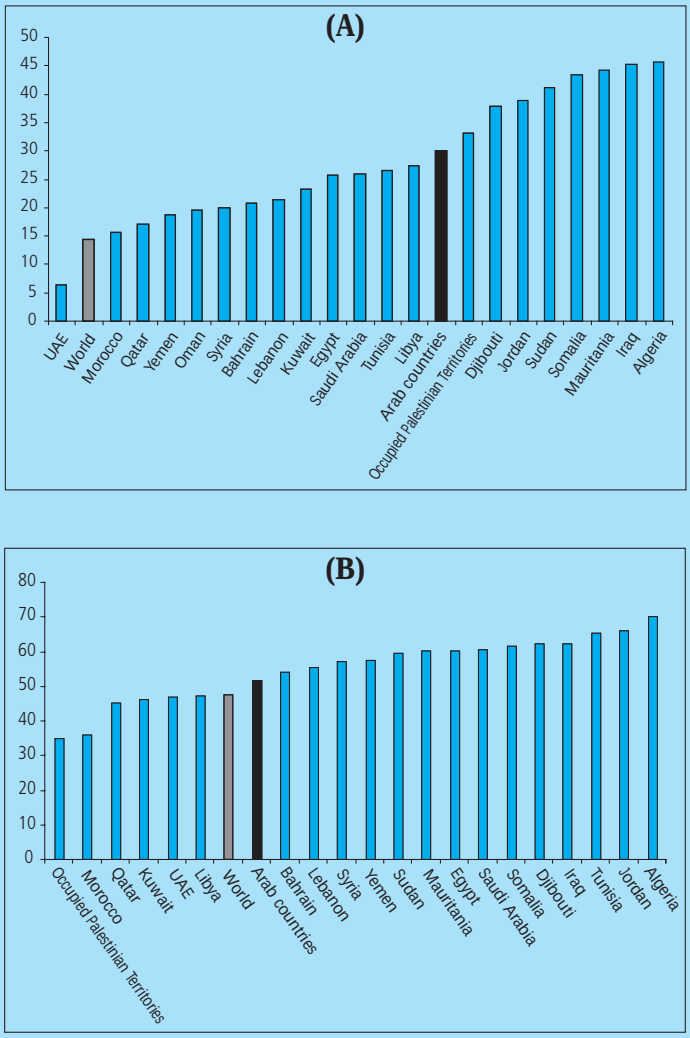
Decline in human poverty rates by country (per cent): 1996-2007



Source: League of Arab States and UNDP, 2008

Figure 2

Unemployment rate among Arab youth (A) and their share in total unemployment (B) (per cent) in 2005/2006



Source: League of Arab States and UNDP, 2008

The Arab poor are more affected than others by changes in world food prices

the millennium (Figure 1). However, when we compare the performance of these countries with that of other countries of the world with similar rankings on the Human Development Index, we find that it could have been better.

The Arab countries also constitute one of the regions of the world most dependent on imports for the food security of their inhabitants. International reports show that most Arab states fall in the band of states with very low sovereignty in terms of food supply, with an Arab Food Sovereignty index of 1.6.[4] Some see the aridity of large swathes of Arab territory as the determining factor in this area. However, much evidence points to poor management of available resources, including environmental resources. The data point to significant facts, perhaps the most important of which is that food imports formed 15 per cent of total imports to the region in 2006. Worse, while Arab countries are mostly self-sufficient in terms of producing foodstuffs for the wealthy, such as meat, fish, and vegetables, foodstuffs for the poor classes, such as grains, oils, and sugar, are largely imported. Thus, the Arab poor are more affected than others by changes in world food prices.

From the 1980s until now, unemployment rates have remained at high levels, or even increased in many Arab states. In the 1980s, for countries like Algeria, Egypt, Jordan, Morocco, Tunisia, and Syria (which comprise about 57 per cent of the Arab labor force), the weighted average unemployment rate was 10.6 per cent. The highest rate at that time was in Algeria (16.5 per cent), and the lowest in Syria (4.8 per cent). In the 1990s, however, the weighted average unemployment rate was 14.5 per cent, with the highest level in Algeria (25.3 per cent) and the lowest in Syria (8.1 per cent). Preliminary evidence for the 2000 decade indicates that the weighted average unemployment rate in these states has risen to 15.5 per cent (League of Arab States and UNDP, 2008).

Studies indicate that Arab women suffer more than men in relation to unemployment (International Labor Organisation, 2009).

The youth unemployment rate remains very high: in 2005 it varied from 46 per cent in Algeria to 6.3 per cent in the United Arab Emirates (see Figure 2). The Arab states still face a major challenge in the creation of job opportunities for youth. Table 4 refers to forecasts made in a recent 2008 study carried out by the UNDP in cooperation with the League of Arab States which clearly show the tangible need to find work opportunities for the ever growing

Table 4

The employment challenge: projected numbers of new jobs required.

Country group	Labor force in 2005 (millions)	Unemployment rate 2005 (%)	Number of jobs 2005 (millions)	Number of new jobs by 2010 (millions)	Number of new jobs by 2015 (millions)	Number of new jobs by 2020 (millions)
Mixed economy (six states)	48.3	11.82	42.59	6.55	14.16	21.78
Mixed oil economy (two states)	15.5	15.61	13.08	2.26	4.92	7.56
Oil economy (six states)	13.7	4.53	13.08	3.37	7.73	12.08
Primary export economy (four states)	22.8	18.68	18.54	2.85	6.17	9.49
Total (eighteen Arab states)	100.3	12.97	87.29	15.03	32.98	50.91

Source: League of Arab States and UNDP, 2008

numbers of Arab youth who each day join the ranks of the unemployed. It is obvious that the picture has become gloomier in view of the current world financial crisis and its repercussions for the region.

GOVERNANCE AND THE WEAKNESS OF INSTITUTIONAL PERFORMANCE[5]

The Arab states have remained weak and hidebound over the last two decades, without any notable change in terms of institutional performance. Available indicators make clear that the Arab states' weak performance in 1996 in terms of governance[6] indicators did not change greatly in the ten years to 2006 (League of Arab States and UNDP, 2008). The effect of this weak performance on many aspects of development and the components of the knowledge society, in particular freedoms, is no secret.

One of the most recent reports has concluded that the major challenges facing the region can be summarised as institutional reform, good governance, the provision of job opportunities–particularly for youth–, the ring-fencing of funds for development that serves the poor, reform of the education system, and diversification of the economic systems so as not to be dependent on one commodity (in particular oil based economies), in addition to the provision of food security (League of Arab States and UNDP, 2008).

The employment picture has become gloomier in view of the current world financial crisis

VARIABLES EXERTING PRESSURE ON THE ARAB KNOWLEDGE SCENE

WAR, OCCUPATION, INTERNAL CONFLICT, AND THE DISRUPTION OF KNOWLEDGE

Occupation, wars, and internal conflicts have an overwhelmingly disruptive influence on the knowledge society. Not only do they affect its mainstays, in the form of education, technology, and innovation, they also, through the economic destruction, disruption to development, suppression of freedoms, and restrictions on movement, strike at the heart of the enabling environments needed for the establishment of the knowledge society. Furthermore, the lack of security means that people are unable to obtain their basic needs, to say nothing of realising their hopes of setting in place

Occupation, wars, and internal conflicts have an overwhelmingly disruptive influence on the knowledge society

the pillars of the society to which they aspire.

With regard to Iraq, it cannot be claimed that education prior to the US intervention in 2003 was devoid of the problems known to other Arab countries. However, many studies and indicators confirm that the standard of education has declined after 2003, and that educational problems have been exacerbated and have accumulated as a result of the conflicts that broke out.

In the period 2003-2007, more than 830 Iraqi academics were killed, most of them doctors, engineers, and physicists

For example, a report of the UN Office for the Coordination of Humanitarian Affairs (OCHA) stated that net enrolment rates in basic education had reached 46 per cent in the 2006-7 school year compared to 86 per cent in the previous year, and that only 28 per cent of graduation-age students had been able to attend their end of year final exams, which only 40 per cent of them passed (UN OCHA, 2008).

A UNESCO report published in April 2007 and entitled Education under Attack, disclosed that political and military violence that targets educational systems is causing growing numbers of children to be deprived of the right to education. The report depicted Iraq's educational system as "the education system most impacted by the severity of attacks, whose scope and numbers of casualties have reached a level so extreme as to threaten the collapse of the school and university systems" (UNESCO, 2007b, in Arabic). The report made clear that over a period of not more than ten months between February and November 2006, 280 Iraqi teachers were killed, and that only 30 per cent of Iraq's 3.5 million pupils attended classes in 2007, compared to 75 per cent in the previous school year. The UNESCO report mentioned that enrolment at Baghdad universities declined by 40 per cent while more than 3,000 academics fled the country. A report presented in June 2007 to the British Cross-party Commission on Iraq[7] stated that in the period 2003-2007, more than 830 Iraqi academics were killed, most of them doctors, engineers, and physicists; more than 70 per cent of the victims were university professors, PhD holders, or the equivalent.

Some sources point to a recent improvement in the state of education and knowledge on the heels of a relative improvement in the political and security situation. This gives hope for better opportunities to deal in the most effective way with the existing and cumulative knowledge challenges if the building of knowledge society is to be renewed in Iraq and if Iraqi energies are to be released anew in support of development and a better future.

Palestinians continue to suffer the negative effects of the occupation on all the operative axes of the knowledge society

Palestinians continue to suffer the negative effects of the occupation on all the operative axes of the knowledge society. The Israeli occupation and repeated incursions into the Palestinian territories have had enormous effects on the educational process, considered the corner stone of any knowledge society. Many pupils, teachers, and support staff have been killed, over and above the continual danger of detention and abuse at the occupation's barriers and checkpoints. During 2008, and without taking account of the losses suffered during the attack on Gaza that began at the end of the year, statistics from the Palestinian Ministry of Education show that forty Palestinian students were killed and eighty others received a range of wounds. Also, 260 students, teachers, and support staff were detained. To this should be added the Israeli incursions that led to the ongoing closure of 100 schools and the loss of 150 school days (Palestinian Ministry of Education and Higher Education, 2009a, in Arabic). UNICEF reported that "nearly half of all students have seen their school besieged by troops, and more than 10 per cent have witnessed the killing of a teacher in school" (UNICEF, 2009).

Nor have the universities been spared attack and the infliction of varied damage. Israeli forces raided the University of Bethlehem and Al-Najah University in Nablus in 2002, and Hebron University in 2003, besieging them and causing lessons to be suspended. The Al-Quds Open University in Ramallah, the Palestine

Technical College in Tulkarem, and Birzeit University have also been raided. Attacks on universities culminated in the destruction of the College of Education of Al-Aqsa University in 2004 and of the buildings of the Islamic University in Gaza in January 2009, during the most recent invasion of the Gaza Strip (Palestinian Ministry of Education and Higher Education, 2009b, in Arabic).

All these practices, as well as further constraints such as the Separation Wall, have been detrimental to the Palestinians with regard to all the mainstays of knowledge—education, importation of technology, and internal and external communication—not to mention that they have been deprived of the freedom of movement and security that constitute the enabling environments needed for the establishment of the knowledge society.

Towards the end of the writing of this report (at the end of 2008 and the beginning of 2009), Israel launched a major assault on Gaza during which populated areas, schools, and UN buildings were shelled. Israeli military operations destroyed Gaza's infrastructure, both educational and that related to the other pillars of knowledge, and left behind them what Amnesty International called a "humanitarian catastrophe" (Amnesty International, 2009, in Arabic). In addition, the human population suffered appalling losses, with 1,326 Palestinians, most of them civilians and 41 per cent of them children and women (430 children and 110 women), killed. A further 5,450 Palestinians were injured. During the same period and as a result of military operations, fourteen Israelis were killed and a further 182 were wounded. Among them, civilians accounted for three deaths and eighteen wounded (UN OCHA, 2009a and 2009b).

Despite this, the Occupied Palestinian Territories hold an advanced position among the Arab countries with regard to a number of indicators related to knowledge in general and education in particular. At the start of 2006, the adult literacy rate indicator reached 92.4 per cent while total primary, secondary, and tertiary education enrolment reached 82.4 per cent (UNDP, 2007c, in Arabic). Palestinian professionals of recognised competence, such as teachers, engineers, and artists are to be found in many Arab and non-Arab countries.

The effects of war are not restricted only to Iraq and the Occupied Palestinian Territories; Sudan too is suffering the woes of civil war in Darfur. With the end of 2006, the number of those adversely affected by the conflict had reached 4 million, including 2 million internally displaced. This has shaken the stability of Sudan and caused a humanitarian crisis to erupt whose repercussions continue to be felt until now (UN OCHA, 2006). One million, eight hundred thousand children under eighteen years of age are among those adversely affected. Education in the schools has obviously suffered extremely. Many schools have been set on fire and razed to the ground (Amnesty International Morocco, 2006, in Arabic). The war has brought ruin to all aspects of life in Darfur, and as a result has generated a society of refugees and migrants. The people have moved to distant locations as a result of the sharp escalation in fighting in many parts of Darfur, and the number of refugees has reached 120,000[8].

Testimonies confirm that Sudan's plunge into internal conflicts will inevitably lead to the complete breakdown in the already faltering establishment of the knowledge society

Despite the dearth of data, testimonies confirm that Sudan's plunge into internal conflicts will inevitably lead to the complete breakdown in the already faltering establishment of the knowledge society. (In terms of knowledge status, the World Bank puts Sudan in a low category, with a score of 1.68 on the knowledge index in 2005, compared with a world average of 6.79 and an African average of 3.3.)[9]

In Somalia, a great deal of effort needs to be exerted to set up the knowledge society

In Somalia, which has long been plagued by internal conflicts and wars, all the indicators make it clear that a great deal of effort needs to be exerted in order for the country to reach a point at which it will be possible to initiate discussion on setting up the knowledge society. At the beginning of this millennium, Somalia's illiteracy rate stood at 62.2 per cent (2001), with a

higher rate for women (74.2 per cent).[10] According to 2007 statistics, the number of internet users has topped 98,000 out of a total population of 9 million, putting Somalia in 127th place out of 155 states.[11]

Given that Somalia has long suffered from the absence of government or a single administrative body, and given its particular makeup and continuous conflicts, the roles of other non-governmental civil society parties have grown, in an attempt to create the mainstays on which the knowledge society depends. For example, education networks, such as the Formal Private Education Network (FPENS), which is one of the largest active education networks with a number of primary and secondary schools in more than half the regions of Somalia, exist (Abdulle, 2008). However, large sections of poor and marginalised groups cannot take advantage of the health and education services provided by these NGOs because these services are generally provided on a cash basis. In one form or another, all these efforts contribute to development. But are they enough to establish a knowledge society, especially in view of the absence of the state for around two decades?

Extremism negates the Other, halts the process of dialogue and prevents mutual understanding

EXTREMISM AND ITS EFFECT ON THE KNOWLEDGE SOCIETY[12]

"Extremism" has become one of the major terms associated with current Arab reality and is in wide circulation, despite the lack of agreement over its meaning.

If there is extremism in religion then, logically, it applies to all religions, and this is what we find in our contemporary world, where the literature teems with reports detailing extremism among Muslims, Christians, and Jews. There are even reports of extremism among Sikhs in India and Buddhists in Myanmar. Besides religious extremism, there is also political extremism, as represented by the extremist wings of the political tendencies.

A distinction should be made between extreme loyalty (Ta'asub) and extremism (Tataruf). Extreme loyalty may remain merely excessive zeal for a particular idea or affiliation. When this goes too far, it falls into the snare of extremism, which in turn leads to obscurantist, inward-looking positions incapable of discrimination. This brings us up against extremism in forms that generate its counterpart of counter-extremism, thus preventing the dialogue and outreach that are the foundations for recognition, mutual understanding, and eventual cooperation and partnership.

What interests us in this context is the extremism that negates the Other, halts the process of dialogue, and prevents mutual understanding. If we are to become familiar with the effects of extremism on knowledge in the Arab countries, we must also become familiar with some of its characteristics and manifestations.

Knowledge can only flourish in an atmosphere of freedom, and the knowledge society can have no foundation as long as extremism remains in play

Knowledge can only flourish in an atmosphere of freedom, and the knowledge society can have no foundation as long as extremism remains in play. Extremism which threatens freedom or bans it–whether through the behaviour of certain groups or the tyranny of regimes that practise extremism through the suppression of freedoms–has a negative effect on the enabling environments of the knowledge society. This is dealt with in detail in Chapter 2 of the Report.

Extremist trends oppose both the acknowledgment of the Other, and dialogue and outreach. For the most part they rely on calls and conceptions which they formulate with a private logic that tolerates no dissent. Some extremist movements have reverted to tradition as a weapon in current political and epistemological battles, indicating that we have not yet rid ourselves of the frozen view of past tradition nor come to a positive reconciliation with our past in all its components. Reference to the relationship in modern Arab thought between the cultural heritage and knowledge impels us to refer to the wide public that has brought certain traditional discourses and symbols back into Arab knowledge and society. While the invocation of some traditional symbols may be positive in encouraging contact with reality and progress, this

reversion, in many cases, is not associated with readings that set tradition in a historical context. The symbolic traditional archive has come to be widely deployed in the battles over our present within and outside our societies and during their confrontations with others, and attempts to employ it in political battles have revived in recent years. On this front in particular, political action requires a new contemporary reading of our historical tradition and ourselves that is responsive to the passage of time.

The cultural heritage, as one component of knowledge, should not be abandoned to become the undisputed arena of unexamined readings. Rather, research projects should be launched in this area that can arrive at an understanding that responds to the questions of our age and our need to respond positively to what is happening in the world. The Islamic tradition, like any other product of humanity in history, has innumerable faces. It is a repository capable of more than one form of creative and innovative use. The continuing presence and domination of a closed literalist understanding of tradition over minds and consciences in our society casts into relief aspects of the images that we create for ourselves and that others, relying on the evidence of the nature of knowledge prevailing among us, will thereafter apply to us.

It can be said that our momentum should start with ourselves–that is, with reform of our historical self-characterisations and correction of our self-perception through action aimed at fuller reconciliation with the values of the world we belong to. This will enable us to join together with all those involved in the making of contemporary history. This does not mean that the others are without responsibility for the situation we find ourselves in and the problems we face; it is well known that our recent past, and our present and future, cannot be understood without taking external factors into consideration. However, we do believe that now, after the battles for independence from those who colonised us, our battles for renaissance and a completion of our liberation depends above all on us. This requires that we work on solutions to the many problematic issues that have their roots in our historical environment: the problematics of innovation and renewal in Islamic jurisprudence, of creativity, and of the establishment of a voluntary political harmony that will, in our hypothesis, facilitate the reform process and the movement of our societies towards the building of the hoped-for Arab future.

The cultural heritage should not be abandoned to become the undisputed arena of unexamined readings

THE STAGNATION OF POLITICAL REFORM AND ITS EFFECT ON THE ENABLING ENVIRONMENT FOR KNOWLEDGE

At the beginning of the third millennium, the language of political reform was once again revived in modern Arab political culture, and a consensus was reached over its necessity. The failure of the majority of the Arab states to find suitable avenues to overcome underdevelopment has contributed to this revival. Similarly, numerous external factors have reinforced the calls for reform that seeks to develop Arab societies and leave their deepening crises stage.

Talk of reform is certainly not new. What distinguishes the new calls for reform is the wholesale nature of their adoption in the majority of Arab states, whether by existing regimes or such organisations of civil society as political parties and civic institutions active on the political and social scene.

This reformist trend is subsumed within a historical context that transcends current Arab circumstances and the accompanying interactions and events on the international level. Here we refer particularly to the events of 11 September 2001, which revealed the presence, especially in areas suffering from occupation, extremism, and marginalisation, of forces using new methods of political action with the aim of inflaming conflict, whether within the

Our momentum should start with a correction of our self-perception with fuller reconciliation with the values of the world we belong to

Arab countries or on the global level.

The reformist tendency in its new form is marked by its reliance on a discourse that calls for gradual and peaceful transition and accepts democracy as the best option for building a new consensus aimed at the generalisation of the language and logic of peaceful reform. However this call, which has crystallised third-generation concepts of political reform, has not been able to maintain its ardour, despite the positive effects it has produced in such Arab states as Morocco, Lebanon, Syria, Jordan, and some Gulf countries.

The reformist tendency calls for gradual and peaceful transition and accepts democracy as the best option

We spoke above of "third-generation reform concepts," a term that affirms the deep roots and continuity of hopes for reform on the Arab political scene. The history of reform in the Arab region has marched in step with the thought of the Arab renaissance, during which the first generation of concepts of reform were formulated. The conceptual fabric of the second generation of reform is linked with the movements for liberation from colonialism. Thus reform has a long history in the Arab world, and the concepts that have crystallised at the beginning of this century complete and fulfil previous steps in the evolution of the reformist orientation in Arab thought. However, we note a halt in the recent revival now that we find ourselves face to face with a stagnation that promises a reversion to old patterns of rule regarding the way in which phenomena within Arab society are dealt with. This stagnation that has affected the waves of reform in various Arab countries in recent years constitutes a kind of regression that impoverishes political life and reduces the options intended to respond to the demand for comprehensive human development.

The stagnation of reform in various Arab countries constitutes a kind of regression that impoverishes political life and reduces the options for comprehensive development

Without going into the details of past and current reform programmes, we would point to the absence of one fundamental element, that represented by the declaration of freedoms, even though the discourse of reform has raised such slogans. We also note the absence of systematic and productive monitoring of the Arab knowledge situation. The data on education and the reform of knowledge environments continue to be expressed in abbreviated form, in the shape of slogans and general demands. If we cast a quick glance at the reform programmes of most states or organisations, we will notice the absence of knowledge in its various manifestations and dimensions as an area of particular interest. This may be explained by the fact that the tyranny of the general political orientation both overwhelms knowledge and dominates society's thinking. However, the failure to specify the contours and horizons of knowledge reform should be considered a failure to recognise the significant pivotal role that knowledge has come to play in human societies.

THE WORLD FINANCIAL CRISIS: OPPORTUNITIES AND CHALLENGES FOR THE ESTABLISHMENT OF THE KNOWLEDGE SOCIETY.[13]

The increasing disassociation of capital flows and financial transactions from the workings of the real economy (real, that is, in terms of production, consumption, commodity export, and true investment) has led to greater "fragility" in the world financial system, a rise in the level of risk on the world's money markets, and growing failure to achieve monetary and financial stability on the global level. This has led to the major financial crisis that escalated at the end of 2008 in Wall Street and has since caused the bankruptcy and collapse of major financial institutions. We believe that this crisis will have repercussions for production and the different knowledge programmes as it has on economic and social development. We also assume there will be ramifications that further slow the process of knowledge indigenisation in the Arab milieu.

The financial crisis that escalated in 2008 will further slow the process of knowledge indigenisation in the Arab milieu

The countries of the Arab region have been affected by the global economic crisis according to their degree of engagement with the currents of financial globalisation.

Thus the Arab region in general, and the oil-producing countries of the Gulf in particular, have been affected by the fall in the price of crude oil.

The most significant negative effects of the global financial crisis on the economies and societies of the Arab region can be summed up as follows:

- A sharp fall in the Arab region's stock exchanges and money markets, which, by the estimate of the international investment house, Global, have suffered losses of around 47 per cent to the end of November 2008.
- A dramatic fallback in crude oil prices, which have tumbled from a record high of $147 per barrel as a result of a fall in demand–mostly from the US–of around 3 million barrels per day.
- Ahmed Goweili, the secretary of the Arab Economic Unity Council, estimates total losses for individuals, organisations, and governments, including sovereign wealth funds, in the Arab region as a result of the global economic crisis to be in the region of $2.5 trillion. The negative effect of these losses will in turn affect the budgets for personal consumption and private and public business sector investment programmes. This will lead to a vicious circle of further economic contraction and stagnation due to feedback loops.
- A fallback in foreign direct investment to the Arab region, and in particular that originating from the US and the Euro zone.

It is expected that the crisis will have its most violent effects on those Arab states that are highly dependent on foreign aid. There are fears that shrinkage of this aid, given the current crisis, will have a negative impact on development programmes and, in consequence, on the building of the knowledge society. It may also take some time for the ramifications of the negative impact of the current financial crisis on the state of knowledge to become apparent. Such crises normally break out first in the financial sector, spreading only after an interval to the real (as defined above) economy, leading in turn to further contraction in the economic variables. This subsequent contraction in the real economy then impacts on the social sectors, resulting in a rise in unemployment levels, a fall in salaries, erosion of savings, and from there, cultural and knowledge impoverishment. These interactions in the social sectors lead to the impoverishment of the middle and lower classes. It is likely that the three sectors will suffer great economic and social hardships during 2009, and that these may extend till the first half of 2010 and perhaps further. This interval provides a good opportunity for those concerned with the conditions of knowledge in the Arab world to make effective plans to manage the crisis and contain its negative repercussions.

Like all crises, just as the current one has negative results and ramifications on the Arab region, so it may also open up new opportunities that can give forward momentum to the course of development, innovation, and the knowledge society. In what follows we will attempt to indicate the most important new prospects open to the Arab economies and societies, so long as good assessment and good planning are maintained over the coming months and years.

There are fears that shrinkage of aid, will have a negative impact on development programmes and knowledge society

The financial crisis may open up new opportunities that can give forward momentum to the course of development, innovation, and the knowledge society

BOX 1

The Effect of the Financial Crisis on Development Funding

The Doha Declaration for Financing of Development issued in December 2008 stated, "We are deeply concerned by the impact of the current financial crisis and global economic slowdown on the ability of developing countries to access the necessary financing for their development objectives. Developing countries and countries with economies in transition risk suffering very serious setbacks to their development objectives, in particular the achievement of the internationally agreed development goals, including the Millennium Development Goals. It is critical to adopt further decisive and prompt actions to contain the current crisis and restore sustained economic growth. Given this global context, we call the attention of all donors to the situation and needs of the poorest and most vulnerable. We also urge all donors to maintain and deliver on their overseas development aid commitments... In this context, it is also important for developing countries to maintain sound macroeconomic policies that support sustained economic growth and poverty eradication."

Source: Doha Declaration on Financing for Development: outcome document of the Follow-up International Conference on Financing for Development to Review the Implementation of the Monterrey Consensus, Doha, Qatar, 29 November – 2 December 2008.

The current crisis may help to restore the status of honest work and sincere effort, and build a new system of incentives to encourage creativity and development

Many key problems still form a major obstacle to the establishment of the knowledge society, the most prominent among them being continuing illiteracy

- Curtailment of the "culture of speculation" and of speculative behaviour in general, especially with regard to stock markets and property.
- The redirection of savings into productive investment channels that have large development and knowledge returns. This should be followed by transition in the Arab economy to a mode of production that encourages creativity and innovation.
- Direction of intra-Arab investments to areas with high development returns rather than those with rapid and purely financial returns such as were characteristic of the 1990s and the beginnings of the twenty-first century, when excessive investment in the financial and property sectors came at the expense of productive and knowledge-based activities with long-term development effects.
- Import substitution as a result of the decline in foreign currency reserves. This will provide impetus to further efforts to improve quality, spread a culture of "excellence" and raise the level of competitiveness of products and services in the Arab market. This again will lead to the concentration of efforts on the local manufacture of knowledge tools, upon whose import from abroad we are presently largely dependent. This will help to solve the special problems of the state of knowledge in the Arab states by developing output to serve our needs and priorities.
- Increased technological and knowledge self-reliance through a gradual move away from very high cost "turn-key" technology contracts and packages. This would include the acquisition of technology and knowledge by processes of creative practice, or what is known in the economic literature as technological and knowledge progress via on-the-job learning.
- Expansion in the development of intra-Arab commerce to compensate for the foreign export markets in Europe and the US to which most Arab exports are directed. This will lead to the opening of other doors for partnership in the future and encourage the transfer of knowledge.

The current crisis may also open up new prospects for a creative adaptation to globalisation through knowledge and technological cooperation with the advanced nations of the South such as India, Brazil, China, South Korea, and Malaysia and by means of other South-South arrangements and partnerships more closely tailored to the levels of economic, social, and knowledge progress in the Arab region. This should give us the opportunity to share in the potential benefits of globalisation through merit, rather than suffering merely the downsides, as has often been the case.

While over the last ten years property and stock market speculation has led to an unprecedented centralisation of income and wealth in the Arab region, it has also led to the "divorce of effort from return," and thus dealt a severe blow to the values of hard work, innovation, and creativity innate in our culture and society. The current crisis may help to restore the status of honest work and sincere effort, and this will help to build a new system of incentives to encourage creativity and development.

Given the current crisis and the pressures on public and private budgets, there must be caution with regard to dipping into allocations for research and development activities and cultural, creative, and artistic projects. The welfare of coming generations is at stake.

OVERVIEW OF THE CURRENT KNOWLEDGE SITUATION IN THE ARAB REGION

The Report will treat of the condition of knowledge and sustain an analysis aimed at revealing its most significant deficits and formulating suggestions to help its revival. Here we present a brief preliminary review of some of the major developments that have occurred in Arab

knowledge over recent years. This will permit us to detail, and closely scrutinise, the various manifestations and foundations of knowledge in the Arab region.

Arab states have, over the last quarter century, witnessed marked progress on the indicator set relating to the proliferation of knowledge among their citizens, starting with the drop in illiteracy rates and ending with the numbers of people holding higher university degrees. When we consider the three key indicators for education used by the World Bank to measure a state's readiness for involvement in the knowledge society–that is, adult[14] literacy rates, enrolment in secondary education, and enrolment in higher education–the progress is demonstrable. In 1980, the average adult literacy rate in the Arab countries had reached approximately 55 per cent for males and 25 per cent for females. In 2005, this average had reached 82 per cent for males and 62 per cent for females.[15] The median of gross enrolment ratio in all programmes of secondary education had reached, in 1980, 57 per cent for males and 38 per cent for females, whereas in 2006 it reached 70 per cent for males and 65 per cent for females.[16] In 1980, gross enrolment in tertiary education exceeded 25 per cent for males and 20 per cent for females in Lebanon only (41 and 21 per cent respectively), while the median reached 8 per cent for males and 4.6 per cent for females. Tertiary education was absent or virtually absent in one-third of Arab countries (with gross enrolment ratio of less than 5 per cent). However by 2005, only three Arab states were left with enrolment rates of less than 5 per cent, while the median had reached 18 per cent for men and 29 per cent for women.[17]

These achievements should not deflect our gaze from the failures that are causing many Arab states to fail to bridge the knowledge gaps. Despite the Arab region having spent 5 per cent of GDP and 20 per cent of government budgets on education over the past forty years (League of Arab States and UNDP, 2008), many of the structural aspects of weakness remain in place. Many key problems still form a major obstacle to the establishment of the knowledge society, perhaps the most prominent among them being continuing illiteracy. Around one third of the adult population is unable to read and write, meaning that there are still some 60 million illiterate people in the Arab countries, two-thirds of them women, and almost 9 million children of elementary-school age outside school, most of them in the countries that have not solved the illiteracy problem.[18] It is impossible to realise the ambition of setting up the knowledge economy and society as long as the regional gross enrolment ratio in upper secondary education remains below 55 per cent for males and females alike, when the industrially advanced states and those of Central Asia have achieved enrolment rates around 84 per cent.[19]

In terms of qualitative performance, students from Arab countries score much lower than world averages in the sciences and mathematics

In addition to this quantitative shortfall in the dissemination of education, the region suffers from numerous qualitative problems. In terms of qualitative performance, studies from 2003 make clear that students from Arab countries score much lower than world averages in grade-8 international tests in the sciences and mathematics. The average scores in mathematics and science in the Arab region were 393 and 419, while the world averages were 467 and 474 respectively (UNDP, 2007a, in Arabic). Similar international studies undertaken in 2007 show that the low performance of pupils from Arab countries in mathematics and the sciences continues; in 2007, the performance of Arab pupils did not exceed 388 in mathematics and 424 in the sciences, while world averages were 445 and 466 (UNDP, 2007d, in Arabic).

The correlation between education and economic growth in the Arab world is weak

Over and above this, it seems that the correlation between education and economic growth in the Arab world is weak. This may be due to a number of reasons, such as lack of conformity of education and training programmes in terms of quality or quantity to pressing developmental needs. The human assets formed by education also have not been

utilised as required to serve society.

On the ICT axis, it is evident that the Arab states have made reasonable progress, in that the region has continued to invest in infrastructure, recording, in 2008, progress in technological performance that exceeded that in all other regions of the world.[20] Four Arab countries came within the top fifty states most ready to utilise ICT and eleven Arab countries witnessed a rise in the value of the ICT index in comparison with 1995. Yet, despite these achievements, the gap between the Arab countries and the rest of the world remains substantial. The performance of the Arab countries also varies from state to state. Such variation between the Arab countries in their utilisation of new technologies and in the use and production of Arabic digital content holds true also for the different social categories within each country, and warns of more fragmentation and extremism should these countries not institute equal access to technology.

On the ICT axis, the Arab states have made reasonable progress

It is to be noted that improvement in Arab country performance according to the ICT index does not correlate with national revenue. Even though some Arab countries that enjoy high revenues occupy advanced positions on the ICT index, these positions remain lower than those occupied by other countries of the world that enjoy comparable national revenues.

Interest in investment in the field of research and innovation as one of the pillars of knowledge has grown in the Arab states since the beginning of the 1980s. Arab academic research centres have steadily and noticeably developed in all specialisations, so that most Arab countries now have research centres and institutions, whereas in the middle of the last century such institutions were limited to Egypt, Iraq, Morocco, and Lebanon. After having been virtually absent from the field of international scientific publication, the Arabs now contribute 1.1 per cent of output in that field (TWAS, 2005). In spite of progress on the research and innovation index, particularly from a quantitative angle, in recent years, Arab innovation performance remains the major weak spot on the current Arab knowledge scene, and the scientific innovation and research gap between the Arab countries and the rest of the advanced regions of the world remains clear, deep, and serious. The Arab region's expenditure on scientific research is one of the world's lowest in terms of Arab GNP. Research and development institutions are weakly integrated with the cycle of production. The development returns of Arab scientific research are very weak and do not correspond to the magnitude of annual Arab expenditure on them, which tops $2 billion and which, in the period 2002-2006, resulted in no more than approximately 38.2 patents per year and 5,000 published scientific papers.[21]

The weakest point in Arab knowledge performance may be the lack of enabling environments appropriate to the establishment of a knowledge society

The weakest point in Arab knowledge performance may be the lack of enabling environments appropriate to the establishment of a knowledge society, particularly in relation to the key index of freedom; as a whole, the Arab states have made no tangible progress with respect to freedom of thought and of expression. Apart from the proliferation of Arab satellite channels and internet blogs, which have provided a safety valve for a noticeable upsurge in activity by the region's youth, the outlook for freedom of thought and of expression remains gloomy. Some Arab governments have imposed restrictions on Arab satellite broadcasting. Additional broadcasting and media legislation and laws have been enacted which have strengthened governments' grip on the media, press, journalists, internet blogs and bloggers, as well as intellectuals. Most media and knowledge-diffusion mechanisms remain state-owned and operate alongside a limited number of large media and entertainment companies transmitting to the Arab countries from the countries of the Gulf or from outside the region.

In contrast, a slight improvement in the development of economic freedoms can be observed in states such as Egypt, Tunisia, and those of the Gulf, where this has led to increased rates of growth.

However, this progress remains limited and does not necessarily reflect a vision focused on establishment of the knowledge society or improvement of knowledge performance. Arab countries are still exporters of primary resources and importers of high value-added products with high knowledge content. There must be a focus on the impossibility of achieving an Arab knowledge and development renaissance through reliance solely on improvement in economic freedom–even if the latter is supported by intellectual property rights– given the continuation of the restrictions imposed on other freedoms, particularly those of thought and of expression. It is not possible to create Arab environments that stimulate knowledge without the existence of an integrated package of freedoms. Similarly, any hope of the equitable social distribution of the results of development will disappear in the absence of a democratic climate that provides popular oversight and fights corruption.

It is not possible to create Arab environments that stimulate knowledge without the existence of an integrated package of freedoms

The Report will deal in detail with these issues in order, seeking to draw a clearer picture of many aspects of knowledge in the Arab region and bring together data that will prepare the way, in the widest possible form, for Arab societies to deal realistically with their challenges and deficits. Once they have done so, these societies will be capable of investing their available capacities in achieiving a breakthrough to the world of knowledge and the establishment of the knowledge society to which they aspire.

End Notes

* Arberry, Arthur J. The Koran Interpreted. Oxford World's Classics. Oxford, Oxford University Press, 1998. p.651.

1 See the section devoted to stagnation in political reform and its effects on enabling environments for knowledge.

2 This paragraph depends on the statistical update of the Human Development Report 2007-2008, which gives the latest data available about the Arab region until 2006. It also depends on the data from the Human Development Report 2003 for comparative purposes (www.hdr.undp.org).

3 Based on the proportion of the population under the lower national poverty line.

4 The Arab Food Sovereignty Index has been calculated for fifteen Arab countries. It is divided into the following bands:

4.5>6.0: High food sovereignty;

2.5>5: Food sovereignty;

1.0>2.5: Low food sovereignty.

0>1.0: Extremely low food sovereignty.

5 Chapter 2 discusses this matter in more detail in terms of its impact on the knowledge society.

6 The governance indicators are based upon six dimensions: Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law and Control over Corruption.

7 An independent multi-party commission formed to issue recommendations around the future of British forces in Iraq.

Source: Jalili, Ismail. "Iraq's Lost Generation" from the website http://www.brusselstribunal.org/pdf/alJalili170607.pdf

8 From a speech by the president of the International Committee of the Red Cross upon his return from Darfur in February 2007 (http://www.icrc.org/web/ara/siteara0.nsf/htmlall/sudan-news-210207?opendocument).

9 The Knowledge Index measures the capacity of a country to produce, indigenise, and diffuse knowledge. It is the average of a country›s score on the indicators of the three key pillars of knowledge economy (education, innovation, and ICT). See the World Bank website (KAM), http://info.worldbank.org/etools/kam2/KAM_page5.asp.

10 CIA website, https://www.cia.gov/library/publications/the-world-factbook/geos/so.html, on 13 March 2009.

11 http://www.nationmaster.com/time.php?stat=int_use-internet-users&country=so- and http://www.worldpress.org/profiles2/Somalia.cfm on 13 March 2009

12 This paragraph relies on the background papers prepared by Fahmi Huwaydi ("Extremism and its Effect on the Knowledge Society") and Hani Fahs ("Fanaticism as an Obstacle to Knowledge" and "The Arab Knowledge Renaissance between the Need for Agreement and a Landscape of Division").

13 This section is based on a background paper to this report prepared during the first quarter of 2009 by Mahmud 'Abd al-Fadil, "The Ramifications of the World Financial Crisis for Arab Economies and Societies: Losses and Opportunities."

14 Adult, here, means a person over fifteen years old.

15 See Statistical Annex, Table 9.

16 See Statistical Annex, Table 10.

17 See Statistical Annex, Table 11.

18 See Statistical Annex, Table 13.

19 See Statistical Annex, Table 15.

20 This is according to the majority of available indicators, including the report of the World Bank on the Knowledge Assessment Methodology published in 2008. See Chapter 4.

21 World Bank website, Knowledge Assessment Methodology (KAM) 2008, http://www.worldbank.org/wbi/kam on 25 December 2008.

CHAPTER ONE
THE THEORETICAL FRAMEWORK: CONCEPTS AND PROBLEMATICS OF THE KNOWLEDGE SOCIETY

CHAPTER ONE

THE THEORETICAL FRAMEWORK: CONCEPTS AND PROBLEMATICS OF THE KNOWLEDGE SOCIETY

Introduction

This chapter presents a general theoretical framework for the knowledge society, based on four major axes linked by the concerns and issues invoked by the project to create a "knowledge society" as an integral part of a comprehensive programme of Arab renaissance. The first of these axes presents the premises and principles guiding the knowledge society. The second deals with the conceptual structure of the discourses that have attempted to shed light on the changes in modern societies since the information revolution. Here we have constructed an operational definition of the knowledge society in the Arab world, based on the ideas put forward in the Report's various chapters. The third axis constructs the systems of reference that have guided, and continue to guide, knowledge discourse in the contemporary world and allows us to become acquainted with the dimensions and options underlying earlier reports on the same topic. The fourth axis examines some of the problematic issues posed today by information and knowledge development in contemporary society, believing that reflection on these issues will influence efforts to close knowledge gaps in the Arab world and achieve comprehensive human development.

While subsequent chapters of the Report examine the quantitative and qualitative dimensions of the most significant foundations of knowledge, this chapter deals with the theoretical structure of Arab knowledge performance and constructs the intellectual frame of reference that underlies it. It seeks to provide insights that will help us acquire keys to the knowledge society, develop the field of knowledge in the Arab world, and support active intercommunication with the knowledge advances of our age.

PREMISES AND PRINCIPLES: THE KNOWLEDGE-DEVELOPMENT-FREEDOM TRIAD

There exists a triadic relationship among knowledge, development, and freedom

Two fundamental premises lie behind the driving concepts of the Arab Knowledge Report and provide orientation for its various chapters, be it this chapter concerned with inquiry into the concepts, problematics and frames of reference, chapter 2 dealing with the enabling environment, or those chapters on the knowledge society's most significant foundations and manifestations. The first premise is that there exists a triadic relationship among knowledge, development, and freedom. When we speak of the relationship between human development and knowledge, we evoke the teleological dimension that places knowledge at the service of development. When we speak of freedom, we have in mind the social and political frameworks that support knowledge and innovation through creative interaction between the expansion of freedom and the creation of knowledge.

Knowledge is a human right and a means to overcome many of the difficulties and obstacles facing mankind

The second premise concerns the relationship between development and the building of a knowledge society, as it is widely recognised that knowledge tends to engender social development, including economic, social, and cultural efforts to overcome the deficiencies that limit the expansion of human well-being.

Knowledge is a human right and a means to overcome many of the difficulties and obstacles facing mankind. Today it is increasingly becoming a vital requirement of development. Current data from countries with high levels of

The successful deployment of the knowledge produced in all spheres of economic and social activity contributes effectively to the expansion of human choice and emancipation

intellectual and technological property confirm that the successful deployment of the knowledge produced in all spheres of economic and social activity contributes effectively to the expansion of human choice and emancipation. This in turn results in the achievement of comprehensive human development.

It is important to stress here that the relation between knowledge and development should not be understood in a framework of mechanistic determinism. On the contrary, this relationship must be understood in light of the historical debate that establishes interactions between these fundamentals and thus creates the manifestations and poles of the knowledge society, as we aim to show.

BOX 1-1

The Concept of Knowledge

This report uses the term "knowledge" to embrace all forms of a society's epistemological and cultural assets and views it as a major organizing principal of holistic human development. Knowledge in this sense seeks to expand options and opportunities available to the individual Arab and to achieve for him or her freedom and an honourable life. Knowledge—whether we are talking in terms of its acquisition, production, indigenisation or deployment—thus becomes a tool and goal that affects all levels of society equally and involves all of fields, from the scientific, technical, cultural, and traditional to accumulated community wisdom.

THE CONCEPTUAL BUILDING BLOCKS

The relation between knowledge and development should not be understood in a framework of mechanistic determinism

The concepts prevailing in the literature on the information age fall into two categories. The first category is that of central concepts that outline the intellectual space of the age; these are still in a stage of theoretical formation and development. The second is that of intermediate concepts that go into the production and reproduction of the discourse on knowledge. Those concerned with the knowledge society have formulated a group of concepts that seek to capture the transformations occurring within new realms of knowledge. These concepts, however, are plagued with ambiguity and conflicting significations, and this increases confusion and widens the gap in an age in which the gains from knowledge are indispensable. The difficulty in terminology is exacerbated by the novelty and speed at which new terms are introduced to the literature. Most terms are no more than four decades old and have been in common use for only three decades. They lack "epistemic saturation,"[1] for they are still marked by an operational character, and this renders agreement on their limits of application difficult.

It follows that our goal in creating a conceptual structure for our work is to be able to delineate the limits of epistemic saturation and, at the same time, to scrutinise the operational dimension behind the concepts in order to reach a minimum of agreement on the significations assigned to particular concepts in the contemporary discourse on knowledge.

FROM KNOWLEDGE TO KNOWLEDGE SOCIETY

THE DEVELOPMENT OF THE CONCEPT OF THE KNOWLEDGE IN ARAB CULTURE

The term "knowledge" (*ma'rifa*) is used in the Arab linguistic and cultural tradition in several ways and with more than one meaning. Knowledge is the opposite of ignorance, as the term "knowledgeable" (*'arif*) is given to one who is well versed in something that he undertakes. When a multiplicity of cognitive specialisations took shape in Islamic Arab thought in the Middle Ages, the same word, in the sense of one who acquires and becomes a bearer of knowledge, began to refer to the specialist in the finer points of information within a specific field of knowledge.

Arabic use of the term *ma'rifa* allows for a positive value since its opposite, *jahl* (ignorance), carries a negative value (Sa'id Yaqtin, background paper for the Report). The dictionary entitled *al-'Ayn*, for example, brings together the meanings given in the entry for the letters that form the root

BOX 1-2

"Knowledge" in al-Tahanawi's "The Terminology of the Arts"

"The term *ma'rifa* is used in a number of meanings. One is '*ilm*, meaning perception, whether this be conceptualisation (*tasawwur*) or assent (*tasdiq*). Thus it has been said, "Every instance of *ma'rifa* and '*ilm* is one of either conceptualisation or assent."

"Another meaning of *ma'rifa* is just *tasawwur*, in the sense indicated above; in this case *tasdiq* is called '*ilm*, also in the sense indicated above.

"Another meaning of *ma'rifa* is perception of the simple, whether this be conceptualisation of its nature or assent to statements that may be made about it. Perception of the complex on the other hand [is specific to *'ilm*], whether this be conceptualisation or assent. With this meaning, then, there is a distinction between *ma'rifa* and '*ilm*, both being more limited than '*ilm* as perception in an absolute sense. This existence of a distinction is also the case for the second meaning of *ma'rifa* and '*ilm* [i.e., that which restricts *ma'rifa* to *tasawwur* and '*ilm* to *tasdiq*] . . . .

"One says, "The Almighty knows (has '*ilm*)" and not "(He) recognises (has *ma'rifa*)", because His perception is not (a) based on evidence, nor is it (b) preceded by a lack of knowledge, nor is it (c) subject to forgetfulness. *Ma'rifa* and '*ilm* can be considered coterminous when used in these [last two] senses.

"Another (meaning of *ma'rifa*) is a technical sense used by the Sufis . . . . [As a certain writer says,] '*Ma'rifa* strictly speaking means '*ilm* simply, whereas in actual usage it means *'ilm* preceded by non-knowledge. But in Sufi parlance *ma'rifa* means that '*ilm* which is not subject to doubt, if, specifically, the thing known is the essence of God Almighty and His attributes . . . . Furthermore, *ma'rifa* is either (a) "evidential" (*istidlali*)—that is, it uses signs as evidence for the existence of their Creator, since some of the Sufis see things and then see Him by means of the things; this *ma'rifa*, if one considers it carefully, occurs only to someone to whom something from the realm of the unseen is revealed, so that he uses both the visible and invisible signs as evidence of the existence of Almighty God . . . . or it is (b) "direct and automatic witnessing" (*shuhudiyya daruriyya*)—that is, it consists of using the existence of the Creator of the signs as evidence for the signs themselves; this is the rank of the Veracious, who are those to whom such witnessing is granted. A sheikh has said, "I saw God before all else," and this is the gnosis that comes through faith and good works, and it means that they have come to know everything through Him, and not that they have come to know Him through any thing' . . .

"*Ma'rifa* is more particular than *'ilm* because it may be applied to two meanings, each of which is a kind of *'ilm*, one being *'ilm* of something esoteric the evidence for which is provided by something exoteric, as would be the case if one scrutinised a person and as a result understood what was hidden within him through some mark that was manifest upon him . . . and the other being *'ilm* of something one saw and of which one had previously been aware . . . .

"Al-Wasiti has said, '*Ma'rifa* is [knowledge of] what I have "seen" through my senses, and *'ilm* is [knowledge of] what I have "seen" as a result of information I have received,' that is, information provided by the prophets, peace be upon them . . .

"Another (meaning of *ma'rifa*) is the technical usage by the grammarians, namely, 'a noun adopted conventionally to indicate a specific thing,' or, according to others, 'a noun adopted conventionally to be applied to a specific thing'; its opposite is 'indefiniteness'. . .

"What is intended by *ma'rifa* is a thing that is defined, for the hearer, *with regard to its being defined*, as if it were functioning as a pointer to that thing by being expressed that way. By the indefinite, on the other hand, is intended the turning of the mind to what is defined, *with regard to its essence*, with no attention being paid to its being defined, even if it is so defined in itself. There is a clear difference between a thing being endowed with specificity and the recognition of its being so endowed."

Source: al-Tahanawi, Muhammad 'Ali al-Faruqi (d. 1745). Kashshaf Istilahat al-Funun (The Unveiler of the Terminology of the Arts). Beirut, Dar Sadir, Vol. 3, pp.994ff.

of the Arabic word meaning "to know" and the changes those meanings undergo according to their vowel signs or etymology (al-Khalil ibn Ahmad al-Farahidi, 2002, in Arabic). Thus *ma'rifa* means "the appearing and being revealed of what is hidden" and *al-ma'ruf* ("that which is known") means "what is clearly viewed" since the word "viewing" (*nazar*) here comprehends both seeing and observing, as well as thinking. In this context, *ma'rifa* indicates transition from one state to another; i.e., transition from ignorance to learning.

As Islamic culture became ever more diverse and vigorous, the Arabic language was further enriched. Some specialised dictionaries highlight the change in the meaning of the term "knowledge.' *Al-Ta'rifat* by al-Jurjani explains that "knowledge" is "what is written to show something specific." In other words, it is "perception of the thing as it is." Change in meaning is a movement towards a signification in a specific area of knowledge, such as grammar, jurisprudence, logic, or mysticism, resulting in the development of a distinction between knowledge (*ma'rifa*) and learning (*'ilm*) and the knower (*al-'arif*) and the learned (*al-'alim*) (al-Jurjani, 1985, in Arabic).

The word *ma'rifa* continued to carry its old meanings as found in the lexica until the beginnings of the twentieth century, after which it expanded under the influence of the second cultural exchange between Arab thought and trends in modern European thought, during the Arab renaissance. The word thus came to mean intellectual and

As Islamic culture became ever more diverse and vigorous, the Arabic language was further enriched

The knowledge revolution at the end of the twentieth century, and above all in the field of information technology, has brought society to the threshold of a new age

philosophical output and research in the various different sciences and theoretical fields. In the last two decades, however, it has evolved further under the influence of several changes and developments. These have affected the fundamentals and bases of the concept of knowledge, including its philosophical, scientific, and cultural fundamentals and brought about its shift from being the preserve of an elite to a right belonging to all individuals in society and a precondition for human development. Mechanisms and means have become available too that allow knowledge to play these roles, as in the case of the revolutions in information technology. Thus, the present age has witnessed a radical change in the signification of the term "knowledge," with new synonyms and meanings that differ from those used in the Arab cultural patrimony, a development that may lead to a disjunction between the term "knowledge" as used in the latter and the meanings that the compound term "knowledge society" bears today.

In the Arab linguistic and intellectual tradition, the term "knowledge" refers to a symbolic product and to intellectual enquiry. Those who possessed knowledge were called the elite—the select few who were possessed of exceptional abilities in scrutiny and contemplation. However, the knowledge revolution at the end of the twentieth century, and above all in the field of information technology, has brought society to the threshold of a new age, in which knowledge has become the upshot of a combination of higher technology and evolved human experience. This has resulted in a revolution in the density and availability of knowledge and in the expansion of economic, social, and recreational roles made possible by the diverse spheres and worlds of production that fashion the knowledge society.

THE INTERACTION AND INTERSECTION OF CONCEPTS

In contemporary usage, the phrase "the knowledge society" is taken to be synonymous with several terms or

BOX 1-3

A Linguistic Perspective on "Knowledge"

Careful observation of the significations and derivatives of the word *ma'rifa* (knowledge) and the syntactical and morphological transformations to which it may be subject, reveals that it has the following meanings:

- "The appearance and revelation of what has been hidden and concealed." Thus the various words built from the root *'–r-f,* whether *'arf* meaning "wind" or "perfume," or *'urf* meaning "a good deed, or act of generosity or open-handedness" or "a projecting part of the body" (as in *'urf al-faras* ("the mare's mane")), or *'arafat* in the sense of "an open space" or as a verb (*'arifa*, imperfect *ya'rifu*) meaning "to know," are all indicative of something becoming conspicuous, appearing, and becoming wide-spread to the point of being plain to the eye. The same meaning is to be found in *ma'arif* ("acquaintances") and *'arif*, which is to say "the chief man among a group of people and the most conspicuous among them."
- "Movement from one state to another." Semantically related is the transformation of the signification to that of movement from ignorance of a thing to awareness of it, or from disavowal and denial to knowledge and acknowledgment. Thus someone who acknowledges (*ya'tarifu*) or recognises (*yasta'rifu*) or characterises (*yu'arrifu*) a thing moves from a state of keeping it secret or denying its existence to one of confessing his guilt with regard to it or revealing its nature, thus making some other person cognisant of it (*mu'tarifun 'alayh*) and aware of it (*'alimun bihi*).

By examining these two semantic fields (appearance, and movement from ignorance to awareness) along with their various associated sub-significations, we find that knowledge means, in sum, "acquiring awareness of something." This has led many to define knowledge as "awareness," in all its general and specific senses. This explains how it comes about that the various derivative forms of the words for knowledge (*ma'rifa*) and awareness (*'ilm*) are, by and large, syntactically and semantically identical, as illustrated by the following:

- *Ma'rifa = 'ilm; 'arif = 'alim; ma'ruf = ma'lum; ma'arif = ma'alim; ta'arruf = ta'allum; ta'rif = ta'lim.*

The two concepts also share antonymy with the words in the following list (in the same order as the above):

- *Jahl/nakira; jahil/munkir; majhul/munkar; majahil/manakir; tanakkur/tankir.*

In the latter case, *tajahhul* is not used as the opposite of *tanakkur* and *tajhil* is a recent coinage. This may be explained by the fact that "adoption of ignorance" (*tajahhul*) and "imposition of ignorance" (*tajhil*) both imply intent, which means that they cannot be realised in actual usage because both conditions (of ignorance, assumed or imposed) are involuntary.

Source: Sa'id Yaqtin, Min al-Ma'rifa ila Mujtama' al-Ma'rifa (From Knowledge to the Knowledge Society), background paper for the Report, in Arabic.

phrases that do not display theoretical or functional equivalence. This points to a number of difficulties, in which the logic of nomenclature becomes entwined with the mechanisms of interpretation. Linking the knowledge society with widely used concepts such as the information society, the knowledge economy, the networked society, the digital society, the information society, or the technology society fails to yield a unified concept. This diversity of terms shows that the central concept has yet to achieve "knowledge saturation." Thus we are faced with concepts that grow up side by side with significations most of which have resonances that tie them in some way to the concept of the knowledge society.

The connotations of the term "knowledge" in "knowledge society" differ from those in "knowledge economy" and "information technology." Similarly, the term "information" is not the theoretical equivalent of the term "knowledge," since "knowledge" implies more than the mere quantity of information and data gathered.. On the other hand, if we look at the many definitions of the word "information" that are subsumed within the term "information explosion," we see that it is at the core of the concept of knowledge. This explosion is creating the salient characteristics of the human information landscape—the images that today are establishing a new world and a new society.

This description of nomenclatural issues and the asymmetry of synonyms reflects only part of the challenge that we face in our current endeavour, since disciplinary frames of reference that influence researchers in their specialised fields themselves control the construction of nomenclature. Engineers believe that they are behind the creation of intelligent technology, and that the latter has banished the traditional educated person from the new knowledge arena and replaced him with the media and technical engineer. Economists likewise believe that the "knowledge-based economy" is expressive of the major transformations of the age and use the concept when speaking of characteristics of economies in post-industrial society. Sociologists, on the other hand, view the knowledge society through the lens of the post-modern age, in that the main traits of this society are being formed in a new perspective of precise technical ideas and innovations generative of a composite world.

On this basis, we will explain the major difference between the term "knowledge" in the Arab linguistic tradition and the concept of knowledge in the contemporary knowledge society. It may also be the case that there is no link between the term "knowledge" as used in "the knowledge society" and the theory of knowledge in the history of philosophy. Today the world finds itself confronted with new meanings arising from the information revolution, communication techniques, and genetic engineering, in addition to those of mathematics, sociology, anthropology, economics, and linguistics. The distinct meanings and nuances that arise from these different uses of the term are often ironed out in intellectual approaches that commoditize knowledge.

Before, we seek to construct an operational definition that is in keeping with our vision for the Report, we shall attempt to bypass the confusion of nomenclature by condensing the question into major poles. These may help us approach our subject, since the interconnectedness and mixing that are on-going today with regard to the significance of the concept "the knowledge society" may force us to create a way out that will advance our thinking and help us to stay in touch with the achievements of our age.

The concepts of "knowledge" and "knowledge society" are still in process of formation, undergoing moments of maturation that accompany any process of birth

POLES OF THE KNOWLEDGE SOCIETY: THE SOCIETY-ECONOMY-TECHNOLOGY TRIAD

Let us begin by acknowledging that the concepts "knowledge" and "knowledge society" are still in process of formation, and, at the beginning of this new millennium, are undergoing

Technology, the economy, and society, constitute elements fundamental to the understanding of the knowledge society

Technology has its limits, but there are no limits to innovation

one of those moments of maturation that accompany any process of birth, or of transition from one area of knowledge to another. Caution is therefore called for when we use these concepts if productive dialogue about their meaning is to be achieved. At the same time, the diversity of synonyms reveals the existence of three major areas—technology, economy, and society—that intersect at the heart of the concept. Thus, we find ourselves facing knowledge technology, a knowledge-based economy, and a knowledge society (Wolton, 1997, in French). There is no disputing the importance of information technology to the knowledge society, just as no one downplays the importance of the role it plays in the formation of the concept itself. Similarly, there is agreement on the transformations that knowledge technologies perform on new economies and societies. This can only imply that technology, the economy, and society, in their contemporary manifestations, constitute elements fundamental to the understanding of the knowledge society.

The new age, with all its visions and hopes of expanding the limits of human options, is being established within the radius of these poles. In this context, we cannot overlook, either, the concept's Utopian significance, for to speak of a knowledge society is, fundamentally, to speak of an open-ended historical vision in the process of formation (Breton, 1997, in French; Nur al-Din Afayah, background paper for the Report, in Arabic). The term "knowledge" in "knowledge society" also refers to the outcome of the combination of information, expertise, and capacity to govern, an outcome which makes the construction of knowledge possible and opens new horizons in terms of greater human control over nature through possession of resources and systems in spheres of work, knowledge and production. At the same time, it must be said that the societies whose major features most closely approach those of the knowledge society operate at the forefront of the information technology industry, and develop educational systems whose universities and research centres foster innovations and inventions. Such societies also provide an enabling atmosphere, institutions, laws, and a firm base of individual and political freedom that stimulate the production and use of knowledge.

The transformations seen by human societies at the end of the last century as a result of changes in the content and mechanisms of the knowledge society and of the information technology revolution have necessitated the reorganisation of society and the economy. The result has been disruption in numerous areas of life. The epistemological paradigms and applied mechanisms that once prevailed within society have ceased to be appropriate for the structural changes this revolution has unleashed. The terms "economy," "society," "culture," "education," and "media" are no longer understood according to the logic of the nineteenth or the first half of the twentieth century. Rather, they call for a new approach using innovative mechanisms designed to meet the requirements of a new age. Within this vision, new economies have formed, as have new means of communications and new principles of work, perception, and interaction. It is no longer adequate to do the right thing; one also has to do it in the right way.

Technology has become one of the manifestations of our existence, and our age has indeed become "the age of technology." Constantly and rapidly evolving information channels dominate and have become electronic markets producing and distributing an infinite array of goods and services. Globalisation, with its new economic order, has helped transform man into a consumer. This composite effect, represented by the information and knowledge-based economies made possible by technology, has had its substantial impacts on human cognition and behavior.

As we have shown, in the knowledge society, technology, economy, and society intersect and interact, nurtured by an

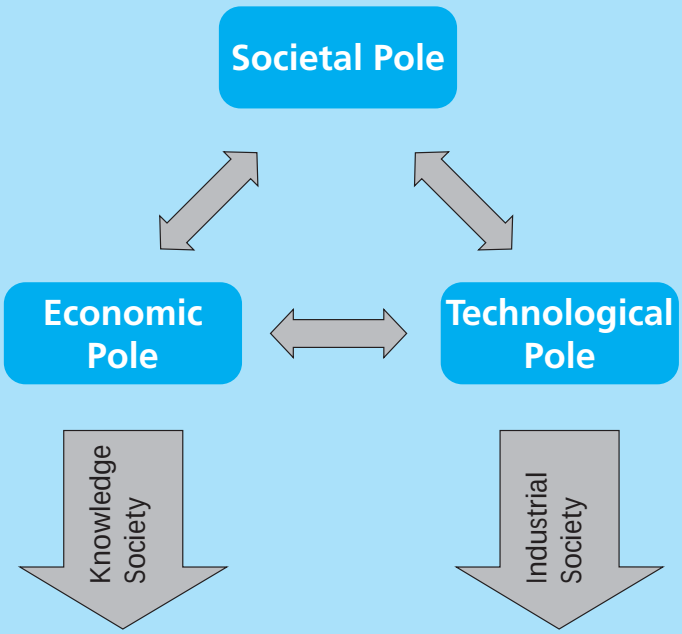
enabling institutional and legal environment based on freedom, intercommunication, and openness. If the knowledge society forms and evolves in the light of technological variables, it simultaneously constructs the major features of the new economy, an economy dominated by networks of transnational corporations; these, in turn give rise to new facilities and services benefiting from human expertise and intelligence. These networks also open to the knowledge society the gates of globalisation, which is capable of building new markets in a world where barriers both visible and invisible fall daily. The third side of the knowledge society triangle is represented by the new consumer within society, who is distinguished by new patterns of behaviour, by globalised cultural patterns, and by intercommunication patterns that create new phenomena, as shown in Figure 1-1, which compares the poles in question in such a way as to allow us to diagnose several current examples of this transformation.

These data are not complete. They are an attempt to capture aspects of phenomena that are in process of formation and transition from the industrial society to the knowledge society, an attempt to examine in detail what is happening in a changing world. Even though Arab societies are not industrial, and despite the knowledge gap between the Arab world and the developed world, the Arabs are a part of this world that aspires to a firmer mastery of scientific knowledge and technology.

The preceding data help us understand the concept of the technology-economy-knowledge triad. Technology has its limits, but there are no limits to innovation, and the economy has its spaces, albeit in the new economies such spaces exist outside of national borders. Despite these facts, the term "knowledge society" goes farther than the opening-up implied by the two previous terms, and has taken up residence in society and in those minds that are capable of building and developing it.

FIGURE 1-1

The poles of the knowledge society



Knowledge Society	Industrial Society
Technology	
Digital*	Analogue
Knowledge processing	Data processing
Sequence machines	Calculators
Logic of use	Operational logic
Electronic informatics directed at the public	Special and specialised informatics
Installation of data	Large quantity of raw data
Worldwide Web	Personal home computers
System profitability	System strength
Processing by topic	Bundling
Different media	Multiple media
Interactive electronic carrier	Paper carrier
Dynamic document	Rigid document
Economy	
Content	Form
Strategy of cooperation	Strategy of competition
Many novice users	Experienced users
Tangible Value	Tangible Cost
Non-paper management	Paper-dependent management
Collective knowledge	Technological knowledge
Knowledge-based economy	Production-intensive economy
Demand-driven market	Supply-driven market
Intercontinental markets	National markets
Society	
Knowledge society	Society of industrial units
Intermingled culture	National cultures
Interest groups	Mass spectators
Data glut	Shortage of information
Horizontal hierarchy (networks)	Vertical hierarchy
Democratic participation[2]	Democratic representation

*A digital description of information technology data, a central pole of the knowledge society.

When reviewing what has been said about these poles, we must emphasise interaction, rather than alignment or juxtaposition. The focus on interaction brings us into contact with productive processes, narrows distances, and produces forms of interaction that are difficult to separate or isolate unless for temporary or procedural reasons, or for expediency.

No one pursues knowledge for its own sake, we mostly seek it for "what it can do"

THE NETWORKED SOCIETY: THE MOST CONSPICUOUS FEATURE OF THE KNOWLEDGE SOCIETY

A strong synonym for the "knowledge society" is the "networked society," which itself has given rise to several synonyms such as the "digital society" and the "digital divide." At the end of the last century, Manuel Castells published an important thesis in three volumes entitled *La Société en Reseaux (The Networked Society)*, a huge work that is courageous, powerful, and original, and touches on many complex aspects of the spirit of our age. Castells believes that the digital character of the knowledge society raises numerous issues. It constitutes the most exciting characteristic of the information revolution by virtue of the ease with which its tools, techniques, and software may be used in production systems. At the same time, this very ease leads to outcomes and problematics that touch the core of the transition to a high-tech precision technology within the knowledge society. The UNESCO Report *Towards Knowledge Societies* illuminates the issue with a telling simile, saying that the difficulty of finding the appropriate item of information in the information age is like "drinking water from a fire hose: there is plenty of water, but one must beware of drowning" (UNESCO, 2005, in French).

In Volume II of the former work, entitled *The Power of Identity* (Castells, 1999, in French), the author devotes special attention to the networked society and explains that the information age is governed and directed by two central poles: the network pole and the active-self pole. In his account, the concept of "the network" does not mean any specific network, but multiple networks controlling sources of power, wealth, and information and enhanced with digital technology. The network is "the new social structure for the information age—the age of the networked society made up of networks of production, power, and experience, a culture that by virtue of these networks plays a part in building a virtual culture within a framework of globalised flows and transcends the concepts of time and place. In this age of ours, all societies have been breached by the sweeping power of the networked society." Opposed to globalised networking, which is the salient feature of the knowledge society, stands the "self"—

BOX 1-4

The Power of Knowledge

I say, then, that the "power of knowledge"—and I might just as well say "powerful knowledge"—is the first reality which presents itself in our current age. I am not saying anything new. We all know that the shift from knowledge as "contemplation," as in the Greek, to knowledge as "power" as in the works of Jabir ibn Hayyan, Bacon, and the modern West, is not new. We all know that contemporary technology is the direct fruit of this understanding. Here we must bear in mind that knowledge is not an accumulation of scientific discoveries but, before anything else, a method that encompasses the rules according to which all the world's data is viewed—man, nature, society, values, creations, and manufactured goods—and that knowledge has its rigorous critical and methodological instruments. Its instrumental or pragmatic nature today not only deals with the applied or technical aspects, but includes all activities of man, society and the state, to the extent that, if "scientific knowledge" on these various fields of human activity were accumulated, it would be possible to shift to action. This means that knowledge would become a "tool" for the "governance" of man, society, and the state, and what we call the "human" and the "social" sciences could pursue these goals specifically. Today no one pursues knowledge for its own sake, i.e., for the pleasure produced by its magic, its exoticism, its revelations, or its beauty; we mostly seek it for "what it can do." Linguistics and the literary arts themselves, at the end of the day, seek human intercommunication and pleasure, and what Spinoza calls the "pleasure of knowledge" operates within the same framework….

Today the power of knowledge is evident in various forms, particularly in the technological sector, and it is our inability to produce "technical knowledge," either now or perhaps in the foreseeable future, that reveals our inadequacy, weakness, and misery. We are able to participate at present only within the confines of the spaces that produce that knowledge, i.e., those of the "European West" or the "American West." Nothing, however, prevents us from producing "human and social knowledge." From within our own national spaces, we can direct our research towards human issues and values, society and its values, and the state and its principles. We can treat these issues on the basis of scientific, rational methodologies and we can benefit from them in our reformulation of humanity, society, and the state, and thus bestow on "knowledge" a power it does not at this time possess.

Source: Fahmi Jad'an, 2002, Riyah al-'Asr, Al-Mu'assasa al-'Arabiyya lil-Dirasat wal-Nashr, Beirut, pp. 14,15,16.

the individual and collective identity (the individual, the citizen, the human being, the group) that seeks to preserve its life amidst the sweeping transformations in knowledge. This tension between the "network" and the "self" produces new forms of social conflict, of which knowledge is a salient feature. Humanity faces, in place of class conflict, a conflict in which networks, with their multiple symbolic bases, play a dominant role in feeding and marshalling its main features. Thus, Castells stresses the roles played by new social and cultural movements, such as students' and feminist movements, the peace movement and environmental movements. There is something in these different movements, as in the collapse of the socialist block and its continuing repercussions, as well as in the retreat of the symbolic power of the patriarchal system within the family and in society at large, that reflects the contradictions ignited by the information age.

From this perspective, the importance of the networked society concept is represented by the social and informational axes. Because Castells highlights the role of information in our age, information, viewed as the product of technological systems and biological models, is his paradigm for the new world. Thus the network becomes an expression of a complex activity; it resembles the human genome strand supported by knowledge, by advanced, that is, and very precise mathematical data. Accepting the network concept means accepting that technology, and specifically information technology, lie behind social organisation. In Castells' words, "information" capitalism becomes the alternative for what Marx in the nineteenth century called "industrial capitalism."

The Internet has become the primary international vehicle for conveying ideas; indeed, it has the power to globalise the world (Castells, 2002, in French). It has helped destabilise all tools of communication and has restructured their architecture, their uses, and their modes of production. At the same time, they have changed how work is conducted and how authority and control are exercised.

The Internet is now the largest registry of reference information for all areas of knowledge. In addition, its networks provide interactive possibilities throughout the fabric of society through rapid digital mechanisms. As a result, the "place" in the networked society is not physical but is equivalent to "flows." Capital flows and the abundant information made available on the internet have no relation to a specific place; they are in a "non-place" that is synonymous with all places. Furthermore, "time," according to Castells, is "non-time," since it is no longer connected to the clock that, in the industrial age, defined its role. In the networked society, time is a sort of vessel that allows us to be in several places at once.

"The Internet has become the primary international vehicle for conveying ideas; indeed, it has the power to globalise the world"
Castells

THE KNOWLEDGE SOCIETY: TOWARDS EXPANDING CHOICES FOR RENAISSANCE AND DEVELOPMENT

The 2005 UNESCO Report adopted the concept of the knowledge society in the plural, as "knowledge societies," viewing this as the most appropriate term for the changes taking place in a world of which technology forms the cornerstone, and the central manifestations of whose general structure are the new economy and communication networks. The manifestations and epiphanies of the latter are, in their turn, reflected in human realities, confronting humanity with new challenges and questions. This highlights the importance of broadening the significations of the term to embrace all the changes and social challenges influenced by this new perspective, or, perhaps more accurately, this new world.

The importance of expanding the significations of the "knowledge" in "knowledge society" requires that the concept no longer be restricted to the scientific and technological dimensions, as it clearly is in the indices and indicators

Expanding the significations of the "knowledge" in "knowledge society" requires that the concept no longer be restricted to the scientific and technological dimensions

related to the knowledge-based economy popular in some literature, such as the reports of the World Bank. While it is true that scientific knowledge is important, the scope of knowledge is broader than that. A more inclusive perspective on human knowledge is called for, one that does not exclude the humanities and other sciences related to aesthetics, values, and the arts, one that excludes none of the symbolic product that fashions humanity's wisdom and infinite capacity for invention, and for material and symbolic production.

The Report adopts a concept of knowledge that is broad enough to encompass the link between knowledge and human development

Expansion of the significations of the term "knowledge" makes the concept of the knowledge society better able to embrace several aspects of humanity's theoretically recognised competence. The interdependence and interaction among these aspects are no longer in dispute, since the capacity for rational thought is equal to the potential of the imagination, and since epistemological synthesis is an act that includes the outcome of the human effort to understand and innovate (UNESCO, 2005, in French). What makes it desirable to expand these significations is the tendency of certain reports by some international organisations to impose knowledge data linked to certain specific societies. A critical examination of the indices and indicators fashioned by the World Bank on the subject of the knowledge society and knowledge economies, for example, reveals that the unit of analysis in these reports is based on data from Western Europe and the United States. How can terms be transferred and generalised to other social paradigms that were not under consideration at the time when the research was conducted and the terms constructed? How, in fact, can the economy or the enabling environment for the knowledge society be reformed without a precise diagnosis of the forms of knowledge accumulation and the knowledge gaps linked to the Arab reality?

Knowledge acquisition, production, indigenisation and deployment is a tool and goal for all levels of society equally and involves all of its fields

The knowledge society, sometimes referred to as the "digital society," is a collective project. It is more than its instruments and its networks. Furthermore, the state of Arab knowledge, with its multiple gaps, calls upon us to define a vision that will help us prepare the appropriate points of entry to the requirements of Arab knowledge as it now is. In this regard, we believe that the concern for knowledge innate in the Arab renaissance project, and especially in those of its dimensions devoted to cultural enlightenment, is part and parcel of the orientation of this report.

This report adopts a comprehensive vision for an Arab knowledge society. It seeks to build a society in which knowledge is a product of the union of information technology, experience, and the capacity to govern with an eye to the wise use of resources, exploitation of the means available to attain renaissance, and an ability to seize the achievements of human development. The Report adopts a concept of knowledge that is broad enough to encompass the link between knowledge and human development. It seeks to expand options and opportunities available to the individual Arab and to achieve for him or her freedom and an honourable life. Knowledge—whether we are talking in terms of its acquisition, production, indigenisation or deployment—thus becomes a tool and goal for all levels of society equally and involves all of its fields, from the scientific, technical, cultural, and traditional to that of accumulated community wisdom.

THE BASIC FRAME OF REFERENCE FOR THE KNOWLEDGE SOCIETY

The intellectual frames of reference and philosophical underpinnings that encompass the system of fundamental assumptions underlying the reports of international organisations on the knowledge society must be made explicit, since these establish the latter's goals, indicators, and working strategies. Even if these reports are, on the whole, issued in a neutral language, rely on quantitative methods, and are careful to benefit in the construction of their data from the

services of seasoned experts and scholars, this is insufficient to give them an objective, neutral stamp, which would, in any case, be hard to achieve. This observation does not imply doubt about the scientific and practical value of the reports of international organisations or reservations about their approaches and results; rather, in order to construct a more humane and more cooperative human space, it aspires to shed light on the "relativity" of their results and conclusions at a time of increasing interdependence between states and societies, and of burgeoning questions about human co-existence dedicated to constructing a human space that is more humane and cooperative.

An understanding of the frame of reference of such reports and studies allows us to grasp messages that are not always clearly expressed, as well as to benefit from their data. Since the World Bank's 2002 report on the knowledge society, its 2007 report on the knowledge economy, the 2005 UNESCO report *Towards Knowledge Societies*, the 2003 Arab Human Development Report, and other reports issued during the 1990s on the subject of knowledge and development have taken as their starting points particular theoretical perspectives based on certain philosophical frameworks and methodologies. Further, these reports have relied on similar data and comparative indicators to address the subject of knowledge performance in our age.

The introductions, conclusions, and action plans of reports issued on the subject of the knowledge society, whether by the World Bank or the United Nations and its educational, cultural, and scientific institutions, may be read as efforts to deal with the predicament brought about by the lexicon of economic analysis that remained in use after the end of the Cold War. Important efforts have been made by scholars and experts to coin new terms that go beyond the ideological positions that continued to describe world economic conditions in terms of the crises created by global capitalism. The theoretical side of their work has assumed various dimensions. The most prominent of these has been the construction of topics to diagnose the dilemmas of our world, important theses of these has been based on various topics, such as the environment, gender, world peace, issues of health and nutrition. These and others once appeared under other labels and today refer to new research areas related to comprehensive human development.

Since it is clear that these reports belong to a new tradition of research and writing, those negative positions that totally reject them may not be justified. The heated political and ideological positions opposing these reports are for the most part based on pre-conceived stances and may not be of value in advancing intercommunication with the world, its institutions, and the reports issued by these institutions. This in no way, however, means that disciplined criticism should be set aside, for the latter seeks among other things to play a role in deepening the dialogue, developing the discussion, and enriching the approaches and outcomes of these reports by using local and idiosyncratic comparative indicators and analytical tools. This helps to develop concepts and expand significations.

The reports of international organisations on the knowledge society may be approached with this positive outlook. Thus, the aim becomes that of modifying and developing their methodology and results in light of the actual situation of Arab knowledge performance and Arab attempts to bridge the information gap and gain access to the information age. Critical examination of the reports of international organisations on the knowledge society reveals that they are informed by at least two main frames of reference:

1. A positivist tendency in which the quantitative orientation dominates. This orientation limits the comprehensiveness of the phenomena under discussion, as well as subjecting the development and knowledge trajectories to a notion

Important efforts have been made by scholars and experts to go beyond the ideological positions that describe world economic conditions in terms of the crises created by global capitalism

of technological determinism, with no alternative to its results and decisions. This position makes the triumph and hegemony of technology the symbol of an age still in fact in the process of formation.

2. The political modernisation trend that invokes the bases and principles of international human rights charters. This tendency is inadequate and ridden with many contradictions and paradoxes (Ruqayya al-Musaddaq, background paper for the Report, in Arabic).

The goal of this critical review is not to diminish the value of international reports, but to uncover their limitations

Before clarifying the contradictions in these systems of reference, it is important to emphasise that the goal of this critical review is not to diminish the value of these reports, but to uncover their limitations and highlight their shortcomings, particularly in aspects related to Arab society, in order to advance the Arab theoretical discourse around the establishment of the knowledge society.

THE POSITIVIST TREND: THE QUANTITATIVE ORIENTATION

The shortcoming of the prevailing positivist trend in the literature of international institutions is its concentration on the economic dimension and the Western experience as the exclusive model to measure what happens in the rest of the world

The contemporary knowledge scene revels in the positivist mindset that is drawn to science and technology. This positivist trend is undoubtedly a powerful continuation of the ideas of the Renaissance and Enlightenment philosophy. However, the developments affecting the state of the world today warrant caution with regard to its general drift, with its optimistic and self-confident attitude towards the course of history, no matter what claims may be made as to its capacity to assist man in his dealings with nature and life. The most conspicuous characteristic of the positivist mind set is its resort to quantitative methods in its epistemological paradigms. Although these methods allow for neutral and objective examination of phenomena, the final conclusions often support predetermined intellectual preferences. The greatest shortcoming of the prevailing positivist trend in the literature of international institutions is its concentration on the economic dimension and its view of the Western experience with its underlying values as the exclusive model whose data it then seeks to transform into indicators by which to measure what happens in the rest of the world.

An objective historical view of the knowledge society cannot be limited to observations on the relationship between knowledge and technology or discussion of knowledge-based economies. In the current state of knowledge, we assume that discussion will be more comprehensive and will turn to the subject of the knowledge society in those of its dimensions that are not blind to the importance of a critical perspective to the construction of knowledge and the realisation of innovation. If we cannot construct knowledge from a critical perspective, we will continue to describe and quantify phenomena without reaching a diagnosis of the deep-seated weaknesses that produce the current state of Arab knowledge (al-'Arabi al-Wafi, background paper for the Report, in Arabic).

This critique does not question the value of the epistemological paradigm of scholars who have developed several methods and tools for studying new phenomena and have sought to illuminate many of their aspects. Nevertheless, we must be aware of the implicit ideological dimensions in reports by international organisations, and we urge that their results and recommendations be read with caution.

For example, the indicators for an information and communications technology (ICT) index proposed by the World Bank reveal that we are faced with an exercise in quantification that pays not the slightest attention to the background of the quantitative data. The index is measured on the basis of population counts, income levels, and level of spending. Some scholars have pointed out the shortcomings of these indicators, believing that they give insufficient importance to the fruits of economic and social knowledge, and

pay too little attention to the qualitative dimension. Education indicators, for example, concentrate on the number of students enrolled and not on other, more knowledge-relevant aspects, such as the quality of education available from instructors, what qualifications the latter hold, and the presence or absence of buildings, science labs, and so on (Mohammed Bakir, background paper for the Report, in Arabic).

The paradigms that give rise to these indicators, with their operational character, claims to objectivity, and technological determinism, could be useful in the societies in which they were constructed. These paradigms may acquire a limited efficacy outside their historical context. However, they must be modified and augmented so that they become suitable for a new unit of analysis related to a new reality, such as that of the Arabs. This gives the methodology a universal character, since testing it in varied research areas would provide an occasion to reconstruct or create alternatives that meet new requirements. Reports issued by international organisations have not been able to rid themselves of this positivist mindset, and the indicators and concepts devised within these reports are not merely vessels to store everything and nothing. Similarly, the fact that we can measure the knowledge gap quantitatively does not exempt us from a more profound diagnosis of knowledge performance in the Arab world, since the prevalence there of systems of reference that have no connection to what happens in the world around them compounds the knowledge gap. This is what makes the challenges of closing the knowledge gap in the Arab world complex and multiple. We do indeed most urgently need to close the existing knowledge gap. However, we also need to shake up what is stagnant in our knowledge and rock the pillars of our unquestioned convictions and our preconceived notions in such a way as to help us to go beyond our text-bound, traditional epistemologies. When this happens, the broadening of the orbit of the study of knowledge, especially from a critical perspective, may become one of the means of expanding our options in life and establishing a knowledge society fulfilling our aspirations for our societies.

THE POLITICAL MODERNISATION MINDSET: EVOKING HUMAN RIGHTS

We need to shake up what is stagnant in our knowledge and rock the pillars of our unquestioned convictions and preconceived notions

The second major system of reference guiding the construction of knowledge society reports, emerging at the end of the last century and the beginning of the third millennium rests on the premises of a liberal and neo-liberal political modernisation.

This becomes clear when we study the principles of the World Summits on the Information Society (Geneva 2003, Tunis 2005), especially in their strong link with the "human rights" vocabulary as established in the Universal Declaration of Human Rights of 1948 and the Covenants on Economic, Social and Cultural Rights of 1966 and 1976. The 2005 UNESCO Report *Towards Knowledge Societies* springs from the same perspective as portrayed by its appeal for adherence to the principle of "the right to knowledge" and its defence of the principles of tolerance and solidarity.

Some human rights issues are framed in the context of a defence of the values of transparency and democratic reform as a pre-condition of the enabling environment that fosters knowledge. In this way, the right to knowledge, access to information, and difference of opinion are transformed into unquestioned requirements for the establishment of the knowledge society and the improvement of knowledge performance (UNESCO, 2005, in French).

Access to information, and difference of opinion are unquestioned requirements for the establishment of the knowledge society

Declarations of principles defending the rights to development, knowledge, and access to information have, however, nothing to do with what actually happens on the ground. They are no more than declarations of intent and hope cast in

In our bid for economic and human development in the Arab world, we cannot be content with the benefits of the "invisible hand" of the market

the language of solidarity, cooperation, and common destiny (Cenre Europe-Tiers Monde, 2007, in French). What controls actions in reality is the logic of power and domination, whose rigidity the contradictions innate in the knowledge society have made more extreme. There is no longer any hesitation over declaring the power of knowledge or of its possessors, since the knowledge gap has become synonymous with poverty, weakness, marginalisation, and, subsequently, dependency and subordination.

The political modernisation mindset is distinguished by its ability to incorporate political values linked to the neo-liberal model. It converges with political and strategic choices supportive of the interests of the strong, of those who possess knowledge and deploy it to run the world. This "neo-liberal" view does not hesitate to declare a pragmatic goal with respect to the conclusions fostered by such reports, thus confirming the incompatibility between the economic policies of the knowledge economy and the political goals of the democratic political project, which, when examined, turns out to be the maker and organiser of the network of institutions and laws that rule the world.

In our bid for economic and human development in the Arab world, we cannot be content with the benefits of the "invisible hand" of the market—the hand that is the common factor in many reports on development and knowledge. The invisible hand may do its work through strangulation, which, where knowledge is concerned, means cutting off its life-blood. This is all the more grave given that life is interdependent with knowledge.

The global financial crisis that began in late 2008 showed that financial choices based on the invisible hand of a completely open market with no effective societal supervision necessarily have negative effects on the various enabling environments and existing markets. The choices by which the future of global financial institutions is determined reveal in turn further dimensions of the crisis.

Thus there are innumerable difficulties in bridging the knowledge gap in the Arab

BOX 1-5

Building the Information Society: a global challenge in the new millennium

Excerpts from the 2003 Geneva Declaration of Principles on Building the Information Society

In the Declaration of Principles of the 10-12 December 2003 meeting in Geneva, we read:

Our challenge is to harness the potential of information and communication technology (ICT) to promote the development goals of the Millennium Declaration, namely the eradication of extreme poverty and hunger; achievement of universal primary education; promotion of gender equality and empowerment of women; reduction of child mortality; improvement of maternal health; to combat HIV/AIDS, malaria and other diseases; ensuring environmental sustainability; and development of global partnerships for development for the attainment of a more peaceful, just and prosperous world. We also reiterate our commitment to the achievement of sustainable development and agreed development goals, as contained in the Johannesburg Declaration and Plan of Implementation and the Monterey Consensus, and other outcomes of relevant United Nations Summits.

We reaffirm, as an essential foundation of the Information Society, and as outlined in Article 19 of the Universal Declaration of Human Rights, that everyone has the right to freedom of opinion and expression; that this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers. Communication is a fundamental social process, a basic human need and the foundation of all social organisation. It is central to the Information Society. Everyone everywhere should have the opportunity to participate and no one should be excluded from the benefits the Information Society offers.

We are aware that ICTs should be regarded as tools and not as an end in themselves. Under favourable conditions, these technologies can be a powerful instrument, increasing productivity, generating economic growth, job creation and employability and improving the quality of life of all. They can also promote dialogue among people, nations and civilisations.

We are also fully aware that the benefits of the information technology revolution are today unevenly distributed between the developed and developing countries and within societies. We are fully committed to turning this digital divide into a digital opportunity for all, particularly for those who risk being left behind and being further marginalised.

We affirm that development of ICTs provides enormous opportunities for women, who should be an integral part of, and key actors, in the Information Society. We are committed to ensuring that the Information Society enables women's empowerment and their full participation on the basis on equality in all spheres of society and in all decision-making processes. To this end, we should mainstream a gender equality perspective and use ICTs as a tool to that end.

region, greatest among them that the bridging of this gap hinges on a sharing of power. The appeals for solidarity, cooperation, and joint action in the conclusions and data of these reports may be nothing more than a mask to obscure the real face of power, which in fact creates and widens the knowledge gap (Centre Europe-Tiers Monde, 2007, in French). Reading Chapter 10 of UNESCO's 2005 report on "The Renewal of Democratic Practices in Knowledge Societies," and Chapter 9, which calls for "Linguistic Pluralism, Strengthening Cultural Diversity, and Sharing Knowledge," we see the distances that are opening up between report discourses and the reality of the situation in countries of the South, including the Arab countries. At the same time, the thickness of the walls that separate knowledge from the external mechanisms that create the knowledge gap and the meagreness of the Arab knowledge performance become apparent.

This does not mean that we are calling for an adoption of the values of others, or arguing that we should become dependent on and compliant with the wishes of power. It does not mean what Ibn Khaldun called "imitating the conqueror." What we mean first and foremost is the incorporation within our own thinking of the knowledge that is available today to all mankind ('Abdallah Al-'Urawi, 1996, in Arabic), or, in other words, the values of knowledge and scholarship and the fundamentals of policy, economics, and management. In this last sphere, specifically, we believe that openness to the world is an expression of the desire to achieve reconciliation with our historical identity and the world and to attain the human development to which we aspire.

The battle over political modernisation continues under various guises, just as the values of enlightenment and reason are still embraced to varying degrees in the majority of Arab countries, as a way to build a political discourse more faithful to the values of reason, justice, and balance (Kamal 'Abd al-Latif, 1997, in Arabic). These are the shared values whose general principles all of humanity tries to reconstruct, in a spirit of agreement over the importance of interdependence, consensus, and mutual assistance in international relations. At the same time, the necessity of benefiting from the new realities to allow the emergence of the knowledge society cannot be overlooked. Using the tools that brought about the knowledge revolution, declarations of principles and intentions can be converted into deeds and action, not simply in order to bring about political modernisation in Arab society, but to achieve a form of political modernisation that is reinforced with solidarity and cooperation worldwide.

PROBLEMATIC ISSUES OF THE KNOWLEDGE SOCIETY

As a reality still in process of formation, the knowledge society, with all its components and programmes, raises many theoretical issues and practical questions, requiring that visions be formed and positions taken. If the ICT revolution that helped prepare for the birth of new economies and drew the borders of knowledge in a new society is described by most as "the soft revolution," the softness was merely the superficial outward form of actions intended to carve out new directions in a rapidly globalising world. Faced by the "softness" of the symbols used to penetrate the worlds of the image, of information, and of the market, to manage them in new ways, and to lay the foundation for a new society, we must pay attention to the problematic issues that have arisen and will continue to arise. We must look at the issues consequent on this revolution, particularly given that their results affect us all in our concern to enter the knowledge society and experience its advances and achievements.

We should not delay dealing with problematic issues raised by the knowledge society, whether local or global, on the pretext that most Arab countries have not

We are affected by everything that happens in the world since we are an active party—even though, as Arabs, we may be merely second or third level actors

We should not delay dealing with problematic issues raised by the knowledge society, whether local or global, on the pretext that most Arab countries have not yet joined this society

yet joined this society. However prepared or unprepared the Arab region may be to indigenise the knowledge society, its likely repercussions are a pressing concern. We are affected by everything that happens in the world since we are an active party—even though, as Arabs, we may be merely second or third level actors—to events that have already unfolded, as we shall be to others that have yet to unfold. This in and of itself gives us numerous opportunities to upgrade our knowledge systems and to begin dealing with the issues of the new society.

The political reform project remains a sine qua non for societies that are seeking to build environments supportive of the knowledge society

Given the number of problematic issues that have come to the fore as the main features of the knowledge society begin to form, we have decided to focus on a limited sample of the former that are connected to the knowledge society and its relationship to identity, the Arabic language, new ethical values, and the performance of Arab women in the knowledge society. In addition, we will deal with political participation, while not ignoring the topic, central to our age, of technology itself. Clearly, in these problems there is an interaction between the local and the universal, the private and the public. The justification for this selection of issues is their link, as a whole, to the Arab reality and our wish to develop an objective discussion leading to the theoretical preparation that must accompany the enabling environment that will permit the Arabs, to bridge, in word and deed, the knowledge gap and to enter into epistemological intercommunication with the rest of the world (Kamal 'Abd al-Latif, 2003, in Arabic).

THE KNOWLEDGE SOCIETY AND EXPANDING POLITICAL PARTICIPATION

With regard to this particular problematic, we seek to compare the current political changes in the Arab world, directing our gaze at political participation, hoping in so doing to highlight the importance of the political factor in bringing about enabling conditions of the knowledge society. We point out that the political reform project remains a *sine qua non* for societies that are seeking, to different degrees, to build environments supportive of the knowledge society. At the same time it is clear that many of the values and achievements of the knowledge society are inseparable from freedom and the construction of social and institutional contracts in support of a state in which individual rights and the rule of law are preserved. Attempts to achieve these goals and aspirations proceed at different rates in most of the Arab world, and have done so for decades.

We cannot favour the political democracy project above all others, for on the political scene globally we find that this project in its various forms has raised many problematic issues that require us to take a new look at the democratic political system. Furthermore, in many parts of the world, including the Mashreq (eastern) Arab countries, certain appropriations of language used within the international conflict and that concern the need to establish "societies dedicated to freedom, democracy and human rights" do not conform to the principles of political modernisation and the spirit of the democratic message (Kamal 'Abd al-Latif, 2008, in Arabic). Rather than respecting difference and diversity, they satisfy themselves with making political reform into a pre-packaged technical prescription. Recent and more distant historical experience has not seen it as such: the shift towards democracy in numerous cases was the outcome of lengthy experience and the product of much laborious spade work to prepare the road for democracy.

In the Arab region, the legitimacy of democratic reform received its highest official recognition at the 2004 Tunis Summit

In the Arab region, the legitimacy of democratic reform received its highest official recognition at the 2004 Tunis Summit, when, in their closing statement, Arab leaders announced a consensus on the need to expand democracy to enhance participation in decision-making and respect for human rights. In addition, an observer of Arab political life may see the political disputes of political parties and civil society institutions as embedding

the values of democratic political reform in varied ways, and these efforts have recently borne fruit in the form of calls for agreement on peaceful democratic transformation. None of this, however, excludes the possibility of disingenuousness, meaning that the discussion is carried on with two sets of logic and two languages, the disingenuous language helping in turn to build other types of deception. This issue has become more acute with the entrance of certain political forces that appropriate religious slogans for the service of politics.

In addition, approaches that jump to unjustified conclusions about Arab society do not fully comprehend that democracy in the West took shape over a long period of historical experience and, in fact, is still reshaping itself to address the challenges posed by the knowledge society. This means that in order to continue to defend political reform, more efforts must be made to achieve a free society, since it is the cornerstone of the knowledge society (Markaz Disarat al-Wihda al-'Arabiyya, 2000, in Arabic).

Some may have reservations about the relationship between knowledge and freedom, since this link is not always required. In many countries that have reached the threshold of the knowledge society, we find signs of a lack of freedom. However, for the Arab region freedom is an inescapable condition if many of the shackles that prevent the blossoming of innovation are to be removed and the way prepared for the knowledge society (Ruqayya al-Musaddaq, 1990, in Arabic).

Expanding the ambit of freedom will help Arab societies to indigenise the mechanisms and values of the knowledge society. In the wake of the failure, especially in Egypt, of the late nineteenth- and early twentieth-century renaissance project, and that of the second generation reformist vocabulary that took shape after the 1967 defeat, the political reform movement in the Arab region has been constructing for two decades past a third generation reformist vocabulary. As of the end of the last century, the Arab political elite has been moving towards the promulgation of a new vocabulary, through which they hope to build an agreed-upon democratic transformation that will transcend the defeats and shortcomings so prevalent in many areas of Arab political life.

If some global paradigms indicate lack of an organic, causative link between political reform and establishment of the knowledge society, this does not mean that political reform is not necessary. In fact, it serves as a catalyst for the processes of innovation and allows them to appropriate for themselves new values and advances. Indeed, we might even go so far as to say that freedom is the other face of knowledge (see Chapter 2).

The UNESCO Report *Towards Knowledge Societies* stressed the importance of revitalizing the democratic public spaces in knowledge societies. It revealed that, in the view of the report writers, the dilemma of democratic reform is a universal one, since reform of the democratic political system is a challenge to all–a challenge that includes that of how to ingrain their experiences in democracy (UNESCO, 2005, in French).

In this context, the report underscored the importance of technological democracy, pointing out that the benefits of information technologies must be made use of in political practice. This position raises significant doubt about the compatibility of democratic government with post-modernist societies, some scholars believing that the age of democracy in Europe has only a short life ahead of it. They base this position on the internal and external contradictions of the so-called democratic countries, in addition to the decline of traditional moral authority and the restrictions placed on freedoms within these societies after the events of September, 2001 (Saint Mary, 1999, in French).

The preceding comments pertain to the developed world. In the Arab world, the problem primarily concerns the need to continue to expand the package of freedom

In order to continue to defend political reform, more efforts must be made to achieve a free society, since it is the cornerstone of the knowledge society

The Arab political elite has been moving towards the promulgation of an agreed-upon democratic transformation that will transcend the defeats and shortcomings of Arabic political life

Freedom is the other face of knowledge

Globalisation is dependent on information and is not restricted to one site

in its basic elements ('Azmi Bishara, 2007, in Arabic). The 2005 UNESCO report, dealing with the democratic question in the Arab countries from this perspective, stresses the importance of continued efforts to achieve political reform. This makes it clear that demand for reform in the Arab world cannot be avoided. Given the many challenges it has to face, it will be a complex battle.

THE KNOWLEDGE SOCIETY AND IDENTITY

Conflict continues, over wealth and power and over information, identities, and cultures

On-going global transformations show synchronicity between the formation of knowledge societies and the appearance of globalisation. We cannot separate globalisation from the information explosion and the latter's economic and knowledge ramifications. Today's globalisation mechanisms are governed by network systems and directed by the Worldwide Web, which is overseen from afar by global financial institutions. These institutions seek to regulate and adjust the Web so that its equilibrium is not disturbed, particularly since, in the eyes of the neo-liberals, the state has become a hindrance to unfettered market activity (Albert, 1991, in French).

Globalisation is dependent on information, the foremost actor in on-going global standardisation. The new knowledge-based economy does not operate in a single place and is not restricted to one site, and it is this phenomenon that links globalisation and information. However, this linkage, in which major forces that own the coffers and symbols of knowledge play the central role, places new challenges before societies

BOX 1-6

Knowledge in an Age of Globalisation

Today the "power of knowledge" intersects with the "the impact of universal cultural dissemination," for knowledge, if it is not itself culture, is most certainly a part or aspect of it. As everyone is aware, for years, "globalisation" and "the effect of globalisation on cultural identity and cultural personality" and especially on "Arab culture" and its particular characteristics have been on every tongue.

There is no doubt that the "universal cultural system" propagated by globalisation through advanced media tools that place everyone at the centre of the world is a strong wind knocking at our doors, blowing through the chambers of our houses and of our minds, and awakening our aesthetic and emotional sensitivities. Our authors, scholars, and media have gone to great lengths in describing the phenomenon and monitoring its influence and effects. Naturally, some of us have praised it from a neo-liberal point of view and others have criticised it from the standpoint of religion, cultural tradition, or nationalism. The rational, realistic view, however, clearly tells us that in the framework of the current age and in the context of our political, economic, and cultural circumstances, we must "live" this reality and be at home in its midst whether we like it or not. However, it is imperative that we assimilate to this "living" critically, with open eyes. The most important thing about such an assimilation is that we realise that the universal cultural system that accompanies globalisation rests on a neo-liberal vision shaped by a host of ethical, social, political, and economic values spread by forces of communication and modern information media across borders and through local spaces, reformulating in so doing our cultural existence and special identity. The values of freedom, democracy, multiculturalism, and human rights established by the universal cultural system, in which some of us see an overwhelming danger to our culture and our distinct identity, represent this danger only with regard to one particular understanding of this cultural identity and one pattern of assimilation of these values. The truth is that contemporary Arab culture is not completely homogeneous, but has numerous cultural systems, including the religio-cultural, the national-cultural, and the liberal-cultural. The first is epitomised by the "Salafist" view, which emphasises its incompatibility with universal cultural values. The other two systems, however, tend towards conditional acceptance of aspects of the universal cultural system. Believers in "cultural Islam," Muslim and Christian Arab nationalists, and humanist socialists—the largest groups of secularists and liberals—willingly accept the basic principles of this universal culture, with occasional reservations. In this regard, the belief prevails that what all Arab spaces lack is specifically these values that the universal culture claims it alone advocates. The truth is that the main difference between the globalised neo-liberal space and the Arab space in all its manifestations centres on questions of freedom and utilitarianism. It is these two principles, which dominate the philosophy of the universal culture, that generally appear in Arab contexts in their rough, overzealous (here I mean "extreme") form. It is possible to reorient these principles, rethinking the meaning of freedom and turning the individualistic overtones of utilitarianism into a more collectivist; more social connotation of "interest." In other words, we could change from "expedient individualism" to "interest-oriented community." The concept of democracy—one of the most salient of the values that the universal cultural system claims for itself—could also be channelled in such a way as to mean a "collective" democracy in keeping with the requirements of Arab societies rather than those of the liberal democracy that is suited to the new capitalism in the American-dominated West. This much needed transformation has already attracted a substantial group of intellectuals in the liberal West itself.

Source: Fahmi Jad'an, 2002, Riyah al-'Asr, Al-Mu'assasa al-'Arabiyya lid-Dirasat wal-Nashr, Beirut, pp. 16-18.

that occupy the lowest rung of the indices and indicators of the knowledge society. Manuel Castells addresses this matter, taking as his starting point the fact that the network age generates new patterns of knowledge-related conflict, patterns that are caught between the logic of identity and the unchecked and explosive logic of information (Castells, 1998, in French; Nur al-Din Afaya, background paper for the Report, in Arabic).

It is true that the conflict continues, at its deepest level, to be over wealth and power, but it has further complex manifestations, including the conflict over information, identities, and cultures.

The confrontation of cultural identities in a rapidly globalising world requires us to clarify certain phenomena, for Arabs are a party to this many-fronted battle within a quadripartite globalisation process that consists of the following trends:

(1) continual expansion of information capital,
(2) rapidly paced evolution of technological discoveries,
(3) the desire of political powers to control the world, and
(4) the insertion of the world into a single cultural mould.

The information technology revolution supports these trends and choices that seek to take ownership of knowledge, power, and influence. The question to consider here is how can national culture and mother tongue be preserved; how, in fact, can we rethink the meanings of identity in the face of the spate of material from networks promoting informational and economic uniformity whose trademarks and cultural icons have filled the cities, and the even villages, of the world? Before we answer, we should point out that in the view of some to talk of identity in an era that recognises only the logic of competition, profitability, and increased production is to dream, or indulge in nostalgia. This is an era dominated by a search for architectural plans for markets yet to be built and the goods to fill them and for the accumulation of further assets in the chain of an information economy that has exceeded all the previous century's expectations for the material economy.

Current uses of the concept of identity in the context of current conflicts show how ambiguous the word is. It is a term used frequently in times of war, when the parties to the conflict need to give each other well defined features in preparation for the confrontation. Historical events, however, indicate that there is no closed, complete identity. A pure identity is merely a fantasy, since market logic requires acceptance of a degree of the standardisation that shapes the destiny of the world (Kamal 'Abd al-Latif, 2003, in Arabic). Here, the world faces a paradox. At their conferences and meetings, international organisations adopt the vocabulary of solidarity, sharing, and respect for identity and difference. They explain that diversity should be seen as a source of wealth and employ a lot of other similar vocabulary useful for dealing with the problematic issues of identity and globalisation. In contrast, the knowledge-based economy and the information

The knowledge-based economy and the information revolution fiercely and destructively permeate all local cultures and economies

Historical events indicate that there is no closed, complete identity. A pure identity is merely a fantasy

BOX 1-7

Cultural and Linguistic Diversity and Local Cultural Identities

Excerpts form the 2003 Geneva Declaration of Principles on Building the Information Society

Cultural diversity is the common heritage of humankind. The Information Society should be founded on and stimulate respect for cultural identity, cultural and linguistic diversity, traditions, and religions, and foster dialogue among cultures and civilisations. The promotion, affirmation, and preservation of diverse cultural identities and languages as reflected in relevant agreed United Nations documents including UNESCO's Universal Declaration on Cultural Diversity, will further enrich the Information Society.

The creation, dissemination and preservation of content in diverse languages and formats must be accorded high priority in building an inclusive Information Society, paying particular attention to the diversity of supply of creative work and due recognition of the rights of authors and artists. It is essential to promote the production of and accessibility to all content—educational, scientific, cultural or recreational—in diverse languages and formats. The development of local content suited to domestic or regional needs will encourage social and economic development and will stimulate participation of all stakeholders, including people living in rural, remote and marginal areas.

The preservation of cultural heritage is a crucial component of identity and self–understanding of individuals that links a community to its past. The Information Society should harness and preserve cultural heritage for the future by all appropriate methods, including digitisation.

revolution fiercely and destructively permeate all local cultures and economies. Are we dealing with a smoke-screen designed to conceal the interests that govern international relations?

It appears that, in contemplating how best to deal with the information age, we cannot set aside the principle of benefiting from the new technologies. This thinking is likely to construct a defined space in a world governed by institutions with the capacity to transcend hopes and dreams and to use the missteps of the past to build the present and produce a future that is more open to the advances of human knowledge, both present and future (Djait, 1978, in French).

The battle over knowledge in our societies is a multi-layered, all-out struggle, which requires greater indigenisation of the notions of reason, history, enlightenment and critical thought

To summarize, all discussion of the repercussions of the knowledge society on Arab culture and identity overlook the fact that the knowledge society essentially requires rational economic management and relies on a social structure supported by a contemporary culture, as well as great capacities of intercommunication with the outside world. Can the Arab region enter the knowledge society on this basis? Can it grasp that buying the technologies of luxury with money does not create a knowledge society and does not lay the foundations on which an enabling environment capable of creating a knowledge-based economy can be built? The battle over knowledge in our societies is a multi-layered, all-out struggle, which requires above all greater indigenisation of the notions of reason, history, enlightenment and critical thought.

THE ARABIC LANGUAGE AND THE CHALLENGES OF INFORMATION TECHNOLOGY

Arabic made tangible advances that played their part in the development of written, auditory, and visual media with the construction of new forms unknown to our old linguistic system

What has been said about identity applies equally to the Arabic language, with which it is interdependent. Arabic's continuing inadequacy with regard to the challenges of the knowledge society, particularly in the area of information technology, results in linguistic isolation that reveals the powerlessness of linguistic media to develop appropriate tools for work and production.

Two positions may be identified with regard to linguistic reform. The first is the "nihilistic" position, which assumes the death of local languages and cultures as a result of globalisation. This ignores the importance of linguistic and cultural diversity in a complex world with contradictory interests and goals. Indeed, it fails to take in that the supposed universality is subject to all parties playing a role in its construction. The second issue is the "political and ideological debate" over the state of the Arabic language. This is a debate that generally fails to address the heart of the subject, which is the state of educational institutions. It also ignores the state of language teaching and the competence of teachers and students in the areas of communication, expression, and writing. For this reason, the debate tends towards the adoption of political positions based on emotion and incapable of visualizing the fate that awaits the Arabic language in the absence of a defined and publicly announced linguistic strategy.

The reality of linguistic pluralism in our society includes inherited features linked to our history and accumulated experience of dealing with the problematics of the Arabic language. To ignore what this has cost us will make it doubly difficult for us to initiate a programme of resolute reform for the Arabic language that will equip it to join the knowledge society. In creative languages, the rules are not transformed into hindrances. On the contrary, these rules are likely to generate new ones to replace antiquated matrices through the renewal of the linguistic structures that innovation calls for. This is something that has not happened in the history of Arabic to date. Modest modifications in the practise and writing of Arabic have been made starting from the time of the Arab renaissance. Nevertheless, the classical language has continued to be generally content with values and vocabulary preserved from

the Middle Ages, as if all that has happened and is happening in the development of knowledge and the world concerned neither ourselves nor our means of intercommunication with the world and its new products (Sa'id Yaqtin, background paper for the Report, in Arabic).

In the last century, the Arabic language made tangible advances that played their part in the development of written, auditory, and visual media with the construction of new forms unknown to our old linguistic system. The increased volume of books and other printed media, the satellite channels, broadcast stations and other media have given expression in Arabic new abilities to grasp subjects and approximate them with new linguistic mechanisms. Text books, movies, and Arabic novels have also played important roles in expanding linguistic sensibilities, enabling them to translate contemporary psychological and social emotions, feelings, and trends.

In the area of informatics in Arabic, it is now possible to find software that offers an electronic library with edited encyclopaedias and books, as well as software teaching the Arabic language for different age groups. These positive indications are no excuse for the continuing decline of the Arabic language, which faces several challenges posed by information technology and the knowledge revolution. The question of whether the Arabic language can confront the challenges of knowledge globalisation is addressed in Chapter 4.

Those who see language as a closed, self-sufficient system confuse the rules for a specific stage of development of a specific system in a language with the way in which that language is used to produce and create knowledge, to create new rules appropriate to its evolving course, its shifting system, and its self-renewing symbolic reserves. The sentimental and the static non-historical views of language encourage the evaluation of a language according to criteria of perfection. We believe it is important to isolate and group these two views together, since both play a role in the dessication and mummification of the language.

The sentimental position on the language comprises a group of epistemological values, such as its absolute perfection, and a closed rule set. These require examination. Both positions ignore the fact that Arabic, like all languages, develops, declines, and is affected by the same incidental transformations that have affected cultural media and symbols throughout history.

The problems of the Arabic language are due to the neglect that it has experienced in recent decades, since most Arab states suffer from a lack of a clear linguistic policy aimed at reforming linguistic performance. Arabic will not regain its position until a linguistic reform policy takes shape that allows it to exercise its proper role in administration and economics, in commerce and contracting, and in all the other areas of modern life, and until we fashion within it the determinants of our existence in a changing world (UNDP, 2003, in Arabic).

The problems of the Arabic language are due to the neglect that it has experienced in recent decades, since most Arab states suffer from a lack of a clear linguistic policy

If we take language to be the vessel that preserves and conveys culture and knowledge, we must also believe that the problems of language cannot be solved by improvisation or in haste. First and foremost, they require inventive, innovative construction of knowledge-related options. After this we can proceed to institution-building and the development of programmes, leading to the accumulation of experience and expertise in developing the Arabic language. This is a particularly pressing challenge since we live at a time when languages that are not in harmony with the mechanisms of innovation, production, and development are slated for oblivion. Today these mechanisms are a prominent feature on the universal linguistic landscape, since, while four thousand languages compete in the world, only fourteen enjoy an effective, productive presence in the universal language network (UNDP, 2003, in Arabic).

The problems of language require inventive, innovative construction of knowledge-related options

Challenges to the Arabic language have been exacerbated by the information revolution and easy access to the highways

The most obvious example of the gap between the status of Arab women and men in the knowledge society is the high illiteracy rate among girls and women, as well as the low rate of female educational enrolment

of the knowledge society. Its current reality not only requires growth and development, but the building of new languages within the language as well, as with all languages that play a creative and interactive role in the knowledge society. This issue may also have a political dimension, in addition to the historical and structural givens that with the passage of time have become part of the structure of the language itself. These call for serious critiques that can move us from language to ideas, or, in other words, to a critique of petrified ways of thinking (see Chapter 4).

Linking the Arabic language with the knowledge society strengthens its position and enables it to develop its media, symbols, and systems (Nabil 'Ali and Nadiya Hijazi, 2005, in Arabic). The history of the formation of Arabic tells of innate capacities that we must now release in order to tear down the barriers that the language has tended to turn into absolute norms. These two facets—the language's innate capacities and the technologies of the knowledge society—provide the opportunity for Arabic to overcome the stagnation that dominates it. Both call for conscious effort, inspiring vision, and a comprehensive strategy. This is a political issue and, at the same time, a technical choice to be confided to specialised and qualified people, who are required to put in place new rules and mechanisms in keeping with the requirements of the knowledge age. There can be no doubt that success in this realm is possible, so long as attention is paid to the exigencies of the age and the issues of change posed by the knowledge society (see Chapter 6).

BOX 1-8

Women's Freedom is a Key to Many Doors

Giving women the same opportunities as men is basic for women's involvement in the knowledge society. It poses the empowerment of women as an integrated system including law, politics, society, economics, and culture, as a way to end the multi-dimensional digital divide and to establish the conditions needed for the assumption of citizenship on the political, economic, social, and cultural levels. That we recognise education as a fundamental driving force of the knowledge society should not lead us to restrict empowerment of women to this critical sector. Education can in fact play that role only if we deal with it as a right and a freedom that expands to and intersects with, not only economic, social and cultural rights, but also civil and political freedoms. It is precisely these expansions and intersections that open the door to the enjoyment of education as a right, one that is in effect a debt owed to the individual by the state under the rubric of "rights and obligations," and a freedom to be enjoyed at the same level as those of choice and conduct and that falls under the rubric "freedom—independence." This can only happen through empowerment considered as a societal act in which the legal, political, economic, social, and cultural aspects of life intermingle. The active parties in this effort cannot be limited to civil society organisations concerned with women's issues but must include all institutions, be these political parties, trade unions, or even government bodies and international organisations.

Source: Ruqayya al-Musaddaq, background paper for the Report, in Arabic.

THE KNOWLEDGE SOCIETY AND ARAB WOMEN

In comparison to their situation in society in the early part of the second half of the twentieth century, Arab women have registered advances. These gains are still not commensurate, however, with the actual role required of them in society. Nor are they fully in accord yet with the values of the knowledge society.

The most obvious example of the gap between the status of Arab women and men in the knowledge society is the high illiteracy rate among girls and women, as well as the low rate of female educational enrolment compared with that of males, especially in higher education (UNDP, 2005, in Arabic).

It is a fact that the Arab presence in the knowledge society is still in its infancy and lacks a unified, concrete strategy, and that much energy is squandered because of poor management and the lack of a clear vision and goal. This said, the position of women on this unsteady ladder is still unquestionably lower than that of men. It is vital that a multi-pronged approach be adopted that seeks to bring women further into the knowledge landscape, with efforts on multiple fronts of empowerment to overcome the many problems that leave women at a lower level in society than men.

The 2005 UNESCO Report *Towards Knowledge Societies* raised the subject of the relationship between women and science and revealed the issue of the underrepresentation of women and that

of various ethnic, religious, and other marginalised social groups, as well as of young people in that area. According to the report, this applies equally to advanced and developing countries, in that the crisis in science education for women may be understood as an indicator of gender inequality. This report called for support of initiatives to make science education accessible to all regardless of gender. Even though the influence of the positivist approach on the report is clear, what matters is that, in general terms, education is an appropriate way to approach the status of women in the knowledge society project. To release the freedom and innovativeness of Arab girls and women requires preparation of numerous enabling environments. These should include those of the family, of societal education and upbringing, and of culture, in order to discourage gender discrimination in its various shapes and foster everything that may encourage women to play a distinguished role in development, knowledge, and public life. Difficult as it may be, this choice may equip Arab society to expand human well-being and give new generations of girls more opportunities to enhance their dignity within society.

Discussion of the status of women in the knowledge society requires an acknowledgment of the complex nature of the subject. Inequality between men and women is longstanding and rooted in history. Ending discrimination means upsetting many delicate balances that have become immutable principles (Kamal 'Abd al-Latif, 2006, in Arabic). To confront this problematic issue requires caution and courage—caution in constructing and analysing the data and courage in building visions and perspectives that are capable of shaking loose the discriminatory behaviours and beliefs which have been perpetuated in society through extant rules, laws, and cultures (Ruqayya al-Musaddaq, background paper for the Report, in Arabic). Let us then proclaim the slogan: "No knowledge society without women!"

To transform this slogan into reality, we must reinforce the successes accumulated by human experience, since education should be considered a central motor in the drive to prepare women to be productive agents in the knowledge society. In recent times, a certain consensus has been arrived at on the importance of education in the life of women and in social revival. Reformist writings of the Arab Renaissance tend to link education and work and their joint role in putting an end to the inferior status of women in our society. In 2007, UNESCO dedicated a report to the relationship between science and technology learning and gender. Its most significant recommendations were:

1. Expanding women's participation in the scientific and technological professions and in scientific research.
2. Raising public awareness of issues related to science, education, and gender.
3. Increasing the amount of data collected in this area in order to support research and construct suitable policies to end existing disparities (UNESCO, 2007a, in Arabic).

In Arab countries, political and cultural pressures and social constraints form multiple and complex restrictions that strengthen tradition and conservatism

In Arab countries, political and cultural pressures and social constraints form multiple and complex restrictions that strengthen tradition and conservatism and create options contradictory to those of justice, equality, and freedom. The effects of these restrictions may be seen on the various structures of society and help delay establishment of the knowledge society, whose material and symbolic options are unlimited. The Tunis Commitment issued by the World Summit on the Information Society (United Nations, 2005, in Arabic) contained a clear recognition that a "gender divide exists as part of the digital divide in society" as well as clear support for gender equality and empowerment of women to overcome this divide.[3]

Arab women have been subject to much discrimination, since information technology has employed new mechanisms to draw stereotyped, degrading images of women, such as those prevalent in the media and the internet

Women in general, and Arab women in particular, have been subject to much discrimination, since information technology has employed new mechanisms to draw stereotyped, degrading images

BOX 1-9

The Virtual as an Interrogation of the Actual

The French word *virtuel* apparently came into Arabic from the field of optics, where the virtual image meets the actual body in front of the mirror—that image that we assume is at the same distance from the mirror as that of the body and which is assumed to be the source of the rays reflected from the mirror that make us believe we are seeing an image of ourselves.

This carry-over from the field of optics brought with it meanings that are still linked with the concept of the virtual, in that it is closer to the realm of hypothesis, illusion, and imagination, and faces and opposes reality.

The French term, it is true, is derived from the idea of "potential" as contrasted with "actual" existence. However, the virtual is not merely illusion and imagination, or even merely possibility. Virtual is to possible as actual is to real. The possible, according to Deleuze, is ready and waiting to become real; it is in a state of perfect readiness for realisation and is therefore fixed, stationary. The possible confronts the real, but the virtual confronts the actual. For the virtual to become actual it must face difficulties and solve problems; it must renew and invent. The possible is a composite of solutions, while the virtual is composed of problems . . .

For entrepreneurial work, for example, to become virtual is for the spatial and temporal dimensions of the work to become a permanent problematic, an issue constantly posed, rather than a static condition. Instead, then, of being a solution, these become a problem, or a complex of problems. The entrepreneurial work becomes virtual if its centre of gravity is no longer a stationary group of institutions, jobs, and timetables and turns into an act of harmonization that, in an uninhibited and fluctuating fashion, constantly reorders the spatial and temporal dimensions of the work team in accordance with imposed conditions that are constantly being recreated.

Virtuality, then, is not a shift from a reality to a variety of possibilities and is not *e fortiori* a cancellation of reality. It is a new way of looking at the traditional concepts of definition and identity and of forcibly inserting the possible "into" the existing. It is a convulsion of the actual.

Source: 'Abd al-Salam bin 'Abd al-'Ali, 2008, Fi al-Infisal, Dar Tubqal, Casablanca, p. 58.

of women, such as those prevalent in the media and the internet (UNDP, 2005, in Arabic). However, information technology itself can present alternatives to such examples of gender discrimination so long as the environments and institutions exist that guarantee construction of a society of knowledge citizenship built on equal ownership of the power of knowledge, thus placing mankind on the path to innovation and well-being.

Today, at the start of the twenty-first century, our lives are enframed by the growing fusion between man and machine

INFORMATION TECHNOLOGIES AND VIRTUAL SPACES

We assume that those who call our age the "information age" want to highlight the fundamental role of information technology in the formation of the knowledge society. Certainly the pace at which science and its technologies have permeated civil societies since the first and second industrial revolutions has reached an extreme in information technologies. At the heart of individual and civil life, and in the knowledge society itself, the result has been uncontrolled outcomes and unimagined prospects.

Today, at the start of the twenty-first century, our lives are framed by the growing fusion between man and machine. We are living in the age of technology and its manifestations *par excellence*, at a point when it is no longer possible for man to dispense with many of technology's advances and achievements. Its overwhelming presence, and that of its instruments and perspectives, embraces all manifestations of production within society. This situation has nothing to do with information technologies and their new and old economies, which in information contracts took on the characteristics of the dominant technical format, whether as foundation or as framework, or in the fields of organisation and the search for markets. Instead, it transcends this specialised sector of knowledge to enter other sectors in numerous areas, such as the environment, mining, and the chemical industry. Today, labor is oriented to constructing more new research spaces employing new methods. Information technologies are applied to the construction of natural disaster early warning systems, biotechnology, genetics, space technology, micro-electronics, new applications of biotechnology in the diagnosis and treatment of disease and desalination, as well as increased agricultural production and energy production and conversion. Man seeks to know and to control nature to achieve human well-being and a life of dignity.

It should be noted here that technological innovation no longer requires prolonged periods of time, as in the case of the first and second industrial revolutions. New technologies allow for speedy development. Through combined efforts, and an appropriate institutional

infrastructure, effort, energy, and resources are saved. What have come to be known as collective laboratories provide prominent examples of such infrastructure. In these labs, the same work is carried out in different locations and the pace of research is facilitated through the use of information and communication technologies, which complement the distributed research efforts. This reduces wasted effort, energy, and resources and enhances the potential for cooperation and complementarity for innovation.

This revolution has brought us high levels of production, as well as continually tearing down the relationships inherited from the first and second industrial revolutions. Simultaneously, it has brought us continuous tension and uncertainty. All that was once solid vanishes like smoke, and new scientific ideas and discoveries become obsolete before they are able to mature and take root.

There are those who believe that technology is merely the application of scientific knowledge. This belief has gained strength through its association with profit, since technology in its current manifestations has been viewed merely as a means to realise specific gains and benefits. For this reason, the importation of technologies is always defended on the basis that they are no more than neutral means to an end. This is not only an Arab way of thinking, it is popular in the West as well, many Western philosophers taking the same position on technology. It is only recently that technology has become a philosophical question in itself: "Technique is a kind of knowing" (Heidegger, 1958, in French). Mechanism, in its contemporary meaning, is not merely an application of science (except in so far as it contains mathematical calculations), but encompasses a certain theory and embodies it. Mathematics is the field of knowledge through which practice took a mechanistic character. Science itself became mathematical only because of its link with the desire for knowledge and control over nature.

Today, therefore, technology has become one of the manifestations of existence, and our age has indeed become the "age of technology." Diverse manifestations spring from the technology that moulds so many of the outward expressions of our lives, most prominent among them the homogenization of life styles and thought, the industrialisation of technological, cultural and tourist activity, the dislocation of place and time, the loss of a sense of closeness, excessive consumption and consumerism, planning and programming, the depletion of natural resources and formation of huge energy reserves. These manifestations and characteristics define the role of technology in standardisation and homogenization, while at the same time revealing the main features of new questions that we are called upon to construct and solve (ʻAbd al-Salam bin ʻabd al-ʻAli, background paper for the Report, in Arabic).

We live in the midst of a new technological revolution, whose impact touches the ways in which life and knowledge are organised and has generated an unprecedented efflorescence of knowledge. As we know, digital technology has produced new, apparently limitless means to store knowledge. The Internet has created a revolutionary enlargement of our mental capabilities, as in the fields of memory, representation, and innovation. However, in the opinion of some, increasing reliance on the machine and dependence on it when called upon to remember weakens the memory itself, which maintains its functionality through use. Apprehension is rising in the knowledge society over new forms of technology and their effects on our psychological skills and ability to work.

We cannot separate knowledge from power. The technological boom that created many aspects of "virtual reality" gives those involved new means to control the world. "The United States and Western Europe together own by far the largest share of knowledge technologies and monitor all global systems. They monitor

We live in the midst of a new technological revolution, whose impact touches the ways in which life and knowledge are organised

Technology has become one of the manifestations of existence, and our age has indeed become the "age of technology"

We cannot separate knowledge from power

The upsurge in technological prowess has raised a number of complex issues, most significant of them its effect on the system of ethics and the future of societal values

There is a consensus that knowledge societies are linked to the basic system of human values of freedom, equality, justice, solidarity, and respect for cultural diversity

The need for a new code of ethics for the knowledge society cannot be denied

the financial, economic, media and information systems, the systems by which knowledge and expertise are transferred and armies and military material moved. They monitor strategic points of entry and exit, controlling the global monetary markets, the markets for primary and manufactured goods, the entertainment markets, and the worlds of virtual education; in fact, they are trying to establish a single, universal style for the world in behaviour, clothing, and taste" (Muhammad Sabila, 2007, in Arabic).

We are not portraying here a fantasy octopus. However, in the manifestations of the current and continuing technological revolution we see a world still developing, some of the aspects of which are predictable while others remain to be discovered. Our abilities to see the big picture and project the likely results have become limited in a world changing too fast to respond to. We may need to maintain caution in our relationship with technology in order to succeed in our new relationship with ourselves and with our new tools in a world that we are fashioning. The pace of this world is too fast for us to absorb, and we will become its victims if we do not manage our affairs vigilantly, wisely, and with insight.

THE KNOWLEDGE SOCIETY AND THE LEGITIMACY OF A NEW ETHICAL CODE

The upsurge in technological prowess in human societies has raised a number of complex issues, most significant of them the effect this has had on the system of ethics and the future of societal values. While values systems have interacted with the challenges unleashed by change and development throughout history, they have also restricted the impact of transformations generative of new realities and questions, since processes of adaptation and acclimation must take place before such shifts can have impact on value systems.

Certainly, the ethical question is becoming increasingly complex in the knowledge society. It has manifested itself in the many aspects of life where contradictions and new forms of conflict are rife, such as the question of gender equality, and issues of migrant labor and migration, combating terrorism, violence, corruption, and organised crime. This is particularly the case on the internet, where new crimes such as banking fraud, violations of personal data, copyright violations, and the repercussions of virtual reality, have arisen as a result of permeation by the systems and symbols of the knowledge society.

In addition, the scientific revolution has raised issues about innovations in genetic engineering (UNESCO, 2005, in French), for humanity finds itself confronted by ethical issues that the values of the past have no ways to address or solve (Centre Europe-Tiers Monde, 2007, in French). Environmental ethics, which have become part of our new view of the world (UNDP, 2007c, in Arabic) and the ethics of new knowledge systems call for the rethinking of the concepts of freedom, equality, security, and trust, concepts that in the past had specific meanings and now must be rebuilt to meet the needs of the changes occurring in knowledge societies.

True, there is a consensus among international institutions that seek to influence aspects of these on-going changes to the effect that knowledge societies are linked to the basic system of human values of freedom, equality, justice, solidarity, and respect for cultural diversity. True too, these values are spelled out in successive human rights charters, making them a foundation of the new code of values. Nevertheless, we must ask: Are the significations and appeals to be found in the letter and the spirit of these rights charters enough, or must we strive to include the variables that arise under the influence of the knowledge and information revolution and thus establish values that fit the current reality?

Inherited philosophical meaning in the age of enlightenment awarded a specific

value to the lexicon of ethics, but we cannot think or work at the beginning of the third millennium using eighteenth- or nineteenth-century values. The knowledge society practices constructive transcendence by creating new aspirations that require the building up of codes of individual and collective values in the area of rights, with content appropriate to the transformations taking place on the ground. The disconnect between inherited significations, the information explosion, epistemological transformation, and the mounting revolution in high-precision scientific discovery and the life of humanity requires us to fashion new meanings that encompass the spirit and logic of epistemological change (‘Abd al-Razzaq al-Dawway, background paper for the Report).

The need for a new code of ethics for the knowledge society cannot be denied. In 2007, UNESCO released the draft of just such a code. Before we provide any ideas in defence of this new draft and highlight its most important points, we must present an inventory of the most important advances in this area, advances that must be further developed to respond to the challenges and questions posed by the knowledge society (UNESCO, 2007, in French).

The Declaration on “The Right to Development” issued by the UN General Assembly in 1986 represented a qualitative shift in the history of international charters, especially with regard to its support for equal opportunity of access to basic resources such as education, health services, food, housing, work, and income. This Declaration was reinforced by a second document containing the Declaration and Programme of Action of the 1993 World Conference on Human Rights, Vienna. This added to the rights in the first Declaration the recognition of democracy, development, and respect for human rights and fundamental freedoms, which are interdependent and mutually reinforcing.

These declarations were not easy to bring about. More than four decades of deliberation went into their preparation in this form. We must look at the actual indicators that the on-going global conflicts reflect. These data show the transformation of the contents of the declarations into acts. They form a pattern of relationships containing a major paradox—the confrontation between these declarations of principles and their signature, and what actually happens on the ground.

Looking at the harsh struggle taking place on the ground, we may say that promises the international community

Promises of the international community concerning the knowledge society have not kept up with the widening and deepening of the gaps between the North and the South

BOX 1-10

The Genome, a New Triumph for Knowledge

The Genome Project has at its core the tracing and drawing of the information contained by the cell (twenty-three pairs of chromosomes for organisms that reproduce sexually, such as man, and a smaller number for other organisms). These single-cell chromosomes give us the complete story of the organism’s characteristics—physical, psychological, and intellectual—and are the basis on which we may make predictions (in some cases with certainty) about the course the natural development of this organism will take. . . .

What makes the Genome Project important is that it can draw the genetic map of a living being in its mother’s womb, before it is a complete foetus. The result is analogous to finding the mistakes in the letters, words, paragraphs, and chapters of a recently written novel before the original is sent to the printer’s, fixing those that can be fixed and predicting defects that cannot be fixed with available medical technologies.

We are, therefore, at the threshold of a new triumph that will open up vast new prospects for the human race and be the dominant feature of the twenty-first century, surpassing the developments in the natural sciences and related technologies of the previous century...

With this new beginning, we find human societies forced to review their ethical values and economic principles to form appropriate legislation to limit man’s excessive aggressiveness on the one hand and to steer these discoveries towards uses conducive to society’s well-being and a better standard of living on the other. Entering the genome age means, in the best case scenario, that a global commercial network will provide increased and improved agricultural yields and remove pesticides from the environment. In preparation for this change, human societies will be obliged to review economic concepts and geo-political boundaries, which in turn may lead to a new understanding of the role of governments and their relationships to individuals, and the role of international institutions. The new genome society will have amongst its goals the treatment of illness before it strikes and the tailoring of medical treatment to the genome blueprint of each individual. This will complement the currently only theoretical capacity to provide the sick person with spare parts taken from his or her own body. Undoubtedly, getting nearer to some of these achievements means a new type of medicine and different medical training, as well as health care of a sort the foundations of which do not yet exist. Increasing longevity and the possible elimination of some of the diseases of aging will mean an increasing burden of elderly people on society and a change in the age map, with collateral impacts on other aspects of life. All of this, of course, is in addition to possible nightmare scenarios—such as the deliberate interference with the human genome map leading to human cloning, with all the scientific, ethical, legal, and even catastrophic, repercussions that that implies.

Source: Mustafa Ma‘rafi, “Al-Bahth ‘an Al-Kamal Al-Bashari” in ‘Alam al-Fikr, vol. 2, issue 35, pp.10-11.

has made concerning the knowledge society have not kept up with the widening and deepening of the gaps between the societies of the North and those of the South. The problematic of varying rates of development today creates symbolic facts that exercise frightening control over access to knowledge. These facts produce forms of marginalisation, isolation, and suffocation that have compounded and continue to compound the disparity among countries of the world, especially between the wealthy nations and the developing world.

Collective human effort must be directed towards the development of a code of ethics broad enough to encompass the spirit of older codes and inclusive of the new variables brought about by the revolution in knowledge areas

The official position in some developed countries remains ambiguous. It speaks with two tongues and employs double standards. It finds no contradiction in its proclaimed positions and thus helps to create further forms of unequal relationship in the world. This question was very accurately analysed by the 2005 UNESCO report *Towards Knowledge Societies* (UNESCO, 2005a, in Arabic). The 2001 UNESCO Universal Declaration on Diversity considered protection of cultural diversity a human right, calling at the same time for it to be viewed as a moral demand that must be respected.

The advances of the knowledge society raise several issues that must be resolved with Arab participation. Is the world today moving towards becoming a mere victim of the "soft" but overwhelming technological revolution, a revolution that is difficult to stop or divert? In thinking about knowledge societies, will we continue to use approaches and ethical systems that fail to assimilate the changes taking place in the world?

By way of example, the most explosive issue in the area of knowledge society ethics is that of the limits of innovation in biology and the life sciences. Discovery of the genome, today considered one of the greatest advances in science and technology, has prompted some to re-launch "gene selection" in the framework of the "liberal inclination towards eugenics." This has led to consideration of the possibilities provided by biotechnology and its accelerating breakthroughs for early diagnosis of artificially fertilised embryos before they are implanted in the womb (Habermas, 2001). In his book *Consequences of the Biotechnology Revolution*, Francis Fukuyama deals with the relationship between the new biotechnology revolution and the value system, highlighting the importance of the subject and the necessity of creating concrete foundations to guide it (Fukuyama, 2002).

Collective human effort must therefore be directed towards the development of a code of ethics broad enough to encompass the spirit of older codes. Above all, it must include the new variables brought about by the unprecedented revolution in knowledge areas and modern communications networks. A new generation of crimes and ethical contradictions accompanies the on-going revolution and defines certain of its repercussions. This is evident in many of the double standards that govern international relations, requiring that we work collectively to reach thresholds of harmony and balance that create and guarantee more humane international relations. We must urge that the new ethical framework for knowledge societies advance our hope to build a more flourishing, humane world, founded on values of human solidarity, coexistence, cooperation, and connectedness.

CONCLUSION

It is no simple matter to pin down the concept of the "knowledge society" and its synonyms or to grasp its related concepts. The process of argumentation followed in this chapter has constructed several arguments that have helped us to take a closer look at the concept and its corollaries. We have in the process consciously dispensed with two important facets of the concept of knowledge: first, significations implied by the term "knowledge" that have been inherited from Arab historical tradition, and, second, the positivist implications that

limit knowledge exclusively to the realm of science and technology. The remaining facets of the definition were presented in the form of assertions that identified the technological and economic poles as the main reflections of the knowledge society. The knowledge society based on innovation creates its new manifestations through the give and take of technological development and the improvement of human theoretical acuity, and contributes to the goal of expanding human options.

In the repertoire of concepts now commonly used, "synonymity" has been replaced by "interaction," which better expresses the relationship of the terms within whose framework the discourses of the knowledge society are organised. A critical attitude was necessary with regard to the positivist quantitative mindset and the modernisation orientation in its human rights and political aspects. This attitude allowed us to deconstruct these two positions, uncover their ideological dimensions, and scrutinise some of their paradoxes and contradictions of reality. The meaning of the concept of the knowledge society was expanded by reference to the requirements of the state of Arab epistemological reality. The axis dealing with the problematics of the knowledge society raised a sample of the most important questions posed, such as those related to identity, language, technology, gender inequality, and challenges to values and ethics. It also raised the question of political participation and democratic reform in the Arab world. We expressed our belief that the reinforcement of the path to attaining the knowledge society in the Arab world is inseparable from the twin demands for a renaissance and for human development, which form the long range goals of this report. Our objective in the above has been to formulate an Arab perception of these topics and problematics and thus produce a vision that combines an analysis of the data and indicators with consideration of them in the light of the complex and composite nature of the knowledge society.

The knowledge society will never be brought into being through the mere transfer of technology or its complacent consumption, nor will it come about through acceptance of the status quo and of dependency, or of the unreflective commoditization of knowledge. Effective and creative involvement can only be attained by building an all-embracing vision of the topic, a vision that does not ignore the fact that epistemological commodities and tools, and technologies, repress certain values and create others, and that the progress to which we aspire calls for a major infusion of knowledge, alertness, and awareness.

Passage through the portals of knowledge—the rite of passage of our age *par excellence*—requires of the Arabs that they complete two steps at one and the same time: reconciliation with the self, through the diagnosis of its weaknesses and failures, and reconciliation with the rest of the world, through a commitment to learn from its achievements. Both steps call for considerable daring and courage—qualities that are essential if history is to be made.

Attaining the knowledge society requires of the Arabs that they complete two steps at one and the same time: reconciliation with the self, through the diagnosis of its weaknesses and failures, and reconciliation with the rest of the world, through a commitment to learn from its achievements

End Notes

1 Epistemic saturation refers to the absence of the lines that set the limits of the connotation of the concept. Early in the process of their formation, concepts emerge in a specific epistemic field in a pre-saturated form by virtue of their novelty and the absence of agreement among their users. Saturation takes place during the process of the cumulative use of the concept, and as a result of agreement on its signification among specialists and practitioners. We must not here associate epistemic saturation with obscurantism and static constancy. Concepts have their own life-spans and forms of crystallization. A signification therefore varies then settles down, then becomes a vocabulary item in the knowledge repository within the frame in which it is used.

2 Michel Cartier, http://www.michelcartier.com and Idris Binsa'id, background paper for the Report, in Arabic.

3 Tunis Commitment, Article 23.

CHAPTER TWO
ARAB KNOWLEDGE PERFORMANCE ENVIRONMENTS: EXPANDING FREEDOMS AND BUILDING INSTITUTIONS

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Introduction

Knowledge is no longer the purely intellectual and contemplative issue it once was; today it is an economic, political, and social issue influenced by the regulatory environment, development policies, and the sum of political, economic, and social freedoms. It is influenced also by recent global developments that, due to the communications revolutions underway around the world, know no barriers.

The relationship of knowledge to a society and its culture and heritage is not a unilateral one; it is a multi-faceted interactive dialectic. Knowledge acts as a support to development, powerfully leveraging it and improving the quality of life. Thus, any positive progress in knowledge performance reflects on the totality of development performance.

Global knowledge environments have witnessed continuous activity, particularly with the emergence of the globalised economy, which does not recognise traditional borders and depends to a high degree on knowledge and intellectual capital. Ideas and information have emerged as the basic engine for economic development, or even for development in its broadest sense. This corroborates Endogenous Growth theory, wherein knowledge is both a fundamental underpinning for development and the result of steadily increasing dividends on investments in human and intellectual capital; as a result the "ideas gap," considered a basic cause of the development gap, is closed (Romer, 1986, 1993). This theory is supported by actual events: developed countries and some in the developing world which have emerged as pioneering epistemological paradigms have succeeded in exploiting digital economic innovations so as to tie knowledge to development and realise rapid economic growth through the provision of enabling environments. At the forefront of such environments are those that have provided a climate characterised by freedom of thought and expression and broad participation.

In the midst of this global activity, issues have emerged of paramount concern to developing nations, among them the Arab countries. The most pressing of these issues may perhaps be formulated as follows: What is the nature of the relationship between knowledge performance and freedom? Is knowledge a public good and to what extent can it be made more democratic, in the sense of being accessible to all? Debate has also ensued over intellectual property. What is its connection to the exercise of monopolies by trans-national corporations? How legitimate are the alternatives available to developing countries?

Sharp disagreement has also arisen over tariff barriers to knowledge exports and the role of a free media in a world of open satellite channels, the internet, and digital media. These are but a sample of the issues and questions on the table in a world teeming with the dynamics of knowledge, technological activity, and intellectual debate. These issues reflect fundamentally new tensions and contradictions, while also constituting what may be described as fuel for those enabling environments which come together to promote the establishment of a new society that might be broadly labelled a "knowledge society."

This chapter cannot do justice to all the components of these enabling environments in the Arab world, which range from regulatory, legislative, institutional, and legal, to social, economic, and political. Nor will it list all the factors which stimulate or impede Arab knowledge advancement. Instead, it will focus

The relationship of knowledge to a society and its culture and heritage is not a unilateral one

Knowledge acts as a support to development, powerfully leveraging it and improving the quality of life

Freedom is the basis of development. It contributes to a broadening of choices and individual possibilities in the various spheres of life

Arab environments, as a whole, still lack the most important mechanisms for empowerment based on knowledge

Achievements in public freedom, social and economic freedoms, and the freedom to create are modest in Arab countries, despite a degree of progress and some signs that give grounds for hope

on the enabling environments from a particular angle, that of freedoms, since they are the cornerstone of such environments. It will also make reference to the role of supporting institutions, given the important role their organisational structure plays in paving the way to a knowledge society.

This chapter takes as its starting point the fundamental premise that freedoms in their various forms are the most salient feature of those environments that stimulate knowledge. This premise has become a touchstone of the era and a guide to all experiments in the advancement of knowledge. Every enabling environment that fosters freedoms provides an appropriate framework for the establishment of a knowledge society. Knowledge and freedom are two sides of the same coin. Similarly, freedom, according to Amartya Sen, is the basis of development (Sen, 1999). It contributes to a broadening of choices and individual possibilities in the various spheres of life. As a consequence, freedoms, here, are both an end and a means to development, a cause and a result. A cluster of political, economic, and social freedoms constitutes the best environment for the production and optimal use of knowledge. It is the most important motivational tool for development in the broad, humanistic sense of the word—development, that is, that transcends mere economic growth and rises in average individual income to include the enrichment of individuals' lives, improvement in their living conditions, and the advancement of the active, contributing citizen. In this sense, freedoms constitute a fundamental axis of knowledge environments.

However, our concern with loosening the reins on freedoms does not mean overlooking the frameworks of responsibility which allow for the protection and investment of the fruits of freedom. These frameworks are comprised of the institutions that support and preserve everything that helps develop knowledge and brings a knowledge society into being. While the environments which enable knowledge are established thanks to a prevailing climate of freedom, they can only ensure continuity and efficacy through sponsoring institutions that organise systems for the production and propagation of knowledge. Furthermore, they only bring about legitimacy and rationality through the agency of the arsenal of laws and legislation that guarantee that they will continue to thrive and develop.

THE STATE OF KNOWLEDGE ENVIRONMENTS IN THE ARAB WORLD: CONSTRAINTS AND PRESSURES

We take this dependence of enabling environments on participation and freedom as our starting point. We may, however, ask ourselves: What is meant by knowledge environments? And do Arab environments stimulate or impede the production, use, and acquisition of knowledge? If we take as our premise that development is freedom and that knowledge is a human right as well as a basic component in the implementation and realisation of development, most indicators show that Arab environments, as a whole, still lack the most important mechanisms for empowerment based on knowledge. Political, social, and economic restrictions are the rule, freedoms the exception. Achievements in public freedom, social and economic freedoms, and the freedom to create are modest in Arab countries, despite a degree of progress and some signs that give grounds for hope. That freedoms in the Arab world are abused is no value judgment or prejudice but rather a fact corroborated by reports, statistics, and qualitative and quantitative indicators. It is true that there is considerable disparity in some of these data from one Arab country to another. This is because the state of freedoms experiences ups and downs, periods of progress, retreat, and instability according to external pressures and states' priorities, over and above the givens of any internal struggles. However, the general trend of freedoms in the Arab world is from bad to worse, not from good to better, despite some successful reform initiatives and despite the indicators of rapid economic growth in some Arab countries in recent years, previous to the aggravation of the

current economic crisis in the autumn of 2008.

The cluster of freedoms necessary for the knowledge-enabling environment is not limited to political freedom; it includes economic, social, intellectual, academic, and creative freedoms, all of them linked to the principles of equality and justice espoused in the principles of human rights. While human rights are considered an integral whole the Arab reality shows a clear disparity in the provision of some freedoms as opposed to others. Thus, a realistic analysis requires that we study the state of each facet of freedom on its own.

It is impossible to rely solely upon improvements in the domain of economic freedoms to bring about an Arab knowledge revival in development if there is a continued imposition of curbs on other freedoms, especially those of thought and expression. Relying on economic freedoms alone, in fact, leads to diminished development whose sustainability can not be guaranteed. In addition, hopes of achieving a fair distribution of development's social yields will also recede in the shadow of an undemocratic climate in which the people have no oversight and in which corruption burgeons.

Limiting political, social, and intellectual freedoms threatens to produce negative repercussions not only on Arab knowledge performance or development performance; it may bring harm to the body politic as a whole, especially in the midst of attempts to contain extremism and eliminate terrorism. As long as oppression, poverty, and social marginalisation remain, extremism and terrorism in all of their forms will abound, with negative impact on the establishment of the hoped-for knowledge society. Furthermore, in the absence of political freedom accomplied by tranparency, accountability, and oversight by judicious governments whose goal is to realise structural reform linked to new vision, possibilities for responsible economic development will dwindle. Freedoms like these can only flourish in the Arab region when they are linked to leaderships open to the outside world and intent on reform through investment in human capital and knowledge industries that rely on Arab human and physical potentials.

POLITICAL ENVIRONMENTS: THE PARADOX OF POLITICAL REFORM DISCOURSE AND THE DECLINE IN FREEDOMS

EXPANDING POLITICAL PARTICIPATION: THE PATH TO KNOWLEDGE AND CREATIVITY

The cluster of freedoms necessary for the knowledge includes economic, social, intellectual, academic, and creative freedoms

Freedom of thought and expression is a principal component, along with political participation, of the enabling environment that contributes to the advancement of knowledge performance. Despite some improvement in some Arab countries in the realms of political participation, democratic reform, and human rights and freedoms, there has been palpable retreat in others. This is because the democratic opening up in the last decade did not achieve the desired results. Many freedoms of opinion, expression, and participation in Arab countries are bound by fetters both visible and invisible, some of which have turned into a reality that constrains knowledge and creativity.

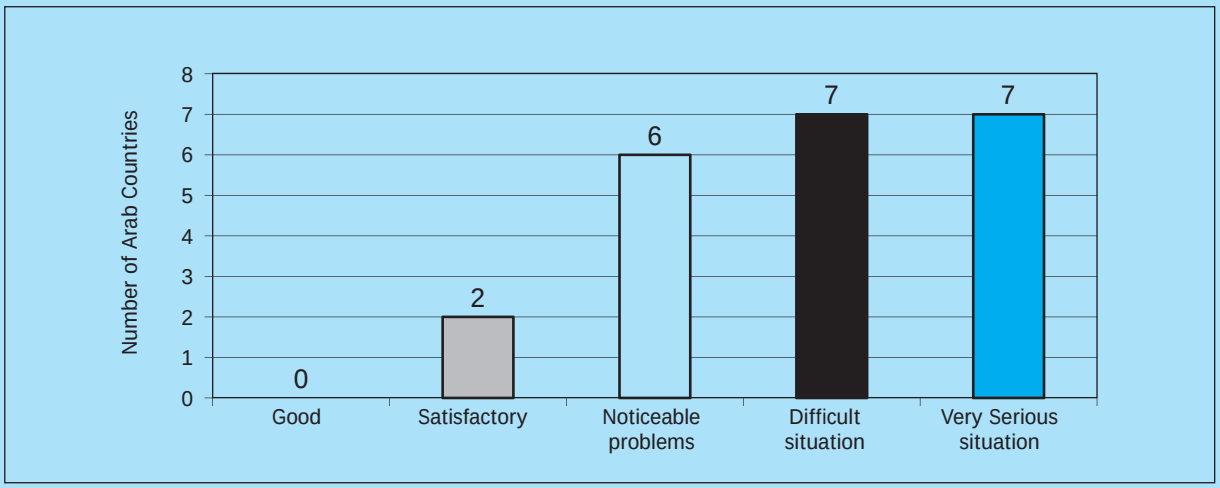
Freedom of thought and expression is a principal component, along with political participation, of the enabling environment that contributes to the advancement of knowledge performance

Talk of reform is common in a number of Arab countries, but seems in most instances to be suspended in the air, unable to come to ground in the real world. Since the events of 11 September 2001, and perhaps before them, there has been serious—though also, at times, prevaricating—talk of the necessity of political reform and relaxation of constraints on freedoms, without even the least of these being accomplished. The Arab Human Development Report of 2004 on the state of freedoms concluded that the problem of freedom in the Arab world was increasing due to the spread of repression, the hegemony of censorship, and the proliferation of mechanisms that

Talk of reform is common in a number of Arab countries, but seems in most instances to be suspended in the air, unable to come to ground in the real world

FIGURE 2-1

Press freedom in the Arab countries, 2008



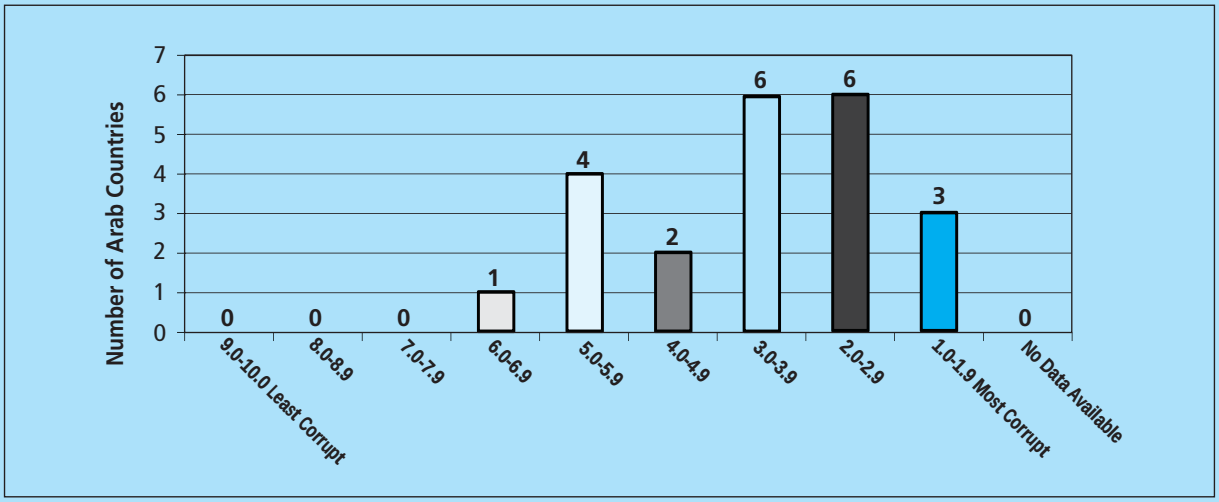
Source: Reporters without Borders, 2008

restrict freedoms. That diagnosis continues to apply, despite a few harbingers of change in some Arab countries (see the Preamble).

This perception finds support in numerous international statistics and studies, to which we must have recourse given the almost complete absence of authoritative and credible Arab scholarship in this field. The Freedom of the Press index published by Reporters without Borders ranks all Arab countries among those which restrict the press, though to differing degrees. This index delineates the margin of freedom that both journalists and media organisations enjoy and the efforts they expend on behalf of press freedom. We find that the situation in the majority of Arab countries according to this index[1] falls between "very serious"

FIGURE 2-2

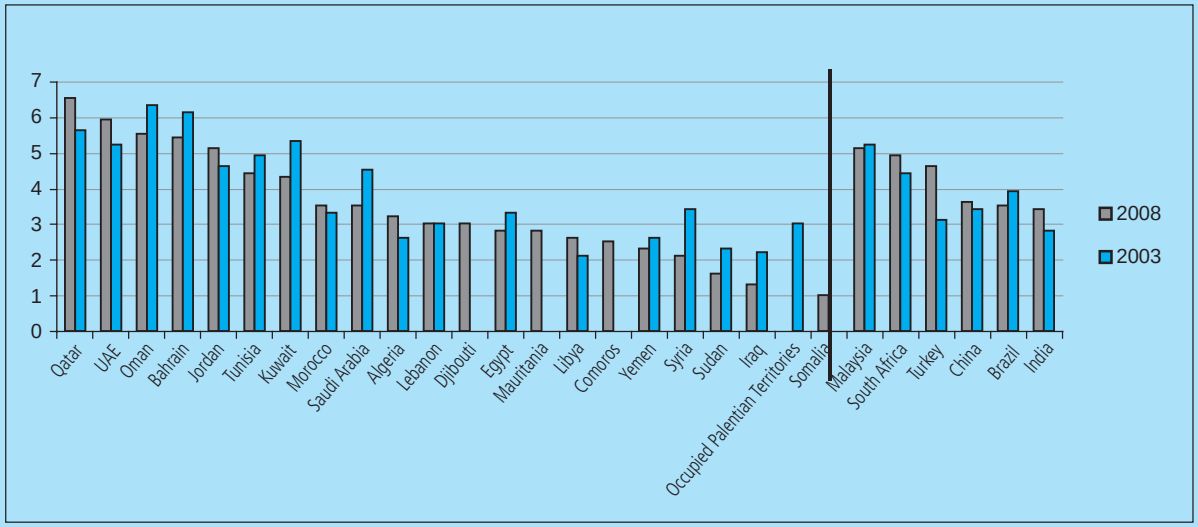
Perceptions of corruption in the Arab World 2008



Source: Transparency International: Corruption Perception Index

FIGURE 2-3

Perceptions of corruption 2003-2008



Source: Transparency International: Corruption Perception Index (May 11, 2009)

and "difficult" (Figure 2-1). We note too that in 2008, all but two Arab countries ranked at the very bottom of 173 countries studied.

In this context, it is possible to compare Arab countries to other areas of the world using the Democracy Index published by the Economic Investigations Unit of The Economist[2]. This index is based on sixty indicators which track performance in the following five areas: the electoral process and plurality, civil liberties, government performance, political participation, and political culture. Most Arab countries received rankings on this index that point to a lack of democracy, and only three—Iraq, Lebanon, and the Occupied Palestinian Territories—received relatively higher marks.

All Arab countries receive a low ranking compared to others such as Malaysia, India, Brazil, and South Africa. Sweden topped the list of 165 countries included in the 2008 study with an average of 9.88, while North Korea came last with 0.86[3].

The other side of the coin is the performance of government itself. Here we refer to the Corruption Perception Index published by Transparency International, which assesses the magnitude of corruption in 180 countries on the basis of experts' evaluations and opinion polls. The index depends on statistics from thirteen independent sources in the public sector and the political sector. Evaluation is based on a normative scale running from zero to ten. Every step up on the scale indicates a fall in the average rate of corruption in the opinion of those surveyed. In seventeen of the twenty-two Arab countries studied, the level of perception of corruption was less than half the value of the scale, i.e., less than five (Figure 2-2), while Somalia came in last with a score of one. Iraq had the next lowest score, of 1.3. Thus, we find that the situation of Arab countries on the world map according to this index[4] is not much better than their situation on the map of freedoms. This implies a direct correlation between the decline in the levels of freedom and democracy, the spread of corruption, and the decline of government performance.

It should be pointed out that Qatar and the UAE recorded the best performance in combating corruption on the Arab front (Figure 2-3). The most important indication of this is that they maintained this good performance in the

In the Arab countries, there clearly is a direct correlation between the decline in the levels of freedom and democracy, the spread of corruption, and the decline of government performance

Corruption Perception Index from 2003-2008, in addition to achieving a marked improvement in the 2008 report. Jordan, Morocco, Algeria, and Libya also recorded improvement, while Lebanon maintained its status quo, and performance deteriorated in the remainder of the Arab world.

Stringent legislative and institutional restrictions in numerous Arab countries prevent the expansion of the public sphere and the consolidation of opportunities for the political participation

CONTINUED CURBING OF PUBLIC FREEDOMS

In the realm of public freedoms, Arab countries as a whole failed to realise tangible gains in terms of freedom of thought and expression. With the exception of the spread of Arab satellite channels and internet blogs, which have provided a very active outlet for youth in the region, the dossier on freedom of thought and expression continues to make depressing reading. Arab states have imposed additional restrictions on Arab satellite channels and issued additional regulations and laws that have tightened their grasp on the media, journalism, journalists, blogs, bloggers, and even on intellectuals: many Arab dissenters and innovators are targets of investigations, exposed to various forms of restriction on their ability to earn a living or travel, to surveillance and possible arrest. Arab countries lead the world in arrests of bloggers, imposing on them fines and prison sentences. Books have been impounded, newspapers and internet sites closed, and some opposition authors or those who have promulgated views deemed indecent have even been declared infidels. Most news media and outlets of knowledge dissemination in the Arab world are still state-owned, though a limited number of large news and entertainment media companies are operational in the region, most operating out of the Gulf, or even from outside the Arab region.

While most Arab constitutions stipulate human rights and freedoms, martial laws such as anti-terrorism laws serve to limit these rights in practice

Stringent legislative and institutional restrictions in numerous Arab countries prevent the expansion of the public sphere and the consolidation of opportunities for the political participation of the citizenry in choosing their representatives in elected representative bodies on a sound democratic basis. The restrictions imposed on public freedoms, alongside a rise in levels of poverty, and poor income distribution, in some Arab countries, have led to an increase in marginalisation of the poor and further distanced them from obtaining their basic rights to housing, education, and employment, contributing to the further decline of social freedoms. Given this climate, it is only natural that rigid social ideas which reject 'the other' should spread and take root, and that discrimination against women and minorities should be practiced, with all the negative corollaries for knowledge and development performance in Arab countries.

FREEDOM OF OPINION AND EXPRESSION: ADDITIONAL RESTRICTIONS

While Arab countries announce their determination to guarantee public freedoms and political reform and to expand and actualize participation of the citizenry, they actually provide little scope for freedom of opinion and political and trade union activities, thus widening the gap between word and deed. Publicised discourse, especially when addressing major powers or world opinion, is reformist and distinctly democratic, but actual practice on the ground differs from or even contradicts it. And while most Arab constitutions stipulate human rights and freedoms, martial laws such as anti-terrorism laws serve to limit these in practice, leaving the door wide open to the authorities to interpret what is unclear in the legal texts. Some Arab states acknowledge the principle of a plurality of political parties while practicing repression in the name of security and on occasion throwing leaders of opposition parties into prison.

In addition, we note that at the same time that lavish investments are being made in upgrading information

technology infrastructure, blogs are closed down and young bloggers repressed, as if a distinction could be made between knowledge dissemination mechanisms and their knowledge content, even though it is the latter that is more deserving of patronage, protection, and concern. This is closely tied to academic and literary freedoms, for Arab writers and scholars risk being declared infidels or legally interrogated on the opinions they espouse or the books and creative works they publish which express opposition, innovation, or criticism. This can be partially explained by cultural seclusion and the outward adherence to constants that this entails. In some instances, unfortunately, this seclusion is actually promoted to isolation from the world and its latest cultural innovations and intellectual developments (al-Tahir Labib, background paper for the Report, in Arabic).

Digital content and the internet in the Arab world have not escaped censorship and government interference in recent years. More and more cases of censorship and internet site prohibition have been recorded; these are a straightforward violation of a citizen's right to privacy and access to information (al-Tahir Labib, background paper for the Report, in Arabic). In one Arab country, a decree was issued requiring internet site owners to record the personal data of writers of articles and comments published on the sites. In another, a blank page appears instead of the banned site. And in a third, a message appears saying that the site has been blocked for 'political, moral, and religious' reasons. One Arab government obliges companies providing internet service to implement systems that permit the blocking of internet sites on a religious and moral basis. And finally, internet cafes in at least two Arab countries are subject to the possibility of inspection and surveillance, and the owners of these cafes are required to submit information on those who use them (Naomi Saqr, background paper for the Report).

Nor have bloggers and activists escaped security surveillance or even arrest. In one Arab country, an editor of electronic sites belonging to one of the country's minorities was arrested and brought before a military tribunal on the charge of 'maligning the president, disparaging the government, and inciting ethnic unrest.' In another country, a blogger was imprisoned for four and a half months for writing on religious subjects. In a third country, three participants in an electronic chat room were arrested in 2005 for messages 'inciting hatred of the government,' and the government obliged everyone with an internet site to register it with the ministry of information or risk legal proceedings.

It is thus not surprising that the list of the fifteen most internet-hostile countries in the world should include four Arab countries. Five Arab countries appear on another list of ten so-called 'countries under observation' (Naomi Saqr, background paper for the Report).

Digital content and the internet in the Arab world have not escaped censorship and government interference in recent years

The list of the fifteen most internet-hostile countries in the world includes four Arab countries, and five of them appear on another list of ten so-called 'countries under observation'

ARAB MEDIA AND GOVERNMENT HEGEMONY[5]

The Arab media have been established and continue to develop under the hegemony of Arab governments or large multimedia companies operating on the Arab regional level. The alliances and interaction between these are no secret, with the two parties between them owning most of the media outlets, which are put to work for their mutual interests. Thus, content proffered in the newspapers, radio, television, and satellite channels is characterised to a large degree by its superficiality, the predominance of shallow entertainment pieces, and diminishing knowledge content, along with a political discourse characterised by loyalty to governments and praise of their achievements. All of this confirms the need for some sort of separation between knowledge and politics, or more precisely, an end to the dependency of knowledge on politics.

In the Arab region, knowledge content is subject to a number of restrictions

The Arab media have been established and continue to develop under the hegemony of Arab governments or large multimedia companies operating on the Arab regional level

Arab creative production, especially in the literary and artistic fields, collides not only with laws restricting freedom of opinion and expression but also with administrative impediments

The production, publication, and distribution of books in Arabic suffer restrictions that limit the diffusion of printed Arab knowledge content

With the continuing restrictions on freedom of thought and expression in many parts of the region, it is difficult to foresee an upsurge in Arab knowledge

exercised through a chain of official oversight on more than one level and according to more than one law. Among these restrictions are the penal code, the press law, laws governing the content of films, censorship laws for books, theatre, and cinema production, and even, at times, emergency and counterterrorism laws. The concept of censorship of knowledge content has also been broadened to include other restrictions, such as those that impinge on political party activity and the holding of elections, the granting of licenses to civil society institutions, and constraints on volunteers who work in the field of human rights and companies working in so-called "free zones."

Some governments have announced guidelines and instructions prohibiting the arrest of journalists, but the latter are still subject to imprisonment and criminal proceedings under the penal code rather than the press law. Publishing a newspaper requires a government license, which is granted primarily on a political basis. In addition, a huge sum of money must be paid in advance as collateral or the like (Naomi Saqr, background paper for the Report). These conditions constitute additional restrictions on the freedom of the press and on the right to publish newspapers, freedoms and rights that are considered among the most important pillars of freedom of opinion and expression.

Arab creative production, especially in the literary and artistic fields, collides not only with laws restricting freedom of opinion and expression but also with administrative impediments, foremost of which is the need for licenses, which may be withdrawn at any time. Forms of discrimination on the basis of specialization, profession, and nationality are also practiced. The greater the number of administrative and security restrictions, the greater the possibility for being turned down. For example, a certain director was asked to 'tone down' some scenes in one of his films that were deemed demeaning to the police. In another Arab country, security services prohibited production of a documentary film despite its having obtained permission from the country with which it dealt. Films, by a number of different directors, have been repeatedly banned, and this may lead Arab film makers to produce their works outside the Arab world, adding one more form of brain drain to the haemorrhaging of intellect from the region.

The production, publication, and distribution of books in Arabic suffer from similar restrictions, and these limit the diffusion of printed Arab knowledge content. For example, the authorities of a certain Arab country prohibited the publication of seventy-three books for reasons associated with 'moral principles, derision of religions, the public interest, and issues affecting specific individuals.' In another country, books are reviewed before publication by religious authorities and security bodies, and ten to fifteen books are turned down every year. Censorship and surveillance are not confined to the pre-publishing phase; books may be impounded, sometimes a number of years after their publication. Among recent examples is the impounding of a work by a female writer on the grounds that it offends religion. A book may be exhibited in the book fairs of one country and prohibited in those of another. The phenomenon of multiple standards for permission to circulate books has sometimes led to reviewing the books and editing the original text so that they might be put on sale in those Arab countries which impose stricter standards. Such revisions constitute self-censorship, which is destructive of innovation and bold endeavours (Naomi Saqr, background paper for the Report).

In view of the above, and with the continuing restrictions on freedom of thought and expression in many parts of the region, it is difficult to foresee an upsurge in Arab knowledge. Accomplishments in this field will, therefore, remain quite limited, especially so long as the Arab

nations continue to occupy their present position on the world map of freedoms and democracy. No distinction can be drawn between democracy in the broad meaning of the word and the democratization of knowledge, with all the latter carries in terms of opportunities for political participation and, in particular, communicativeness, since the latter can not be achieved in isolation from the first.

ECONOMIC ENVIRONMENTS: TOWARDS RESPONSIBLE FREEDOM AND A BALANCED ECONOMY

The economic environment which stimulates the production and spread of knowledge is based on a cluster of freedoms, such as free enterprise, the freedom to invest, the encouragement of competition, and fair trade. These are practiced through the agency of a judicious and responsible administration that imposes transparency and accountability. The existence of such a cluster leads to the creation of the proper climate for advancement in knowledge performance and for connectedness with a rapidly evolving world which is growing ever more open and interdependent.

There is no doubt that the global economic crisis has put the subject of economic freedom on the docket for review and has produced doubts about the credibility and effectiveness of this freedom as a matter of principle. Some have even gone so far as to call for the abolition, or restriction, of economic freedoms. This logic is, to a great extent, fallacious. It is not reasonable to demand that freedoms be abolished simply because they have been abused by an irresponsible minority. In this context, as with all other freedoms, we differentiate between responsible and irresponsible uses of economic freedom. We look at economic freedom as an enabling tool for the proper exploitation of resources, which includes catalyzing a healthy business sector and promoting a varied and vibrant economy. We cite the outstanding economic performance built over the course of several decades on economic freedom in industrialised countries and even in those of recent growth, like South Korea, which have realised the greatest benefit from economic freedoms by focussing on development, which has led to outstanding economic performance derived largely from knowledge industries of advanced technical content.

Those countries most open and most committed to the cluster of responsible economic freedoms record high averages of success in participating in and benefiting from the global knowledge reserve. This confirms the assertion that economic freedom and the encouragement of competition within a stimulating economic environment are elements of success in connecting with the world on the basis of knowledge. This is particularly so in light of international entanglements and the appearance of new business models in the global economy which depend principally upon technology and ideas, and in which knowledge performance plays an important role in promoting development.

On the economic front, competitive markets and open economies stimulate competition for domestic and foreign markets among companies in any given country. As a consequence, the relative growth of open economies depends on the ability to innovate and acquire market share among consumers. Knowledge plays a fundamental role in penetrating these markets by virtue of its role in the production and development of competitive products. On the other hand, knowledge itself is regenerated as a result of this competitive process through new, 'dynamic and sequential,' models and the economy moves 'from one temporary equilibrium to another.' According to economist Paul Romer's theory of endogenous growth, up-to-date knowledge is an essential element of the development process; this differs from neo-classical theory, which focuses on

The global economic crisis has put the subject of economic freedom on the docket for review and has produced doubts about its credibility and effectiveness

Economic freedom and the encouragement of competition within a stimulating economic environment are elements of success in connecting with the world on the basis of knowledge

The relative growth of open economies depends on the ability to innovate and acquire market share among consumers

closed economies and considers technical change an external factor, not determined by the will of the local economy and the internal knowledge and technological development policies (‘Atif Qubrusi, background paper for the Report, in Arabic).

The Arab countries most prepared to produce and put knowledge to use are those that observe the largest number of the cluster of responsible economic freedoms encouraging local competition

In view of the above, the Arab countries most prepared to produce and put knowledge to use, especially business-related knowledge, are those that observe the largest number of the cluster of responsible economic freedoms while encouraging local competition. They also limit monopolistic practices and the hegemony of mega-corporations over the market. Although most Arab countries have passed laws which encourage competition, the challenge lies in actual compliance with these laws. In addition, the creation of a balance between the interests of consumers and foreign companies on the one hand, and local heads of business on the other, is also a challenge, especially in that many of the latter participate, under other guises, in the game of politics and decision-making in the Arab world.

MEASURING ECONOMIC FREEDOMS

Although most Arab countries have passed laws which encourage competition, the challenge lies in actual compliance with these laws

The best method to measure economic freedoms might be that which focuses on opportunities to produce knowledge from the inside and fend off the advance of knowledge products coming in from developed countries and giant multinational corporations. Based on that method, an Arab index could be constructed, focusing on the competitiveness of knowledge output, the free flow of knowledge products, and the extent of Arab participation as equal, and not simply dependent, partners in global knowledge industries (see the sections devoted to a proposed Arab index in Chapters 2 and 6).

The absence of such an Arab index makes it necessary to rely on available international indicators. Here we present two indices fundamental for tracking economic freedom. The first is the Heritage Foundation’s Index of the Economic Freedom.[6] The second is the Economic Freedom Index published by the Fraser Institute for International Research, which consists of five indicators.[7] In addition, we have used the Competitiveness Report published by the World Economic Forum,[8] as well as the World Bank’s Doing Business indicators.[9]

TOWARD EXPANDING ECONOMIC FREEDOMS

In the Economic Freedom Index of the Heritage Foundation, performance is evaluated using ten components of equal weight.[10] Each of the ten freedoms is evaluated on a scale of 1-100, where 100 represents the maximum in freedom. In evaluating the ten freedoms, the authors depended on reliable, internationally recognised sources. The index for 2009 includes data from the second half of 2007 through the second half of 2008.[11] Hong Kong led the list of 183 countries studied with a total of 90.0, while North Korea came in last with a balance of two points.

The average of economic freedom for the Arab countries studied[12] was below the international average on the basis of the Heritage Index. This places them among those countries that are ‘mostly unfree’. In addition, no Arab country is found amongst those designated as ‘free’ (Figure 2-4). However, nine of the seventeen Arab countries studied rank among those described as ‘largely unfree,’ and six are amongst those designated ‘moderately free.’

By measuring the chronological performance of the Arab countries studied, it becomes clear that the predominant trend for the average of economic freedoms since 2003 is one of decline followed by recovery, despite the realisation of some progress in the field, most of it in the form a slight increase in the last three years, 2006-2009 (Figure 2-5). This slight increase may be linked

to the third oil boom, which reached its climax between 2006 and 2008, propelling freedoms to the increase shown over their 1999 values.

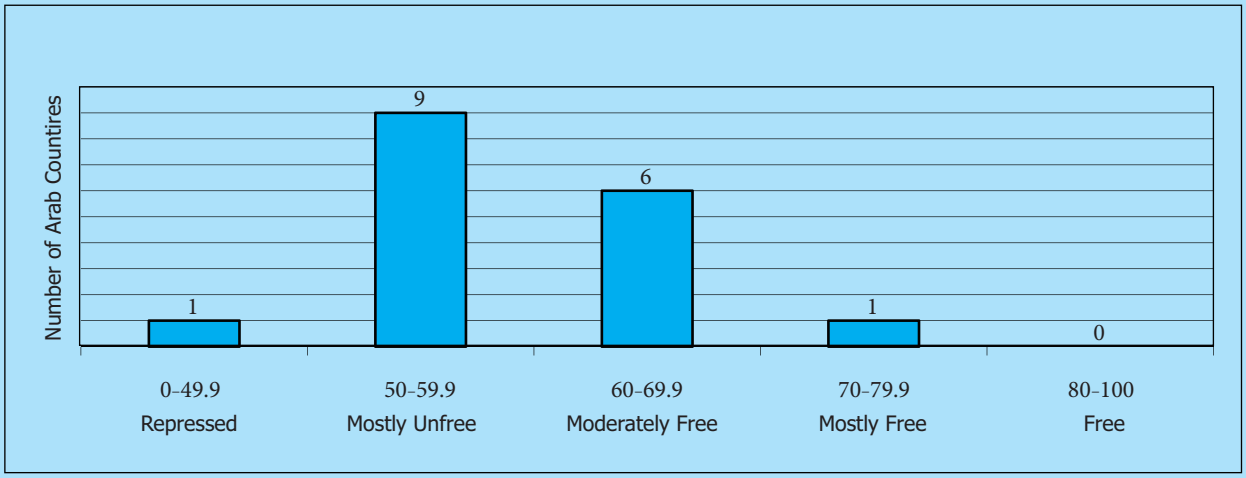
Arab countries included in the study recorded a noteworthy superiority in one category of the Heritage Index, and that is fiscal freedom. This is attributable to the low rate of taxation, and indeed its absence in a number of Arab countries, particularly those of the Gulf (World Bank and International Finance Corporation, 2007). The lowest levels of freedoms in this index for Arab countries overall are in the categories of property rights and freedom from corruption, both of which play a vital role in the promotion of business and competitiveness and, as a result, the enrichment of the knowledge society.

In addition to the low rate of taxation, fiscal freedom, and the stability of the monetary system, there were some other successes in the business environment in

Egypt came among the top ten countries enacting reforms for the third time in four years, particularly in terms of the tax system and the field of business start-up

FIGURE 2-4

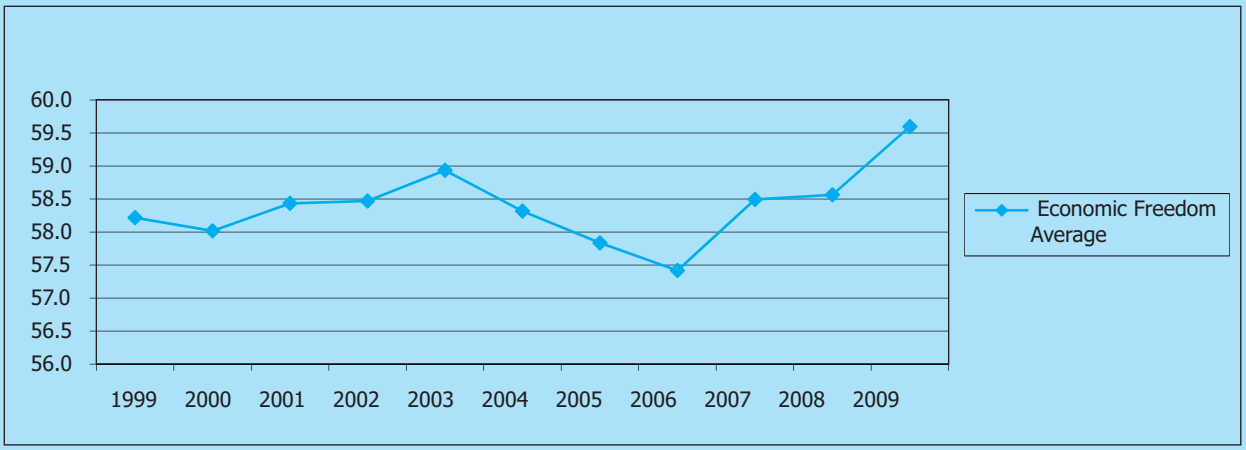
Distribution of Economic Freedom in Arab Countries, 2009



Source: Heritage Foundation, 2009

FIGURE 2-5

Average economic freedom index for seventeen Arab countries



The Heritage Foundation, 2009

TABLE 2-1

Arab Countries that realised positive reforms in the field of business, 2007-2008

Starting a business	Dealing with construction permits	Employing workers*	Registering property	Getting credit	Protecting Investors	Paying Taxes	Trading across borders	Enforcing contracts*	Closing a business
Egypt	Egypt		Egypt	Egypt	Egypt	Morocco	Egypt		Saudi Arabia
Jordan	Mauritania		UAE	Morocco	Saudi Arabia	Tunisia	Djibouti		
Lebanon				Tunisia	Tunisia		Morocco		
Mauritania				UAE			Syria		
Oman				Occupied					
Saudi Arabia				Palestinian					
Syria				Territories					
Tunisia									
Occupied									
Palestinian									
Territories									
Yemen									

* No Arab country undertook positive reforms in the business domains of employment contracts enforcement.

Source: World Bank and IFC (International Finance Corporation), 2007

GCC countries were able to realise cash surpluses thanks to a rise in petroleum revenues

According to some reports, there is no positive conditional relationship between increased oil and gas revenues and support for economic freedoms

some Arab countries. This was the case in Egypt, which came among the top ten countries enacting reforms for the third time in four years, particularly in terms of the tax system and the field of business start-up, as well as in dealing with building permits and property registration, obtaining funding, and protecting investors. Similarly, positive reforms in the field of business start-up were carried out in Tunisia and Yemen, where the minimum for capital required for that purpose was cancelled, and in Jordan, where it was lowered. It is worth mentioning that Saudi Arabia made progress in reforms in the field of business closure, a category which included no Arab countries between 2003 and 2007. These reforms include the introduction of declaration of bankruptcy as a means of liquidation and a market exit device, as well as a reduction in the role of the courts, setting of time frames, and the maintenance of transparency through use of the internet (World Bank, IFC, 2007).

THE OIL BOOM DID NOT FOSTER ECONOMIC FREEDOM AS HOPED

The Heritage Index for 2009 shows that the Arab Gulf countries realised the highest relative average for economic freedoms among Arab countries, and that this happened thanks to the policy of economic openness, the attraction of foreign investments, and the modernisation of the infrastructure. In addition, initiatives were undertaken that gave the private sector a larger, wider role in the production process. Member countries of the Gulf Cooperation Council were able to realise cash surpluses thanks to a rise in petroleum revenues (Fraser Institute, 2008). However, with the exception of Qatar and Bahrain, per capita income 'averages' witnessed a decline as a result of the swelling demand for imports. This resulted in the depletion of resources that would have been better invested locally (World Bank, 2009).

Since 2003, certain Arab oil-producing countries (Saudi Arabia, Libya, and Oman)

have realised a degree of progress with regard to economic freedoms as compared with five non-oil-producing countries (Egypt, Lebanon, Yemen, Syria, and Jordan) (Figure 2-6). The figure also makes clear the absence of any positive conditional relationship between increased oil and gas revenues and support for economic freedoms. Some Arab countries depend on oil economically and have benefited from the third oil boom, yet have recorded no improvement on the Heritage economic freedom index. In contrast, certain non-oil-producing Arab countries enjoy more economic freedoms than the oil-producing countries when freedom is measured against size of population, and in addition may enjoy lower rates of inflation and slightly better rates of both employment and income (Heritage Foundation, 2009).

Certain non-oil-producing Arab countries enjoy more economic freedoms than the oil-producing countries when freedom is measured against size of population

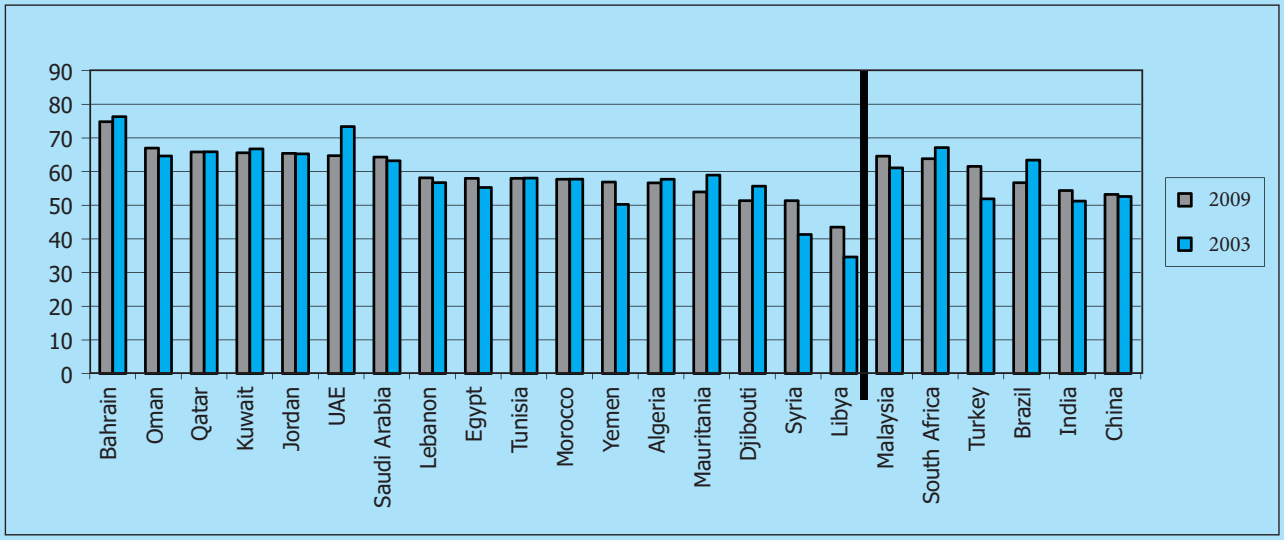
The index of the Fraser Institute for International Research points out that most Arab countries studied, whether non-petroleum producers, such as Egypt, Tunisia, Jordan, Algeria, and Syria, or petroleum producers, like Kuwait,[13] Oman, and the UAE, made acceptable progress in economic freedoms between 2003 and 2006 (Figure 2-7). This index relies on forty-two variables in five areas of economic freedom: size of government (spending, taxes, and commercial enterprises); legal structure and security of property rights; access to sound money; freedom to trade internationally, and the regulation of credit, labor, and business. Overall evaluation is based on the combined average of the five categories on a scale of 0-10 (Mu'assasat al-Buhuth al-Dawliyya, 2005, in Arabic).[14]

According to the competitiveness index published by the World Economic Forum, the countries of the Arab Gulf, and in particular Qatar, Saudi Arabia, the UAE, and Kuwait, lead Arab countries and occupy a leading position among countries around the world (Figure 2-8). This index is constructed on the basis of twelve critical pillars of competitiveness and presents a comprehensive picture of the competitive arena in the various countries at all phases of development. These pillars include institutions, infrastructure, macroeconomic stability, health, primary education, higher education and training, goods market efficiency, labor market efficiency, financial market sophistication, technological readiness, market size,

Most Arab countries studied made acceptable progress in economic freedoms between 2003 and 2006

FIGURE 2-6

Heritage economic freedom index for 2009, Arab countries-comparison countries



On a scale of 0 (least free) to 100 (most free)
Source: Heritage Foundation, 2009

BOX 2-1

The Contradictory Nature of Economic Freedom Indicators

The evident contradiction among the data produced mostly by western international institutions forcefully indicates the need for careful deliberation before issuing judgements based on them. This points to the pressing need for Arab society to become more deeply involved in the relevant global discourses and the production of relevant data and reliable indicators. The absence in the Arab sphere of institutions capable of producing and publishing authenticated indicators leaves the Arab researcher and planner before a particular selection of information and indicators which may contradict each other—as demonstrated above—or lack the legitimacy and authority which accuracy would confer. This is a powerful indication of the urgent need to draft Arab indices for knowledge environments and their antecedents, indices that should spring from the actuality of the Arab world. This would lend them credibility and respect, and as a result, authority, whether on the front of Arab society, in both its formal and civil sectors, or amongst specialised bodies at the local, regional, and international levels.

business sophistication, and innovation. The report also includes comprehensive lists of the most significant strengths and weaknesses of the countries included in the study. The index is on a scale of 0 to 7, where seven indicates the greatest competitiveness. Qatar, Bahrain, and the UAE were all among the list of the world's forty most competitive countries (World Economic Forum, 2008b).[15]

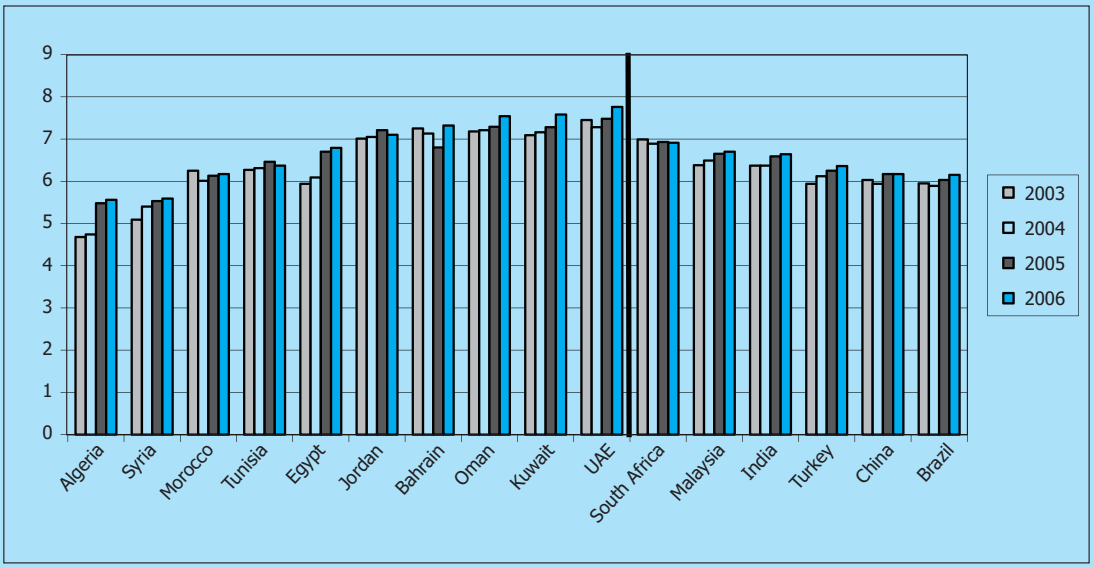
According to this index, non-petroleum exporting Arab countries received a relatively favourable rating *vis-à-vis* Arab petroleum exporters when compared to their peers in other countries of the same group. The competitiveness report attributes this to the modest score in innovation and business sophistication in petroleum countries and the negative effect of this in terms of their overall economic stability and improvement in the institutional environment (World Economic Forum, 2007).

The composite business environment index published by the World Economic Forum describes an outstanding performance by a number of Arab countries, such as Tunisia, the UAE, and Jordan, with regard to its various components, namely effectiveness of anti-trust policy, intensity of local competitiveness, and degree of market dominance.[16] This may afford promising signs, however provisional, of the existence of enabling environments for knowledge industries in both some petroleum and some non-petroleum Arab countries.

In summary, the Arab region witnessed, up to the onset of the global economic crisis in the autumn of 2008, two principal changes. First was the third petroleum

FIGURE 2-7

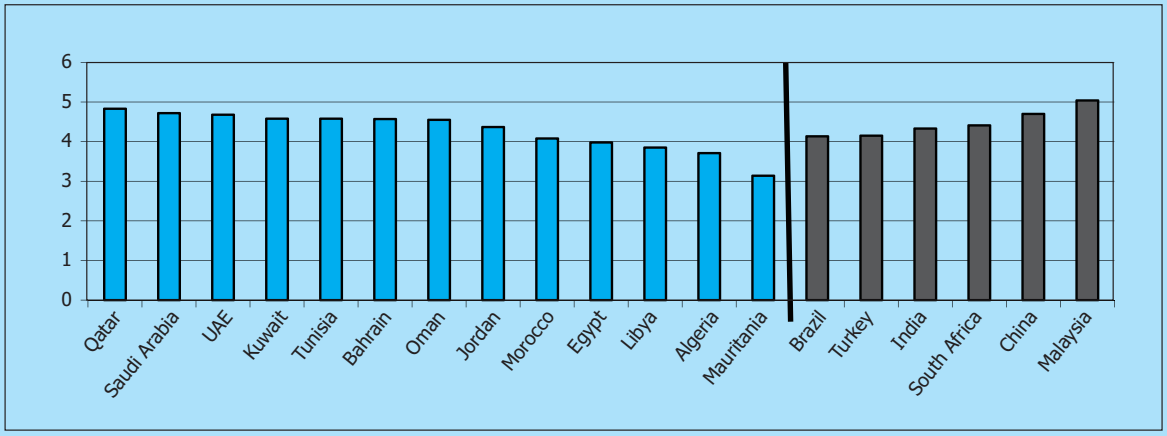
Fraser Institute index of economic freedom of Arab countries vs. comparison countries



Source: Fraser Institute data base (January, 2009), http://www.freetheworld.com

FIGURE 2-8

Index of global competitiveness for Arab countries



On a Scale of 1.00 (least competitive) to 7.00 (most competitive)
Source: The World Economic Forum, 2008b

boom, beginning in 2000, from which the oil and gas producing and exporting countries in particular derived great benefit, and which led to an exceptional economic revival, unlike what was happening at the same time in many countries of the world, including certain developed countries. From 2000-2007, there was an increase in GNP (gross national product) in Arab countries, especially the petroleum exporters among them, and even a number of non-petroleum exporters such as Egypt and Tunisia, which benefited partially from the increase in petroleum prices (World Bank, 2009). Secondly, some Arab countries like Egypt, Kuwait, and Jordan took important steps towards openness and on the road to the deregulation of their economies and the removal of some inhibiting restrictions to business and to commercial, banking, and investment activity. This contributed to a relatively good economic performance for this period, which preceded the current economic crisis.

However, most of these huge petroleum revenues were invested in specific sectors like construction, which relies heavily on foreign labor, as well as in investments outside the Arab world which produce rapid returns. Therefore, petroleum revenues did not produce a comparable surge in the growth of the per capita GDP in many Gulf countries. On the contrary, after 2005, these averages actually declined[17] in a number of petroleum countries, such as the UAE, Bahrain, Saudi Arabia, and Kuwait (see Figure 2-9). Likewise, the oil boom was not accompanied by a boom in knowledge mirroring the investment of oil revenues in knowledge sectors, nor was it reflected in an improvement in individual living conditions in all the social brackets in the Arab world as a whole. In fact, the poor grew poorer in the shadow of the inflation which swept across the world and through the Arab region at least until the autumn of 2008. Investment in the establishment of a knowledge society and economy was very modest, whether in quantitative or qualitative terms or in terms of impact. This is not to deny the numerous praiseworthy efforts and initiatives that have been made in this regard, both by the public and private sectors and by civil society organisations[18] whose goals are the transfer and indigenisation of knowledge and the enhancement of knowledge content or that include knowledge programmes and activities in one form or another. Numerous initiatives have been undertaken in the region in production fields such as industry, agriculture, and services, and in

The oil boom was not accompanied by a boom in knowledge mirroring the investment of oil revenues in knowledge sectors in the Arab world as a whole

External pressure, restrictions imposed by international agreements, and stipulations of free trade agreements do not always contribute positively to the establishment of knowledge societies

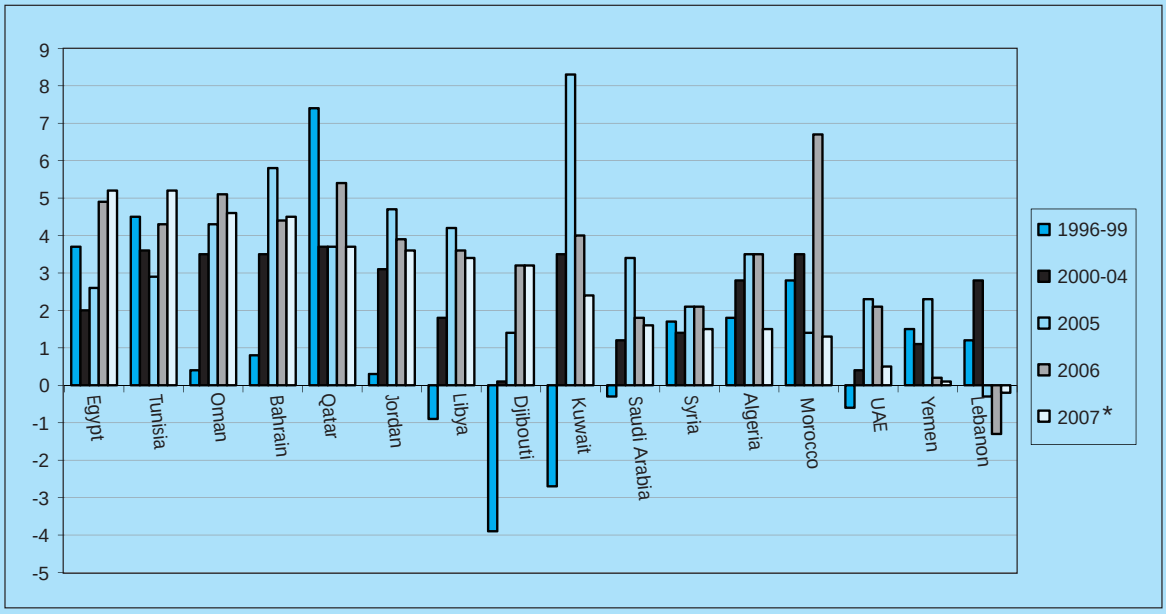
education, involving a reasonable quantity of knowledge value added and including different forms of knowledge transfer. These initiatives remain, however, modest and uncoordinated, especially when compared to total investment and revenues and to the opportunities in the field of knowledge transfer that might otherwise have been generated at the Arab regional level. All in all, the third oil boom has not sufficiently contributed to producing long-term Arab development, let alone a rise in Arab knowledge content.

The slight improvement that may be detected in the Arab region is embodied in the advancement of economic freedoms in some countries, which has occasionally led to an increase in growth averages, as in the cases of Egypt and Tunisia. Nevertheless, that advancement remains limited and does not necessarily reflect a vision which aims at establishing a knowledge society and advancing Arab knowledge performance. This is evidenced by the fact that Arab countries continued to export raw materials and import high value-added products that embody a high knowledge content. Statistical findings of the UN conference on commerce and development (UNCTAD) point to a continuing, even increasing, deficit in net exports of manufactured goods in most Arab countries between 2003 and 2006 (Figure 2-10). In contrast, most Arab countries had a steadily increasing surplus in exports of raw primary commodities during the same period.

Discussion of freedoms is fraught with difficulties, and measurements of economic freedom allow for numerous interpretations depending on the content and implications of each index. No matter how precise the indicators, there are reservations as to the perspective of each in measuring economic freedom. This perspective does not necessarily reflect the circumstances of developing countries, Arab countries included. These indices do not speak, for example, of the need for emancipation from the external hegemony and external legal restrictions that play a negative role in the rise of Arab knowledge performance. Similarly, external pressure, restrictions

FIGURE 2-9

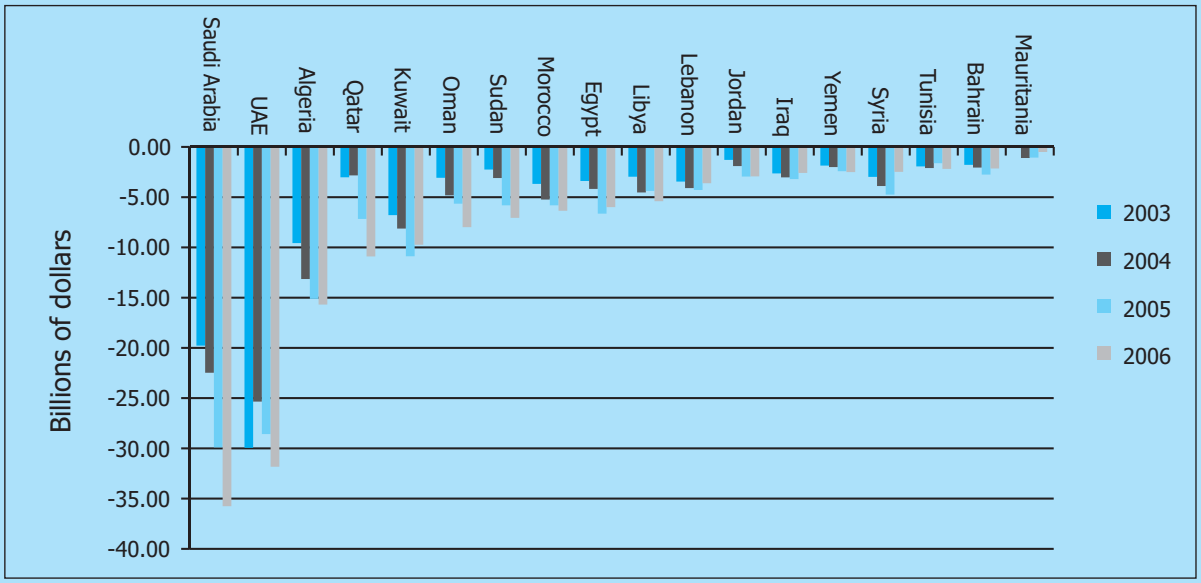
Average growth of per capita GDP



*World Bank estimates
Source: The World Bank, 2009

FIGURE 2-10

Net exports of manufactured goods in Arab countries



Source: UNCTAD website, http://stats.unctad.org/handbook/reportfolders/reportfolders.aspx, on 22 March 2009

imposed by international agreements, and stipulations of free trade agreements do not always contribute positively to the establishment of knowledge societies in developing countries, and, among them, countries of the Arab world.

And now that the global economic crisis is upon us, buffeting the economies of developed and developing nations in succession, the fact remains that Arab countries neglected to exploit the climate of revival and economic openness that accompanied the oil boom to bridge the knowledge gap, and to invest those returns in building Arab knowledge content. This could have allowed for the accumulation of organisational knowledge which, via the business sector, is engendered in knowledge industries and knowledge economies that are open to the world. More than ever before, this crisis calls for redoubling cooperative efforts not only to ward off the dangers associated with it but also to increase investment in Arab knowledge capital. It should guarantee the sustainability of development built on solid foundations, rather than on economic rent-seeking, and should move towards supporting responsible economic freedom that gives priority to joint Arab investment, especially in knowledge industries, with a focus on supporting an Arab capability to catch up with the knowledge economy.

MEDIA, CULTURAL, AND SOCIAL ENVIRONMENTS

POVERTY AND SOCIAL MARGINALISATION

The global economic crisis calls for redoubling cooperative efforts not only to ward off the dangers associated with it but also to increase investment in Arab knowledge capital

Social freedoms are considered the real guarantee of individuals' ability to exercise their individual freedoms and political rights as they wish, without violating others' rights. Specific reference should be made to marginalised groups in society and, pre-eminently among these, the poor, who suffer from social exclusion and inequitable income distribution. In its modern definition, poverty is the curtailment of an individual's opportunities to attain his or her basic rights in society (Sen, 1999). Marginalisation constitutes, in all its forms and at all levels, a barrier to the individual's exercise of social freedom.

The Arab poor suffer from social marginalisation, economic privation and social inequality–all of which have powerful repercussions on knowledge acquisition and production

Despite the discrepancy in the size of this bracket from one Arab society to another, this group constitutes an important segment of the population in the Arab world. Reference can be made to Yemen and Mauritania, among the most difficult Arab cases, for which the Human Poverty Index, published by the United Nations,[19] shows a poverty rate of more than 35 per cent. Eight other Arab countries that together account for about 60 per cent of all Arabs record averages of greater than 20 per cent on the UNDP's Human Poverty Scale.[20]

It is obvious that the Arab poor, some of whom are growing poorer, suffer from social marginalisation and economic privation, and that they do not enjoy equality with the remainder of their fellow citizens. If the poor represent the most important and most dangerous group among the marginalised, then class differences represent another large barrier to achieving social equity and freedom. And all of the above have powerful repercussions in the domain of knowledge acquisition and production.

TRENDS TOWARDS RELIGIOUS RADICALISM AND INTOLERANCE

Arab culture exists within the framework of a body of texts, established truths, and deep-seated lore that impact convictions and codes of behaviour

It is difficult to approach the topic of social freedoms and their development without also considering the general structure of Arab culture, which rests on a complex of customs, traditions, practices, premises, social convictions, and religious beliefs. Space does not permit us to discuss all the areas of dysfunction within Arab culture. The analysis here is of freedoms, especially social freedoms and their relationship to the evolution of the environments needed to enable an Arab knowledge society. Furthermore, this analysis does not proceed from value judgments that either exaggerate or underestimate the extent of the matter.

The first thing to be noted is that Arab culture exists within the framework of a body of texts, established truths, and deep-seated lore that impact convictions and codes of behaviour. The limits of practices that have been handed down generation after generation are more powerful and more numerous than those of the law. This cultural heritage constitutes the general framework of society and determines its trajectories in a way that makes emancipation from its influence difficult (al-Tahir Labib, background paper for the Report, in Arabic). These constants reflect, in many instances, an intellectual inertia which dominates the culture, resulting in a society that lives and thinks with a one-dimensional vision that rejects change, creativity, and innovation, believing in and preferring to submit to restrictions. As a result, society often takes a preconceived stance *vis-à-vis* 'the other,' one of rejection and condemnation that forecloses dialogue. All of this leads to the drawing up of civilisational battle lines, to reciprocal bouts of cultural mud-slinging, and to an enmity that may reach the point of symbolic and even armed violence. (see Chapter 1)

One cannot go into the restrictions imposed on social freedoms without referring to the fears that accompany writing on certain topics that have a role in shaping our social situation, such as religion, politics, and sex. These are problematic issues that stir up a host of taboos, fears, and sensitivities (al-Tahir Labib, background paper for the Report, in Arabic, and Nabil 'Ali, 2003, in Arabic), and the operative spheres of these taboos and their interpretations have widened in recent decades. This escalation has coincided with the high tide of religious dogma that has been disposed in most cases to outward forms and ritual at the expense of the true essence of religions as represented by their ethical values, tolerant teachings, and moderate practices. And these narrow-minded interpretations have become wide-spread among religions. A number of factors may have assisted the spread of this radical current among broad social groupings in the Arab world, especially the easily influenced young,

namely the spread of poverty, social marginalisation, political frustration, and repeated political defeats, not to mention the waves of westernizing propaganda broadcast by the news media. As a result, obscurantism has increased, as has people's reliance on radical interpretations of texts as sources of religious authority. Likewise, there is a spread of religious rulings, or fatwas, labelling certain people as infidels as well as of resort by lay-people to closed-minded interpreters in understanding the matters of daily life. This phenomenon has reached alarming proportions with the spread of illiteracy in a number of Arab countries. Many such mistaken notions and practices have come to be reflected in aspects of daily life, creating restrictions on social freedoms and a challenge for knowledge advancement and intercommunication with the outside world.

Careful consideration of the content of some Arab media, especially that broadcast by some satellite channels, reveals a proliferation in production and dissemination of a radical religious discourse far from the language of religious tolerance. An opposite discourse, no less profuse in Arab media, springs from extreme consumerist, materialist values and tries to exploit politics, sex, or the dream of fame and quick profit. This polarization in broadcasting between openness to the point of libertinism, and isolationism to the point of hostility to the age and the world, that is at odds with knowledge and openness and constantly pulling the individual back into the past, has become wide-spread. All this redoubles intellectual and behavioural polarization, which is followed by social polarization. The discourse of rationality and moderation has a weak presence on the Arab airwaves in general, despite the serious effort it represents to present a knowledge content that is modern, critically balanced, tolerant, and in tune with the times, times which are responsible for many of the great knowledge feats of our world.

FREEDOM OF INTELLECTUAL PROPERTY[21]

Intellectual property is an area of overlap between economic and socio-cultural data. It also brings together phenomena with mutually intersecting economic, cultural, and social indicators. These we will deal with under the rubric of cultural and social stability, while recognizing their direct implications on more than one economic front.

Economic and social freedoms are strongly tied to the issue of intellectual property, which plays a fundamental role in moving the process of human development forward. Intellectual property includes the output of the human intellect and all it involves in the field of patents, copyrights, trademarks, and industrial design. There is much debate in this domain over whether knowledge is a public or a private good, over the congruence between literary and financial rights, and over the consequent extent of the conflict between excessive protectionism and the principle of competition, especially in knowledge industries.

Intellectual property acquires particular importance through its relevance to the means by which developing countries benefit from and interact with the global reservoir of knowledge, both in terms of production and use. Thus, the issue of freedom of intellectual property has come to occupy centre stage, becoming a pivot for discussion in global discourse on the production and distribution of knowledge and its connection to development. While developed countries, backed by mega-corporations, call for additional protection of intellectual property, developing countries, backed by NGOs, defend the margins of available freedoms and affirm that a hard-line approach to protectionism and its improper application may have a negative impact on innovation and the spread of knowledge, and even on the other dimensions of development as well.

Some developing countries have succeeded in profiting from these margins

A spread of religious rulings, or "fatwas", labelling certain people as infidels has reached alarming proportions with illiteracy in a number of Arab countries

Careful consideration of the content of some Arab media reveals a proliferation in production and dissemination of a radical religious discourse far from the language of religious tolerance

of freedom of intellectual property to subsidise their knowledge industries, with positive impacts on development. For example, in 2007, by national decree, Brazil used the flexibility related to compulsory licensing for immune deficiency medication and obtained permission to import an equivalent alternative from India (Martini, 2008). Such actions stem from a clear vision which stipulates that the individual citizen's right to health is a constitutional right guaranteed to all citizens (Shaver, 2008) and have led to a more than 70 per cent drop in the price of the medication. Likewise, India has been careful to promote the manufacture of generic drugs and invest in them. It has also decided that software programmes do not fall under the rubric of inventions and thus are not subject to the patent restrictions[22] that limit the exchange of knowledge and participation in its production. These actions reflect a vision intent on promoting knowledge industries.

Arab countries have been absent from the negotiations specifically devoted to intellectual property, to knowledge access, and to efforts to combat international monopolies and external monopolistic pressures

GLOBAL DEBATE, ARAB ABSENCE

Naturally, we now find in the global arena a clear polarization in stances between advanced countries on the one hand and developing ones on the other. This makes debate and discussion, with an enlarged circle of participants, doubly important and adds impetus to the dialogue. Nevertheless, Arab countries have no presence, no active participation, in this momentous global discussion. They have also been absent from the negotiations specifically devoted to intellectual property, to knowledge access, and to efforts to combat international monopolies and external monopolistic pressures. Egypt may be the only Arab country to have participated in a number of international efforts calling for freedom of intellectual property for developing countries. These efforts include setting up a group of development-friendly countries, drafting a development document in 2004, launching the Access to Knowledge initiative, and making a rough draft of a treaty for it in 2005. This treaty is still under discussion internationally.

Perhaps one of the most important axes of global discussion and debate is that of access to knowledge. This involves "the necessity of applying protection in a way that supports development and the spread of knowledge, especially by maximizing countries' ability to benefit from the flexibilities and exceptions present in legislation for the protection of intellectual freedom." Among the most important of these are the exclusions for the purposes of education and scientific research and the manufacture of generic drugs classified by quality. Most Arab countries have not made full use of the exceptions and provisions for flexibility in the World Trade Organisation's Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement of 1994, the agreement of international reference that governs all countries in their dealings with the intellectual property issue. Flexibility includes numerous facets, most prominent of which are flexibility in implementation, extended grace periods for the intellectual product, standard setting,[23] and implementation of intellectual projects, especially anything connected to education and scientific research.

Legislation on intellectual property and its application has been passed in Arab countries without regard for their particular circumstances

While NGOs and consumer groups from other developing countries participate in the global debate on fostering knowledge and development, Arab civil society is absent from a global scene that is witnessing effective action from a number of countries in Africa, Asia, and South America. Arab debate on the subject is limited to the local purview among a restricted circle of legal specialists, as if the issue did not extend beyond the cloisters of the halls of justice. Legislation on intellectual property and its application has been passed in Arab countries without regard for these countries' particular circumstances and their need to benefit from the exceptions and privileges that international schools provide. Neither does this legislation

TABLE 2-2

Arab Countries according to their ties to trade agreements and intellectual property

Arab Non-Members in the WTO	Arab Members in the WTO	Arab signatories to a bilateral free trade agreement with the USA
Algeria	Jordan	Jordan
Iraq	UAE	Bahrain
Sudan	Bahrain	Morocco
Yemen	Djibouti	Oman
Lebanon	Kuwait	
Occupied Palestinian Territories	Morocco	
Syria	Saudi Arabia	
	Tunisia	
	Egypt	
	Mauritania	
	Qatar	
	Oman	

Source: Muhammad al-Sa'id and Ahmad 'Abd al-Latif, background paper for the Report, in Arabic.

reflect a clear vision directed towards establishing a national perspective on innovation, the catalysis of creativity, and development of local knowledge content.

REGULATING INTELLECTUAL PROPERTY IN THE ARAB WORLD: DISPARITY AND OCCASIONAL EXAGGERATION

Perhaps without realizing the importance of intellectual property, Arab legislation has codified the restrictions that new international legislation dictates, based on the priorities of those countries most advanced economically, technologically, and in terms of knowledge performance. There is considerable disparity among the Arab countries in terms of the features of regulatory systems that protect the rights of intellectual property, depending on how closely tied they are to the TRIPS agreement. As a corollary, it is possible to divide Arab countries according to the regulations currently on their books for the protection of intellectual property into three groups, on the basis of how closely they apply the standards found in international accords (see Table 2-2).

The first group includes Arab countries with fewer laws and standards than exist in the multilateral international system represented by the TRIPS agreement. An example is Yemen, which grants copyright for thirty years, rather than the fifty of the accord. Countries of the second group include Arab members of the WTO. All obligations and standards on the protection of intellectual property as set out in these accords are necessarily incumbent upon them as a fundamental and inescapable condition for membership. The third group is composed of those Arab countries that are members in the WTO but which, at the same time, are party to a number of additional trade agreements, such as free trade agreements or a bilateral economic cooperation agreement with the United States or the European Union. These agreements usually stipulate additional and more stringent restrictions and standards for intellectual property protection than those set out in the TRIPS agreement.

In fact, these agreements reflect the interest of mega-corporations and the terms of advanced countries, leaving little scope for creativity in developing countries.

Free trade agreements usually stipulate additional and more stringent restrictions and standards for intellectual property protection than those set out in the TRIPS agreement

TABLE 2-3

Rights and responsibilities of Arab members in the World Trade Organisation in the field of copyright and access to knowledge

Country	Number of years author's rights are protected	Accepts special obligations in technical procedures for protection?	Permits compulsory licensing?	Makes exceptions for libraries and universities for scientific and educational purposes?
Bahrain	70	Yes	Yes	Yes
Djibouti	25	No	Yes	Yes
Egypt	50	Yes	Yes	Yes
Jordan	50	Yes	Yes	Yes
Kuwait	50	Yes	Yes	Yes
Mauritania	70	No	Yes	Yes
Morocco	70	Yes	No	Yes
Oman	70	Yes	No	Yes
Qatar	50	Yes	Yes	Yes
Saudi Arabia	50	No	Yes	Yes
Tunisia	70	Yes	No	Yes
UAE	50	Yes	Yes	Yes

Source: Muhammad al-Sa'id and Ahmad 'Abd al-Latif, background paper for the Report, in Arabic.

Nine Arab countries have accepted special obligations for technical procedures for the protection of digital products not found in TRIPS, and these should have been avoided

There, the strict protectionism in, for example, the pharmaceutical industry or of software protects the interests of mega-corporations that belong, for the most part, to industrialised countries that built their harvest of knowledge, historically, in a climate free from restrictions on knowledge exchange.

On the legislative level, regulations in Egypt, Lebanon, and Syria stipulate some exceptions specific to the pharmaceutical industry. In addition, some exceptions from the articles of patent law have been ratified in Egypt, Tunis, and Jordan, while in Syria, Morocco, and Jordan regulations allow for some flexibility in copyright laws. Djibouti and Mauritania remain exempt from implementing the provisions of the TRIPS agreement on medicines until 2013 and 2016, respectively. Bahrain, Morocco, and Oman, however, have broadened some of their commitments under this agreement, and even accepted additional commitments in the framework of other free trade agreements ratified with developed countries such as the United States and the European Union. Similarly, legislation of many Arab countries includes special obligations for technical procedures for technology protection, such as encryption, even though these are not among the requirements of the TRIPS agreement.

Table 2-3 on rights and responsibilities of Arab countries shows that five of twelve Arab countries apply stricter provisions for protection of authors' rights than those called for by TRIPS, with protection extending to seventy, rather than the fifty years mandated by the agreement. Nine Arab countries have accepted special obligations for technical procedures for the protection of digital products not found in TRIPS, and these should have been avoided. And

while some of these nine countries became subject to these obligations because they are linked to secondary free trade agreements with developed countries, Egypt included them in its own national legislation for no apparent reason.

Noticeable in Table 2-3 is the fact that most Arab countries–nine of the twelve covered by the sample–have the right to issue and use compulsory licensing to exploit intellectual work without the agreement of its owner, in cases that serve the public welfare. However, this right has not been put into actual practice, and no compulsory license has been issued by any Arab country. However, all the Arab countries listed in the table obtained exclusions from the agreement for libraries and universities for scientific purposes. This is an issue of critical importance which must be implemented and awareness of which must be promoted in the Arab world to foster widespread access to knowledge.

CHALLENGES AND OPPORTUNITIES FOR ACCESS TO KNOWLEDGE

The Arab world faces a number of challenges in the field of protecting intellectual property rights and transmitting and providing access to knowledge. The first challenge lies in the absence of the subject from national agendas. Here, partnering with the global knowledge reserve and gaining access to its sources and resources of knowledge in important fields such as health, education, and development is of particular importance. The second challenge is embodied in the bilateral agreements on economic cooperation and free trade with industrial countries, especially countries of the European Union and the USA, which aim both at increasing opportunities for products of Arab countries to penetrate these markets and at increasing foreign investment flows. This has not actually transpired, due to the great disparity between the resources of these Arab countries and the capacities of the developed countries. In fact, it is generally the opposite that happens, with all that that entails in terms of negative economic and social consequences for the Arab side.

The third challenge relates to how to benefit from the Arab knowledge product, however modest, through the provision of adequate support, accompanied by increased positive interaction with the rich and accessible global knowledge reserve, and the beneficial deployment of any outcomes. Finally, there must be participation in knowledge production in a way that moves sustainable development in the Arab world forward and diminishes the sharp disparities between countries in light of the rapid advancements in technology. In this context, reference must be made to the appearance of new business models in the world economy that depend principally on ideas. In these models, knowledge performance plays an effective role in boosting development through knowledge production, and the promotion of and investment in endogenous resources, rather than through the remittance of ever larger annual payments to manufacturers of knowledge in the developed world.

OPPORTUNITIES FOR CREATIVE ARAB COOPERATION

The Arab world, like other developing areas, suffers from a lack of competent specialists in legal texts in the field of intellectual property, a new field subject to global considerations. Along with these deficiencies come constant external pressures, pressures that may be formidable in the case of non-compliance with the articles of intellectual property agreements and which are often quickly capitulated to. This highlights the necessity for coordination and the sharing of expertise among Arab countries, especially those that have undergone such experiences, even if the results were of limited value (Muhammad al-Sa'id and Ahmad 'Abd al-

Arab countries suffer from a lack of competent specialists in legal texts in the field of intellectual property. This highlights the necessity for coordination and the sharing of expertise among countries that have undergone such experiences

It is possible to begin with specific and practical procedural steps to create real Arab cooperation in the field of knowledge by freeing up intellectual property

Latif, background paper for the Report, in Arabic).

It is possible to begin with specific and practical procedural steps to create real Arab cooperation in the field of knowledge. For example, one could provide latitude for the strengthening of the Arab knowledge reserve by freeing up intellectual property, in emulation of other countries that have realised the importance of providing latitude for freedom to produce and implement knowledge, with all the positive effects this has had on development. This strategy requires that government, the private sector, and civil society organisations participate in the formulation of policies and practical programmes. It also requires the existence of a wise and serious leadership at all levels able to implement these policies and present new initiatives. In this context, the maximum degree of coordination and cooperation between Arab countries would have to be realised in order to agree on united stances in the face of whatever issues might arise with regard to intellectual property on the world stage. An exchange of legal expertise to review many of the laws that some Arab countries have issued without benefiting from the allowances and flexibilities for which international agreements provide would also be needed.

The current state of knowledge-enabling environments as viewed from the angle of freedoms in the Arab world is not one to stimulate the advancement of Arab knowledge performance

These efforts would not begin from scratch, given that, in fact, there are already examples of Arab cooperation in the field of intellectual property, such as the Arab Agreement for Copyright (1981, then 2002), and the special legislation on protecting author's rights and associated rights (1998). Cooperation among members of the Gulf Cooperation Council in the field of patent law is considered a successful example of Arab legislative coordination; through this, a single system for patenting was applied from 1998, and modified in 2002. This system gives automatic protection in the six member states of the Gulf Cooperation Council without the patent having to be registered in each of the states separately. The Unified Gulf Patent Office in Riyadh takes an active role in the process of examining, registering, and protecting the patents.

Knowledge is an integral, homogenous whole in its essential categories and components, influenced by the elements of the enabling environments and the cluster of freedoms

SUMMARY: FREEDOMS: A COMPREHENSIVE CLUSTER OR DISPARATE ELEMENTS?

It can be said that the current state of knowledge-enabling environments as viewed from the angle of freedoms in the Arab world is not one to stimulate the advancement of Arab knowledge performance. The picture looks bleak when one compares freedoms in the Arab world to those in other regions. However, while this characterization is accurate, the situation with regard to Arab enabling environments varies considerably from one country to another and conflicting pictures sometimes emerge. Caution, therefore, is called for in making judgments and generalizing results, even when defining the relationship between knowledge performance and the enabling environment in any given country. Performance also varies considerably from one year to another, as the international reports show. While a particular Arab country may lead in economic freedoms and occupy an outstanding position in one of the pivotal knowledge performance categories, it may record in the same year a slump on the front of political and intellectual freedoms. This will inhibit the pivotal category of innovation that is so closely tied to the abundant supply of intellectual freedom (see Chapter 6).

This phenomenon may be explained by the fact that knowledge is an integral, homogenous whole in its essential categories and components, and influenced as a single entity by the elements of the enabling environments and the cluster of freedoms. Knowledge, after all, is a harvest of different kinds of information acquired from a number of sources, such as education, scientific research, media and publication, economic activity, cultural heritage, historical wisdom,

and political participation. All of these environmental components are affected by and affect each other in the context of whatever freedoms are dominant in the society. As a result, knowledge performance can improve in one country and deteriorate in another, just as one of the basic categories of knowledge may advance while the other categories relapse as a result of the performance of those freedoms, which constitute, in the end, an important and authentic part of any enabling environment for knowledge.

Arab countries, as societies and as individuals, suffer from tensions and contradictions in their performance in enabling knowledge, because, perhaps, of the lack of a clear vision and an organising strategy to catch up with the age of knowledge. These tensions may be the result of security or political fears which exert pressure in the direction of curbing freedom and deregulating commerce. Here, the lack of awareness that knowledge environments on the global front are heading in the direction of greater democratization of knowledge becomes clear. In that process of democratization, the principle of sharing by all citizens in the production of knowledge sparkles, offering an expression of thinking by groups of individuals through horizontal communication media, not through an elite discourse coming from on high.

Generally speaking, it can be said that change in the actual situation of freedoms in the region in recent years has been confined to an improvement in economic freedoms. An analogous improvement in political and intellectual freedoms, democratic pursuits, and freedom of expression has not occurred; they have remained as before in most Arab countries. There also has been no improvement in social and cultural freedoms; in fact, they may even have suffered a decline in some areas.

The freedom of thought and expression are still the weakest link in the cluster of freedoms and environments for advancement of Arab knowledge performance. And the possibility of separating the various freedoms and defining the role of each in the advancement of knowledge performance remain among the most problematic of considerations that must be addressed. Clearly, exercising just a few types of freedom, and to a most minimal degree, will not be enough to establish a knowledge society in the Arab world, which lacks both political and social freedoms.

Arab countries suffer from tensions and contradictions in their performance in enabling knowledge because of the lack of a clear vision and an organising strategy

FROM NURTURING ENVIRONMENTS TO SUPPORTING INSTITUTIONS

In the previous section of this chapter we have laid out what we believe to be the cornerstone of the enabling environments that should assist in the formation of a knowledge society in the Arab world, and we have classified these environments within a general orientation that we believe to be central to the formulation of such a society. All of this relates to what we have called an expansion of the domain of freedoms, whether at the political, economic, social, cultural, or media level.

The catchword 'freedom' is not a panacea for all the obstacles that fall in the way of the formation of a knowledge society and an advancement of Arab knowledge performance. Definitely, other factors besides a shortfall in freedoms hinder our ability to reach the thresholds of a knowledge society. One might cite the hegemony of custom, petrifaction of ideas, closed-mindedness, rejection of innovation, introversion, and a lack of interaction with the latest developments of our age.

Freedom, with the possibilities it offers of a leap forward towards all that contributes to strengthening and transforming the human experience, must be considered a central pillar of empowerment. It is also, as we have said, a pursuit that correlates with the needs of Arab society. Nevertheless, this empowerment, which is based on the responsible exercise of freedoms, requires

Empowerment, which is based on the responsible exercise of freedoms, requires the creation of supportive and protective institutional frameworks that ensure sustainability, development, evaluation, and oversight

the creation of supportive and protective institutional frameworks that ensure sustainability, development, evaluation, and oversight. This is because institutional society in the contemporary sense of the word is synonymous with modern society. In the knowledge domain, developed societies have hundreds of institutions capable of accumulating the symbolic and material goods of the knowledge society not only at the level of economic production but also at that of management and its various associated social, legal, and other spheres.

To build and implement an enabling environment in the Arab world, we must propagate the institutional climate that nurtures the efforts made to establish the hoped-for knowledge society

To build and implement an enabling environment in the Arab world, we must propagate the institutional climate that nurtures the efforts made to establish the hoped-for knowledge society. The hope is that these institutions would then go on to embrace the requirements for its establishment, such as the creation and operationalization of a legal mechanism and laws to regulate the institutions that will have the task of supporting the knowledge conduit and reinforcing its branching side-channels. This will help forward the aim of generalising, propagating, producing, and patronising knowledge, whether in terms of human resources or of technological means. Laws and regulations must assume the role of protection, and provide the institutions with their legitimacy so that they may strengthen and elaborate their own regulatory mechanisms. This clarifies the boundaries and parameters of their work, as it does their relationship with the institutional network of the knowledge society.

Many Arab countries have begun attaching particular importance to the role of science and technology in the service of development. Certain Arab institutions are shining examples of this trend

The achievement of transparency depends on building institutions and their regulations, in that institutions contribute to oversight, accountability, and the rule of law. They also contribute to a degree of decentralization and effectiveness in the performance of their defining tasks, in that networking and subsidiary creation lead to a strengthening of the mechanism of institutionalization, which is synonymous with modernization. Through networking, institutions come to possess, in their turn, the power to access the contacts of other institutions at home and abroad. This is particularly true when they have encompassed the networked spaces provided by the revolution in information technology. This generates an environment that stimulates acculturation, sharing, and learning, and offers opportunities for taking calculated risks, namely, institutional action in its responsible, rational form that is based on calculations of interest and return on investment.

The subject of supportive, regulatory legislation for efforts to inaugurate the knowledge society ramifies and grows as the issues related to its establishment expand and proliferate. The Arab world not only lacks an institutional perspective on knowledge; it also lacks many of the requirements of institutionalism, such as regulations and legislation specific to it. The delineation and development of these constitutes a basic requirement for the entire endeavour.

PIONEERING INSTITUTIONS AND SHINING EXAMPLES

Despite the lack of vision and institutional practice and despite the weakness of the legislative framework within which to promote the advancement of the knowledge society in the Arab world, we find many illuminating institutional attempts aimed at embracing, catalysing, and propagating knowledge initiatives. Many Arab countries have begun attaching particular importance to the role of science and technology in the service of development. Certain Arab institutions that try to participate in the building of a knowledge society are shining examples of this trend; space permits us to mention only a small number of them here. In Jordan, for example, there is the Princess Basma Centre for Youth Resources, which was founded in 2004. It is the first such institution to specialise in youth programmes and is known regionally for its vitality and creative and empowering curricula. The Centre launched the

first INTEL computer club; INTEL is considered a pioneer in its attention to information technology and its use in development. This centre is likewise considered the essential partner to the International Youth Foundation (IYF).

In Saudi Arabia we should mention, among a number of examples, Mawhiba (Talent), the initiative of the King 'Abd al-'Aziz and His Men Foundation for Patronage of the Gifted, whose basic mission is to discover and sponsor those with talent. It has held a large number of lectures and seminars in the field of developing talent in various regions of Saudi Arabia, publishes the magazine Mawhiba, and has translated many books on the subject into Arabic. It has established a division to support Saudi inventors that has helped more than two hundred, introducing them to investors and issuing patents for their inventions. The foundation is working on setting up an invention incubator to develop and commercialise Saudi inventions. To this end, the foundation holds marketing sessions which bring together the inventor and relevant agencies from the private and public sector. The foundation also supports artistic and cultural creativity out of conviction as to its importance as a facet of knowledge.

In the UAE, among the most important initiatives in support of knowledge and creativity has been the establishment in 2007 of the Mohammed bin Rashid Al Maktoum Foundation, a personal initiative of His Highness Sheikh Mohammed bin Rashid Al Maktoum, vice-president, prime minister, and ruler of the UAE, who allocated the sum of ten billion dollars as a knowledge endowment. The foundation's goals can be summarised as follows: to develop knowledge and human potential in the Arab region and to use those potentials in the creation of a new generation of leaders able to support comprehensive development efforts all over the Arab world. A second initiative, "Dubai Giving," is an extension of the first endowment. In cooperation with the Mohammed bin Rashid Al Maktoum Foundation, "Elaf," the first Arab electronic newspaper, plans to launch a knowledge page on its site. The foundation has also launched academic scholarships for studying abroad, such as the "Mohammed bin Rashid Al Maktoum Scholarship Programme", which falls under the knowledge and education sector. The programme offers scholarships to the top universities of the world for qualified Arab students.[24]

In Qatar, the mission of the Qatar Foundation includes preparing young people in Qatar and the region to face the challenges of an ever-changing world.[25] The Foundation also aims to advance the State of Qatar to the point at which it can assume a leading role in educating for innovation and scientific research. The Foundation works on three axes: education, sciences and research, and society. At its Education City, the Foundation provides support for a select group of institutions known for the excellence of their programmes, covering stages from early childhood to university and higher studies, and that offer integrated programmes focussing, in the first place, on building capabilities and developing character. In the realm of the sciences and research, the Science and Technology Oasis, which cost more than three hundred million US dollars to construct, is regarded as a research and development centre in basic fields, such as medicine, bio-technology, ICT, environmental sciences, particle science, and nano technology. The Qatar Foundation's research division cooperates

In Saudi Arabia, the initiative of the King 'Abd al-'Aziz and His Men Foundation for Patronage of the Gifted has established a division to support Saudi inventors

The mission of the Qatar Foundation includes preparing young people to face the challenges of an ever-changing world

BOX 2-2

Towards Productive Intercommunication for Knowledge:
Translation in the Age of al-Ma'mun

The Mohammed bin Rashid Al Maktoum Foundation is translating a number of the masterworks of world science and culture, at the rate of one book per day, thus calling to mind the Golden Age of the Arabs during the reign of the caliph al-Ma'mun—a period characterised by its interest in translation, by its openness, and by the ability and willingness of the Arabs to communicate with the cultures of the rest of the world. This pioneering experiment may assist Arab knowledge societies towards wider intercommunication with other human societies. It may also help in creating a greater openness towards world sciences and scholarship in such a way as to enrich the existing Arab reserve of knowledge and the establishment of the hoped-for knowledge society.

with its partners in leading a process of embedding the mainstays of this research environment in order to built technological and innovative capacity in Qatar and create early solutions for the difficulties and challenges faced by the country in the areas of health, climate change, clean energy, and others. Research is also part and parcel of the academic programmes of each university branch present in the Education City, the intention being to make a reality of the linkage between innovation and the educational process and to direct both to serve the needs of society. The Sciences and Technology Oasis also undertakes to commercialise new knowledge and inventions via support programmes that make it possible to convert research projects into marketable products. The Qatar Foundation also seeks to link its programmes to the service of the society, in fulfilment of the principle of knowledge as a road to development.

Oman's World Studies Institute aims to undertake studies on local and global economic issues, focusing on the Arab world

Oman's World Studies Institute was founded in 2005 as a non-profit non-governmental organisation. The Institute aims to undertake studies on local and global economic issues, focusing on the Arab world. The Institute is the representative in the region for the Fraser Institute for Economic Freedoms network.

In October, 2008, Egypt's Arab Academy for Science and Technology signed a cooperation agreement with the Egyptian Fund for Science and Technological Development (2008 budget, one hundred million Egyptian pounds), to reinforce cooperation between the two. It aims to offer patronage to Arab inventors, providing them with an appropriate climate, and directing the results of their scientific and technological research towards the service of Arab societies. The agreement covers exchange of expertise, arbitration for technological projects, and the provision of services in support of networking and cooperation among relevant Arab institutions to support science and technology and catalyse them in the service of the economic, social, and environmental development for Arab society.[26] The new Bibliotheca Alexandrina is working hard to revive the spirit of openness and research which characterised its ancient counterpart. It is not only a library, but a cultural centre which brings together a library capable of housing millions of books, an internet archive, six specialised collections, a planetarium, and a discovery hall to acquaint children with science, in addition to a panoramic mural of civilisation, nine permanent galleries, seven academic research centres, and 'Vista," a virtual interactive system for science and technology applications.

The new Bibliotheca Alexandrina is working hard to revive the spirit of openness and research which characterised its ancient counterpart

In the countries of the Maghreb, we find, to name but a few examples, the Islamic Foundation for Education, Science, and Culture in Morocco, an institution founded in 1979 to coordinate the specialised agencies of the Organisation of the Islamic Conference in those three fields and that organisation's member nations. Recently it has taken an interest in a number of strategies for the development of bio-technology in the Islamic world (2003), for water resource management (2003), for developing university education (2006), and for cultural solidarity in the service of civilisation and development issues for Muslims.

Outside the orbit of these institutions, a number of other activities have been undertaken, such as the dedication of prizes and the holding of exhibitions, all of which point to the importance a number of Arab countries attach to catalyzing, in expedient fashion, the establishment of the knowledge society. In Saudi Arabia, the foundation of King Abd al-Aziz, Mawhiba, with participation by the Saudi Aramco Corporation, organised the first Saudi innovation exhibition, "Ibtikar 2008," in March 2008, under the slogan "Innovation in the Service of Development." With the participation of sixty-three inventors and an estimated twenty-two thousand visitors of all ages, the exhibition displayed its selection of over sixty medical and electronic inventions. The exhibition organised basic prizes for boys and girls

from the ages of thirteen to twenty-five and certificates of appreciation to those under twelve. Among the goals of "Ibtikar 2008" were developing inventions and national innovations, highlighting them, evaluating them, and investing in them on an individual basis, with the participation of the public and private sectors. It also strove to provide guidance, help knowledge and technology take root and invest in them, and transform innovations into products with an economic return, all of this paving the way for the realisation of comprehensive development in Saudi Arabia.[27]

In November, 2008, Qatar began celebrating Academic Excellence Day with the designation of six prizes for high school graduates, university graduates, holders of doctorates, outstanding teachers, outstanding schools, and scientific research for secondary students.[28]

The Kuwaiti Science Club organised the first international exhibition for inventors in the Middle East in October, 2007. The Kuwaiti Office for Patronage of Inventors, adjunct to the Kuwaiti Science Club, does follow-up on Kuwaiti youth, fostering their talents and helping them register and enforce patents. A number of Arab and international science agencies took part in this exhibition, helping many inventors to get acquainted with each other and with the investors; this was especially important in view of the fact that marketing is the one problem common to all inventors around the world. This exhibition invited Kuwaiti investors to offer support funds to the inventors by acquainting themselves with the inventions and choosing those of use for manufacture.[29]

The Syrian Ministry of Economy and Development announced a contest for the best young inventor for 2008 to be chosen from among university and institute students, as part of a programme for the dissemination of the culture of intellectual property and the promotion of creativity and invention. Prizes of over 30,000 Syrian liras were earmarked for the competition.[30]

Our review of institutional initiatives reveals actions that truly aspire to strengthen institutionalism and fortify the supporting environment for the knowledge society. At the same time, however, these actions place us in uncharted territory: they neither cover all the domains of knowledge, nor do they reflect a clear policy for doing so. They are, rather, an avant-garde action in dire need of oversight, consolidation, and expansion so that together they may indeed contribute to propelling us into the knowledge society.

These laudable efforts, despite their important role in spurring and providing financial support for contributors to the field, are disorganised and uncoordinated. Indeed, some of them overlap and repeat the work of others, leading to a waste of effort and of the meagre resources available. Here again, we call for openness and interaction in order to profit from the experiences of others. Many countries that have made progress on the knowledge front have taken competitiveness into consideration in this domain and have worked on drafting treaties and strategic initiatives to prepare an appropriate institutional atmosphere for the knowledge society. In March, 2000, European leaders put forward an agreement known as the Lisbon Treaty which aims at making the European Union more competitive and dynamic. The initiative comprised many policies and focused on creating new job opportunities, bringing together 2,010 policy initiatives aimed at utilizing the possibilities of information and communications technology to promote additional innovation and productivity in Europe.[31]

Review of institutional initiatives reveals actions that truly aspire to strengthen institutionalism and fortify the supporting environment for the knowledge society. However, these actions place us in uncharted territory: they neither cover all the domains of knowledge, nor do they reflect a clear policy for doing so

LEGISLATION AS THE WAY TO SUPPORT INSTITUTIONALISM

Establishing the oversight institutions that support efforts to establish the knowledge society requires carefully configured regulations and legislation. In a knowledge society, the value of institutions increases in proportion to

Establishing the oversight institutions that support efforts to establish the knowledge society requires carefully configured regulations and legislation

BOX 2-3

The Legal Framework for the European Union

The communications market in the European Union was completely deregulated in 1998. From that time on, a rapprochement of communications technology and broadcasting via digitalization in the European Union forced the redrawing of organisational borders to include "all internet communications and services" in a new organisational framework which came into force in July, 2003. In less than five years this framework was reviewed and brought up to date.

Principal Goals of the Organisational Framework for 2003:

Decreasing organisational burdens on companies that provide services to the information society

- Making sure that all clients, including those with disabilities, have the right to all basic services at reasonable prices (telephone, fax, internet access)
- Encouraging competition through deregulation of the market and of the monopoly by some national companies that offer services like high-speed internet

The reorganisation that the European Commission launched at the end of 2007 aims at simplifying and systematizing laws by establishing a single unified European agency to undertake these regulatory tasks.

The European Union is determined to guarantee that citizens and companies benefit from the knowledge society. In 2006 the Commission worked to limit the unwarranted rise in prices for the use of mobile telephones during travel in other E.U. countries, and it reduced what are known as 'roaming' charges by more than sixty per cent in 2007, followed by further reductions in 2008 and 2009.

In the long range, it gives priority to eradicating the "digital gap." The E.U. also has numerous initiatives of providing high speed broadband connections, expanding e-commerce and business services to companies, putting public services on the web, and supporting competence and the competitive potential of all sectors of industry and service.

There are three priorities:

- Providing companies and citizens access to a large group of high-quality, moderately priced services and utilities of the communications infrastructure
- Providing every citizen the skills necessary to live and work in an information society
- Providing life-long access to learning as a fundamental part of the European social model

The organisational authority is an inseparable part of the organisational framework of electronic communications in the European Union and it takes on its shoulders the reform process which must be implemented before the end of 2009.

As for the national organisational authorities, among their fundamental tasks are:

- Encouraging competition in the domain of electronic communications networks and services
- Guaranteeing users the benefit of the greatest degree of choice, price, and quality
- Encouraging investment in infrastructure development and encouraging innovation
- Encouraging the active use of wireless and digitalizing resources

Source: the website of the European Commission: Europe's Information Society
http//ec.europa.eu//information_society/Europe/i2010/ict_and_Lisbon/index_en.htm

Arab legislation remains, for the most part, insufficient to address the questions and issues of the knowledge society

the legal framework that endows them with the foundations that guarantee their continuity and make them viable in society. The task of legislation is also to provide institutions with the tools that allow for self-scrutiny and accountability and thus impart transparency.

The reality, however, is that Arab legislation remains, for the most part, insufficient to address the questions and issues of the knowledge society, whether by protecting them, as in the case of property rights, or by supporting them, or in drafting guidelines for their continuity and development. For example, Arab countries' positions vary widely as regards the law of freedom of information published by Privacy International. Some of them find themselves in the list of countries with an inferior level of laws guaranteeing this freedom; a large number fall into the category of countries that have not made laws governing information; and three Arab countries are still waiting to implement these laws, laws which have come to be taken for granted in free and developed countries.

It is incumbent on us to make use of this aspect of the experience of more developed countries. In Europe, the Legal Framework for the Information Society (LEFIS), was established by the European Union as an international research project under the "Sixth Frame" programme. The project has more than sixty members, including academic and research institutions, companies, lawyers, and European Union public administration experts.

LEFIS proposes standards for information technology and communications in schools and law faculties, promotes the study of laws and by-laws, and practices in applied arts centres. The project has also applied itself to devising teaching

solutions that allow use of the available academic resources on-line. A further goal is to draft legal policies arising from discussions that have sprung up around the European Union. The aim of the project is to formulate and implement a plan for educational infrastructure as well as for research in the legal field to effectively address the needs of the knowledge and information society. Based on previous initiatives subsidised by the European Union, it can be expected that this project will lead to an improvement in legal education and succeed in adapting it to the new social, political, and institutional climate. Legal education will thus come to include electronic, social, economic, and ethical dimensions as well as policy-making.[32]

The Free Knowledge Institute, a non-governmental organisation, believes that "by promoting the use of free knowledge in the fields of Technology, Education, Culture, and Science more individuals and organisations will profit from the benefits of sharing knowledge." The institute supports 'free knowledge' in all its forms in the fields of information technology, and educational, cultural, and scientific materials, so that it may be used, studied, modified, and freely distributed. The institute's basic goal is to support equal opportunity, prosperity, and the collaborative ethic in creativity and knowledge exchange. Among the institute's most important initiatives is SELF, funded by the European Commission, which has drawn up a programme to encourage creativity, cooperation, exchange of academic materials, and ongoing training. It gives special importance to free and open programmes so that all who wish to may contribute by presenting and sharing knowledge without restrictions, drawing inspiration from the example of Wikipedia.[33]

The European Union has also undertaken the drafting of a legal framework to regulate the climate in which such institutions operate, to provide the environments and freedoms necessary to the establishment of the knowledge society, and to facilitate its movement and its development. This framework is periodically reviewed to help it stay current with the continuous changes in the knowledge revolution.

We live in the age of the "fifth freedom," that is, the freedom of movement of knowledge between countries. This expression was coined by the European Union in 2006 and under its rubric it set aside approximately twelve billion euros to subsidise creativity and technology.[34] It follows that, among Arab countries, too, this concept must be applied in the exchange of expertise in the knowledge fields.

Our examination of European examples reveals the fragility and marginality of the institutionalisation currently in place in many Arab countries and in the region as a whole. Arab institutions of scientific research are like isolated islands lacking everything that is needed for collaborative work aimed at raising levels of scholarship and creativity, be that between the Arab institutes themselves, or between them and scientific research institutes known around the world for their productivity and creativity.

This impels us to consider the generalisation and prioritizing of institutionalism as a way of accessing the knowledge society.

Arab institutions of scientific research are like isolated islands lacking everything that is needed for collaborative work aimed at raising levels of scholarship and creativity

ON THE NEED FOR AN ALTERNATIVE INDEX: A PROJECT IN CRITIQUE AND TRANSCENDENCE

An analysis of the enabling environment of Arab knowledge demonstrates that an alternative methodology is needed for studying the state of knowledge and measuring knowledge performance in Arab countries. However, this can only come about throughº the use of a new index that monitors, as one of its chief indicators, the various freedoms to which this chapter is devoted, to wit, freedom of thought and expression,

An analysis of the enabling environment of Arab knowledge demonstrates that an alternative methodology is needed for studying the state of knowledge and measuring knowledge performance in Arab countries

and the political, economic, and social freedoms. It must do this in addition to monitoring institutionalization and enabling and encouraging legislation, as well as measuring actual progress towards the knowledge society. These freedoms provide the climate needed to build the various branches and types of Arab knowledge and the institutions that support them, as well as the laws and regulations in force and their implementation. It is to be hoped that the desired Arab index will transcend the traditional methods of measuring the production of knowledge via indicators imposed from on high, seeking, instead, to measure knowledge production from an internal perspective. It should search for evidence of environments that act as catalysts to the use and production of knowledge content and that boost good governance through a method suited to the production of knowledge under the umbrella of these freedoms. It is an index that would depend principally on participation within a broad space of freedoms, and aim to encourage and utilise indigenous resources and the spread of democracy in producing and disseminating knowledge and creativity instead of importing knowledge from industrial countries.

The desired Arab index will transcend the traditional methods of measuring the production of knowledge via indicators imposed from on high, seeking, instead, to measure knowledge production from an internal perspective

The alternative index might also explore scientific knowledge environments and scientific research in creative ways to motivate scientists in research and development groups in an atmosphere of academic freedom and freedom of thought and expression. The index might also be broad enough to measure the level of cooperation between scientific and research institutions on the one hand and the industrial sector on the other. It would also monitor the extent of participation in the production of knowledge via digital media (Arab content in Wikipedia, Arab sites in the worldwide web) and Arab publications (the number of independent newspapers, for example, and the number of detained journalists and bloggers) and it would evaluate the state of social freedoms (gender freedom, freedom of marginalised classes and the poor, freedom of religious practice).

The above is just a summary of the broad outlines of such an index, and in particular for one linked to freedoms. It suggests a starting point for the observation of Arab knowledge environments from an internal point of view that comprehends the interaction between freedoms and knowledge and sustainable development. It would observe knowledge from the vantage point of Arab reality itself and not according to indicators derived from industrial countries. This would pave the way for the construction of an alternative index to monitor Arab knowledge environments and synthesise what may perhaps be considered the nucleus of a project for Arab knowledge accomplishment.

PEERING INTO THE FUTURE: TRAJECTORIES OF THE ENABLING ENVIRONMENT

It is possible to peer into the future of knowledge-enabling environments in the Arab world in light of the diagnosis presented in this chapter by pausing before three possible future trajectories. The first is pessimistic. It assumes that the state of knowledge-enabling environments will remain as it is, with the continued imposition of restrictions that rein in freedom of opinion, thought, creativity, social participation, and intellectual property. Slight improvements in knowledge performance and a partial improvement, possibly superficial, in the state of freedoms, may occur but will not necessarily lead to an advanced, competitive economic structure based on sophisticated local knowledge industries. On the contrary, the situation will worsen, especially in view of the global economic crisis, with the continued squandering of natural and human resources, including an additional brain drain and loss of promising scientific and university talents. The Arab world will remain, according

to this trajectory, a consumer, not a producer, of knowledge.

The second trajectory presents a realistic outlook that contains a degree of hope. This trajectory would take proper advantage of the slight opening to economic freedoms in the Arab world and give it a little push for the sake of an enhancement of Arab knowledge performance, while trying to find vistas for "new levels of freedom" that the world economic crisis may open through new possibilities for the use of Arab knowledge (see the section devoted to the economic crisis in the preamble). This realistic trajectory requires an enlightened leadership aware of the impediments that a continued flow of Arab resources abroad entails, especially in the light of current global economic conditions. Under such a leadership, Arab investments in two basic domains would be encouraged. Top priority would go to a heavy investment in Arab human capital. This would occur through support of creative initiatives in education, establishing and operating endowments for research and scholarships, and expanding science prizes as a sophisticated means of encouraging individuals to participate in scientific research, as is done elsewhere in the world, even by mega-corporations. These would be over and above an opening to global knowledge networks and support for the trend towards the democratisation of knowledge rather than its monopolisation. Second priority would go to investment in promoting knowledge-based industries, such as the pharmaceutical industry, software, and information technology, and expanding them by making the greatest possible use of the flexibility available in the laws on intellectual property and by working together with other developing countries. This would lead to a boost for national knowledge industries as they integrate into global economies, while maintaining the priorities of the Arab countries, and without submitting to the dictates of the developed world.

Nevertheless, this trajectory does not remove the fundamental impediment that hampers Arab knowledge, namely, the restrictions imposed on the freedom of thought and expression irrespective of how the Arabs may flourish economically. Even if this trajectory leads to some economic success,[35] that success will run into the ceiling of restrictions on freedom of thought and expression and perhaps the ceiling of cultural restrictions, from which liberation can be expected, at best, only in the long term.

Finally, the most desirable trajectory is the optimistic scenario which shows a leap forward in vision and leadership in the Arab world and a consequent expansion in political freedom to complement economic freedoms. This would come about as a result of an awareness of the danger of repressing freedom of thought and expression. It would happen when attention is paid to the implementation of competitiveness, freedom of intellectual property, the enrichment of intellectual life, scientific research, and creativity, and the realisation of Arab knowledge unity, based on a climate headed towards democracy in its broad sense, including the democracy of politics, business, and knowledge. In this healthy climate, cultural and social freedoms would be realised successively, and Arab countries would cooperate, particularly in view of the global economic crisis and the coordination of efforts it requires of developing countries.

The most desirable trajectory is the optimistic scenario which shows a leap forward in vision and leadership in the Arab world and a consequent expansion in political freedom to complement economic freedoms

The ideal solution is to release all these freedoms. This is in harmony with human rights and will bring about equality and social justice. If the Arabs direct their attention exclusively towards economic freedoms, the basis of Arab knowledge-enabling environments will remain incomplete and far from realisation. A knowledge model built on a limited number of freedoms will lead to the production of only certain forms of knowledge, not to a knowledge society. The likeliness of the success of such a knowledge model and its longevity, not to mention its ability to bridge the knowledge gap, remains questionable, both on the Arab and the global level.

End Notes

1 The index divides the Arab states into five groups according to their degree of press freedom (good, satisfactory, noticeable problems, difficult, very serious) based on a sliding scale according to which the higher the level of press freedom the lower the value on the index.

2 http://www.economist.com/media/pdf/Democracy_Index_2007_v3.pdf.

3 Calculations were made according to Table 3 in the Democracy Index, 2008, published by the investigations division of the Economist. http://a330.g.akamai.net/7/330/25828/20081021195552/graphics.eiu.com/PDF/Democracy%20Index%202008.pdf.

4 This applies also to the Governance Index issued by the World Bank, which consists of several indicators, the most significant of which are political stability, absence of violence and terrorism, efficacy of governance, quality of institutional performance, freedom of expression and accountability, the rule of law, and control of corruption. See Governance Index, World Bank, 2008, covering the years 1996-2007. http://info.worldbank.org/governance/wgi/worldmap.asp#.

5 This section of the Report draws primarily on the background paper prepared for the Report by Naomi Saqr, "The Impact of Media Laws on Arab Digital and Print Content," in English.

6 See www.heritage.org/index.

7 See http://www.freetheworld.com/2008/EconomicFreedomoftheWorld2008.pdf.

8 See http://www.weforum.org/en/initiatives/gcp/ArabWorldCompetitivenessReport/index.htm.

9 See http://www.doingbusiness.org/documents/DB09_landlocked.pdf.

10 Components of the Index are: business freedom, trade freedom, fiscal freedom, size of government, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption, and labor freedom.

11 It should be taken into consideration that some of the freedoms, such as monetary freedom, were based on the average rate of inflation from January 1, 2005 through December 31, 2007.

12 Statistics for 2008 include seventeen Arab countries, namely, Algeria, Bahrain, Djibouti, Egypt, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, Syria, UAE, and Yemen.

13 The Heritage Index reveals conflicting results, showing a sharp decline in Kuwait, Oman, and the UAE from 2003-2009.

14 The index relies on only thirty-nine indicators for the Arab countries, given the paucity of data and the use of 2006 data for the 2008 report.

15 Evaluation is made on the basis of data available to the public and on opinion polls, according to a comprehensive annual survey conducted by the World Economic Forum in cooperation with its network of institutes (the research institutes and business organisations in the countries covered by the report), and in 2009 information was gathered from more than 12,000 business executives (see World Economic Forum, 2008b).

16 See Statistical Annex, Table 5.

17 Despite the rise in per capita income as an absolute figure in these petroleum countries in the period from 2005-2007, there was a decline in the rate of growth of GDPs during the same period.

18 See the section of this chapter entitled "Pioneering institutions and shining examples," which is devoted to efforts and initiatives aimed at the establishment of knowledge-nurturing institutions.

19 The index is calculated as an average of three components: first, adult literacy rate, second the likelihood of not surviving up to the age of forty, and third, the average percentage of the population that does not have reliable access to water and the percentage of children who are underweight for their age. To examine the index for human poverty, 2008, see the website for human development: http://hdr.undp.org/en/media/HDI_2008_En_Tables.pdf.

20 The list consists of Djibouti, Egypt, Iraq, Mauritania, Morocco, Sudan, Yemen, and Comoros. Somalia should perhaps be added to the list, despite the lack of supporting data (Statistical Annex, Table 2).

21 The term 'freedom of intellectual property' in the sense of emancipation from restrictions on intellectual creativity was used by Naglaa Rizq in her book Intellectual Property and Knowledge Creation in the Arab World: the Political Economy of Knowledge and Development, Edward Elgar Publishers, forthcoming 2010. This section of the chapter relies heavily on the background paper for the Report by Muhammad al-Sa'id and Ahmad 'Abd al-Latif, in Arabic.

22 This is according to the third paragraph of the patent ordinance of 1970. For further detail, see (Noronha, 2006).

23 Examples of TRIPS flexibilities include early use, compulsory licensing, and government use of patents in some

specific cases.These flexibilities have been provided for the sake of public welfare such as the fair and just use of intellectual property for purposes of education.

[24] The website Dar Al Hayat, "The Mohammed bin Rashid Foundation and Elaf launch "Ma'rifa" electronic website".

http://www.daralhayat.com/science_tech/02-2009/Article-20090213-+7067573f-c0a8-10ed-0095-ef1792de150d/story. html, on 14 February, 2009.

[25] See the Qatar Foundation's website: http://www.qf.edu.qa/output/page40.asp.

[26] "Cooperation Agreement to Assure 'Freedom of Knowledge Movement' and a Conference on Investing in Arab Inventors," http://www.mawhopon.net/ver_ar/news.php?news_id=3971 on 16 March, 2009.

[27] "Grounding the Culture of Invention in the Society: Prizes Distributed at Inventors' Exhibition," http://www.sec.gov.qa/content/resources/detail/19079 on 16 March, 2009.

[28] The Qatar initiative to develop education website, March 2009: "Sheikha Al Hamud: Honoring high-achievers is a feature of a developed society," http://www.sec.gov.qa/content/resources/detail/19079 on 10 March, 2009.

[29] "Kuwait hosts the first regional inventors' exhibition," http://www.mawhopon.net/ver_ar/news.php?news_id=2757 on 16 March, 2009.

[30] "The Syrian Ministry of Trade announces a contest for the best young inventor for 2008…"

http://www.mawhopon.net/ver_ar/news.php?news_id=3195 on 16 March, 2009.

[31] European Commission website: "2010 in the context of information and communications technology and the Lisbon Strategy,"http://ec.europa.eu/information_society/eeurope/i2010/ict_and_lisbon/index_en.htm, on March 16, 2009.

[32] LEFIS, http://www.ittig.cnr.it, on March 10, 2009.

[33] For more information on the institute, see the website: http://www.freeknowledge.eu/

[34] The first four freedoms are: the free mobility of humans, capital, services, and products among countries of the European Union.

[35] In view of the continuing restrictions of associated freedoms, and particularly political freedom, some observers are placing their bets on economic freedom alone as the lever most likely to raise Arab developmental and knowledge performance, alluding to the possibility of the Arab region repeating the achievements of certain countries in East and South Asia and of China. Such a bet is beset by risks and pitfalls. A large body of literature exists that offers a different assessment of the experience of these Asian countries. In light of the clear differences in the regional and global political situations of each area, and the clear difference between them in terms of economic and social make-up and systems of knowledge and production, such comparisons and bets are fraught with difficulty.

CHAPTER THREE
EDUCATION AND THE FORMATION OF KNOWLEDGE CAPITAL

CHAPTER THREE

EDUCATION AND THE FORMATION OF KNOWLEDGE CAPITAL

Introduction

From our discussion of an empowering environment and the part it plays in the preparations for entrance into the knowledge society we turn to a survey of Arab knowledge capital. We shall take as our starting point in this crucial area an examination of the state of education in Arab societies aimed at analysing what and how their educational systems contribute to knowledge and development and to diagnosing the flaws that impede the ability of these systems to broaden the scope of knowledge in Arab societies. The various levels and outputs of education form the central base of the knowledge society. An assessment of its present state in the Arab region should then lead us directly to the sources of the knowledge gap between it and the rest of the world.

To consider education in the Arab nation in terms of its achievements and its relationship to the knowledge society is to broach the challenges confronting the educational systems in most Arab countries. Theses challendges include illiteracy, appropriateness of educational systems to serve development plans, science instruction with greater openness to the fruits of contemporary scientific knowledge in its various specializations, the relationship between education and the market (the need to link educational systems to the development requirements of Arab societies), and the relationship between education, unemployment, and job opportunities (placing education at the service of production and the expansion of choices). Following an inspection of these conventional challenges, we will proceed to the newer challenges facing those who see education as an underpinning for and mainstay of the knowledge society. In this context, issues such as the technical utilisation of modern media, quality standards, and long-distance learning become additional indicators of the large and multifaceted gap in our educational systems.

These new challenges to education and the formation of a knowledge society have helped to crystallise in a general way new problematics linked to the tasks now assigned to the educational process in its various phases in view of the substantial discoveries of new and varied knowledge media, such as information technologies, in a world evolving at unaccustomed speed.

Most Arab countries face multi-layered problems in their educational systems, problems further aggravated by the many innovations introduced by the revolution in information technology. The demands are manifold and blend the challenges of the past with those of the present and future. In view of the difficulty of the subject and the many ways of approaching it, we have chosen to examine the role of education in the creation of Arab knowledge capital. This approach will help us, firstly, in assessing the modes of knowledge accumulation that currently exist at the different educational levels and, secondly, in pinpointing the flaws and shortcomings that keep our educational systems from performing their central function of fostering the necessary conditions for entry into the knowledge society.

Modern societies have charged their educational systems with the task of disseminating knowledge among the broader public, a responsibility formerly restricted to the family, the religious establishment, masters of trades and, for the privileged few, a handful of tutors. Despite the rise of rival institutions, educational institutions around the world have maintained their pivotal role in the dissemination of knowledge and the formation of the human energies that form the backbone of the knowledge society. Moreover, instruction has long since expanded from teaching the

The challenges facing education in the Arab nation revolve around a set of axes that include illiteracy, appropriateness of educational systems to serve development plans, and greater openness to the fruits of contemporary scientific knowledge

In their educational systems, most Arab countries face multi-layered problems aggravated by the many innovations introduced by the revolution in information technology

In the last quarter of a century, Arab states have achieved remarkable progress on all indicators used to gauge the dissemination of knowledge among their people, from lower illiteracy rates to higher numbers of university graduates

basic skills of reading, writing, and arithmetic and inculcating the essential skills of a trade to include the development of analytical and critical abilities, organisational and decision-making skills, the powers of creativity and innovation, and other higher behavioural and mental competencies. Nor is the knowledge that an educational system is presumed to impart limited anymore to the ability to answer the question, "What do you know?" Educational systems are now expected to equip students to answer such questions as, "Do you know how to do such and such?" "Where and how do you find such and such information?" "How do you assess the value of the knowledge you have obtained?" and "How can this knowledge be put to use?" It is through competencies of this sort that individuals become knowledgeable in varying degrees and ways. Thus they become persons aware of the underlying substance and intrinsic value of things and of how to deal with them, educators capable of contributing to the dissemination of knowledge, and active players in their environment and society through their ability to take decisions and espouse views on the basis of available knowledge, as opposed to superstitions, traditions, prejudices, random improvisation, or personal whim.

"When all have access to the lights of knowledge, the time of democracy will have come."

- Victor Hugo (circa 1840)

"An ignorant people is more tractable than an educated one."

- Egyptian ruler Muhammad Sa'id Pasha, son of Mohammed 'Ali Pasha (circa 1860)

Achievements should not blind us to the failures that have prevented many Arab countries from emerging into the knowledge society

THE GENERAL STATE OF KNOWLEDGE AS PROVIDED THROUGH EDUCATION IN THE ARAB COUNTRIES

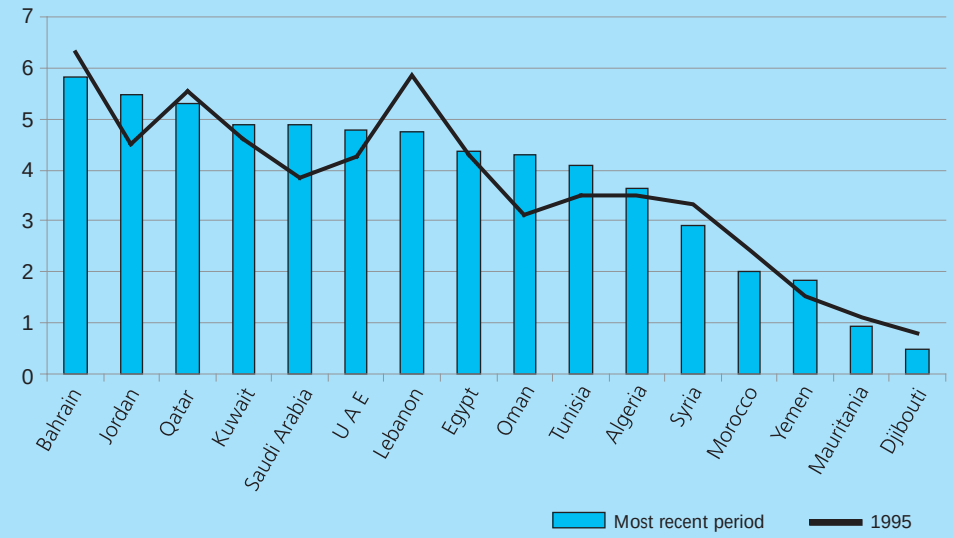
In the last quarter of a century, Arab states have achieved remarkable progress on all indicators used to gauge the dissemination of knowledge among their people, from lower illiteracy rates to higher numbers of university graduates. Taking the three major education indicators used by the World Bank to assess a country's preparedness to compete in the knowledge economy–adult[1] literacy rates, secondary school enrolment rates, and enrolment in tertiary education–the progress these countries have achieved becomes readily apparent. Whereas in 1980 the adult literacy rate across the Arab region was approximately 55 per cent for males and 25 per cent for females, by 2005 it had climbed to 82 per cent and 62 per cent respectively.[2] In 1980, the gross enrolment ratios in all levels and types of secondary schooling stood at a median of approximately 57 per cent for males and 38 per cent for females. In 2006, they had reached 70 per cent for males and 65 per cent for females.[3] In 1980, tertiary enrolment exceeded 25 per cent for males and 20 per cent for females in Lebanon only (41 per cent and 21 per cent respectively). The medians were 8 per cent and 4.6 per cent respectively and higher education was non-existent or virtually non-existent in a third of Arab countries (tertiary enrolment was less than 5 per cent). By 2005, only three Arab countries had tertiary enrolment rates below 5 per cent and the median had risen to 18 per cent for males and 29 per cent for females.[4]

Figure 3.1 presents the education and human resources[5] index for seventeen Arab countries from the most recent period of available statistics and the comparison of these results with the 1995 levels. The indices are based on the World Bank's Knowledge Assessment Methodology (KAM).[6] The figure throws into relief the huge discrepancies between these countries, some of which have progressed significantly since the mid-1990s, while others have declined in comparison with other countries in the world.[7] It also reveals that very few Arab countries belong to the upper half of the world's countries on this index (a score of 5 or more).

Nevertheless, these achievements should not blind us to the failures that have prevented many Arab countries from emerging into the knowledge society. How can they even see the light at the end of this tunnel when more than 60 million of their people, two thirds of them women,

FIGURE 3-1

Education and human resources index for Arab Countries
(most recent statistical period compared to 1995).



Source: World Bank, KAM, http://info.worldbank.org/etools/kam2/KAM_page5.asp

In the Arab world, more than 60 million people, two thirds of them women, are illiterate, and some nine million school-age children are out of school

are illiterate, and when some nine million school-age children are out of school, most of these in the very countries that have failed to solve the illiteracy problem?[8]

How can these countries possibly build a knowledge economy if the rate of upper secondary school enrolment is less than 55 per cent for both males and females at a time when this rate exceeds 80 per cent in industrialised developed nations and the countries of Central Asia? Indeed, the Arab region lags behind most of the rest of the world in the three above-mentioned variables, ranking sixth out of the eight regions of the world and placing higher than South and West Asia and Sub-Saharan Africa only.[9]

THE NEED TO DRAW AN ACCURATE PICTURE OF KNOWLEDGE CAPITAL

To produce a clear and accurate portrait of the knowledge capital of any society one must look beyond the quantifiable variables mentioned above. These indices and the criteria used to calculate them provide only a preliminary idea of this capital. Whereas illiterates, for example, are alike in their inability to access written knowledge, however diverse the material foundations of this knowledge, literate people differ greatly in knowledge and skills, especially if they have persisted in their studies beyond the level of compulsory schooling. As we know, public educational systems around the world begin to bifurcate with the end of basic education, which is to say from the upper secondary school level. Consequently, it is possible to imagine that people might possess a glut of certain types of knowledge and of a paucity of other types of knowledge due to the differences between the curricula used in the different branches of secondary education and in the different specialisations at the tertiary level. Moreover, completed levels of education and official graduation certificates do not necessarily reflect the true quality of an individual's knowledge and skills.

Completed levels of education and official graduation certificates do not necessarily reflect the true quality of an individual's knowledge and skills

MEASURING A SOCIETY'S KNOWLEDGE CAPITAL

One way to broach the question of knowledge capital in a society is to observe how knowledge is distributed among older generations and then to

Knowledge is more than the information acquired at school. It extends to the information and know-how acquired through experience in the economically productive workplace, as well as from life

track the opportunities for knowledge acquisition available to the younger generations through the educational system. "Knowledge capital" refers to the sum of epistemological skills possessed by the individuals of a community. It covers knowledge in the various fields of learning, notably languages and literature, maths and sciences, technology, health and environment, the arts, the humanities and sociology, and philosophy among others. It also includes various mental skills such as the ability to acquire information and to learn independently, analytic abilities and rational processing, the ability to evaluate (which involves critical thought) and apply information and know-how to solve theoretical or practical problems, combinatorial and synthesising skills, planning and organisational abilities, the capacity to make projections for the future, the ability to acclimatise to change and new givens, the ability to take advantage of opportunities for renovation, creativity and innovation, and other such higher intellectual skills. The concept further includes knowledge-based human and social competencies,[10] foremost among which are communicative skills, the ability to form constructive and cooperative relations with others, the ability to work as part of a team and to participate effectively in public affairs, and leadership, guidance and managerial skills.

Quantitatively, the more education is universalised across society and the higher the average level of schooling, the greater the ability of the members of that society to participate in the knowledge society; the qualitative side of the equation is far more difficult

Measuring the knowledge capital of the members of a community poses an immense challenge to researchers and strategists in human resource development. Knowledge is considerably more than the information individuals acquire at their desks at school. It extends to the information and know-how acquired through experience in the economically productive workplace, as well as from life experience–the informal activities one engages in and the interactions with others that lead to various types of awareness about diverse aspects of life. In the context of the process of assessing total national wealth, in general, and intellectual capital, in particular, some scholars (Bontis, 2004) attempted to measure "national human capital" by using indices that are so obviously disparate as to render their use in deducing a meaningful indicator difficult.[11]

To avoid confusing the issues and losing sight of the distinct character of knowledge capital acquired through education, the approach of this report to "national human knowledge capital" will rely solely on the direct relationship between the individual, the institutions of learning, and the learning process. This focus on what formal educational institutions offer and what students gain from them is also determined by the absence of reliable data on the opportunities available to individuals in Arab societies to acquire knowledge outside of their formal educational systems. We will also deconstruct the equation into its quantitative and qualitative components, examine these separately, and then bring them together in common conclusions.

Quantitatively, we can presume that the more education, in its various levels, is universalised across society and the higher the average level of schooling, the greater the ability of the members of that society to participate in the knowledge society. The best objective gauge for this criterion is the level of schooling attained by those who are currently not enrolled in educational institutions. As for those who are still of school age or still enrolled in educational institutions, more than one indicator will have to be brought into play to determine the level of formal schooling that these individuals may ultimately attain. Examples of such indicators are enrolment rates at each educational stage and average school life expectancy.

The qualitative side of the equation is far more difficult, as there are no standing agencies for monitoring the knowledge possessed by different sectors of society, the sources of this knowledge, and the role that the systems for formal education, training, and continuous learning systems play in shaping it. We will, therefore, have to use various approaches in order to obtain an overall, if only initial, estimate

of the qualitative knowledge capital that a society's educational system can ensure. Every society has the right to ask its educational system: What is the quality of the knowledge that will be gained by recipients in the various educational levels? Does the education system truly create knowledge capital and equip us to compete in the knowledge society?

The selection of knowledge to be taught in formal educational institutions derives from a society's project for the appropriate rearing of its emerging generations. It generally takes the form of what are usually termed educational curricula, together with their particular tracks or streams, pedagogic methods, and means of assessing whether students have attained the desired results. The chain of selections (some of which are ideological in nature) begins with setting the amount of time to be allocated to each subject–mother tongue, foreign languages, maths, humanities, pure sciences, the arts, and so on–at the pre-university levels. But the more crucial gauge in this area is whether the recipients have obtained the knowledge, skills, and attitudes expected of them at these levels.

BOX 3-1

The Aims of Education for All

The World Education Forum, held in Dakar, Senegal, in 2000, in response to the call of UN organisations led by UNESCO, produced a framework for action entitled "Education for All: Meeting our Collective Commitments." It provides for collective international commitment to the attainment of the following goals:

1. Expanding and improving comprehensive early childhood care and education;
2. Ensuring that by 2015 all children have access to and complete free and compulsory primary education of good quality;
3. Ensuring that the learning needs of all young people and adults are met through equitable access to appropriate learning and life skills programmes;
4. Achieving a 50 per cent improvement in levels of adult literacy by 2015, especially for women, and equitable access to basic and continuing education for all adults;
5. Eliminating gender disparities in primary and secondary education by 2015;
6. Improving every aspect of the quality of education.

The UN General Assembly incorporated goals 2 and 5 into the Millennium Development Goals, thereby entering them into the agendas of all UN development organisations.

KNOWLEDGE CAPITAL FORMATION BY CHILDREN

Enrolment in basic education is the first step in formal education towards the creation of national knowledge capital. To participate in the knowledge society an individual must possess a range of knowledge, intellectual skills, and attitudes that can only be obtained through continuous schooling for, according to most experts, a period of at least nine years, or what is commonly referred to as "basic education." Accordingly, this report has analysed four complementary indicators for evaluating the opportunities to create knowledge capital in children: primary school enrolment rates, numbers of children outside school, enrolment rates in the upper stage of basic education, and average school life expectancy rates.

For the qualitative aspect of the formation of knowledge capital in children we will survey the different types of knowledge they come into contact with and the levels of competence they are expected to attain in each. How, then, do the Arab countries stand with regard to the foregoing?

QUANTITATIVE INDICATORS

The statistics on net primary school enrolment rates show that only four Arab countries approach the saturation point (95 per cent and above)

The statistics on net primary school enrolment rates show that only four Arab countries approach the saturation point (95 per cent and above) according to this criterion, eight countries range between 80 per cent and 94 per cent, and six–Djibouti, Mauritania, Oman, Palestine, Yemen (and Saudi Arabia)[12]–fall below this, with Djibouti showing a rate of less than 40 per cent. We should note, too, that only two countries (Bahrain and Tunisia) have attained the saturation point for female enrolment. These figures clearly reflect large disparities among Arab states. Gross enrolment ratios, meanwhile, reveal the inflation in enrolment figures arising from such unhealthy phenomena as high repetition rates and the packing of classrooms with students beyond the reasonable limit for the designated age group of a class. Enrolment rates are inflated by more than 10 per cent in six

Arab countries with Mauritania at the top with 21 per cent.[13]

Available statistics also indicate that some nine million children in the Arab region are out of school. Most of these are in Sudan, Saudi Arabia, Somalia, Yemen, Iraq, and Morocco. But even those countries with a reputation for good performance in education, such as Lebanon and Jordan, are not immune to this phenomenon.

Although the laws in most Arab countries provide for compulsory education up to at least the end of the intermediate level,[14] only eight countries have attained gross enrolment ratios meeting or approaching the expected rate of more than 95 per cent through the active application of this provision. Seven countries lag well behind (with enrolment rates of less than 70 per cent): Iraq, Morocco, Yemen, the Comoros, Djibouti, Mauritania, and Sudan. There are no precise statistics for Saudi Arabia and Somalia. Five countries–Jordan, Kuwait, Lebanon, Oman, and Syria–approach the expected level (with enrolment rates of between 85 per cent and 94 per cent).[15]

Although the laws in most Arab countries provide for compulsory education up to at least the end of the intermediate level, only eight countries have attained gross enrolment ratios meeting or approaching the expected rate of more than 95 per cent

Lastly, relying on data from the UNESCO Institute for Statistics, we can rank Arab countries on the basis of school life expectancy[16] for children enrolled in basic education into the four following categories:[17]

A. Countries in which the average number of school years extends to the start of tertiary education. The countries in this category are Bahrain, Tunisia, Jordan, Libya, Lebanon, and Palestine.
B. Countries in which the overall average of school years is equivalent to the end or close to the end of secondary school. Algeria, Egypt, Qatar, Kuwait, the UAE, and Oman fall into this category.
C. Countries in which enrolled children can generally expect not to exceed the upper stage of basic education: Iraq, Morocco, Yemen, and the Comoros.
D. Countries in which enrolled children can only expect to complete primary education or a little more: Mauritania, Djibouti, and Sudan.

On the basis of the data available on the four preceding indicators, we can classify Arab countries according to the four following categories in terms of their ability to ensure opportunities for the formation of basic knowledge capital among new generations of children (between 6 and 14 years of age)(see Table 3-1):

A. Countries that can ensure to a high degree that the opportunities are available to their children to obtain the fundamental knowledge necessary to participate in the knowledge society. These countries (for which the four indices average out to 85 per cent or more) are Bahrain, Tunisia, Algeria, Qatar, Egypt, Jordan, the UAE, and Libya.
B. Countries that can ensure such opportunities to a considerable extent, but must exert additional efforts to guarantee that no child remains excluded from the avenue leading to the acquisition of this knowledge. With overall averages of between 70 per cent and 84 per cent, these countries are Kuwait, Palestine, Lebanon, Oman, Morocco, and Iraq (as well as Syria and Saudi Arabia).
C. Two countries that must exert intensive efforts in order to equip a greater number of children to participate in the knowledge society: Yemen and Mauritania (with average scores that fall between 55 per cent and 69 per cent).
D. Countries with a questionable ability to provide sufficient numbers of children opportunities to access the knowledge society within the foreseeable future, if educational opportunities remain in their present state. With average scores of less than 55 per cent, these countries are the Comoros, Sudan, Djibouti (and Somalia).

Figure 3-2, which plots the opportunities for basic knowledge capital creation in children in Arab countries in relation to per capita GDP, depicts a moderately loose correlation between these two variables. As can be seen, financial capacities exceed

TABLE 3-1

Opportunities for basic knowledge capital formation in children through education in 2005 (per cent)

Country	A Enrolment rate	B Net enrolment rate in primary education	C Gross enrolment ratio in upper stage of basic education (adjusted*)	D Ratio of expected school years to age 18**	Average score (A+B+C+D)/4
Libya	..	..	100	91.9	..
Bahrain	99	98	97	80.2	93.6
Tunisia	97	96	99.8	73.7	91.6
Algeria	98	95	100	66.5	89.9
Qatar	98	94	94.2	67.2	88.4
Egypt	96	94	91.4	65.9	86.8
Jordan	94	90	87.7	72.4	86.0
UAE	95	88	90.5	62.4	84.0
Kuwait	89	83	84.9	68.9	81.5
Occupied Palestinian Territories	80	76	93.3	70.9	80.1
Lebanon	83	82	82.1	70.1	79.3
Syria	..	95	85.8	..	..
Oman	77	74	87.7	64.2	75.7
Morocco	88	88	64.4	51.6	73.0
Iraq	89	89	54.1	49.3	70.4
Saudi Arabia	75	78	58.8	..	..
Yemen	75	75	47.6	43.9	60.4
Mauritania	80	79	25.2	39.4	55.9
Comoros	55	..	38.3	43.9	..
Sudan	44	..	43.9	25.4	..
Djibouti	38	38	25.2	19.2	30.1
Somalia	..	..	..	..	..

Source: UNESCO Institute for Statistics, Data Centre; figures in columns C and D and average score are provided by Ramzi Salama/Report core team member.

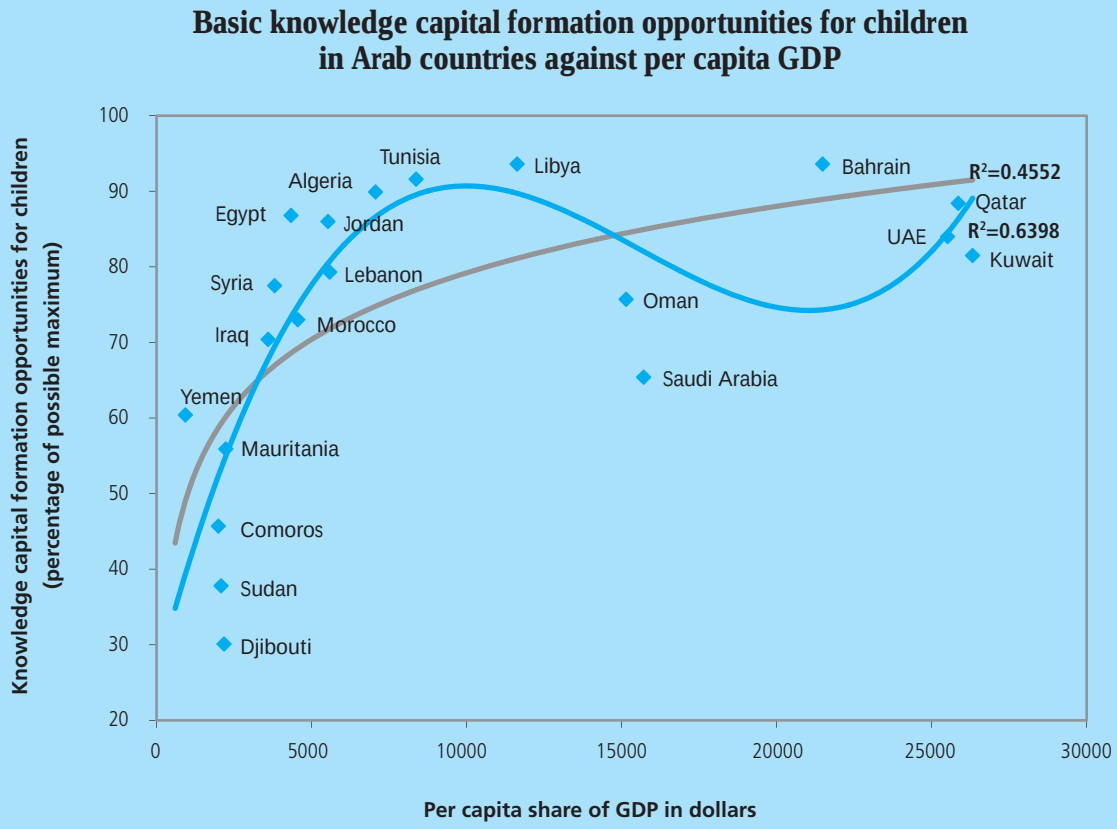
* Base averages reduced by 6.7 per cent (average over 100 per cent in the Arab countries in question) to correct for errors in the calculation of gross enrolment figures, which may exceed 100 per cent.

** It may be supposed for the sake of argument that the gross school life expectancy of a given age cohort may, under ideal circumstances, approach eighteen years, as is expected in some countries of the world, such as Ireland and Norway. On the other hand, it may be considered overoptimistic to hope to approach the twenty years that is expected for Australia and New Zealand. The figure of eighteen years has therefore been taken as a maximum for the calculation of the expected figure for all Arab countries.

potential achievement in Kuwait, Saudi Arabia, Oman, Djibouti, Sudan, and the Comoros, whereas anticipated achievement exceeds relative financial capacities in Bahrain, Libya, Tunisia, Algeria, Egypt, Jordan, Syria, and Yemen, regardless of the calculated equation.[18] In these terms, Saudi Arabia and Oman clearly lag well behind the norm, whereas countries such as Tunisia, Algeria, Jordan, and Egypt have managed to ensure high opportunities for the creation of knowledge capital in children, in spite of their limited financial capacities.

Tunisia, Algeria, Jordan, and Egypt have managed to ensure high opportunities for the creation of knowledge capital in children, in spite of their limited financial capacities

FIGURE 3-2:[19]



QUALITATIVE INDICATORS

Time allocated to school subjects in basic education

Apart from Arabic language and maths, the knowledge capital that Arab countries impart to those who have enrolled in or completed basic education varies, in terms of quantity at least

A study on the time allocated to school subjects in basic education[20] in Arab countries during the last decade shows considerable variation between these countries in the ratios of class time allotted to religious education and foreign language instruction, a moderate variation in the class time dedicated to science and technology, social studies, the arts, and physical education, and general conformity in the amounts of time allotted to Arabic language[21] and maths instruction. It follows that, apart from Arabic language and maths, the knowledge capital that Arab countries sought to impart to those who have enrolled in or completed basic education during this period varies, in terms of quantity at least.

The average ratio of class time allotted to Arabic language instruction (28.5 per cent at the primary level and 26.4 per cent in total basic school education) is somewhat lower than the international average for the time allotted to instruction in the mother tongue (up to approximately 32 per cent in primary school education) (International Association for the Evaluation of Educational Achievement, 2003). Classes allotted to Islamic religious instruction average about 12 per cent of the total in the Arab region as a whole, in contrast to the global rate of about 5 per cent among countries whose educational curricula feature religious education instruction (Majallat Mustaqbaliyyat, in Arabic, 2003). The quota for Islamic religious instruction reaches 28 per cent in Saudi Arabia, which is followed by Yemen (20 per cent), Sudan (18 per cent), and Oman (17 per cent). In Tunisia and Algeria, the time ratio for Islamic religious instruction is around the global average.

Virtually the only area in which Arab countries conform to the rest of the world is that of the ratio of class time accorded to maths instruction (about 16 per cent) (UNDP, 2007a, in Arabic). In science and technology instruction, including information and communications technology, Arab countries as a whole depart moderately from the global norm. However, whereas the average ratio of class time accorded to science instruction, alone, in the Arab region (10.5 per cent) is somewhat lower than the global average of 11.7,[22] it is markedly lower in Mauritania, Egypt, Saudi Arabia, Yemen, Sudan, and Tunisia. The rest of the Arab countries approach the global average in this regard (UNDP, 2007a, in Arabic).

Noticeable differences between Arab countries emerge with regard to the ratio of class time dedicated to social studies, arts, and physical education. Nevertheless, the general averages in these areas rival the international norms (three hours per week for both social studies and the arts and two hours per week for physical education).

In foreign language instruction at the school level of basic education there is little conformity among Arab countries. Tunisia, Lebanon, Morocco, and Mauritania have long been accustomed to allocating relatively large blocks of class time (from six to eight periods out of thirty-five periods per week) to this item and Qatar, Kuwait, the UAE, and Jordan have recently introduced it into their curricula with significant emphasis. On the other hand, in Saudi Arabia, Libya, Yemen, Syria, Iraq, Egypt, Oman, and Sudan, foreign language instruction is absent or near absent from their curricula.

One is also struck by the total absence of computer technology instruction in many countries and by the scarcity of countries that have introduced this subject into their primary school curricula. We also observe a considerable amount of class time devoted to extra-curricular activities in Egypt, and to political education in Syria.

Due to certain peculiarities of Arab education systems, the time allotted for instruction in most subjects is relatively low in the majority of Arab countries. Time allocations for the various subjects should be well balanced, so that no subject is given time at the expense of another that may be regarded as basic for the formation of the growing child's knowledge capital. It also stands to reason that the total class time required of basic education in most Arab countries–an average of 802 hours per year, consisting of thirty-three weeks at the primary level, and an average of 911 hours per year, consisting of thirty-three weeks each at the upper level of basic education–is not sufficient to form a knowledge capital solid and robust enough to allow the individual to reap the optimal advantage from higher levels of learning and to actively participate in the knowledge society. This shortcoming is at its most evident in all the Gulf countries (with the exception of Oman under its new system of education), Syria, Iraq, Libya, and Tunisia.[23] Indeed, one UNESCO report observes that the median number of annual hours allocated to primary education in Arab countries is lower than the levels recommended by numerous international organisations and forums, which is between 850 and 1,000 hours per year. The report adds that if we consider the amount of time actually dedicated to instruction, children in many Arab countries receive less than 70 per cent of the time allotted for their formal education (UNESCO, 2008a).

The total class time required of basic education in most Arab countries is not sufficient to form a knowledge capital that would allow the individual to actively participate in the knowledge society

Children in many Arab countries receive less than 70 per cent of the time allotted for their formal education

Quality of knowledge acquired through basic education

The results of a 2003 study on the performance of eighth-graders in maths and sciences (UNDP, 2007a, in Arabic), in which ten Arab countries took part,[24] aroused considerable dismay in Arab educational and political circles. In maths, the students from Arab countries that participated in this study ranked noticeably lower than the overall international average. They were in the company of students from ten other countries, mostly

from sub-Saharan Africa and Asia. Thirty countries ranked significantly higher than the international average. These were mostly the advanced industrialised countries of Western and Eastern Europe, North America, Asia and the Pacific and they also included Malaysia, which came in twelfth, and Israel, which came in twenty-third. Only 10 per cent of Jordanian participants, 8 per cent of students in Egypt, 6 per cent of Lebanese, and 5 per cent of Palestinian participants achieved high scores; figures for the rest of the Arab countries were even lower. Globally, 23 per cent of participants in the study achieved high scores, with higher rates yet in those countries that ranked the highest. In other words, the knowledge measured by the maths test is possessed by a scant minority of Arab students and absent among the overwhelming majority of them.

Arab countries also ranked at the bottom (coming in at between thirty-eighth and fifty-first place out of fifty-two countries) in the science test. Again, the results were significantly lower than the international average, with the exception of Jordan which, with results equivalent to the global average, ranked thirtieth. About 21 per cent of Jordanian students achieved high scores, while only about 10 per cent of Egyptian and Palestinian participants and even fewer participants from the other participating Arab countries matched this performance.[25] Arab countries have performed poorly in other international studies on maths, science, and reading acquisition.[26]

Arab educational curricula in general are almost entirely lacking in activities aimed at developing learners' abilities to collect, organise, sift, and analyse information

Arab students continued to perform poorly in maths and sciences in similar international studies conducted in 2007. In the studies of eighth-graders, Arab countries were among the bottom finalists in maths (between thirtieth and fifty-first out of fifty-one participating countries)[27] and sciences (between twenty-second and fiftieth out of fifty-one participating countries).[28] In the equivalent tests for fourth-graders, Arab countries came in between thirty-first and thirty-eighth place out of thirty-eight countries in maths,[29] and between thirty-third and thirty-eighth place out of thirty-eight participating countries in science.[30] No country came near to approaching the international averages apart from Dubai/UAE, which ranked first among all Arab countries in the four tests (UNDP, 2007d, in Arabic).[31]

These studies have shown that while, with the exception of a few details, the science and maths curricula in countries such as Jordan, Palestine, Egypt, and Bahrain are largely the same as those in the rest of the world, Arab educational curricula in general are almost entirely lacking in activities aimed at developing learners' abilities to collect, organise, sift, and analyse information. They also fail to teach how to interpret the phenomena suggested by the information, fully probing all possible ramifications and possibilities, and other similar skills for the handling of information and natural phenomena. The acquisition of such skills is intimately connected to the development of the higher mental faculties individuals

BOX 3-2

Oman's New Plan for Education

The Sultanate of Oman has recently made radical changes in its pre-university public education plans. It has introduced the new Basic Education system, which consists of ten years in two phases, the first covering grades one to four and the second grades five to ten. Basic education is then followed by the Secondary Education phase which extends over two years and is divided into Arts and Science tracks. Oman has also introduced the principle of coeducation in the first phase of basic education. These reforms were put into effect in the 1998-1999 academic year with an eye to their gradual roll-out across the country, as material and human resources permit.

The newly adopted education plan marked a clear break with its predecessor by adding four weeks to the school year, which is now 180 days, and spreading the educational subjects over forty-minute long classes per week, bringing the weekly and annual times allocated to instruction up to international levels. The Basic Education curriculum has introduced classes for the instruction of computer skills and augmented classroom time allocated to maths, sciences, and social studies to levels equivalent to or greater than international norms. English language instruction has been introduced into the curriculum, starting in the first grade of basic education at an average of five classes per week. New teaching and self-learning methods have been adopted with the aim of developing learners' mental, practical, and life-skills faculties. The new plan retains, to a large extent, the prominence of Islamic studies and Arabic language instruction, while it reduces the number of physical education courses in favour of maths. In the secondary school science track, the number of social science classes has been reduced in order to augment the hours allocated to earth- and life-sciences.

The progress of this experiment should be monitored with an eye to assessing its impact on the formation of knowledge capital among new generations of Omani youths.

must possess if they aspire to participate in the knowledge society. The low performance expectations with regard to language acquisition is also striking, judging by the fact that the curricula of the Arab countries in question defer until later years what is taught earlier in other countries. Moreover, the few hours allotted per week to instruction in foreign languages and various other subjects such as arts, social studies, and physical education offer little assurance of their proper acquisition.

Science and technology instruction and foreign language instruction seem fated to get the shortest end of the stick in the distribution of class time. It is little wonder, therefore, that school graduates of basic education come away with a paucity of know-how in these subjects and that this, in turn, leads to a general disinclination among youth to specialise in the sciences in later phases of the educational process.

Generating sufficient and balanced knowledge capital in Arab children requires increasing the number of annual hours of instruction and weekly periods to appropriate levels and reviewing how these are distributed among the various curricular subjects, as Oman has recently done (see Box 3-2). It also requires an overhaul of the curricula and the pedagogic approach so as to ensure that learners can obtain the required knowledge and develop their higher mental faculties. To this end, every country must ask the following questions: "What knowledge do we really want our school graduates of basic education to have acquired?" "Will this knowledge truly equip our children to meet the demands of the knowledge economy and to participate effectively in the knowledge society?" "Will the time set aside for the acquisition of each knowledge category and the methods of instruction actually lead to the learners' acquisition of the designated knowledge?" Certainly, the answers to such questions must lead to greater receptiveness to progressive Arab and international experiences in these fields, and this, in turn, should reinforce the principle of openness to others in the development of the Arab project for knowledge capital creation through education.

Basic education is a crucial phase in the intellectual formation of the members of Arab societies. Many will leave the formal educational system at the end of this phase, which generally coincides with the end of compulsory education, in order to enter the labor market or vocational training. The remainder will follow the various streams of general and technical secondary education and receive different types of instruction depending on the particular stream. Gaps in knowledge formation at the level of basic education may not, therefore, be filled by what is offered at the more advanced educational levels or through practical life experience. How can people with such gaps, lacking the fundamentals that allow them to comprehend the information they encounter or to deal with problems that require certain types of awareness, analytical skills, and decision-making capacities, participate in the knowledge society? Clearly, all Arab countries without exception must upgrade the various quality components of their educational systems in order to bring the performance of their students up to international averages.

Generating sufficient and balanced knowledge capital in Arab children requires increasing the number of annual hours of instruction and weekly periods to appropriate levels

KNOWLEDGE CAPITAL FORMATION BY YOUTH

QUANTITATIVE DIMENSIONS

The literacy rate among youth (ages 15 to 24) has attained the saturation point (95 per cent or higher) in ten Arab countries. Four others (with literacy rates for this age group between 85 per cent and 94 per cent) have approached this point while a further three (with rates from 66 per cent to 80 per cent) fall well below it.[32] The gender parity index,[33] in this regard, is above 95 per cent for half the Arab countries, whereas it is still relatively low (under 0.90) in Egypt, Mauritania, Morocco, and Yemen.

Available figures on upper secondary school enrolment indicate that four Arab states (Bahrain, Kuwait, Libya, and Qatar)

Every Arab country must ask such questions as: "What knowledge do we really want our school graduates of basic education to have acquired?" "Will this knowledge truly equip them to meet the demands of the knowledge economy?"

While Arab countries vary greatly in their tertiary education enrolment rates, none have attained the saturation point

have gross enrolment ratios (90 per cent or above) approaching saturation point. Nine countries (with ratios of less than 65 per cent) lag far behind: Algeria, Yemen, Morocco, Iraq, Syria, Comoros, Sudan, Mauritania, and Djibouti.[34] Seven others rank in between (with rates between 65 per cent and 90 per cent). We observe that in thirteen countries the gender parity index is in favour of females, which suggests, in part, that males tend to drop out before this level. The gender parity index is significantly lower only in Djibouti, Iraq, and Yemen.[35]

Proceeding from the assumption that the young adults of today are the children who attended school between the ages of nine and nineteen, with an average age of fourteen, we calculated the school life expectancy for the current generation of youth as it stood in 1992. According to the available data,[36] the rate of school life expectancy for the entire sector of today's young adults, whether or not they are still in school, comes to an overall average of eight school years (nine for males and seven for females) across the board in the Arab region, which is one year less than the school phase of basic education. Of course, there are considerable disparities among Arab countries. Average school life expectancy in Libya and Bahrain, for example, extends to the tertiary educational phase, whereas it stops short of the end of primary school in Mauritania, Sudan, and Yemen.[37] On the whole, therefore, the current generation of youth (ages 15 to 24) in the Arab world has a relatively low school life expectancy, even if considerable numbers of them are still pursuing their studies in upper secondary and tertiary educational institutions.

While Arab countries vary greatly in their tertiary education enrolment rates, none have attained the saturation point. Libya ranks the highest, with 56 per cent, followed by Lebanon, Palestine, and Jordan (from 46 to 40 per cent); and then by Egypt, Bahrain, Tunisia, and Saudi Arabia (from 35 to 29 per cent). The rates then continue to plunge from 23 per cent and 15 per cent in the UAE, Algeria, Qatar, Kuwait, Oman, Iraq, and Syria, while access to this level of education remains the privilege of only a select few in Morocco, Yemen, Sudan, Mauritania, Djibouti, and the Comoros (all of which have enrolment rates under 11 per cent).[38] The apparent disinclination of males to pursue tertiary education in Qatar, Kuwait, the UAE, and Bahrain, in which the gender parity index falls between 3.30 and 2.40 (in favour of females), as well as in Saudi Arabia, Tunisia, and Algeria, in which this index is between 1.46 and 1.26, partially accounts for the Arab region's low ranking in tertiary education enrolment compared to other regions in the world. That twelve countries show enrolment rates below the average of the Arab region as a whole (22 per cent) also helps explain this ranking.[39]

On the basis of available data on the four above-mentioned indices (see Table 3-2), Arab countries fall into the following

BOX 3-3

The Growing Numbers of Universities in the Arab Region

As countries in the Arab world began to deregulate their economies in the 1990s, governments introduced legislation permitting the local and foreign private sectors to setup higher educational institutions. The result has been an unprecedented boom in the numbers of these institutions, whether established as non-profit or commercial organisations.

It is impossible to draw an accurate portrait of this phenomenon due to the lack of a complete database on the numbers and types of these institutions and their affiliations, curricula, and enrolment figures. However, the available information suggests that they remain marginal in terms of student numbers. Given the stagnation in gross tertiary educational enrolment ratios between 1999 and 2005, it appears that the added educational opportunities furnished by old and new establishments (more than 1.5 million opportunities) have not stimulated a rise in enrolment rates, but rather absorbed the population growth in the category of youths who complete secondary school.

The establishment of branches of foreign universities and higher educational institutes with foreign affiliations is a manifestation of the globalisation of higher education. It is premature to determine the actual effect these institutions will have—whether they will diminish or enhance the quality of higher education, whether they will merely reproduce outworn educational programmes, curricula and services, or whether they will introduce and stimulate innovation in these concerns. UNESCO has approached this phenomenon from the standpoint of the right of students, their guardians, and the whole of society to quality higher education suited to the needs of national development. In 2005, it elaborated "Guidelines on Quality Provision in Cross-border Higher Education," in cooperation with the Organisation for Economic Cooperation and Development. The guidelines urge these institutes, regardless of their affiliation or means of delivering educational services, to conform to the national quality standards in both the providers' home countries and in the recipient countries, so as to prevent the commercialisation of higher education from leading to a sacrifice of quality.

TABLE 3-2

Opportunities for the formation of knowledge capital by youth (ages 15-24) in Arab countries, 2005 (per cent)

Country	A Literacy rate	B Gross enrolment ratio in upper secondary education	C Gross enrolment Ratio in tertiary education (adjusted*)	D Rate of School Life Expectancy (up to 18**)	Average score (A+B+C+D)/4
Libya	99	94	70	72	84
Bahrain	100	98	41	78	79
Jordan	99	76	50	67	73
Lebanon	..	72	58	67	..
Qatar	97	96	24	67	71
Occupied Palestinian Territories	99	70	51	..	..
UAE	97	78	29	61	66
Kuwait	99	99	24	..	..
Egypt	85	77	44	56	66
Tunisia	95	68	38	56	64
Oman	98	79	23	44	61
Algeria	92	58	26	56	58
Saudi Arabia	97	..	36	44	..
Syria	93	32	19	56	50
Iraq	..	32	20	56	..
Yemen	79	40	11	28	40
Morocco	74	34	14	33	39
Comoros	89	27	3	..	..
Mauritania	66	20	4	22	28
Sudan	..	25	8	22	..
Djibouti	..	16	3	..	..
Somalia	..	..	..	..	..

Source: UNESCO Institute for Statistics, Data Centre; figures in columns C and D and "Average score" were composed by Ramzi Salama, Report core team member.

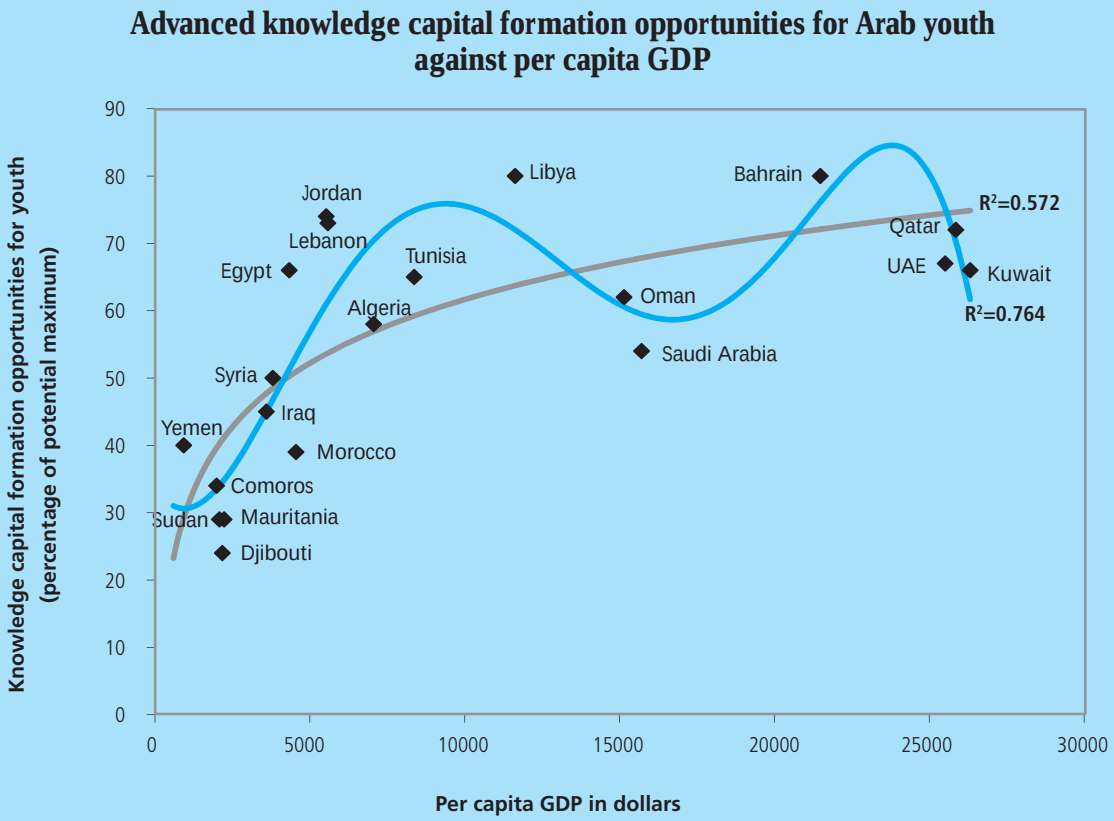
* As a percentage of the 80 per cent that forms a reasonable goal reached by some industrialised countries.
** As a percentage of the eighteen years that constitute the reasonable maximum.

Only two Arab countries largely ensure opportunities for youth to obtain the advanced knowledge for participating in the knowledge society: Libya and Bahrain

four categories in terms of their ability to ensure advanced knowledge capital formation in young adults (ages 15 to 24):[40]

A. Two countries largely ensure opportunities for youth to obtain the advanced knowledge for participating in the knowledge society: Libya and Bahrain (79 per cent to 84 per cent);
B. Eight countries ensure a reasonable level of opportunity: Jordan, Qatar, the UAE, Egypt, Tunisia, (Lebanon, Palestine, and Kuwait) (64 per cent to 73 per cent);

FIGURE 3-3



There is a consensus, internationally and in the Arab region, that secondary education, whether general or technical, plays a key role in the formation of the knowledge capital

C. Three countries need to exert additional effort to create a critical mass of youth sufficiently equipped to participate in the knowledge society: Oman, Algeria, and (Saudi Arabia) (50 per cent to 61 per cent);
D. Nine countries have questionable potential for ensuring opportunities for a sufficient number of youth to enter the knowledge society in the foreseeable future: Syria, Yemen, Morocco, Mauritania, (Iraq, the Comoros, Sudan, Djibouti, and Somalia) (under 50 per cent).

Figure 3-3 plots the opportunities for advanced knowledge capital formation in Arab youth in ratio to per capita GDP. Again we find a moderately loose correlation between the two variables, as evidenced by the distance of some of the countries located away from the curve of the exponential equation and by the multiple crests of the polynomial equation. Whereas achievements in this area exceed financial capacities in Bahrain, Libya, Jordan, Lebanon, Egypt, and Yemen, the reverse is the case for the majority of poor nations, such as Djibouti, Mauritania, Sudan, and Morocco, as well as for the majority of relatively wealthy nations, such as Saudi Arabia, Oman, Kuwait, and the UAE.

QUALITATIVE INDICATORS

There is a consensus, internationally and in the Arab region, that secondary education, whether general or technical, plays a key role in the formation of the knowledge capital needed to progress toward the knowledge society. To what extent does secondary education in Arab countries contribute to the formation of the qualitative cognition needed to equip youths to participate effectively in the knowledge society?

General secondary education and the formation of knowledge capital by youth

Arab countries have gone to great pains to develop general and technical secondary school programmes and curricula, and they have made some effort at streaming this level of education (UNESCO, 2003, in Arabic). However, an analysis of authorised secondary school curricula in Arab countries during the last decade of the twentieth century[41] reveals that these fall considerably short of official aspirations in all but a few pioneering instances, such as Bahrain and Oman. Countries influenced by the French educational system have divided their general secondary education into three or four streams or tracks, while the remaining countries have adopted two–arts and sciences. Libya is the exception with six.[42] One positive point to which we should draw attention is that curricula for the science branches in most Arab countries contain courses allocated to social sciences and, similarly, most curricula for the arts and humanities branches contain some science courses. As result, early streaming does not mean that those who choose one branch will remain unexposed to the subject matter in the other, even if the proportion of classes allocated to social studies in the science track is in some cases quite low.[43] Available data on secondary education shows that the arts tracks have higher intakes than the science tracks. When more than two tracks exist, as in Lebanon, Libya, and the countries of the Maghreb, enrolment figures in the tracks that, according to some at least, may require more academic effort, such as literature and basic sciences, decline in favour of social sciences and life sciences, which seem closer to the applied than to the theoretical sciences.[44]

Several issues require attention in Arab secondary school curricula. One is that in many countries social studies are largely limited to geography, with little or no attention accorded to sociology, economics, or even history. With regard to the latter, the tendency is to home in on certain historical eras and to pass over others. We also note the rare appearance of philosophy in Arab secondary school curricula, apart from those influenced by the French system.[45] Good philosophy instruction at the secondary school level is of unquestionable importance. It contributes to the refinement of the personality of learners, hones their intellectual competencies, and expands their world view, all of which are especially important in adolescence, that especially crucial phase in an individual's intellectual, psychological, and social development (UNESCO, 2007). Rare, too, is the inclusion in each track of optional subjects, which give students appropriate opportunities to discover and develop their own inclinations and abilities. Nor do curricula provide courses aimed at developing self-study capacities, such as research, information analysis, and processing skills, or communicative skills, life and community participation skills, and other such knowledge and know-how that directly equip learners to participate intelligently and effectively in the knowledge society. The absence of certain subjects from the curricula in this phase undoubtedly reflects specific social and ideological choices. However, it is also the case that the low overall weekly periods and annual number of school hours in some countries[46] compared to the international norms makes it difficult to introduce optional courses, independent learning courses, and other such beneficial items into this educational phase.[47]

Technical secondary education and the formation of knowledge capital by youth

The practice in technical secondary education differs little from that in its general counterpart in that it places greater emphasis on the acquisition of the practical skills needed for the performance of a specialised vocation than on the formation of technicians capable of adjusting to changing job requirements.

Arab countries have gone to great pains to develop general and technical secondary school programmes and curricula, and they have made some effort at streaming this level of education, but these fall considerably short of official aspirations in all but a few pioneering instances

In many Arab countries, social studies are largely limited to geography, with little or no attention accorded to sociology, economics, or even history and, in the latter, the tendency is to home in on certain historical eras and to pass over others

Available statistics since 1970 indicate that technical education has been unable to attract sufficient numbers of Arab youths. Until the end of the twentieth century the exceptions to this rule were Egypt, Tunisia,[49] Bahrain, and Djibouti, joined later by Jordan and Lebanon. Only after the beginning of the twenty-first century did Syria, Iraq, and Algeria follow suit, albeit to a lesser extent.[50]

One could say that, during the last three decades of the twentieth century, the educational systems in the Arab region were able to create a critical mass of technicians capable of meeting the demands of the labor market in only Egypt, Tunisia, Bahrain, and Lebanon. As a result, Arab countries made do with under-qualified local labor or imported expertise, whether from other Arab countries or abroad.[51] Nevertheless, with the turn of the twenty-first century, there has been noticeable improvement. Enrolment in technical secondary education has reached acceptable levels in about half the Arab countries,[52] which can now boast of, or are well on their way to forming, a critical mass of young technicians with the knowledge and know-how to meet the demands of the knowledge economy, if not the knowledge society.[53]

BOX 3-4

The knowledge students should acquire: the contemporary French approach

The Commission for the Deliberation of Educational Content was established at the request of French President Francois Mitterrand with the purpose of revising the knowledge imparted by the educational system and ensuring the unity and coherence of this knowledge. The commission, composed of prominent figures from the French intelligentsia and world of education, submitted a report in 1989, recommending a series of general principles that it deemed applicable anywhere at the present time. Among these principles are, firstly, the need to periodically review curricula in order to introduce content required by scientific advancements and social change and, secondly, the need to give priority among instruction and learning processes to methods of thinking that are applicable to diverse domains, such as empirical, analytical, critical, deductive and historical thinking, over the types of knowledge that are available outside the educational system or that are accessible through other means. A third principle is the need to strive for flexibility, gradualism, and horizontal cohesion and integration in educational content on the basis of a clear educational philosophy that explains why such knowledge is required and how it should be acquired, including the amount of time that should be allocated to its instruction. Such justifications and conditions should rest on the findings of research and studies revealing the methods that are most conducive to learner acquisition of the required knowledge. A fourth principle is the need to diversify methods of delivering the curricular content and periodically to assess learners' progress in terms of the curricular aims. Fifth is the need to transcend the artificial antithesis between theoretical and practical knowledge by striving to merge the acquisition of applied skills with the acquisition of theoretical or abstract knowledge, and the need to transcend the divide between the sciences and humanities by reinforcing awareness of their overlapping dimensions in the various subjects taught.

In a study conducted at the request of UNESCO, Edgar Morin[48] defined seven types of knowledge that learners should derive from the educational system. These are:

1. Awareness of the nature of knowledge and how to obtain it, the difficulties involved and the risks of error and illusion;
2. Development of the natural inclination to contextualise and categorise information, and strengthening the ways of comprehending the relationships between the whole and the parts;
3. Awareness of the unity of mankind, physically, intellectually, sociologically, and culturally;
4. Awareness of the unity of the planet earth and the human species and the difficulties both have experienced and continue to encounter;
5. How to confront the uncertainties scientific advancement has created in all aspects of life and how to accept uncertainty where there is no means of attaining certainty;
6. An understanding of social phenomena with an eye to those dimensions that can foster understanding between peoples;
7. Awareness of the ethical dimension so as to develop the consciousness that a person is an individual, a member of society, and a member of the human species, that the relationship between the individual and society must be organised on the bases of democracy and respect for rights, and that the relationship between societies must be organised on the bases of mutual understanding and membership in a single human species.

THE ROLE OF HIGHER EDUCATION IN THE FORMATION OF KNOWLEDGE CAPITAL

Quantitative indicators

There is no consensus over universally applicable criteria for ideal or preferable ratios for the distribution of students between higher technical and university education. To develop such criteria one would have to have an accurate picture of the (generally domestic) needs of the job market for technical or university qualifications. The globalisation and opening up of labor markets, and the consequent occupational mobility and migration, have compounded the difficulties in identifying these needs.

The available data on the intake at the tertiary educational level in Arab countries[54] show that from under 1 per cent to around 31 per cent join the vocational stream. The countries can be categorised into three groups in this respect. The first, with

relatively high enrolment rates of between 31 per cent and around 20 per cent, includes (from highest to lowest) Djibouti, Libya, Tunisia, Oman, and Algeria. The second, in the middle range of 17 per cent down to 10 per cent, includes Iraq, Morocco, Lebanon, Yemen, Saudi Arabia, Syria, Jordan, and Palestine. Lastly, with the lowest enrolment rates in the vocational track, come Bahrain, Egypt, Mauritania, Qatar, and Kuwait.

Consequently, at a median of 84 per cent, intake in higher education is heavily concentrated in the universities at the undergraduate phase. Only a very small proportion of students continue to the post-graduate phase. The median is 1 per cent, with some noticeably higher rates in Tunisia (7 per cent); Morocco, Iraq, Syria (5 per cent), and Algeria (4 per cent). While female enrolment exists at all three higher educational levels, it exceeds 40 per cent in only three countries (Tunisia 55 per cent, Algeria 44 per cent, and Saudi Arabia 40 per cent).

There are many reasons why the young are reluctant to enter the vocational stream. Prime among them is the low regard that society has for this branch of learning. Students, therefore, flock to university programmes, with the aim of obtaining the prestige of a degree and title, even if they end up in jobs that do not require a university education and have very little to do with the specialisation engraved on their certificates. This is a clear manifestation of the squandering and misuse of resources, a phenomenon that runs counter the requirements for creating a diverse human resource capital capable of meeting the needs of comprehensive, integrated, and sustained development.

The second phenomenon that needs to be urgently addressed is the very low enrolment rates in graduate studies. In order to strike a balance between higher educational institutions' task of transmitting knowledge and the task of developing and renewing this knowledge through its various uses, graduate studies must be expanded, especially at the doctoral level. In developed societies, doctoral degree-holders account for 1.3 per cent

BOX 3-5

Expansion in General and Technical Secondary Education in Bahrain and its Impact on Female Enrolment

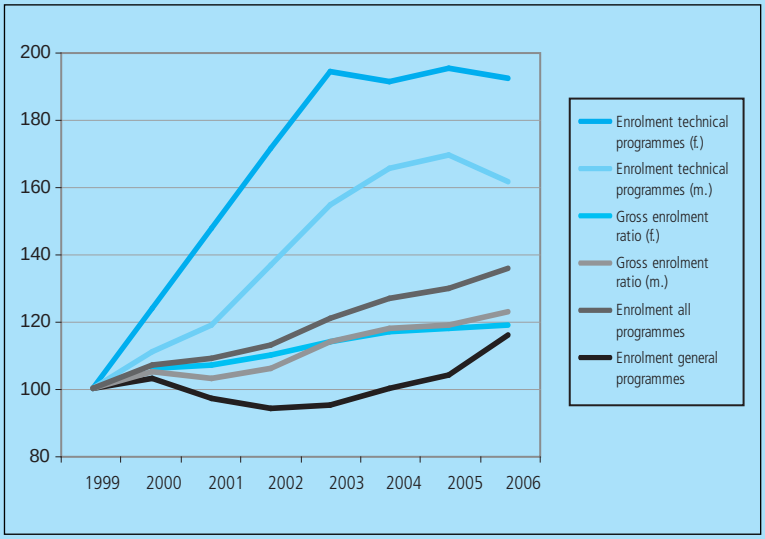
Bahrain has scored a series of achievements in education that have raised it to level of the vanguard of Arab countries in this domain. Its experience merits attention. Bahrain boasts one of the lowest ratios of children out of school, the highest level of net enrolment in primary education, the best enrolment rates in secondary education as a whole, and gender parity. It has nearly reached the saturation point in enrolment rates at the upper secondary education level, and it has the highest enrolment rate in technical secondary education among both Arab and Asian countries.

Secondary education enrolment rates in Bahrain have risen steadily from 1999 to 2006. It is clear that this growth is due to the noticeable increase in the enrolment, depicted in the graph below, of young women (f.) and men (m.) in the technical and vocational programmes. This increase is much higher than the rise in the gross enrolment rate at this educational level, whether taking into account all programmes combined or only the general secondary school programmes.

This quantitative development is undoubtedly connected with the structural reform of secondary education that Bahrain put into effect in the last decade. In addition to diversifying the programmes of technical secondary education and providing an element of flexibility in these programmes, the avenue is now open to enrol in corresponding higher educational programmes, thereby offering a horizon for technical secondary school graduates to continue their studies and progress further in their vocational choice.

Some characteristics of Bahraini society may have played a part in this dual development (the rise in technical secondary school enrolment and the rise in female enrolment in this educational branch). Bahrain is an urban society. With a per capita income lower than that of other small Gulf countries, it depends more on its own people than on imported labor to keep life's wheels turning and promote economic development.

Development in general and technical secondary school enrolment in Bahrain, 1999 to 2006 (100=1999)



Source: UNESCO Institute for Statistics, Data Centre, 13 March 2009.

BOX 3-6

More PhDs Needed as University Teachers

Higher education in the Arab region suffers a considerable shortage of teachers. In 2005, the student-teacher ratio was 25:1, compared to the global average of 16:1. The Arab student-teacher ratio is the highest among all regions of the world, including sub-Saharan Africa. Taking the global average as the norm, we find that, in 2005, the Arab region needed some 154,000 additional members in its educational staffs. This signifies that the higher education system in the Arab region does not ensure sufficient human resources with higher academic qualifications, especially doctoral degrees, to meet the needs of its teaching staffs autonomously.[56]

The shortage is more severe in some countries than in others. The student-teacher ratio is at least double the global average in Yemen, Egypt, Algeria, and Palestine, and one-and-a-half times the global average in Jordan, Bahrain, Mauritania, Libya, the UAE, and Saudi Arabia. Only in Lebanon, Qatar, Oman, Djibouti, Kuwait, Tunisia, and Morocco does the student-teacher ratio fall close to the global average. However, due to its growing higher education intake rates, Lebanon, alone, currently appears to be self-sufficient in staffing its universities, in spite of deficiencies in some specialisations such as maths.[57]

High student-teacher ratios are detrimental to the instruction and learning processes and to the productivity of institutions and academic staff members. The more class numbers swell the lower the potential for teacher-student interaction and the higher the risks of drop-out and repetition which, in turn, exacerbate overcrowding and further delay graduation. Another adverse effect of high student-teacher ratios is that teaching staff become so encumbered by the tasks of instruction, whether due to too many students in the classroom or to too heavy a teaching load, that they have no time for scholastic research and creativity. In addition, it reduces the available time for the types of tandem activities that enrich the learning process and it increases the likelihood of demotivation, which can prove disruptive to the learning process. All such phenomena are detrimental to the quality of the knowledge capital that students acquire.

In addition, many of the staff members engaged in higher educational institutes in the Arab world are inappropriately qualified. According to a regional study carried out ten years ago (Subhi al-Qasim, 1998, in Arabic,) no more than 60 per cent of tertiary education staff members possess a doctorate, although the ratio is somewhat higher in the fields of science and technology.[58] Moreover, fully-fledged "professors" account for only 16 per cent of the staff. In order to qualify for a professorship one must, in addition to possessing a doctorate, have published valuable articles in serious and reputable academic periodicals.

In sum, most higher education systems in the Arab region do not furnish teaching staffs with the necessary specifications. If they have a sufficient number of PhD holders[59], these may still not meet the required competency. If they do meet the required competency, circumstances may not be conducive to their further research or their participation in academic life at the international level, or they may find themselves drowning beneath too heavy a teaching load, with the result that in a few years they will either grow academically jaded, leave the educational system for private sector employment, or emigrate. The majority of staff members without PhDs will find their academic dynamism depleted within an even shorter time.

Available data shows large discrepancies between Arab countries in the intake rates in the various fields of higher education

of all relevant age brackets, which means a minimum overall higher education intake of over 50 per cent, a graduate level intake of at least 10 per cent, and no less than 2 per cent to 3 per cent intake in doctoral programmes.[55]

Tertiary education and the formation of the specialised knowledge capital needed to meet development needs

Distribution of undergraduate and graduate students by discipline

It is difficult to produce credible universally applicable criteria for the preferred balance of enrolment rates between the diverse higher educational specialisations. Every country has its own economic, political, and social structures, and its particular financial capacities, which determine to a large extent its needs for the types of highly qualified expertise produced at the higher education level. Still, it is generally acknowledged that every society requires sufficient numbers of experts in education, health, engineering, management, and other fields in order to run its institutional machinery and meet its service and developmental needs in these fields. In addition, every society needs specialists in all fields to undertake the tasks of development.

In general, there are no specific plans in Arab universities for steering students and setting intake guidelines for the various disciplines in terms of their relationship with the domestic and foreign labor markets. Many Arab countries have expanded their university systems, opening new branches and universities in many of their cities, but not in accordance with any comprehensive ordering of the actual needs of these countries. If anything, this has compounded the problems of higher education. Moreover, many countries have merely cloned their universities, with little thought for the relationship between the university and its immediate environment. This begs the question as to the limitations inherent in the type of expansion that fails to embrace the quality of the complex relationship between the university and its designated functions within a particular community from the standpoints of internal coherence, openness to the immediate environment, and escape from the "ivory tower."

Available data shows large discrepancies between Arab countries in the intake rates in the various fields of higher education.[60] Whereas education degree programmes attract between 1 per cent and 4 per cent of students at the tertiary level in Algeria, Bahrain, Lebanon, Mauritania, Morocco, and Tunisia (and these are extremely low ratios by any standard), rates climb to around 20 per cent or more in Iraq (19 per cent), Jordan (20 per cent), Saudi Arabia (24 per cent), Palestine (27 per cent), and Oman (30 per cent). These higher figures may indicate over-enrolment in education degree programmes in these countries at the expense of other disciplines. Perhaps somewhere midway between the two observed extremes would strike a balance in the intake levels between the various fields of higher education.[61]

Turning to those engaged in the diverse fields of medicine, including specialists from other Arab countries and abroad, the available figures for Arab countries[62] indicate that Lebanon, Qatar, Jordan, and the UAE have acceptable numbers of doctors, whereas the others range between those that need to exert greater effort in order to raise the ratio of doctors per 1,000 people to a level midway between the global average and the European rate (which is the highest in the world), and those countries that need to work intensively in order to attain the global average. Interestingly, there is a surfeit of dentists in Jordan, Lebanon, and, to a lesser extent, Syria. One also notes that Jordan is unique for a large surplus in pharmacists, with a pharmacist per 300 persons or per 50 families. One is particularly struck by the huge variation between Arab countries in all indicators in this profession. One would be hard put to come up with a single explanation for the disparity. Perhaps the most salient factor that would account for this situation is the failure of educational systems to steer sufficient numbers of students into this vital field with an appropriate balance between its diverse specialisations.

In spite of the lack of abundant data on enrolment rates in medicine and health sciences, we can affirm that the overall ratios are quite low.[63] We can therefore conclude that at the current rates of enrolment in medicine and health care sciences, Arab countries will not in the future be able to ensure highly qualified human resources in medicine and healthcare vocations in numbers sufficient to meet the health needs of Arab societies, most of which are desperately short, in comparison with international averages, of specialists

The picture with regard to engineering is less grim than those of education and health. Still, apart from Iraq and Libya, Arab oil-exporting countries do not have higher enrolment rates in their schools of engineering than other Arab countries, in spite of their greater need for engineers, not only in the field of petroleum and petroleum derivatives, but in every other field of engineering, owing to the abundance of revenues available for funding major construction projects. That these countries resort to imported labor is proof of the inability of their educational systems, including their systems of higher education, to respond to their developmental needs for highly qualified human capital.

Nor can it be doubted that many Arab countries have a shortage in student enrolment in the pure, life, and applied sciences and maths in favour of the schools of literature, social sciences, law, and business administration.[64] Moreover, the job market is not sufficiently diverse and plentiful to absorb most liberal arts graduates, whereas the need for specialists in science and technology is at least as great as the need for specialists in education, health, and engineering, assuming that the Arab countries aspire to generate the knowledge human capital capable of closing the scientific and digital gap between them and the industrially developed world. This is precisely the talent that the higher educational systems in the Arab region are not supplying.

The agricultural sciences require a special study due to the lack of available data on many Arab countries, their diverse

Many Arab countries have opened new branches and universities in many of their cities, but not in accordance with any comprehensive ordering of the actual needs of these countries

Many Arab countries have a shortage in student enrolment in the pure, life and applied sciences and maths in favour of the schools of literature, social sciences, law, and business administration

The available data on the fields of education, medicine and health sciences, engineering, and other fields suggest a shortage of specialised human capital capable of meeting the requirements needed by Arab societies

needs, and the consequent lack of criteria for determining, for example, their relative need for agricultural engineers for areas that can be utilised for plant or livestock production, or their need for veterinarians and the like. In view of the great differences between Arab countries in such matters, each country should be considered individually in terms of its specialisation needs. That said, the available information on schools of agriculture in Arab countries indicates that they offer insufficient diversification to cover their needs for the diverse specialisations in agriculture and food production, and that they occupy a marginal position among higher educational institutions. Such information leads one to believe that agricultural production, in all its forms, is based on traditional know-how rather than modern scientific knowledge.

In general, one can only speculate as to whether higher education in Arab countries can truly ensure the knowledge capital needed to respond to the diverse requirements of development and the needs of the labor market. Certainly, the available data on the fields of education, medicine and health sciences, engineering, and other fields suggest a shortage of specialised human capital capable of meeting the requirements needed by Arab societies to approach issues with a high degree of intellectual acumen and to take decisions based on in-depth knowledge of the issue at hand. This is especially true when they are compared to modern industrialised countries in this regard.

Thousands of graduates pour out of their higher educational institutes with no real employment opportunities while their domestic labor markets lack graduates in many important specialisations

Furthermore, the imbalance in the distribution of graduates over the various specialisations,[65] of which the social sciences, law, and business administration hold the virtually uncontested lead, suggests, in spite of the importance of these sciences, that the higher education systems are not conducive to the generation of the diverse types of qualified human capital Arab countries need to manage and to develop their societies. Thousands of graduates pour out of their higher educational institutes with no real employment opportunities while their domestic labor markets lack graduates in many important specialisations.

Qualifications of graduates

Rare is the information from independent and reliable sources on the qualifications of graduates from any educational level in Arab countries. Generally, the available information is restricted to the grades awarded to students on the required subjects in the curricula of the programmes from which they graduated, which, in turn, begs many questions as to how and on what basis these grades are awarded (UNDP, 2007b, in Arabic).

Perhaps the best project in this domain is that conducted by the UNDP Regional Bureau for Arab states in cooperation with the UNESCO Regional Bureau for Education in the Arab states. The project studied large samples of graduates from business administration and computer science university programmes in many Arab countries on the basis of standardised tests. Table 3-3 shows the total results for students tested in business administration in Arab universities. Table 3-4 shows the results for the computer science test. Both tables compare the results with those of their counterparts in universities in the USA.

If we lump the grade rankings into three categories, we find that business administration students from Arab countries on the point of graduating range as follows: 41 per cent failed or performed poorly, which is a very high ratio by any standard; 47 per cent had acceptable or good marks; and 12 per cent rated very good or excellent. In the USA, 15 per cent of those tested performed poorly (about three times less than their counterparts in Arab countries) and none failed, 61 per cent had pass or good marks, and 24 per cent (or more than double) ranked very good or excellent.

Thus, while there do exist students in Arab countries in the higher performance categories, they are exceptions to the

TABLE 3-3

Comparison of overall results of students in Arab countries and students in USA on the business administration test[66]

Grade categories	Ranking	Ratio of students in Arab countries (per cent)	Ratio of students in the US (per cent)
120-130	Fail	15	0
131-140	Poor	26	15
141-150	Pass	28	22
151-160	Good	19	39
161-170	Very good	9	10
171-200	Excellent	3	14
Total		100	100

Source: UNESCO Regional Bureau report (Salamé and El-Murr, 2005)

rule. The vast majority (about 70 per cent compared with 37 per cent of their USA counterparts) are clustered in the lower rankings. This extremely high figure raises grave questions concerning the quality of the human resource capital coming out of higher educational institutions in the Arab world. As to the specifics, students in the Arab states are more or less on a par with their counterparts in the USA in a single component in the business administration programme: economics. They do not come off at all well in any of the other components–accounting, management, statistics, finance, marketing, legal affairs and international business administration–all of which constitute essential applied knowledge needed to participate in the knowledge economy.

The available data also points to telling discrepancies in how students from the different participating universities performed. None of the students from the participating universities in Lebanon, Jordan, Palestine, Yemen, and Algeria attained the general average observed among the students from the universities in the USA. Nor was this average attained by 75 per cent of students from other universities in Lebanon, Syria, Egypt,[67] Sudan, and Morocco. Only the students from a single university in Morocco came close to rivalling their USA counterparts.[68]

In Table 3-4, showing the results of the computer science test, we find the same percentages of failed marks for both the students from the Arab region and those from the USA (15 per cent of each group). The divergence begins from the poor ranking upwards, with results in favour of the USA students. Whereas the vast majority of students from Arab countries are split between the lower grade category, with 48 per cent receiving failed or poor marks, and the middle category, with 47 per cent receiving pass or good marks,

While there do exist students in Arab countries in the higher performance categories, they are the exceptions to the rule

TABLE 3-4

Comparison of overall results of students in Arab countries and students in USA on the computer science test.[69]

Grade categories	Ranking	Ratio of students in Arab countries (per cent)	Ratio of students in the USA (per cent)
120-130	Fail	15	15
131-140	Poor	33	23
141-150	Pass	32	19
151-160	Good	15	23
161-170	Very good	4	12
171-200	Excellent	1	8
Total		100	100

Source: UNESCO Regional Bureau report (Salamé and El-Murr, 2005)

leaving only 5 per cent at the top end of the scale, students from the USA range as follows: 38 per cent with grades of failed or poor, 42 per cent with grades of pass or good, and 20 per cent with grades of very good or excellent (four times the ratio among students of Arab countries in this category). It follows that the Arab higher educational institutes under study have a 50 per cent success rate of producing acceptable levels of knowledge in computer science. But this is not good enough to generate a critical mass of highly skilled human resources capable of engaging in the processes of development, renewal, innovation and other such activities that would propel Arab countries toward the knowledge economy.

Literacy rates among adults have not reached the saturation point (95 per cent and above) in any Arab state

KNOWLEDGE CAPITAL ACQUIRED BY ADULTS THROUGH EDUCATION[70]

The available data shows steady progress in the average number of years of schooling completed in all Arab states

Literacy rates among adults have not reached the saturation point (95 per cent and above) in any Arab state.[71] However, they do approach this level (with rates of between 85 per cent and 94 per cent) in eight countries, and have attained lower rates (from 70 per cent to 84 per cent) in eight others. They remain poor (from 54 per cent to 65 per cent) in five countries. There is a noticeable discrepancy between males and females in these rates. It is about 20 per cent in favour of males overall in the Arab region, with the highest discrepancy (38 per cent) in Yemen. The only exceptions to the gender discrepancy (with differences of 5 per cent or less) are Qatar, the UAE, Kuwait, and Bahrain.

The average number of years of schooling completed is considered the best indicator of the quantitative knowledge capital acquired by adults through the educational system. However, to calculate this indicator requires accurate information on the school grade reached by every member of a society. UN organisations involved in population studies use a clear scale of completed levels of education among adults[72] for this purpose. Although countries have used the scale for their comprehensive and interim censuses, Arab countries rarely publish this data. Therefore, two approaches have been brought into play in order to estimate the knowledge level of adults. The first relies on past school life expectancy rates, since the adults of today are the children who entered the school system nineteen or more years ago. Accordingly, the rate of school life expectancy was calculated for the period from 1990 (those born in 1984 at the latest) working backwards to 1970 (beginning with those born in 1958), which is to say as far back as statistics are available. This approach thus covered adults who, in 2008, were between a minimum of twenty-five and a maximum of fifty years of age.

The available data[73] shows steady progress in this rate in all Arab states for which statistical data is available. The median school life expectancy rates in Arab states ranged from the primary level to the intermediate level, with discrepancies favouring males, except for in Qatar, the UAE, and Bahrain in recent periods, when the discrepancies favoured

BOX 3-7

The Educational Level of Saudi Arabians

The internet site of Saudi Arabia's Ministry of Economy and Planning[76] provides precise statistics on the education level of the Saudi people. On the basis of this data, we have calculated the level of education of the latter as an illustration of how the same may be done in other countries. Each individual was given a mark according to his level of education, starting from zero for illiterate and ending with eight for a doctoral degree graduate, according to the scale of educational levels attained by adults.[77]

According to the findings, the average educational level of Saudis currently employed is the secondary school level (with a mark of 3.97), which is not bad from the perspectives of the knowledge economy and knowledge society. The average level of education among Saudis not employed, most of whom are women (79 per cent), is just a little beyond primary school (2.13), which suggests deficiencies in meeting the requirements of a knowledge society. Thus, the overall rate of schooling among Saudi adults is 2.95, or the equivalent of the intermediary level.[78]

It is clear from these findings that the higher a person's educational level in Saudi Arabia the greater the likelihood of his participation in the country's economic life. Therefore, even though the general level of education in Saudi Arabia falls short of the minimal level for creating a knowledge society, we could say that the forces active in the developmental fields in society have attained the required educational level,[79] while the educational level of more than half of Saudi adults, especially women, is clearly too low to enable them to participate in the knowledge society.

females. According to this data, too, the overall school life expectancy for today's adults in the Arab region as a whole was eight years (nine for males and seven for females), or the equivalent of completing the year before the end of basic education. Nevertheless, there is considerable variation from one country to the next. The rate for the youngest adults is the higher education level in Bahrain and Libya, whereas it is only the end of primary school for their counterparts in Mauritania, Sudan, and Yemen.

The second approach for estimating the level of education of adults aged twenty-five to fifty is to follow the enrolment figures of these sectors in the various levels of education from 1970 to 2005.[74] According to the findings of this approach, Arab countries have worked hard to eradicate illiteracy. Some 50 per cent of those who had formerly been included in the statistics on illiteracy can, at least, read and write today. The findings of seventeen Arab countries for which statistical data is available[75] show great strides forward in the educational levels from one age bracket to the next among adults in virtually all Arab states, in spite of large discrepancies from one country to the next and within the various age brackets. According to these findings, the median level of education of the age group that is today fifty years old is 2.5 (less than end of the intermediate level), whereas that of the group that is today twenty-five years old is 4.0 (the secondary school level). This is equivalent to five years more schooling than the older age group.

Due to population growth, the younger the age-bracket the more weight it should carry when assessing the overall level of education of adults aged 25 to 50 in Arab countries. Taking approximations of the relative weights of these age-brackets, the median educational level for them is 3.2, or a little higher than the intermediate level. Nevertheless, Arab countries vary considerably with respect to this average,[80] which can range from as high as secondary education, as in Bahrain, Lebanon, Qatar, and Kuwait, or even slightly higher, as in Libya, to below the end of the primary level, as in Djibouti and Somalia. At least half the countries concerned, however, are in the vicinity of the intermediate level of education.[81]

Thus the knowledge level attained through the educational systems by adults in Arab countries–particularly

TABLE 3-5

Estimated knowledge capital acquired through education among adults (25 to 50 years) in Arab countries in 2008 (per cent)

Country	Literacy Rate in 2005 A	School life expectancy rate among adults (aged 25 to 50*) B	Average score (A + B)/2
Kuwait	94	51	73
Libya	86	57	72
Bahrain	88	55	72
Qatar	89	52	71
Jordan	91	47	69
Lebanon	86	52	69
UAE	89	45	67
Occupied Palestinian Territories	92	..	..
Syria	82	44	63
Saudi Arabia	84	38	61
Egypt	71	48	60
Tunisia	76	43	60
Oman	83	35	59
Algeria	74	43	59
Iraq	74	40	57
Comoros	73	..	..
Morocco	54	32	43
Djibouti	65	21	43
Sudan	61	..	..
Yemen	56	..	..
Mauritania	55	..	..
Somalia	..	19	..

Source: UNESCO Institute for Statistics; Data Centre; figures in columns B and "Average score" were assembled by Ramzi Salama, Report core team member.

* As a percentage of 7.33, or eighteen years of study, taken as a reasonable maximum, as above.

the generations of the primary vital forces in society, which is to say the age groups between twenty-five and fifty, which account for the largest numbers of adults–averages something close to the end of the basic education level, with evident discrepancies in favour of males, in general. On the basis of discrepancies in the region, we can categorise individual countries as follows (see Table 3-5):

A. No Arab country can boast the ability to produce a clear majority of inhabitants above the age of twenty-five with high levels of education (i.e., with a literacy plus educational level index higher than or in the vicinity of 84 per cent[82]).

B. Countries that have a critical mass of adults who possess a relatively sufficient knowledge capital (a literacy plus education level index of between 67 per cent and 73 per cent) to enable them to participate in the knowledge society. Eight countries fall into this category: Kuwait, Libya, Bahrain, Qatar, Jordan, Lebanon, the UAE, and Palestine.

C. Countries that have a minimal level of adults capable of participating in the knowledge society (i.e., with a literacy plus education level index between 50 per cent and 66 per cent), yet that simultaneously contain large numbers of adults who lack this ability (especially females). There are seven countries in this category: Syria, Saudi Arabia, Egypt, Tunisia, Oman, Algeria, and Iraq.

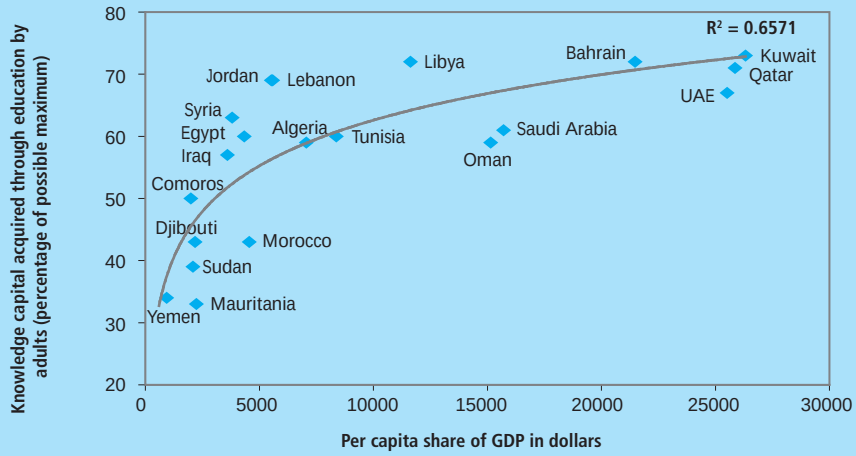
D. Countries that lack a sufficient mass of adults capable of participating in the knowledge society (i.e., with a literacy plus education level index of less than 50 per cent). In other words, the ability to participate in the knowledge society is restricted to a predominantly male elite that varies in size from one country to the next. There are seven countries in this category: Morocco and Djibouti (to which can be added the Comoros, Sudan, Yemen, Mauritania, and Somalia, for which sufficient data are unavailable).

Eight Arab countries have a critical mass of adults who possess a relatively sufficient knowledge capital to enable them to participate in the knowledge society. Seven other countries lack this critical mass

Figure 3-4 illustrates the adult knowledge capital formed through education in Arab states with respect to per capita GDP, again depicting a moderately loose relationship between these two variables. As can be seen, most Arab countries cluster around the exponential curve, the exceptions being Libya, Lebanon, Jordan and Syria, which show educational accomplishments among adults exceeding these countries' current financial capacities, and the UAE, Saudi Arabia, Oman, and Morocco, which

FIGURE 3-4

Adult knowledge capital acquired through education in Arab countries against per capita GDP



show educational accomplishments among adults below these countries' current financial capacities.

KNOWLEDGE CAPITAL REQUIRED FOR PARTICIPATION IN THE KNOWLEDGE SOCIETY

QUANTITATIVE DIMENSIONS

Table 3-6 lists the Arab states in order of how they rank on the scale of total actual or estimated quantitative components of the knowledge society for each of the three major strata: children, youth, and adults. The table makes palpable the huge discrepancies between Arab societies in their respective abilities to supply the quantitative knowledge capital needed to facilitate participation in the knowledge society.

All three age strata of citizens in Libya and Bahrain are making steady strides towards the degree of excellence (an overall grade of 84 per cent and above) that characterises countries capable of engaging confidently in the knowledge society. Qatar and Jordan, however, (with overall grades of above 75 per cent) possess only a reasonable quantity of the knowledge capital needed to participate in the knowledge society among adults and ensure the acquisition of that capital among the emerging generations of youth and children. Lebanon, Kuwait, the UAE, Tunisia, Palestine, Egypt, and Algeria (with overall grades of between 69 per cent and 74 per cent) follow in terms of their progress toward qualifying for participating in the knowledge society, while Yemen and the Comoros, Mauritania, Sudan, Djibouti, (and Somalia) show themselves unable to realise the minimal level of quantitative components among all age sectors of society to attain this end. With overall marks of less than 50 per cent, participation in the knowledge society in these countries is restricted to small elites. The rest of the Arab states fall in varying degrees between these two poles in terms of their ability to establish a critical mass of people able to participate in the knowledge society. Thus we find Oman, Syria, Saudi Arabia, and Iraq in the middle of the scale (with totals of between 58 per cent and 66 per cent) and Morocco (with an overall score of 52 per cent) at the lowest degree of ability.

TABLE 3-6

Summary of estimated quantitative capital obtained through education for the different age strata of Arab societies in 2005 (per cent)

Country	Expected knowledge capital acquisition among Children A	Knowledge capital among youth B	Knowledge capital among adults C	Average score (A + B + C)/3
Libya	*(94)	80	72	82
Bahrain	94	80	72	82
Qatar	88	72	71	77
Jordan	86	74	69	76
Lebanon	79	(73)	69	74
Kuwait	82	(66)	73	74
UAE	84	67	67	73
Tunisia	92	65	60	72
Occupied Palestinian Territories	80	(70)	(65)	72
Egypt	87	66	60	71
Algeria	90	58	59	69
Oman	76	62	59	66
Syria	(78)	50	63	64
Saudi Arabia	(65)	(54)	61	60
Iraq	70	(45)	57	58
Morocco	73	39	43	52
Yemen	60	40	(34)	45
Comoros	(46)	(34)	(50)	43
Mauritania	56	29	(33)	39
Sudan	(38)	(29)	(39)	35
Djibouti	30	(24)	43	32
Somalia	..	..	..	..

* Numbers between brackets are estimates based on incomplete statistical data.
Source: UNESCO Institute for Statistics; Data Centre. Figures were assembled by Ramzi Salama, Report core team member.

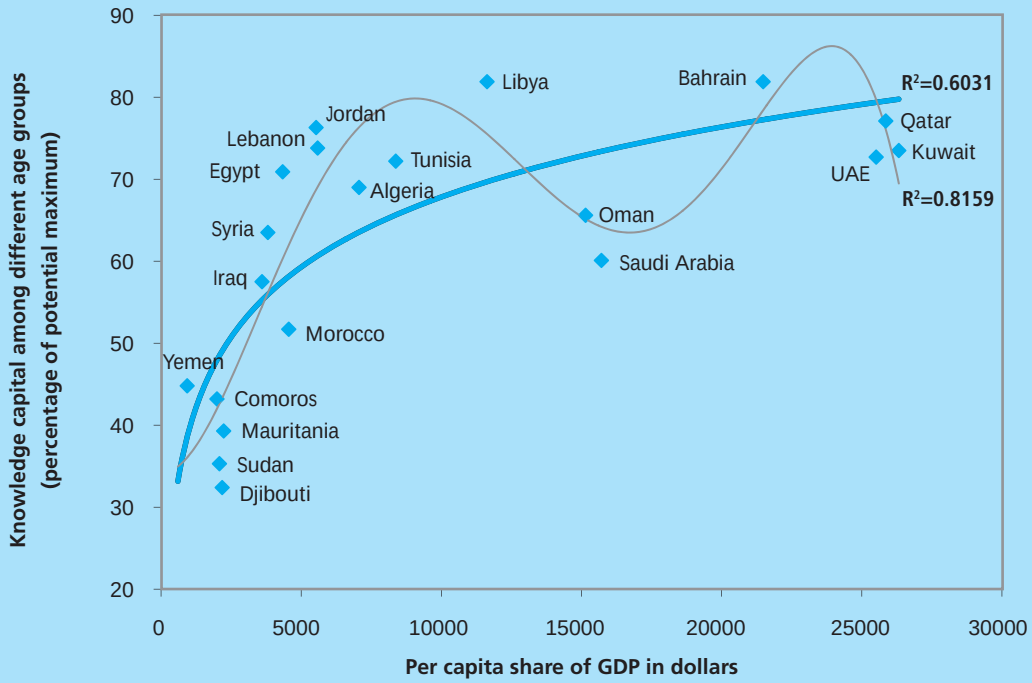
Most Arab countries have been unable to ensure openings at the upper secondary and the various tertiary education phases in quantities sufficient to keep pace with population growth rates

For the most part children are clearly more fortunate than preceding generations with respect to the potential for obtaining the requirements necessary to participate in the knowledge society. However, the situation is not so clear cut when we come to the prospects of youth in knowledge formation when compared to adults. Although youth are, indeed, more fortunate than adults in this regard in half the Arab countries, it is impossible to believe that statistical error or the methods of estimating certain figures can explain why the reverse should be the case in the other half of the countries. The countries in which this phenomenon manifests itself most clearly are Kuwait, Syria, Saudi Arabia, Iraq, Morocco, the Comoros, Mauritania, Sudan, and Djibouti. Undoubtedly, the particular circumstances of each of these countries account for this. The upheavals that Iraq has experienced since 1990 have reduced the opportunities available to youths at their particular educational levels. The rest of these countries, apart from Kuwait, have evidently been unable to ensure openings at the upper secondary and the various tertiary education phases in quantities sufficient to keep pace with population growth rates among youth and the rising numbers of graduates from basic education. In Kuwait, the reluctance of youths, especially males, to proceed to tertiary education (as evidenced by only a 10 per cent enrolment rate in this level in 2005) is one of the primary causes of the decline in the opportunities for Kuwaiti youth in terms their preparedness for the knowledge economy and society.

Figure 3-5 depicts the knowledge capital created or expected to be created through formal education for the various age strata in relation to the per capita GDP. That there is a strong directly proportional correlation between these two variables is evidenced by how most countries cluster in the vicinity of the exponential curve. The exceptions are Libya, Lebanon, Jordan, and Egypt, which have made educational

FIGURE 3-5

Actual (or expected) knowledge capital formed through education among different age groups in Arab countries against per capita GDP



inroads well beyond their current financial capacities, and Saudi Arabia, Djibouti, and Sudan, where the reverse applies to a remarkable extent.

It should be borne in mind that each country has particular characteristics and circumstances of its own even if it ranks the same as others. This applies particularly to the countries at the upper end of the scale. For example, the degree and focus of efforts the UAE must expend to lift its national knowledge capital to the level of the knowledge society is not the same as that required in Jordan or Lebanon. Likewise, the degree and focus of efforts required in Kuwait and Tunisia are not the same as those required in Saudi Arabia and Syria. As for the countries at the lower end of the scale, they must take urgent and comprehensive measures covering all age groups and the majority of the indices.

QUALITATIVE DIMENSIONS

All indicators for which statistical evidence is available point to an overall decline in the quality of the knowledge capital in all areas in the Arab region. This should not be taken to mean that Arab states are totally deficient in quality or that there are not scattered islands of excellence and distinguished elites. These do exist in varying degrees from one country to the next and one field of specialisation to the next. Frequently, however, they are the exception that proves the rule.

For example, the number of class hours allocated to maths in basic education is on a par with that in other countries for this subject that is so essential to the formation of knowledge capital. Yet, we find at the same time that Arab students do not, as a whole, fare well in the international standardised tests that measure their maths acquisition. In like manner, Arab countries generally allocate a sufficient amount of classes to physical education, yet rarely do their athletes win high medals in the Olympics or other such athletic competitions that demand outstanding performance. Some students perform extremely well in standardised tests in computer science and business administration; however, the majority end up at the lower end of the grade scale in the selfsame tests. Enrolment rates in secondary and higher educational institutes are climbing, but in most cases the students flock to educational streams and specialisations that already have more than their fill of graduates while other tracks and specialisations are plagued by glaring shortages.

In sum, Arab educational systems are not functioning well in the creation of critical masses of the qualitative knowledge capital Arab societies need to enter sure-footedly into the knowledge economy and to participate effectively in the knowledge society.

INVESTING IN THE FORMATION OF HUMAN KNOWLEDGE CAPITAL THROUGH EDUCATION

The creation of human knowledge capital requires interplay between many diverse factors. Foremost among these are the time devoted to teaching and learning, the nature of the curricula and the competencies learners are expected to acquire from the various types of educational programmes. Also critical are the expectations of those in charge of education and instruction towards learners in terms of learning and performance, the opportunities available to learners to increase their knowledge, the quality of the instruction provided by the human resources responsible for instruction, and the policies, plans, programmes, and practices founded on reliable pedagogical knowledge. Such are the considerations that are brought to bear in the formulation, operation, revision, and development of the instructional/educational process.

Ensuring the requirements of quality knowledge capital creation and its universalisation across the widest possible cohorts of children, youths, and adults through formal education and continuing learning processes requires effective

Capital creation across the widest possible cohorts of children, youths, and adults, requires effective government supervision and enormous financial resources that are sometimes beyond the means of nations and can only be ensured at appropriate levels in countries with a high national income

The available data for the Arab region reveals considerable disparity between Arab countries in their levels of spending on education

government supervision and enormous financial resources. Not infrequently these sometimes lie beyond the means of nations and can only be ensured at appropriate levels in countries with a high national income.

Spending on education

The available data for the Arab region reveals considerable disparity between Arab countries in their levels of spending on education.[83] Whereas Djibouti, Saudi Arabia, Tunisia, and Morocco allocated high proportions of their national budgets (from 20.8 per cent to 27.6 per cent) and high ratios of GDP (between 6.5 per cent and 8.7 per cent) to the different stages of education over the last five years at least, other countries for which statistics are available (with the exception of Kuwait) have spent from the equivalent of 4.7 per cent of GDP (Egypt) to as little as 1.7 per cent (UAE). If the education allocations in Qatar and the UAE are sufficient given these countries' relatively high gross domestic product, and Kuwait is munificent in terms of what it spends on education, the outlays on education in Egypt and Mauritania appear insufficient to ensure an educational system capable of meeting the challenges of the twenty-first century. Egypt has nevertheless scored tangible quantitative achievements in education. And if the level of public allocations for education in Lebanon is modest by all recognised standards, one must also bear in mind the contributions made by Lebanese civil society through the proliferation of private and parochial schooling at all educational stages.

One justification for the relatively low outlays on education in countries such as Egypt and Mauritania is the need of these countries to spend large sums of money on developing the infrastructure necessary to meet the demands of their large population increases, on expanding the various social and utility services to minimal levels of availability and reliability, and other such essentials. Another factor that may account for low educational outlays is limited government revenues with respect to gross national income and, hence, the limited amounts of funds available for public expenditure. Still, one is struck by the inversely proportional relationship, in these countries, between public expenditure on education with respect to GDP and the overall indicators of knowledge capital formation through education. Nothing could be more indicative of the intensive fiscal management efforts being exerted by the less wealthy nations to catch up with and enhance their prospects for human capital formation, even if the results are not necessarily commensurate to the efforts expended due to the paucity of available public financial resources as well as to other educational and social factors.

Statistical analyses show a definite, if variable, correlation between per capita level of national wealth, and the various indices of quantitative human knowledge capital formation through education

National income and the formation of quantitative knowledge capital

Statistical analyses show a definite, if variable, correlation between per capita income (which is to say the level of national wealth), and the various indices of quantitative human knowledge capital formation through education. The figures we have included above illustrate the correlations between some of these indices and per capita GDP in Arab states.

From more detailed analyses we find that the loosest relationship is between per capita national income and primary and higher educational enrolment. The universalisation or partial universalisation of primary education in Arab countries has reached such a degree as to have divorced enrolment rates at this level from national wealth. Exceptions are Djibouti, which suffers acute shortfall in enrolment, and Oman and Saudi Arabia, in which enrolment rates are not commensurate with per capita GDP. Tertiary education enrolment rates follow a polynomial trendline that peaks away from per capita GDP in numerous places, showing various inversely proportionate relations. Consider, for example, that middle-income

FIGURE 3-6a

Maths performance of eighth-year students in Arab countries against per capita GDP.

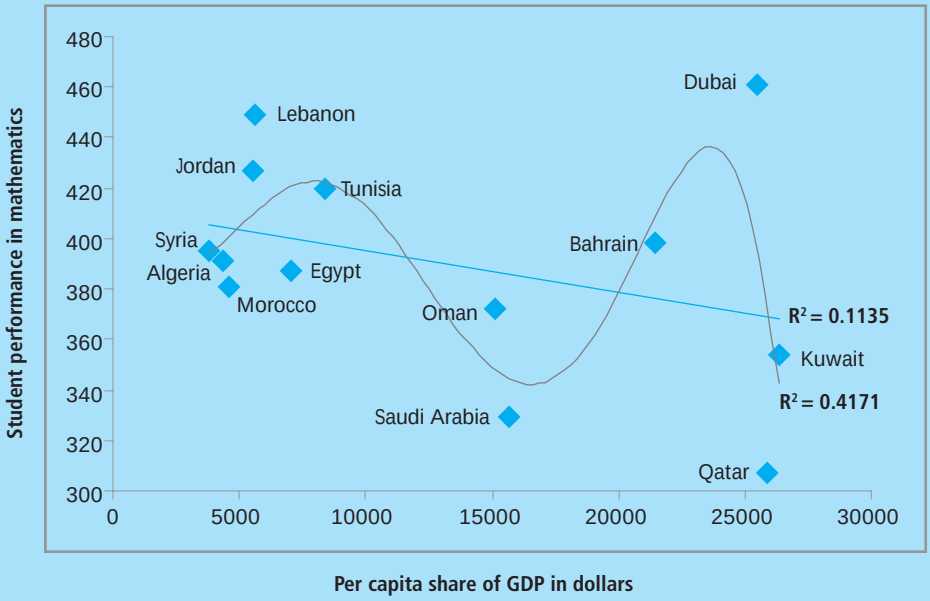
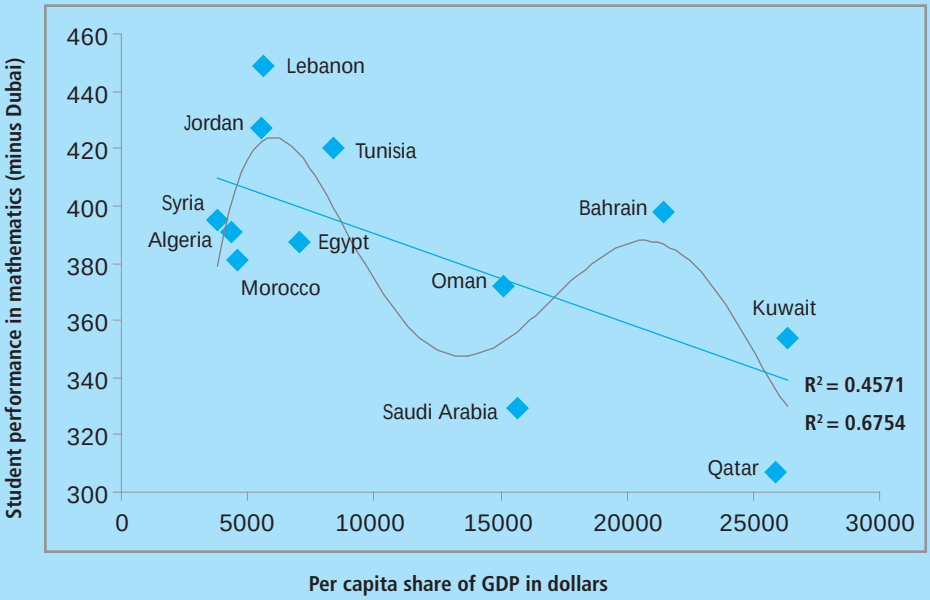


FIGURE 3-6b

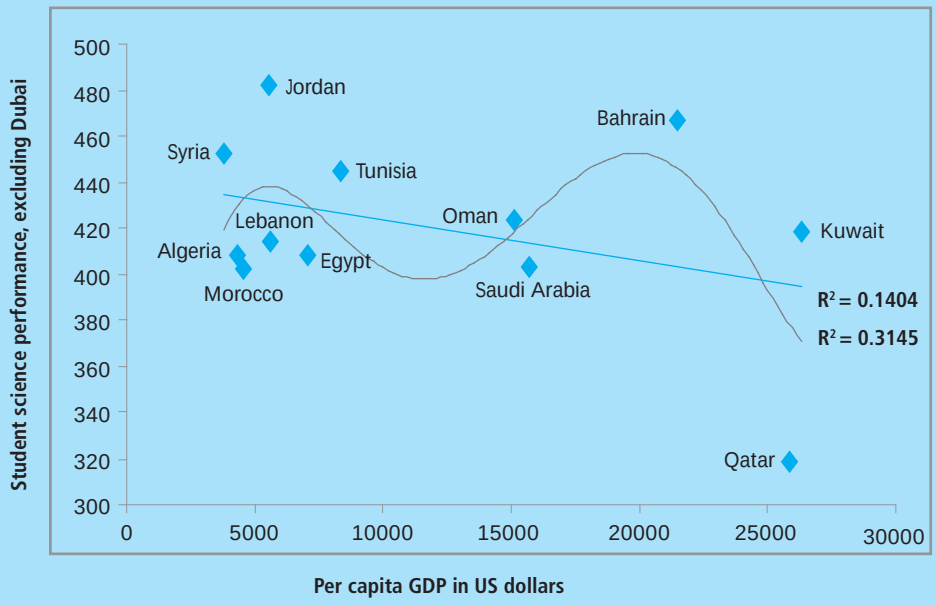
Math performance of eighth-year students in Arab countries against per capita GDP (excluding Dubai).



countries, such as Libya, Lebanon, Jordan, and Egypt, attain high enrolment rates at the tertiary educational level, whereas such rates dwindle to disturbing levels in such relatively wealthy countries as Kuwait, Qatar, the UAE, and Oman. On the other hand, there is a much closer relationship between per capita income and upper

FIGURE 3-7

Science performance of eighth-year students in Arab countries against per capita GDP (excluding Dubai).



Financial prosperity explains only some of the differences between Arab states in the quantitative dimensions of national knowledge capital and seems to have an inverse relationship–albeit moderate–with the qualitative performance of students

secondary level enrolment. Here enrolment rates at this level have, indeed, become an indicator of a society's wealth: the lower the secondary enrolment rate, the poorer the society; the more prevalent attendance is at this level of education, the wealthier the society.

Most other indicators have moderately close relations with per capita income. Some are virtually linear, as is the case with the relationship with gross enrolment rates, total secondary education enrolment rates at both the lower and upper levels, and the total knowledge capital among adults. Others tend toward a polynomial pattern, as is the case with the relationship with enrolment rates at the upper stage of basic education and the total scores on the opportunities for the formation of knowledge capital among children and youths. The relationship between literacy and per capita income is virtually linear; less so, however, than the relationship between per capita income and overall secondary education enrolment, as a whole, and upper secondary education, in particular.

National income and qualitative capital formation

If we consider education quality indicators, such as eighth graders' performance in maths, in connection with per capita GDP, the results reveal an inverse relationship between national prosperity and student performance (see Figure 3-6a). On the other hand, if we exclude the students from Dubai/UAE from the equation,[84] the inverse relationship grows more pronounced, with the peaks in the polynomial curve becoming less jagged, as can be seen in Figure 3-6b. The same applies with regard to the relationship between national prosperity and eighth-grader performance in sciences (see Figure 3-7), albeit the inverse relationship is less acute in this case.[85]

EDUCATIONAL REFORM EFFORTS

Financial prosperity explains only some of the differences between Arab states in the quantitative dimensions of national knowledge capital and seems to have an

BOX 3-8

The Contribution of Non-Public Schools to Education in the Arab Region

Locally and foreign affiliated parochial and private schools occupy a respectably sizeable realm in the pre-university educational galaxy in the Arab region. They ensure most of the educational opportunities in the pre-elementary phase in the majority of Arab countries, more than 60 per cent of school opportunities at the primary stage in two Arab states, and more than 20 per cent of these opportunities in at least four other states. In most other countries, they are concentrated, to large extent, at this level. Non-governmental schools are also prominent at the intermediate and secondary education levels in at least nine Arab states. Indeed, in such countries as Bahrain, the Comoros, Djibouti, Jordan, Kuwait, Lebanon, Mauritania, Qatar, the UAE (and Saudi Arabia), it seems as though these institutions are indispensable for ensuring schooling opportunities for adolescents and young adults.[86]

One is naturally inclined to ask the question as to whether non-public institutes actually contribute added value to the formation of knowledge capital in the Arab region. If they do, then what exactly is this added value that public schools do not provide? What are the achievements of private schools that government schools fail to attain? What factors account for the possible differences between these two types of education providers?

Perhaps the most salient contribution of non-public providers is that they alleviate the burden of ensuring education for all members of the public from the shoulders of the national budget. However, these providers have also created a glimmering image for themselves–sometimes merited, sometimes not–that extends the scope of parents' and students' expectations from these institutions to international horizons.

The more prestigious schools accomplish this by adopting a curriculum that generally uses a foreign tongue as the primary language of instruction and that raises performance expectations by setting achievement standards at the ability to pass foreign and internationally recognised proficiency tests. Frequently, too, their curricula and course cycles are geared to equip their students to enter internationally reputed universities. They also enable professional contact with the world abroad through continual exposure to the latest developments in pedagogy and educational technology and by arranging for their teaching staff to participate in internationally certified educational training courses and professional development workshops. Furthermore, by introducing elements of general universal culture into the heart of the local culture, treating them as though they were fundamental components of human culture, they lend an extra international dimension to the educational service they deliver.

Certainly, the socio-economic and scholastic selectivity many of these institutions practice accounts, to a considerable extent, for the success rates of their students. It also explains their ability to impose their higher achievement expectations on students. Yet these institutes could not have imposed such conditions if they did not thrive in an environment that permits freedom of movement, initiative, originality, and innovation in all their activities. This is precisely what public schools generally lack, restricted as they are by the general political climate, government bureaucracy, the dominance of quantity over quality, and the fixation with having to treat all government schools and their staffs in like manner. Such are the factors that tend to choke off all attempts to excel and depart from the norm.

Non-public schools generally control quality education, the quality of their teaching and other working staff, through the margin of administrative and financial independence that they enjoy. They can attract whatever attested expertise they wish, whether for the purposes of administration, instruction, training, or provision of educational support services. They can offer their students the best state-of-the-art educational equipment and media their budgets can afford. Nevertheless, the non-public providers that truly contribute to the development of education in theory and practice, and that do raise their student performance levels to international standards, are not necessarily the rule. Indeed, the reality is that they are more in the nature of "islands of excellence" scattered here and there in a sea of sometimes good, sometimes questionable institutions. Despite this, even the more mediocre providers frequently give the impression that they offer an added value to Arab society, not necessarily because of their actual contribution but because of how far public schools lag behind the development train.

inverse relationship – albeit moderate – with the qualitative performance of students. Therefore, there must be other aspects that account for the differences between these countries in knowledge performance. Is performance connected, for example, in any way to educational reforms recently undertaken by Arab countries?

In fact, Arab states from the Gulf to the Atlantic have experienced great surges of domestic educational development efforts backed by the technical and financial support provided by the international community as embodied in such international organisations as UNESCO, the UNDP, and the World Bank, by such influential regional organisations as the EU, or by means of bilateral cooperation programmes, among the most important of which are the French, German, British, US, and Japanese cooperation programmes. Most of the recent public education development drives arose from the framework of the first World Conference on Education for All (held in Jomtien, Thailand, in 1990), which defined six goals to be met by 2000. As most Arab countries failed to attain these goals by that time, they reaffirmed their commitment to them in the Arab Regional Conference on Education for All held in Cairo in 2000, and then in the World Education Forum held in Dakar later that year, in the hope of achieving them by 2015 at the latest.[87]

BOX 3-9

Human Capital Formation to Meet the Needs of Instruction and Pedagogy

Education systems need highly qualified human resources to design pedagogical policies, plans, and programmes; to administer pedagogical and educational affairs and run teaching institutions; and to provide the instructional and pedagogical support services needed to generate human capital among forthcoming generations in sufficient quantities and of the required quality. All the relevant literature on the subject in Arabic or other languages confirms that the various types of human resources for education must be prepared at the university level.[89]

The statistics published by the UNESCO Institute for Statistics on teacher qualifications are not sufficient to determine whether educational systems are truly equipped with sufficient human resources capable of turning the wheels of the pedagogical process. These statistics fail to take into account the type of the teachers' degrees (the educational level completed), the nature of their qualifications (scholastic or specialising in education), and the quality of that qualification (the instruments that authenticate its worth); this greatly reduces the possibility of meaningful comparative studies between countries.[90] We should therefore ask whether the higher education systems in this region ensure a supply of teachers and other education specialists in sufficient numbers to feed the education sector with the highly qualified human resources it needs.

Simulation exercises indicate that education systems, in general, must allocate no less than 5 per cent of every adult age bracket to the purposes of providing for the basic needs of these systems.[91] Applying this figure to the enrolment rates in tertiary level education degree programmes (hypothetically the twenty to twenty-four age bracket) in Arab countries, the deficiencies in the preparation of teachers and others responsible for the educational process become readily apparent for most of the Arab countries for which statistics are available, as does the need to rectify the flaws. Undoubtedly, most of the other countries must suffer shortages similar to those observed in the countries for which there are available data. According to the simulation exercises, Djibouti, Mauritania, Sudan, Syria, Yemen, Morocco, Iraq, Algeria, and Tunisia are quite short of competent educators and hence must greatly expand the enrolment levels in education and teacher training programmes at the tertiary level. But even in countries that show an imbalance in favour of education and teaching training programmes compared to enrolment rates in other higher education specialisations, as is the case in Palestine, Jordan, and Saudi Arabia, this imbalance does not necessarily ensure the provision of the necessary numbers or the different types of qualifications at the quality that the education system needs.

A recent evaluation of university programmes in pedagogy in different specialisations, at different levels and in various Arab states (Salamé and El-Murr, 2005), reveals that these programmes, as a whole, lack most of the quality components, from inputs (programme design) and processes (i.e., using modern resources and modern information technologies to enhance the learning process and the monitoring of student progress) to outputs (quality of graduates, especially as pertains to their acquisition of the higher mental competencies). The programmes also lack quality assurance components, from benchmarks and effective mechanisms for assessing learner acquisition and performance to annual monitoring and periodic review systems for assessing the programmes themselves and monitoring the careers of students after graduation. Furthermore, the study concludes, the persons in charge of these programmes are devoid of a culture of awareness of and dedication to quality and of the need constantly to upgrade the quality of the educational services they provide and to plan, follow up, and adjust.

Social pressures resulting from mounting numbers of students completing basic and, hence, secondary education in many Arab countries have given rise to a drive specifically aimed at the reform of technical and higher education. This drive took shape at an international conference sponsored by UNESCO in 1998, which was preceded by a regional conference on the subject held in Beirut that year.

The World Bank report, *The Road Not Travelled–Education Reform in the Middle East and North Africa* (World Bank, 2007b) observes that, over the previous fifty years, the thirteen Arab states that comprise the subjects of its study have drawn up extensive plans for reforming their educational systems at all their levels and for all their types of education. It estimated an average of 2.5 such plans per country during this period with an average of twenty-five measures per plan.

But in spite of the efforts undertaken in Arab countries since the 1990s (1990 to 2005),[88] it appears that many of them have fallen short of realising the goals of Education for All (UNESCO, 2008a) and from meeting global standards with regard to occupational, technical, and higher education. Certainly significant progress has been made in the quantitative indices for education–in enrolment rates and in others; however, such indices have reached the saturation point in very few countries. Meanwhile, the qualitative indicators place Arab countries well behind not only the industrialised developed nations but also a large group of other nations in Asia and Latin America, which have made enormous strides in the quality of their educational services and have obtained results equal or close to those of the advanced industrialised nations.

The World Bank report cites differences between Arab countries on the basis of a compound index that combines measurements of enrolment at all educational levels, gender parity, primary education efficiency, and the quality of education as evidenced by adult literacy rates and results in international standardised tests such as those mentioned earlier in this chapter. Naturally, the differences are most pronounced between the better performing countries, such as Jordan and

Kuwait, and the worst performers such as Morocco, Iraq, Yemen, and Djibouti.

The report describes the performance of Arab states in terms of three "building blocks" which are subsumed beneath the headings "engineering" (consisting of physical resources, finance and administration, curricula and teaching methods), "incentives" (which cover evaluation and monitoring, motivation and rewards, and information), and "public accountability." It suggests that the most successful countries, such as Jordan, Kuwait, and Lebanon, have education systems that feature a good mix of engineering, incentives, and public accountability. Indeed, it demonstrates that with such a mix, education systems can perform acceptably even in environments marred by violence and instability as is the case in Palestine and as was formerly for a protracted period the case in Lebanon.

On the basis of the foregoing, the World Bank report maintains that the way forward is for countries to make the transition from engineering inputs to engineering for results, from hierarchical control to incentive-compatible contracts, and from accountability to the state to broader public participation in educational affairs. In addition, it urges Arab states to synchronise human capital accumulation with labor demand both within each individual Arab state and within the Arab region as a whole and, more generally, to tailor education to the needs of economic development and the generation of large numbers of job opportunities so as to optimise the economic returns on investment in education.

Perhaps the lack of extensive public debate in Arab countries, together and individually, on the nature, goals, and challenges of education reform, and the dearth of published studies, research, and documents on these issues have caused reform efforts to turn in on themselves, exposing them to the dangers of oversimplification. This has given rise to the tendency to handle reform as though it were merely a matter of applying ready-made formulas. In fact, authentic reform entails setting in motion a societal dynamic that is associated with the unleashing of the forces of innovative thought, experimentation, evaluation, rectification and renewed initiative, thereby generating a new and vigorous educational culture that pervades all facets of the educational system and all aspects of its relationship to the needs of comprehensive integrated development ('Adnan al-Amin, et al, 2005, in Arabic). In all events, it is clear that the Arab states, in general, do not have the critical mass needed to sustain the impetus of efforts aimed at elevating their educational systems to the standards achieved by developed nations. Undoubtedly the fault for this shortcoming can be traced to levels of responsibility, from the leaders of educational thought and education planners to teachers and instructors at all phases of the education process, via education and school administrators and all others in charge of providing educational services, especially those concerned with quality assurance.

The lack of extensive public debate in Arab countries has given rise to the tendency to handle reform as though it were merely a matter of applying ready-made formulas

An example of a societal dynamic promising for reform occurred in Morocco in 1998-2000. In this period, the organs and energies of civil society were galvanised into action, generating the impetus that launched the National Charter of Education and Training (1999), or the so-called "Education Law," that laid out the fundamental pillars for reform at all levels and in all branches of education in the kingdom. The experience was remarkable in spite of the hurdles that have continually obstructed the implementation of the agreed-upon principles by dint of the sheer number of difficulties and the fact that some of these have been left to accumulate for so long and have become so intractable as to defy solution even after years of work. A similar movement occurred in Lebanon from 1995 to 1997, although in this case it was restricted to the reform of the public education curricula.

In all other countries, officials in charge of the education systems and education experts formed the primary and sole

Arab educational development drives have, as a rule, remained stuck in the rut of expansion, as opposed to reform, which is why improvement has occurred only in the quantitative indicators

BOX 3-10

The Lebanese Association for Educational Studies: a model for national and pan-Arab networking for the development of educational knowledge

The Lebanese Association for Educational Studies (LAES) was founded in 1995 with the aim of developing pedagogical knowledge. The decision to form the association was inspired by three considerations: the quantitative and qualitative decline in the educational knowledge produced by governmental agencies, the fact that the educational knowledge produced in universities remains locked up in these universities, and the fact that the huge shortage of educational knowledge compels officials to take their decisions on the basis of the pressures of the moment and of narrow interests, and not on the basis of acquiring knowledge.

LAES is a non-governmental, non-profit organisation with no representative capacity for employees or specialists in education. It established itself in this manner in order to avoid any dependency on the government, any commercial taint, and any need to act in the manner of a syndicate or lobby, so as to be able to enjoy full and unrestricted academic freedom. Its membership is restricted to university professors endowed with the qualities of the impartial and objective scholar.

It was not long before the LAES developed into a point for contact and exchange among scholars from diverse disciplines, Lebanese institutions that had remained remote from one another for historical reasons, and parallel global cultures (Arabophone, Francophone, and Anglophone). As these diverse elements participated in study circles and joint research projects, prejudices evaporated, minds opened to fresh approaches and diverse perspectives, and the general scope of thought broadened. The added knowledge value from this networking was palpable.

Soon the LAES and its publications became a resource for scholars, researchers, and others, both from Lebanon and abroad, interested in information on the state of education and pedagogy in Lebanon. In addition, the activities of this association began to attract the attention of people engaged in the educational sector. One of the conferences it organised drew around 500 participants, and had it not been for the confines of the venue there could have been more.

"Providing a network" for Lebanese academicians had not been explicitly mentioned in the aims of LAES. However, the phrase "enhancing the educational academic community" was used in order to sum up the association's desire to strengthen the type of scholastic interplay aimed at the advancement of educational knowledge by compiling a body of literature consisting of tests, criteria standards, and analytic and assessment approaches and methodologies to help ensure objectivity and quality in study and research, and applying this literature and making its findings available through publication and conferences. In the process, LAES has become, at the Lebanese national level, a nucleus of the educational academic community.

Another of the association's aims was to "engage with similar organisations in other Arab countries." However, due to the dearth of such organisations, LAES's activities in this regard have been confined to cooperation with a single "similar" organisation, the Kuwaiti Society for the Advancement of Arab Children. The joint activities undertaken in the context of this cooperation included a study circle on "The Reform of General Education in Arab Countries" (papers and discussions appeared in book form in 2005) and a study on *The Psychological Conditions of Children and Youth in Lebanon after the July 2006 War* (2008).

LAES also engaged in academic activities with a broader Arab scope in cooperation with faculties of education, Lebanese-based UNESCO committees, universities, ministries, and individual scholars. Such activities included conferences and workshops all of whose proceedings have been published, an example being the conference on "*Teacher Preparation in the Arab Countries*" (2001). The association also conducted a major study on a topic that is now of the highest priority in higher educational circumstances. Incorporating an extensive survey in 2003 to which 157 Arab universities responded, the results of the study were published in 2005 with the title, *Quality Assurance in Arab Universities*, and distributed widely in the Arab world. Such a large-scale effort could not have succeeded had it not been for the cooperation and support LAES received from the Federation of Arab Universities and the UNESCO bureau in Beirut.

Faced by the poor level of networking on educational knowledge in the Arab region, the sense that education specialists in each country are in the dark about what is happening in their field in other countries, and the near certainty that the lack of networking and the mutual ignorance are detrimental to Arab knowledge production in every Arab country, LAES had another inspiration. This was to create a database on all the books, articles, theses, and studies on education published in Arab countries and to make it available to all on a website, the Arab Educational Information Network (www.shamaanet.org).

LAES hopes that all other scholars, organisations, and institutions that share its belief that networking, information exchange, and the creation of a robust educational academic community form a prerequisite to the development of educational knowledge in Arab states and a fundamental pillar for their educational revival will support its efforts.

(Based on a contribution by 'Adnan al-Amin, General Secretary, LAES)

agents of the reform processes. As these processes did not provide for widespread grassroots participation, the diverse sectors of society could not be brought to embrace the reform aims and hence be mobilised towards the realisation of their aims.[92] Unfortunately, the reform initiatives that were launched in Lebanon and Morocco also proved unsustainable. In these cases, follow-through proved weaker than hoped for, and, as a result, these initiatives failed to fully mature, yielding only partial results, as can be seen in the indicators discussed in this chapter.

Arab educational development drives have, as a rule, remained stuck in the rut of expansion, as opposed to reform, which is why improvement has occurred only in the quantitative indicators. In most cases, educational systems in Arab countries have

remained encumbered by the prevailing educational cultures in these countries. Apart from smatterings of imported literature on desirable systems and preferred practices, modern and innovative ideas on education remain alien to the prevailing cultures. The wheels of educational reform thus become mired down, hampering the achievement of saturation in quantitative goals and obstructing tangible progress towards the realisation of qualitative goals (Naila al-Sellini, Rafi'a Ghubash and Fathi al-Zayyat, background papers for this Report, in Arabic).

CONCLUSION

Educational systems occupy a crucial place in the formation of knowledge capital in modern societies, which have become dependent more on "scientific" knowledge than on inherited "traditional" knowledge for the pursuit of their interests and advancement of their welfare. Experts agree that the ability to understand the way things work and approach them with a minimum degree of intelligence, the ability to manage one's personal, health, financial, and other affairs, and the ability to participate effectively in society, economically, socially, politically, culturally, and environmentally are contingent upon possessing a well-rounded basketful of basic knowledge. This can only be acquired by attending educational institutions for a period of no less than nine or ten years.

While half the Arab countries have attained enrolment rates approaching the saturation point for the present generation of children, the other half continue to lag behind. Simultaneously, available indicators demonstrate that the quantitative inroads achieved remain unaccompanied by corresponding qualitative inroads. The performance of Arab students, from countries that have universalised basic education to countries that are still troubled by elitism at this phase, rarely rivals that of their counterparts elsewhere in the world. In addition, the problem of children out of school remains rampant and severely plagues about a third of the Arab countries, jeopardising their prospects for entering the knowledge society with any degree of confidence in the foreseeable future.

Meanwhile, it is sufficient to note that the formal education of a huge percentage of youth–over 40 per cent in seven Arab countries–does not extend beyond the level of basic education, hampering these countries' ability to engage in the knowledge economy, which requires theoretical and technical knowledge that can be acquired only in educational phases higher than basic education. But even among the numbers that do cross the threshold beyond the basic level, the knowledge capital they acquire may satisfy their personal intellectual propensities while not necessarily coinciding with the requirements a society bent on making the transition to the knowledge economy. This is an economy that is heavily dependent upon specialised sciences, modern technologies, and the information and communications revolution, as well as upon openness to the latest advances in knowledge, sustained and constructive interaction between countries and societies, and intensive networking between individuals and institutions. Yet, while at least some higher education institutions in Arab countries do not prevent some of their most outstanding talents from excelling, Arab societies brim with fine minds and gifted individuals who do not have the opportunities to grow and fulfil their potential. The absence of such opportunities forms an obstacle to generating a critical mass of highly qualified human capital with the power to create, innovate, and renew and the skills and competencies it takes to steer the processes of sustained development that Arab societies so desperately need.

With regard to adults, since the beginning of contemporary modernism in the last quarter of the twentieth century, the education systems in most Arab countries have largely failed to create the cohesive, homogeneous, and highly skilled human knowledge capital needed to form the knowledge society and to participate

The performance of Arab students, from countries that have universalised basic education to countries that are still troubled by elitism at this phase, rarely rivals that of their counterparts elsewhere in the world

Arab societies brim with fine minds and gifted individuals who do not have the opportunities to grow and fulfil their potential

effectively in the knowledge economy. What improvement has been achieved in school life rates between 1970 and 2000 has been sluggish. In addition, with only a few exceptions, female school life expectancy continues to lag behind that of males, albeit in varying degrees from one country to the next. The overall portrait of adult knowledge capital in each Arab country today gives the impression of "a home spread across many houses": some of the younger adults possess a solid knowledge capital, others do not; the older adults, on the whole, are poorer in their knowledge assets than younger ones; female adults, both young and old, have less knowledge capital than males, at levels, moreover, that often plunge to zero or next to zero due to the rampant illiteracy among elder female adults. Clearly, the "lights of knowledge" have not reached all in the Arab region during the last quarter of the twentieth century. Rather they have remained the preserve of an elite–a relatively extensive one in some countries and a considerably narrower one in others.

Clearly, the "lights of knowledge" have not reached all in the Arab region during the last quarter of the twentieth century. Rather they have remained the preserve of an elite – a relatively extensive one in some countries and a considerably narrower one in others

The mediocre situation regarding knowledge capital among adults in most Arab countries and the worrying situation regarding availability of opportunities for the formation of knowledge capital in children and youth in around half the Arab countries may have their roots in the limited financial resources at the disposal of these countries. Yet, painstaking study of the circumstances surrounding knowledge capital formation through education shows that Arab countries, in general, have not been tight-fisted in their spending on education, but rather have been clearly deficient in their attention to the factors conducive to the better quality and efficacy of education. Progress towards this end begins when educators and the general public reach the conviction that it is impossible to form solid knowledge capital without dedicating sufficient time to the instruction and learning processes. Thereafter curricula based on a well-grounded educational philosophy must be designed, as well as a clearly defined vision of the type of citizen that should be formed and the requirements for their formation, inclusive of the properties of the human resources involved in this process. The formative process, in turn, will require promoting among all concerned with the educational process, including learners, a culture conductive to productivity, achievement and quality; a culture of responsibility and accountability, and a culture based on information acquisition and exchange and the taking of decisions based on reliable knowledge.

To compound the grimness of the situation, all major education and training reform projects have failed to accomplish their objectives and overcome the flaws existing in the various structures and institutions of the education systems.

Moreover, a closer look at individual Arab countries reveals their isolation and great variation in terms of performance and on the ground reality, these huge differences being well recorded on all the human development indices. What happens in Morocco, Oman, Libya, or Bahrain in human resources creation has nothing whatsoever to do with what happens in any other country. If some Arab governments are allowed even a glimpse at the experiments undertaken in other Arab countries, it is via international and regional organisations and then they rarely attempt to benefit from these experiments. Equally rare are their attempts to coordinate with each other, even minimally, on the formulation of educational policies and plans. The same applies to the academic communities involved with education in these countries, who have failed–except for rare occasions-to set up networks to promote interaction and the exchange of expertise in spite of the perpetual calls for such action in view of the demands of globalisation, one of the most important components of which is effective networking between individuals and institutions.

The problems that this chapter has brought to the fore in the course of its examination of Arab knowledge capital

reveal the breadth of the gap that continues to separate the state of Arab knowledge capital from the advances in knowledge and the ongoing knowledge revolution elsewhere in today's world. We can sense how wide this gap is when we realise that Arab knowledge capital as shaped at the various phases of the education process still provides evidence that our educational system, in spite of the many efforts dedicated to alleviating its critical condition, is still a long way from serving the society of knowledge, freedom, and development.

The poor quality of education almost across the board in Arab countries and, indeed, the quantitative deficiencies in many of them, reveal that our dream of using education as the avenue to becoming masters of nature and of our fate–the great dream of the Arab Renaissance–remains thwarted. Some of the obstacles have been inherited from the past, but others are rooted in our failure to properly manage our problems in education and turn them to the service of our aspirations for a knowledge society and to realise comprehensive human development.

Before defining the general outlines of a strategy for entering the world of knowledge, we will turn first, in the following chapter, to the current situation and the horizons of information and communications technology in Arab knowledge performance. Not only is ICT intimately connected with education and training, it opens the avenues to the economy, the media, and the various other realms that require information for the construction and operation of their projects.

Some of the obstacles have been inherited from the past, but others are rooted in our failure to properly manage our problems in education and turn them to the service of our aspirations for a knowledge society and to realise comprehensive human development

End Notes

1 "Adult" is defined here as of fifteen years or older.

2 See Statistical Annex, Table 9.

3 See Statistical Annex, Table 10.

4 See Statistical Annex, Table 11.

5 It should be borne in mind that this index takes into account only the three above-mentioned education indicators, namely, the adult literacy rate, secondary enrolment (in its lower and upper stages), and tertiary enrolment. Index values run from zero to ten and show the position of the country relative to all other countries appearing on the index. Thus, the index for the highest 10 per cent of countries falls between nine and ten, the next 10 per cent between eight and nine, and so on.

6 See Statistical Annex, Table 12.

7 A decline in the value of the education index does not necessarily mean a decline in the absolute values for the education indicators entered to create the index. Rather it implies that the relative position of the country in question according to the education indicators has declined, or in other words that it has either indeed witnessed a decline in the indicator in question or that those indicators have risen for that country but to a lesser degree than those of other countries that are jockeying for their place on the scale.

8 See Statistical Annex, Table 13.

9 The Arab region always seems to rank no higher than sixth among the world's regions on the commonly used indicators (see for example Statistical Annex, Tables 14 and 15).

10 It is important to distinguish knowledge-based human and social skills from human and social behaviour influenced by factors connected to individual makeup, such as personal motives, personality traits, and other elements that shape personal identity.

11 Bontis adopted an approach in the regard whose most important applications are to be found among commercial and industrial firms primarily concerned with innovation and which advocate attention to intellectual capital as a leading component of a company's wealth, alongside its material and financial wealth. The intellectual capital of a company consists primarily of its human capital (and the knowledge and know-how it possesses) and its structural capital (the organisational structures, databases, internal processes and external relations). For further information see, in addition to Bontis's writings above, the following works, as well as the Journal of Intellectual Capital and World Bank documents on the subject:

- Edvinsson, Leif, and Malone, Michael (1997). Intellectual Capital: realizing your company's true value by finding its hidden brainpower. Harper Business, New York.
- Stewart, Thomas (1997). Intellectual Capital: the new wealth of organisations. Doubleday/Currency, New York.
- Harris, Louise (2000). "A Theory of Intellectual Capital" in Advances in Developing Human Resources, vol. 2, no. 1, pp.22-37.
- Litschka, Michael, Markom, Andreas and Schunder, Susanne (2005). "Measuring and Analyzing Intellectual Assets: An Integrative Approach" in Journal of Intellectual Capital, vol. 7, no.2, pp. 160-173.

12 There are no precise statistics available for Saudi Arabia on this matter; however, application of the available data allows us to allocate this country a place as given within brackets. We have used the same method to place other countries when the available data permits.

13 See Statistical Annex, Table 16.

14 Lebanon, Iraq, and Saudi Arabia are the exceptions to the general rule regarding compulsory education which is restricted to elementary school. Even this remains unapplied, as is the case with other Arab countries in which compulsory education officially extends to the end of the intermediate level. In the Sultanate of Oman there is no defined duration for compulsory education.

15 See Statistical Annex, Table 17.

16 This indicator refers to the total number of years children of a certain age can expect to spend in formal education from the primary to the tertiary levels, presuming that the overall enrolment rates in a country remain constant over the course of a given year. The upper limit in this indicator is 20 years, or the number of years it generally takes to complete formal education with a PhD. This indicator does not factor in repetition rates (which are generally high in Sudan and in Arab countries influenced by the French system such as Mauritania, Morocco, Algeria, Tunisia, and Lebanon) or the education drives some nations occasionally undertake leading to surges in post-elementary school enrolment rates. However, it remains a valid tool for drawing comparisons between

countries and providing a picture of their relative progress with respect to the general level of education that a given generation of children can obtain, other factors being equal.

17 See Statistical Annex Table 17. Note that Syria, Saudi Arabia and Somalia are not listed due to the lack of statistical data sufficient to calculate this indicator.

18 The blue curve represents the exponential relationship between the two variables, the other line shows the polynomial relationship between them. Palestine and Somalia are not included in this or similar figures due to the lack of available data on per capita GDP in Palestine and the state of education in Somalia.

19 Figures 3-2 through 3-7 were assembled by Ramzi Salama, Report core team member, from data available at the UNESCO Institute for Statistics.

20 Identified as the most prevalent form educational phase in the Arab region, it consists of nine years of primary and intermediate education. Calculations have therefore been made on this basis, even for countries that use a different system, as is the case with the Jordanian system and the new system in Oman.

21 See Statistical Annex, Table 18, which excludes Palestine and Somalia, due to the lack of data, and the Comoros and Djibouti, which are special cases due to the virtual absence of Arabic language instruction in their curricula.

22 It should be borne in mind that a one per cent difference in the amount of time allocated to a subject is equivalent to about 100 class hours in the basic education phase. This is not inconsiderable.

23 See Statistical Annex, Table 19.

24 These countries, in order of their results, were Lebanon, Jordan, Tunisia, Egypt, Bahrain, Palestine, Morocco, Syria, Saudi Arabia, and Yemen.

25 These countries, in order of their results, were Jordan, Bahrain, Palestine, Egypt, Syria, Tunisia, Saudi Arabia, Morocco, Lebanon, and Yemen.

26 Kuwait and Morocco took part in the international study on fourth-grader reading skills, ranking thirty-fifth and thirty-sixth out of the thirty-seven participating countries or regions. Their average scores were very low compared to the overall global average (see the report by the International Association for Educational Achievement, PIRLS, 2003). Jordan, Tunisia, and Qatar participated in the study on maths, science, and reading acquisition conducted by the Organisation for Economic Cooperation and Development . In maths they ranked fifty-second, fifty-fourth, and fifty-sixth respectively out of fifty-seven participating countries; in science they ranked forty-fourth, fifty-fourth, and fifty-sixth out of fifty-seven; and in reading they placed at forty-seventh, fifty-second, and fifty-fourth out of fifty-six participating countries. In all areas, their results were far below the global averages.

27 These countries, in the order of their widely differing results, are Dubai/UAE, Lebanon, Jordan, Tunisia, Bahrain, Syria, Egypt, Algeria, Morocco, Oman, Palestine, Kuwait, Saudi Arabia, and Qatar.

28 These countries, in order of their widely divergent results, are Dubai/UAE, Jordan, Bahrain, Syria, Tunisia, Oman, Kuwait, Lebanon, Egypt, Algeria, Palestine, Saudi Arabia, Morocco, and Qatar.

29 These countries, in order of their widely divergent results, are Dubai/UAE, Algeria, Morocco, Tunisia, Kuwait, Qatar, and Yemen.

30 These countries, in order of their divergent results, are Dubai/UAE, Algeria, Kuwait, Tunisia, Morocco, Qatar, and Yemen.

31 The above tests were conducted in the participating countries with the support of the UNDP regional office for Arab countries. We took the results of the three participating regions of Canada as representative of a single country.

32 See Statistical Annex Table 20. Statistical data is lacking for five countries: Lebanon (which likely belongs to the first category), Djibouti, Iraq, Somalia, and Sudan (which most likely fall into the third category).

33 Given as the ratio of females to males.

34 In addition to Somalia, for which there are no accurate statistics. Statistical data on this point is also lacking for Saudi Arabia.

35 See Statistical Annex, Table 20.

36 See Table 3-2.

37 To these we can add the Comoros, Djibouti, and Somalia, for which we have no precise statistical data.

38 No statistical data are available for Somalia.

39 See Statistical Annex, Table 11.

[40] Accurate statistics are not available for the countries between brackets. However, the congruence of the data justifies their appearance as shown.

[41] As mentioned earlier, our purpose in analysing curricula data from the 1990s, which is to say before some countries introduced curriculum reforms, was to gain insight into how the educational system was preparing those who, today, stand at the threshold of their independent occupational and social careers. Few countries have upgraded their curricula since that time. Morocco and Oman are among those that have, but their reforms in this regard are too recent to judge in terms of efficacy.

[42] The Libyan system requires specialization at a very early age, following the end of basic education. From this point, students are streamed at the secondary level of education into one of six branches, three in the arts and humanities (literature and media, social sciences, and economy) and three in the sciences (basic sciences, engineering, and life sciences). These streams feed into similar specialisations in tertiary education.

[43] This analysis is based on the data on secondary educational tracks available in the World Data on Education data base, published by UNESCO International Bureau of Education, Geneva: http://www.ibe.unesco.org/Countries/WDE/2006/index.html.

[44] For example, among the applicants for the terminal year of general secondary education in Lebanon in 2008, 7.8 per cent applied to arts and humanities, 11.9 per cent to general sciences, 32.9 per cent to life sciences, and 47.4 per cent to social sciences and economy. In this context, it is important to note that the Confederation of British Industry recently (11 August 2008) sounded the alarm that only 7 per cent of British sixteen-year olds opt for a triple science GCSE (secondary school programme) covering physics, chemistry and biology and that such a low rate threatens the future of British industry. See, for example, the following web page (accessed on 22 August 2008): http://www.inthenews.co.uk/news/science/bright-kids-should-study-triple-science-$1235850.htm.

[45] Interested readers may find it useful to examine the philosophy curricula adopted in Morocco and Lebanon.

[46] See Statistical Annex, Table 21.

[47] One can not help but be impressed by the great attention prominent French intellectuals and the French government itself, even at the presidential level, devote to the question of the knowledge that should be taught, in general and at the secondary educational level in particular. The subject is under constant debate, and the concern also manifests itself in the attention accorded to it by periodicals, the numbers of intellectuals and educators who contribute to the discussions, and the relevant web pages and forums on the internet. For further information see:

- Bourdieu, Pierre et Gros, François (1989). "Rapport pour un enseignement de l'avenir." (This report was produced by a special committee formed at the request of the French president with the purpose of delineating "the primary orientations for the gradual transition to educational content needed to keep pace with the evolution of science and society."
- Domenach, Jean-Marie (1989). Ce Qu'il Faut Enseigner: pour un nouvel enseignement général dans le secondaire, Éditions du Seuil, Paris.
- Isambert-Jamati, Viviane (1990). Les Savoirs Scolaires. Enjeux Sociaux des Contenus d'Enseignement et de Leurs Réformes. Éditions Universitaires, Paris.
- Morin, Edgar (1999). Les Sept Savoirs Nécessaires à l'Éducation du Futur. Éditions du Seuil/UNESCO, Paris.
- Sciences Humaines, 2001."Quels Savoirs Enseigner?" , Mensuel No. 121, Novembre 2001. Presses Sorbonne Nouvelle, Paris.

[48] Morin, Edgar (1999). Les Sept Savoirs Nécessaires à l'Éducation du Futur, Editions du Seuil/UNESCO, Paris.

[49] Tunisia has experienced a downturn in interest in the technical stream in recent years.

[50] See Statistic Annex, Table 22. Djibouti has been excluded from this analysis because the total enrolment in secondary and tertiary education during this period is marginal.

[51] By way of comparison, during the same period in Eastern European countries, for example, more than 70 per cent of students followed the technical secondary school track (see Majallat Mustaqbaliyyat, March 2001, in Arabic).

[52] These countries are Egypt, Tunisia, Bahrain, Jordan, Lebanon, Syria, Yemen, Algeria, Morocco, and Sudan.

[53] Available data on some countries indicate an imbalance in the distribution of technical secondary students across the major specialisations, these being business administration and information systems, industry, agriculture, tourism, and health and human services. The imbalance favours business administration and

information systems. The available data includes, for example, that pertaining to the tracks of candidates for the general secondary school entrance exam in Jordan (see the Jordanian Ministry of Education website).

54 See Statistical Annex, Table 23.

55 For example, available statistics on the qualifications of adults in Saudi Arabia indicate that it would take 88,000 more doctoral level graduates, or three times the current number of PhD holders, for this country to rival developed countries in this area. Saudi Arabia compensates for this shortage through imported expertise, among which are more than 16,000 PhD holders and 40,000 MA holders (source: statistics on the Saudi Arabian Ministry of Economy and Planning website: www.mep.gov.sa, on 17 February 2009).

56 For example, in 2004, Algeria's Minister of Higher Education and Scientific Research announced that Algeria needed 24,400 new teachers in order to meet the needs of the country's universities over the next four years (Algeria's Al-Watan newspaper, 16 July 2004).

57 This was the opinion of academic officials from the Lebanese University and private Lebanese universities at the beginning of the 2008-2009 academic year.

58 According to a UNESCO study on higher education in Iraq in 2003, only 28.2 per cent of the country's university teaching staff possessed doctoral degrees. This ratio is extremely low by any standard.

59 Experts agree that a higher education system cannot fulfil its function unless at least 70 per cent of teaching staff have doctoral qualifications (with a sufficient diversity in their disciplines and specialisations). In addition, the staff members must not be so encumbered with teaching responsibilities as to be prevented permanently from engaging in research connected with the subjects they teach, towards which end they should receive all possible support and facilities (library, Internet access, opportunities to take part in conferences, etc.) so that they can remain in close contact with the latest developments in their fields.

60 See Statistical Annex, Table 24.

61 Each country's needs for qualified educators can be estimated accurately on the basis of actual enrolment figures or projected enrolment figures at the various phases of education. However, this requires making certain assumptions with regard to enrolment rates at each level, numbers of students per class, teacher course load, educational support services to be provided by the educational system, and other such variables. Indeed, this is generally the practice in planning processes for human resources for the education sector.

62 See Statistical Annex, Table 25.

63 Libya may be the only exception to this rule. According to the available information from Libyan official sources, there is a surfeit of students enrolled in these disciplines. Higher Education officials in Libya say that about 28 per cent of first year university students enrol in health disciplines, especially human medicine, because this field is open to secondary school graduates who have completed the required tracks that feed into these disciplines. No additional qualifications are required and there are no upper limits to student numbers.

64 See Statistical Annex, Table 24.

65 See Statistical Annex, Table 26.

66 The results listed in this table reflect the performance of 623 students from twelve universities in the following nine Arab states: Lebanon, Syria, Jordan, Palestine, Egypt, Sudan, Yemen, Algeria, and Morocco.

67 We should also note the considerable variation in the performance of students from the relevant university in Egypt, who ranged from the lowest to the highest grades on the scale. This contrasts with the performance of students from one of the universities in Lebanon and the universities concerned in Yemen, Jordan, and Algeria, who were clustered at in the lower grade categories. Only one university in Morocco and another in Lebanon tested above the lower end of the scale.

68 As these tests were held in specific Arab universities, we can not generalise from their results to all universities in these countries or to all states.

69 The results listed in this table reflect the performance of 295 students from seven universities in the following six Arab states: Lebanon, Syria, Sudan, Yemen, Algeria, and Morocco.

70 The term "adult" in this chapter refers to members of society who are aged twenty-five and over, as distinguished from youth (ages 15 to 24) and children (ages 6 to 14). However, because of the lack of detailed statistics on the literacy of adults as defined here, statistics on this issue refer solely to all persons of majority age, which is to say both youth and adults, following the practice of UNESCO.

71 See Statistical Annex, Table 9.

72 The scale cites nine degrees of learning: illiterate, literate, primary level, intermediate level, general secondary

level or the equivalent, post-secondary level lower than the bachelor degree level, the bachelor degree level, the pre-doctorate graduate level, the doctorate level.

73 See Statistical Annex, Table 27.

74 The calculation of primary school enrolment rates was used as a springboard for the calculation of the rest of the rates. It was estimated that half of those not enrolled at this level were illiterate and the other half literate. Then, it was assumed that those not in secondary school five years after this level had completed only the primary level, that those not in higher education after an additional five years had completed secondary school, and that those enrolled in higher education had completed the first university phase. This approach naturally tends to inflate somewhat the actual level of schooling attained.

75 See Statistical Annex, Table 28.

76 http://www.mep.gov.sa, on 17 February 2009.

77 This scale is divided into nine levels of schooling: illiterate, literate, primary level, intermediate level, general secondary level or the equivalent, post-secondary level lower than the bachelor degree level, bachelor degree level, pre-doctorate graduate level, doctorate level.

78 It is useful to observe, here, that the average level of education among imported labor in Saudi Arabia (of whom 86 per cent are male) is 2.58, or between the primary and intermediate levels. If we grant for the sake of argument that the knowledge society requires skills of at least the secondary school level, the imported labor in Saudi Arabia that meets this criteria, if large in numbers (967,380), makes up only 31 per cent of the total (33 per cent of these are male and 21 per cent female). Meanwhile, the overwhelming majority of foreign workers (of whom there are 2,125,554) range from the illiterate and literate levels (12.5 per cent and 29.3 per cent respectively) to the primary and intermediate school levels (12.3 per cent and 14.6 per cent respectively). This majority makes up the uneducated manual labor and semiskilled labor force in the country.

79 Note that this measurement is purely quantitative and has no bearing on the actual quality of the knowledge capital individuals have acquired. The data mentioned earlier in this chapter on the ratios of class time allocated to the various items on the basic and secondary school curricula indicate that the highly idiosyncratic approach to the formation of human resources in Saudi Arabia may not equip these resources to participate effectively in the knowledge economy as it is understood in the context of globalisation.

80 See the second to the last column in Table 28. Note that we used an overall average of 2.5 per cent annual population growth for the entire region. It follows that these results should be considered provisional until the necessary data is available to be able to calculate the actual educational capital for adults in the manner used for Saudi Arabian citizens mentioned in Box 3-7.

81 Note that this approach has led to results very close to the results from the calculation of the actual average educational level attained by adults in Saudi Arabia.

82 The scale consists of six grades, each consisting of 16.66 per cent of the total. Thus the highest grade (from 84 per cent to 100 per cent) is excellent in terms of the ability to participate in the knowledge society. This is equivalent to the level attained by advanced industrialised countries, which is a literacy rate above 95 per cent and an average school life expectancy of no less than 13 out of 18 possible years. The second grade (between 67 per cent and 83 per cent) is good and the third (between 50 per cent and 66 per cent) is the lowest acceptable level. Grades lower than these point to various degrees of inability to participate in the knowledge society.

83 See Statistical Annex, Table 29.

84 The performance of the students from Dubai is an exceptional case that merits closer study. However, it is noteworthy that Dubai citizens account for only about 25 per cent of the total number of students in the emirate's schools, that more than 80 per cent of the total number of students are enrolled in private schools in which 95 per cent of the student body are non-citizens, and that non-citizens make up 40 per cent of students enrolled in government schools. See Dubai Statistics Centre website http://www.dsc.gov.ae/DSC/Pages/Statistics%20Data.aspx?Category_Id=0226 (accessed on 19 January 2009). See also Box 3-8, which features an analysis of the contribution of non-public schools to education in Arab countries.

85 The average performance of Bahraini students in maths and sciences is a remarkable exception to that of students from the other Gulf countries.

86 See Statistical Annex, Table 30.

87 See Box 3-1: "The Aims of Education for All."

88 Apart from Iraq and Saudi Arabia which undertook extensive reforms recently.

89 Finland, for example, whose students perform very well in comparative international scholastic achievement tests, has made it obligatory since 1979 that all candidates for teaching posts in all phases of the education system and for other posts of responsibility in the educational process have at least a Masters degree in education.

90 For instance, a UNESCO report observes that teachers in seven Arab countries on the whole meet national criteria for the qualifications necessary to practice the teaching profession, whereas everyone is perfectly aware that in many of the countries concerned the said qualifications start at a secondary school degree, which by no means can ensure the optimum performance of educational tasks. Moreover, even a Bachelor's degree should not be considered sufficient qualification unless it is linked with a teacher education qualification of a sufficient duration and that meets internationally recognised quality standards.

91 In the simulation, it was assumed that if about 50 per cent of a certain age group enrols in higher education, then 10 per cent of it should join the faculties of education (which train the teachers and other education specialists for the various educational levels). However, given the severe shortages in the Arab countries, as a whole, in this domain, and the ascertainable need of their education systems for highly qualified staff, an even higher proportion of enrolment in this stream of higher education is needed.

92 The quantitative data treated previously indicate that Bahrain and Libya are the only two Arab countries that have managed to attract large numbers from diverse sectors of their populations into employment in the educational system. All other initiatives aimed at qualitative development, such as those set into motion in Qatar, Oman, and the UAE, have yet to bear fruit.

CHAPTER FOUR
INFORMATION AND COMMUNICATIONS TECHNOLOGIES IN THE ARAB COUNTRIES: THE PILLARS AND TOOLS OF KNOWLEDGE

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INFORMATION AND COMMUNICATIONS TECHNOLOGIES IN THE ARAB COUNTRIES: THE PILLARS AND TOOLS OF KNOWLEDGE

Introduction

Over recent decades, unprecedented global advancement has occurred in the production, exchange, and processing of information, as well as its analysis and use. The impact of this advance may exceed that brought about by the Industrial Revolution, since the infrastructures of information and communications technologies (ICTs), their equipment and their software, have come to play the role of society's nervous system. ICTs are valuable tools for the circulation and adaptation of knowledge, as well as being among the forms of human knowledge that are the most dynamic, have the most far-reaching effects, and are the most embedded in the fabric of modern life. They present many opportunities and challenges and mandate the formulation of specific strategies. In addition, they demand the dedication of human and material resources at the national level and the improvement of mechanisms for cooperation at the Arab, regional, and international levels to ensure ideal diffusion and utilisation.

Information technology (ICT) represents one of the main pillars for the establishment of a knowledge society. It represents the key means to deploy and circulate knowledge, in addition to its role in developing, supporting, facilitating, and speeding up scientific and cultural research of the widest possible scope.

The Arab countries have made noteworthy progress in most of the pivotal aspects of ICT and in particular in infrastructures, where investment is ongoing. In 2008, they recorded levels of development in technological performance exceeding those observed in all other regions of the world.[1] Four Arab countries have been listed among the top fifty most ready to utilise ICT, all of them Gulf Cooperation Council (GCC) countries (the UAE, Qatar, Bahrain, and Kuwait, occupying twenty-eighth, thirty-seventh, thirty-ninth, and fiftieth ranks respectively) (World Economic Forum, 2008b).

However, scrutiny of the Arab knowledge landscape reveals that the digital gap remains and is acute. Investigation of Arabic digital content, which is a guide to the utilisation and production of knowledge in Arabic, demonstrates that the Arab countries and their societies fall short according to most criteria (UNESCWA, 2008). As long as steps are not taken on various levels in the domain of technology policy and legislation, and as long as many issues related to Arabic language usage on the net are not settled, the state of Arabic knowledge content will never pass an extremely low threshold but will continue to draw upon other, random sources for content and seek succour from past tradition, both good and bad.

Performance also varies from one Arab state to another. The disparity that we witness today in the Arab countries' utilisation of new technologies and in the use and production of Arabic digital content also affects sections of society within each one. This promises further fragmentation and extremism until such time these countries lay the basis for equal access to technology and its potential.

No Arab countries will be able to emerge from the current embryonic stage in dealing with technology and contributing to its development unless they open themselves up to those parties that, to the extent possible to them, are active and relevant. Similarly, they must orient themselves to the indigenisation, adaptation, and reformulation of the production of technological knowledge, thus enabling more enlightened and creative utilisation of the available tools of

The impact of the advances in information production, exchange, and processing may exceed that brought about by the Industrial Revolution

The Arab countries have made noteworthy progress in most of the pivotal aspects of ICT. In 2008, they recorded levels of development in technological performance exceeding those observed in all other regions of the world

technology. There is of course a major role for the government and private sectors and for the organisations of civil society in reaching this goal. Yet the roles of all these will remain limited without a deeper understanding of the crisis of knowledge content–digital or otherwise–within Arab societies.

While necessary material costs may affect opportunities and limit them to particular groups, successive ICT revolutions and ongoing cost reductions will power the diffusion of knowledge among wide sections of society, provided that such advances in technology are accompanied by accelerated production of content and its utilisation in new applications. This, however, will require improved utilisation of time and better deployment of resources if the knowledge gap and the wealth gap that divide the world's peoples and the social groups within a single society are not to become more pronounced.

Over the last ten years the Arab countries have started to lay down ICT infrastructures. All indicators reflect noticeable disparity in their attempt to access these technologies

ICT IN THE ARAB COUNTRIES

Over the last ten years the Arab countries have started to lay down ICT infrastructures. All indicators reflect noticeable disparity in the Arab countries' performance in their attempt to access these technologies.

The World Bank's ICT index, which is based on progress in acquisition of telephone lines, computers, and the internet,[2] is the most evolved knowledge economy index indicator for eleven Arab countries. This index shows that six of these countries are substantially ready to adopt the knowledge economy. Only one Arab state—Jordan—scores lower on the ICT index than on any of the other knowledge economy indices. For comparison, for four countries it is the economic incentives and institutional regime index or the innovation system index that holds this position, while for eight it is the education and human resources index that does so.

Some Arab countries that enjoy high GNPs occupy a high position on the ICT index. However, this position remains lower than that of other countries in the world that enjoy comparable GNPs

Eleven Arab countries witnessed a rise in their score on the ICT index in comparison with 1995. In the case of Sudan, this score rose from 1.2 in 1995 to 3.8 in 2008, one the highest growth rates in the Arab region. With respect to the six countries that witnessed a decline in their scores, and with the exception of Djibouti where the score fell by 1.7, the decline did not exceed 0.3.[3]

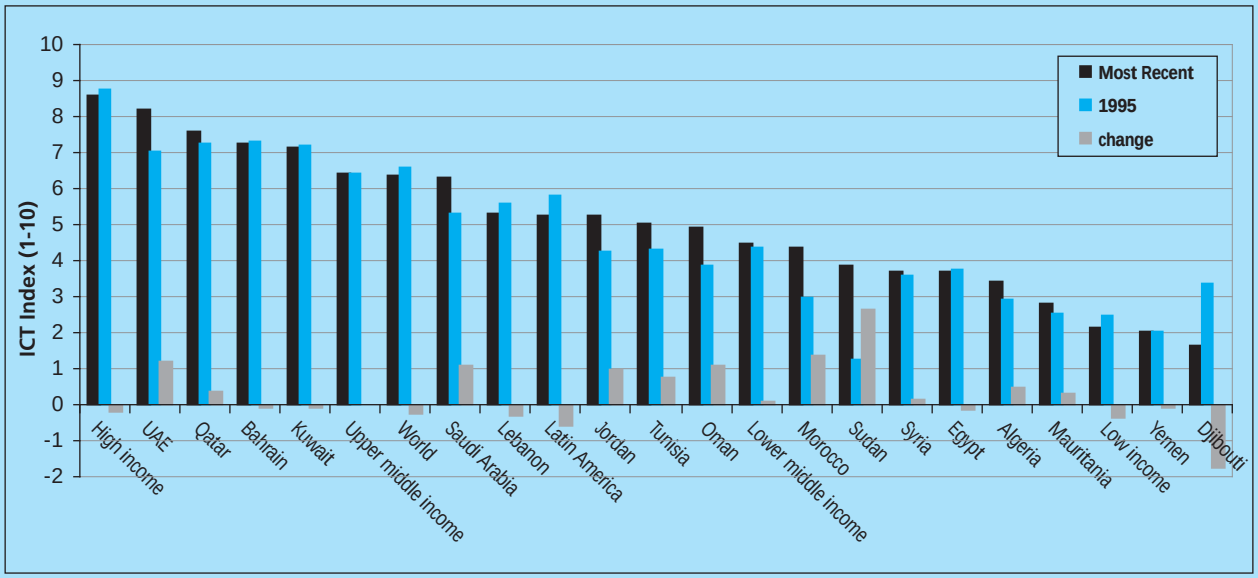
As Figure 4-1, and Table (a-1) in the Statistical Annex (ICT), indicate, some Arab countries that enjoy high GNPs thanks to their natural wealth occupy a high position on the ICT index. However, this position remains lower than that of other countries in the world that enjoy comparable GNPs. On the basis of international indicators in the area of ICT infrastructure, there are some grounds for optimism and hope in terms of the acquisition of a range of ICTs in the future. The following paragraphs present a picture of the advancement achieved in the distribution of computers and access to the internet–an advancement considered to have a tangible effect on the production and diffusion of knowledge. On the other hand, the spread of fixed and mobile telephones is deemed to be less of an indication of, and to have lesser impact on, the production and diffusion of knowledge (see Part B of the Statistical Annex/ICT). Much of this is attributable to the fact that the telephone networks available to most citizens of the Arab countries are of traditional forms and do not enable access to digital content or the utilisation of modern communications technologies. Certain further obstacles may hinder the utilisation of such technologies even when they are present.[4] Part C of the Statistical Annex/ICT presents a comparative categorisation of the Arab countries according to a number of indicators that reflect ICT plans and initiatives under implementation.

THE SPREAD OF COMPUTERS AND THE INTERNET

The emergence and spread of the personal computer in the second half of the 1980s laid the foundations for major transformations in the relationship between technology and its users with regard to

FIGURE 4-1

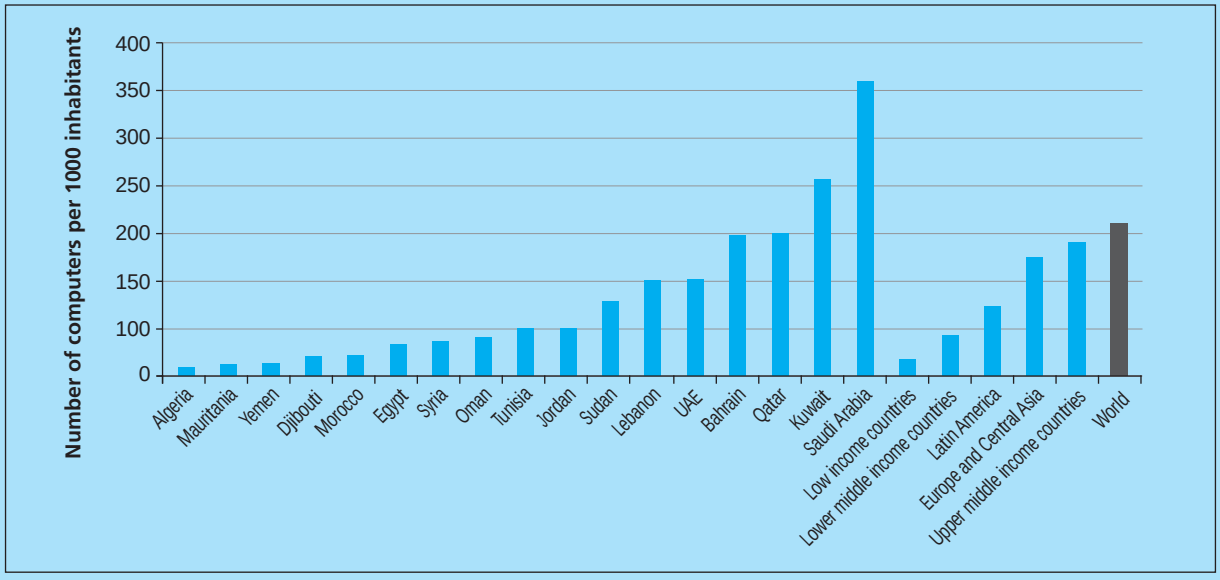
ICT index values for Arab countries and selected groups of non-Arab countries (1995, most recent statistics with + and – change values)



Source: World Bank database, Knowledge Assesssment Methodology (KAM), http://info.worldbank.org/etools/kam2/KAM_page5.asp on 13 February 2009.

FIGURE 4-2

Number of computers per 1,000 inhabitants, Arab region, and selected groups of non-Arab countries



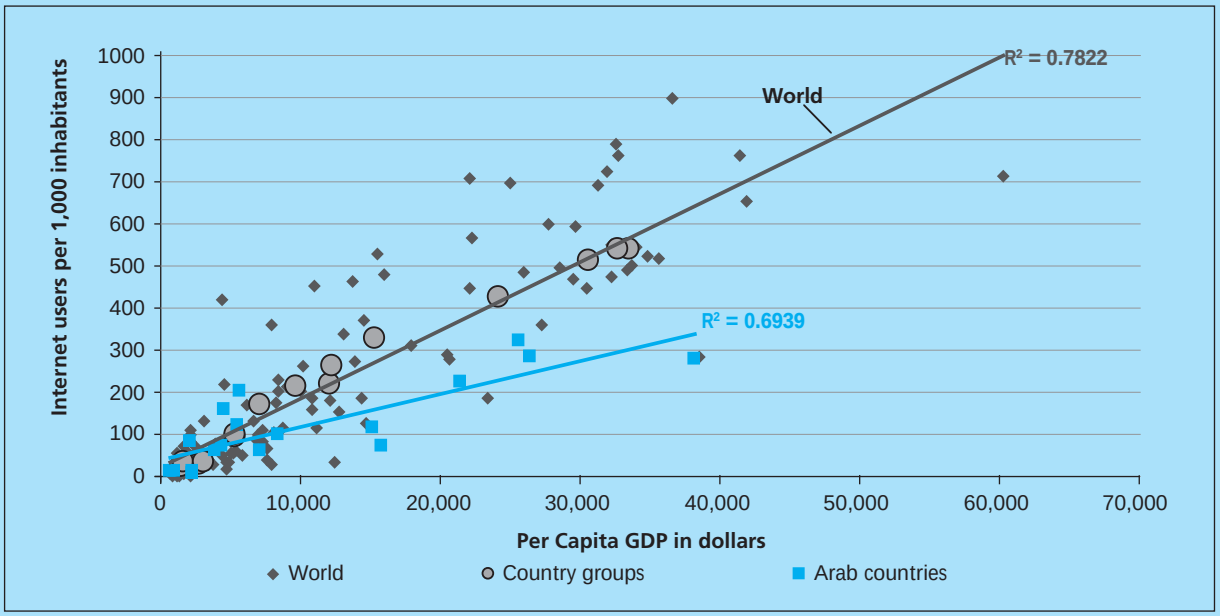
Source: World Bank database, Knowledge Assesssment Methodology (KAM), http://info.worldbank.org/etools/kam2/KAM_page5.asp

access to information and knowledge resources stored in various media. Figure 4-2 makes clear that in most of the Arab countries the number of computers per person is less than the global average. With the exception of Saudi Arabia and Kuwait, the average number of computers per 1000 inhabitants in all Arab countries falls below the world average, approaching it in Bahrain and Qatar, but falling perceptibly below it in Lebanon, Sudan, Jordan, Tunisia, and Oman. In the other Arab countries

In most of the Arab countries the number of computers per person is less than the global average

FIGURE 4-3

Internet users - Arab world, world, and selected non-Arab country groups by per capita GDP



Source: World Bank database, Knowledge Assesssment Methodology (KAM), http://info.worldbank.org/etools/kam2/KAM_page5.asp

In the Arab world as a whole, internet usage has noticeably proliferated in the last five years

(Syria, Egypt, Morocco, Djibouti, Yemen, Mauritania, and Algeria) it is substantially lower than the world average.

In the Arab world as a whole, internet usage has noticeably proliferated in the last five years. However, rates of internet use in most of these countries are still less than the prevailing global rates of twenty-one per cent of the population. With the exception of four Arab countries–Bahrain, Kuwait, Qatar, and the UAE–rates of internet usage in the Arab region are lower than the world average. The population of a number of Arab countries–among them Egypt and Algeria, which together represent one third of the total population of the Arab region–uses the internet at rates lower than those prevailing in lower middle income countries.

The proliferation of personal computers in Arab countries, as in others, is dependent on the costs of obtaining them–which continue to go down–and on the dissemination of the skills necessary to use them among groups of users– which continue to grow. Some Arab countries have participated in programmes that aim to make low-cost computers available. Available information indicates how important it is to expand such programmes and encourage cooperation between concerned international parties–manufacturers and international organisations–and concerned public and private sector parties in the Arab World, with the goal of arriving at designs better fitted to local requirements. Computer assembly workshops have spread in some Arab countries and personal computers are available on the local market at lower cost than imported models. Given that a local assembly industry permits a broader diffusion of computer technology, it is worthwhile for relevant government bodies to offer it support, to set regional quality standards for computer production to safeguard the interests of consumers, and gradually to raise the level of production so that the industry can respond in an on-going fashion to technological development.

Figure 4-3 shows clearly how the number of internet users grows hand in hand with per capita GDP in the world's

countries and the Arab countries. The circles show the world average and average rates of internet use for some regional groupings based on income and according to their position on the scale of the Human Development Index (HDI). This figure suggests that the increase in average per capita income in the Arab region may not have stimulated internet use to the extent that comparable increases in average per capita income have done globally. This must be due to the extent to which digital content in Arabic meets the requirements of the Arab countries' citizens and institutions. It is also worth pointing out here the low level of internet use by businesses in the Arab countries and the small number of schools able to access the net. Despite some of these countries being in the top third of countries in the world with respect to a number of ICT indicators–such as mobile phone penetration, numbers of computers, and costs of internet access–the Arab country with the highest levels of internet use places only thirty-eighth with respect to internet use by businesses (see Statistical Annex/ICT).

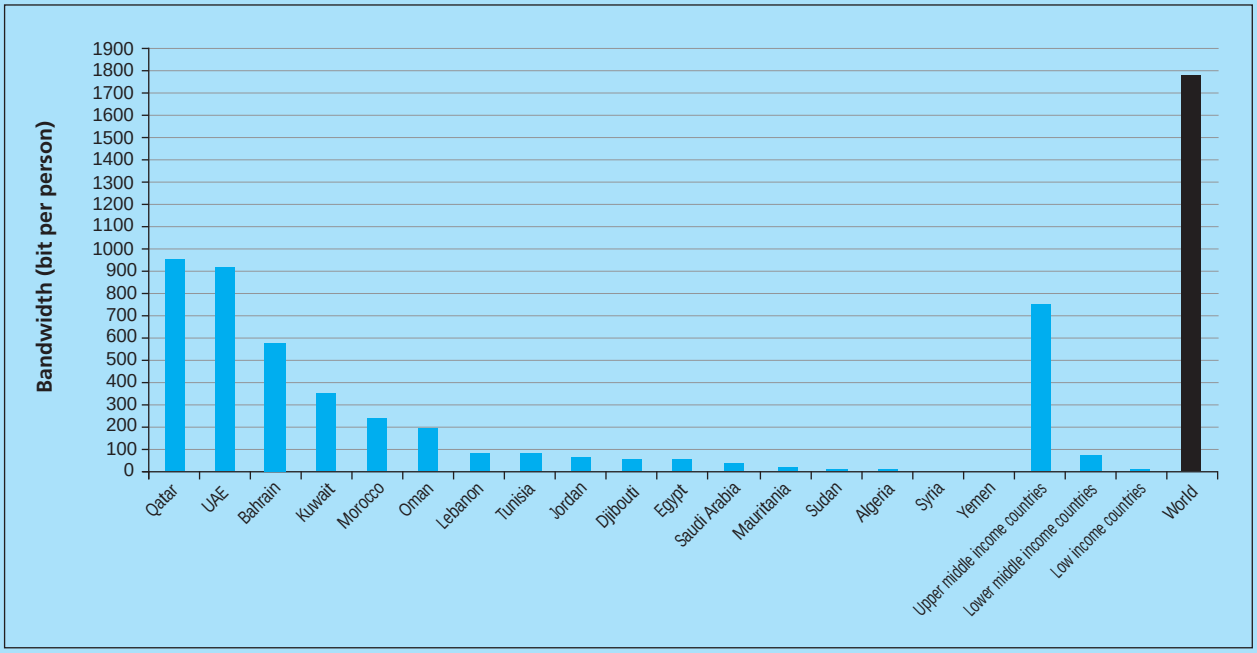
Figure 4-4 shows the existence of a double divide in internet bandwidth[5] between the Arab countries on the one hand and between them and higher middle income countries on the other. In general, communications networks capable of accessing internet services in Arab countries are still of low specification. For example, internet users in a number of advanced countries like the US, Canada, the UK, Singapore, and Japan can access internet services at speeds that reach or exceed one billion kilobits (kb) per second. By comparison, in most Arab countries the connection speeds of the networks in use range from 128kb to 1024kb per second.

The cost of internet access influences the nature of internet use, especially in light of the rise in cost of basic commodities and the fall in real income. Figure 4-5 depicts the cost of internet access in the Arab countries for which data is available as well as the world average and that of some groups

Some Arab countries are in the top third of countries in the world with respect to a number of ICT indicators, but the Arab country with the highest levels of internet use ranks only thirty-eighth with respect to internet use by businesses

FIGURE 4-4

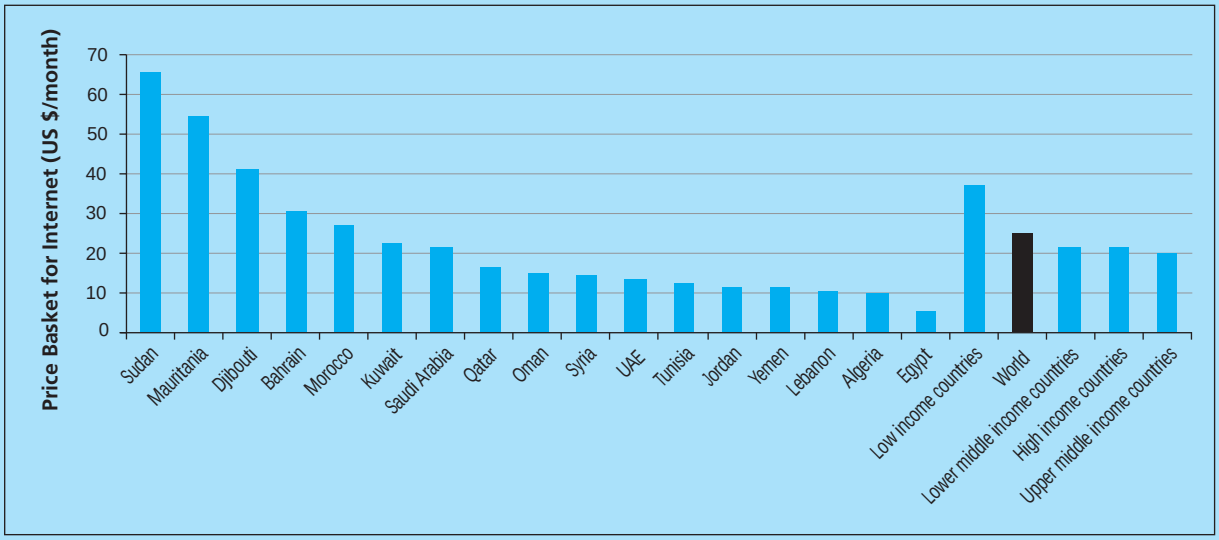
Bandwidth of global internet access for the Arab world and selected non-Arab country groups



Source: World Bank database, Knowledge Assessment Methodology (KAM), http://info.worldbank.org/etools/kam2/KAM_page5.asp

FIGURE 4-5

Price basket for internet (in US dollars per month) in some Arab countries, worldwide, and in selected non-Arab groups of countries by income



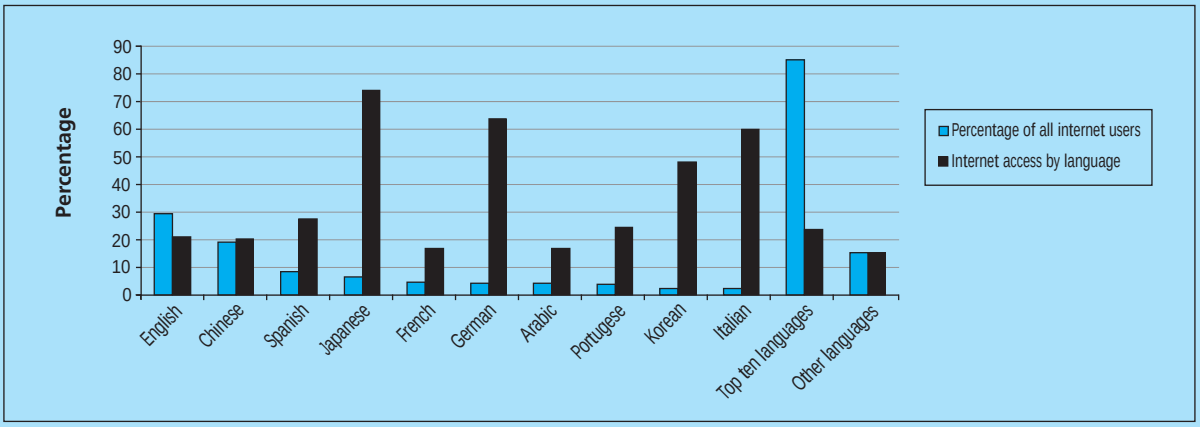
Source: World Bank database, Knowledge Assessment Methodology (KAM), http://info.worldbank.org/etools/kam2/KAM_page5.asp

Internet access costs in Egypt are lower than in any other Arab country, and lower even than those prevailing in the advanced nations

of countries for comparison. It shows that the cost of internet access in most Arab countries is lower than the average value for all the world's countries. Only three Arab countries–Sudan, Mauritania, and Djibouti–have a noticeably higher cost than the world average, and these are countries that have only made modest progress, even with respect to the other Arab countries, in obtaining ICTs. Internet access costs in Egypt are lower than in any other Arab country, and lower even than those prevailing in the advanced nations. Another matter worthy of attention is the drop in internet access costs in Yemen in comparison with its peers in the low income group of nations. The cost of access in ten Arab countries is much less than the average cost among the higher middle income nations. In six

FIGURE 4-6

Language access to internet and ratio of speakers to total internet users



Source: Internet World Stats website in January 2009.

Arab countries–Egypt, Algeria, Lebanon, Yemen, Jordan, and Tunisia–this cost is less than half the world average.

The fall in the price of internet access, particularly in high population countries such as Egypt, indicates policies that encourage internet use. However, it is necessary to go further than these policies in confronting the difficulties which broad swathes of Arab society undoubtedly face in utilising technology applications. This means giving attention to developing Arabic content and acquiring technology able to process it. It is also necessary to adopt creative approaches that make interaction with computers and the net easier for the illiterate and those lacking computer skills using touch-sensitive screens and user-friendly software.[6]

On a reading of the data presented in the preceding paragraphs (Figure 4-1's presentation of the ICT index from the World Bank database and the data indicating an expansion in internet use in some Arab countries), we find some improvement in the indigenisation of knowledge tools and technologies. However, the data neither put these matters in context, nor reveal their actual contribution to the productive employment of these technologies.

THE ARABIC LANGUAGE AND THE INTERNET

The number of those using the internet in Arabic approached 60 million at the beginning of 2008. That is, the access of Arabic speakers to the internet is close to 17 per cent of the population of the Arab countries.[7] This proportion falls below the world average which is close to 22 per cent. Arabic also has one of the lowest penetration rates among the top-ten group of world languages on the net. While it is close to the internet penetration rate of Chinese speakers, the number of Chinese web pages tips the balance in favour of the latter language. As for Arabic language penetration in comparison with Hebrew, the latter comes out on top with almost 66 per cent penetration, placing it in the ranks of the languages of advanced nations such as Japan (73.8 per cent) and Germany (63.5 per cent).

The number of Arabic speakers using the net is close to 4.1 per cent of all internet users globally. In terms of global internet use, this puts Arabic in seventh place among the world's top ten languages, and is close to the Arab countries' proportion of the world's population (see Figure 4-6).

Table 4-1 gives a picture of the place of Arabic among the world's top ten languages in terms of numbers of speakers, its rate of growth on the internet between 2000

Arabic has one of the lowest penetration rates among the top-ten group of world languages on the net

TABLE 4-1

Top ten languages used on the net (number of internet users by language)

Top ten languages	World population for this language 2007 (millions)	Growth of this language on the net 2000-2008 (%)	Internet penetration by language (%)	Internet users by language (millions)	Internet users as a percentage of world users (%)
English	2039	203.5	21.1	430.8	29.4
Chinese	1365	755.1	20.2	276.2	18.9
Spanish	452	405.3	27.6	124.7	8.5
Japanese	127	99.7	73.8	94	6.4
French	410	458.7	16.6	68.1	4.7
German	96	121.0	63.5	61.2	4.2
Arabic	357	2063.7	16.8	59.9	4.1
Portuguese	240	668.0	24.3	58.2	4.0
Korean	73	82.9	47.9	34.8	2.4
Italian	58	162.9	59.7	34.7	2.4
Top ten languages	5218	278.3	23.8	1242.7	84.9
Other languages	1458	580.4	15.2	221.0	15.1
Total	6676	305.5	21.9	1463.6	100.0

Notes:
1) These statistics were updated in June 2008.
2) Internet penetration is the ratio between the total of internet users speaking a language and the estimated total population speaking that language.
3) Data derived from publications of the International Telecommunications Union, the Computer Industry Almanac, Nielsen Net Ratings, and other reliable sources.
4) World population information comes from the U.S. Census Bureau.
For definitions and help in obtaining details on a number of languages see the website of Site Surfing Guide

Example for data interpretation: there are around 125 million Spanish-speaking users of the internet and this number represents close to 9 per cent of world internet use. Of all those who speak Spanish (some 452 million people), 27.6 per cent use the internet. During the period 2001-2007, the number of Spanish speakers using the internet increased by 405 per cent.

Source: Website of Internet World Stats in January 2009

The growth rate in Arabic-speaking internet users (2064 per cent in the period 2000-2008) is the highest among the top ten languages on the net

and 2008, and the number of internet users who speak the language and their proportion of total internet users. The fact that the growth rate in Arabic-speaking internet users (2064 per cent in the period 2000-2008) is the highest among the top ten languages on the net is one of the positive trends displayed in the table. In comparison with the other languages, the growth rate for Arabic speakers is many times more than that for Chinese (755 per cent) over the same period (see Figure 4-7). This acceleration in internet use promises greater possibilities for success in promoting applications of technology in various fields. This should contribute to a revival in Arabic knowledge performance in general.

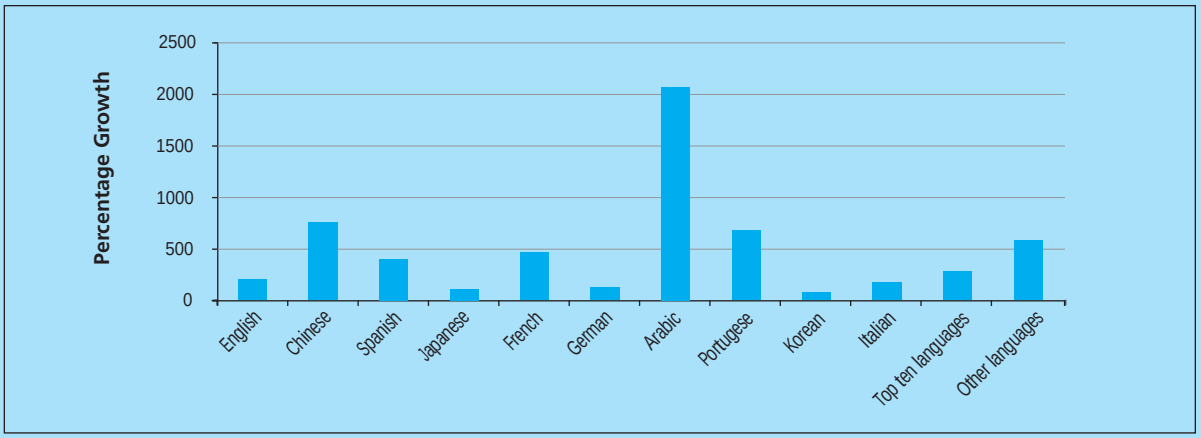
Arabic digital content is restricted to limited areas, most of which are disconnected from the reality and needs of Arab societies

Despite Arabic's accelerating growth on the internet over the last few years, its presence on the net remains below expected level in terms of the number of its speakers. The efforts expended in creating Arabic digital content are also restricted to limited areas, most of which are disconnected from the reality and needs of Arab societies and fail to enrich knowledge related to social or economic development. Certainly, the domination of some subjects and meagre treatment of others directly related to pressing developmental issues and current cultural affairs is out of keeping with the challenges of a highly competitive world; in such a world, marginalisation is the fate of cultures that fail to reproduce themselves adequately through the creation of knowledge and devise new forms for its utilisation. If Arabic digital content is to be upgraded, national and regional policies aimed at enabling creative intercommunication and interaction with the world and contributing to it in a critical spirit that affirms the Arab region's capacity to assimilate, indigenise, and cultivate and, indeed, create knowledge are called for.

While the proportion of Arabic-speaking users of the internet is not much less than the average of its global use, available data do not permit distinctions between kinds of internet use. Detailed studies must be undertaken to reveal the ways in which Arabic speakers use the internet in comparison with others. In preparation for the launching of initiatives aimed at developing Arabic digital content, studies of the content of sites visited would also be useful to reach an understanding of the kinds of digital content that have the biggest circulation among Arabic-speaking user sectors. Some recent statistics[8] reveal a total number of Arabic-only web pages of approximately forty million out of forty billion pages, or one thousandth of the total. This proportion clearly shows the low volume

FIGURE 4-7

Growth of languages on the internet 2000-2008



Source: Internet World Stats website in January 2009.

of Arabic content and its low rate of creation relative to other countries and languages.

On the other hand, the statistics indicate that the picture has begun to change, albeit extremely slowly. Although Arabic content on the net remains stable, the number of Arabic sites and pages has grown markedly larger. The number of web pages containing content in Arabic–including those written in both Arabic and English–has risen from 114 million pages in 2005 to 189 million pages in 2006, an increase of 65.8 per cent. The corresponding increase in the number of English language pages is 63 per cent. The number of Arabic language pages is expected to reach 5.1 billion in 2012, on the basis of a rise to 80 per cent growth in the years to 2010 and 60 per cent growth subsequently.

It is no exaggeration to say that the future of Arabic depends on the extent of its use on global information networks. This will require great effort on the technical level to obtain all the necessary capabilities to deal with the language itself. Ambitious targets on the national level are also called for so that institutions in the Arab countries–government ministries, universities, schools, civil society organisations–use Arabic in their operations. In this way, Arabic will become a language for the circulation and production of the various branches of knowledge, as it was during the flowering of Arab-Islamic civilisation. ('Abd al-'Aziz bin 'Uthman al-Tuwayjiri, 2008, in Arabic).

Internet use and the spread of Arabic on the net present interrelated opportunities and challenges that call for unconventional approaches to broaden its user base and raise its status (see Chapter 1). Favourable policies and initiatives must be adopted; regional and international partnerships must be entered into. Digital content related to the Arab countries should also be produced and distributed in foreign languages.[9] As the following paragraphs in the section on Arabic digital content make clear, creating advanced search engines, automatic translation systems, smart processing of scripts, semantic searching, and the deployment of interactive websites to facilitate learning are among the tools needed to ensure the spread of a language on the net.

ANTICIPATED ADVANCES IN ICT

The number of web pages containing content in Arabic has risen from 114 million pages in 2005 to 189 million pages in 2006, an increase of 65.8 per cent

Over the last few years key technologies have converged so as to secure on a single platform kinds of services–such as internet access, video and audio telephony, and radio and television broadcasting–that were previously only available separately. In the last two decades great progress has been made in providing plentiful and up to date information on the internet and via the search engines operating on it. It is now possible, by networking computers in educational institutions and research institutes across the globe, to run software that requires the supercomputing capabilities used in models and simulations of physical and natural processes.

Microprocessor evolution is expected to continue in the short term on the basis of many current technologies that are all subject to incremental improvements aimed at limited performance upgrade. This development will help to increase the power of personal computers and lessen their cost.[10] This implies the continued dominance of the personal computer in accessing knowledge resources. Use of multi-core processors will allow high performance computing without a marked increase in energy consumption. Current processor design tends towards simplification of the internal structure through use of multiple cores and parallel programming. Utilisation of the gains made by microprocessor development requires new solutions for memory access, cross-core communication, and greater reliability.

It is no exaggeration to say that the future of Arabic depends on the extent of its use on global information networks

The term "next generation networks" describes all the anticipated key technologies in the backbone and access networks expected to come into general use during the next five years. These will

During the coming decade the technology of the semantic web, which aims to make the web machine readable and enable computers to "understand and absorb" data prior to processing it, is expected to become more elaborated

The acquisition of the semantic web technology should be a priority for Arab research and development programmes that aim toward a more intelligent and coordinated utilisation of forthcoming ICTs with regard to Arabic digital content

permit the transmission of various kinds of data packet, as is the case currently for the internet. Since these networks are built on top of internet protocols, this will facilitate communication between different kinds of network and allow users to get access to different kinds of content via any means–computer, mobile telephone, and similar devices–and at any time, irrespective of the quantity of data over the range of the different varieties of digital content.

Next generation networks will permit the securing of new services such as communication via multimedia, including instant messaging, video-calls, and video transfer on the net. Next generation networks also possess features superior to those of their predecessors in terms of information security and the use of more flexible and extensive data storage and computing structures on the network. Other features of the next generation networks are ease in securing services that conform to user requirements and behaviours and ease in searching and accessing knowledge content.

In many concerned institutions, research and development activity is tending towards the production of more effective versions of search engines, which currently often return unwanted results to the user. This will enhance internet performance in general for all its users and will enable, in particular, the expected search engines to gain a better "understanding" of the content of web pages and sites. Searching the web will focus on content, structure, and user ends. To a great extent this will be achieved by relying on marking up pages with semantic tags related to the content. During the coming decade the technology of the semantic web,[11] which aims to make the web machine readable and enable computers to "understand and absorb" data prior to processing it, is expected to become more elaborated. This should make the acquisition of such technology a priority for Arab research and development programmes that aim toward a more intelligent and coordinated utilisation of forthcoming ICTs with regard to Arabic digital content (Nawwar al-'Awwa, background paper for the Report, in Arabic).[12]

On the software level, the trend for collaborative software development outside the monopoly imposed by major companies is expected to continue. Freeware, or open source software, is anticipated to present a serious challenge to proprietary commercial products in terms of cost, speed of evolution, and reliability.

Expected advancement in networks, infrastructures, and software over the next few years will lead to the availability of a wider group of ICT applications, such as e-commerce, on the internet and to improved conditions for cooperation in various arenas including engineering design, distributed industrial manufacturing processes, and networked research and development activity. The most prominent example of the benefits that will accrue to users of next generation networks will be apparent in easier and more effective access to distance learning and continuing education services, with the possibility of tailoring educational programmes to suit the learner's requirements and previous qualifications. These services will come to rely to a greater extent on virtual reality applications and artificial intelligence software. Ideal utilisation of the coming technologies, particularly next generation network technologies, requires development of the communications infrastructure towards a unified format for the transmission of data in its various forms together.[13] Once this is done, it will be possible to offer such services at lower cost and in broader scope, which will generate the revenues and opportunities to develop these services and offer more of them, and in the long run achieve numerous economic and social gains. However, this is subject to the provision of favourable policies that permit competition in introducing the new technologies and that channel this competition in the interests of the consumer. Regional and international cooperation aimed at the

exchange of future technology services or at partnership in providing them will help to add value due to the migration to next generation networks and services. These, in turn, will realise comprehensive economic and social benefits that will extend in a cycle affecting all functions and sectors of society. In order to reach this goal, it is necessary to support research activity aimed at developing applications dedicated to spreading Arabic language use on the network. Coordination between Arab countries and benefiting from the lessons of countries and institutions that have made earlier progress in utilising and developing modern technologies is called for.

Advancement in the development and deployment of technologies that ensure improved confidentiality of data transmission is expected to continue. However, such an advance will not be enough to limit the practices of certain countries and institutions in exploiting their technological superiority to eavesdrop and breach data confidentiality and privacy.

The future of ICT presents valuable opportunities to deploy innovative means to acquire, produce, and distribute knowledge which will enrich Arab knowledge accumulation. It is expected that the cost of internet access in peripheral regions will continue to fall. The convergence of ICT and the media will also accelerate with the deployment of broadband network infrastructure. This will expand the opportunities and options available to citizens to obtain media, education, and health services and to communicate with their governments and with local and external markets. In addition, the business sector will be energised, and marginalised rural and urban groups will be developed. Nevertheless, this increase in opportunity is dependent on to the application of clear policies that make the massive investment required by communications technology compatible with guarantees of the social right of all citizen groups to benefit, as well as support for the participation of women and guarantees of freedom of expression.

TECHNOLOGY APPLICATIONS AND ARABIC DIGITAL CONTENT

REGULATORY FRAMEWORKS

Since the end of the last decade, most Arab countries have begun to institutionalise ICT through policy formulation, infrastructure, institution building, and the enactment of laws and regulations related to the utilisation of these technologies. Egypt, Tunisia, Jordan, and the UAE are considered the pioneers in these endeavours. Egypt created a ministry for communication and information technology in 1999. It laid the foundations for a national plan aimed at setting the bases for the information society in Egypt through coordination between the pertinent government agencies and in partnership with private sector institutions. Tunisia made marked efforts in the second half of the last decade aimed at developing and expanding the communications infrastructure and human capacity, and at creating databases to improve, in particular, the performance of government institutions. An initiative embracing ICT was launched in Jordan in 2000 to boost ICT exports and attract direct foreign investment. The UAE stands out among its Arab peers in the implementation of numerous activities that have come to fruition in an impressively short time. It therefore occupies advanced positions in world rankings, and the top spot among Arab countries according to many ICT indicators.

The Arab countries have finalised policies, strategies, and action plans concerning ICT and its utilisation in accordance with the decisions of the Summits on the Information Society of 2003 and 2005 and the working plan deriving from them. Initiatives have been taken that seek to make the information

Since the end of the last decade, most Arab countries have begun to institutionalise ICT through policy formulation, infrastructure, institution building, and the enactment of laws and regulations related to the utilisation of these technologies

The UAE has come to occupy advanced positions in world rankings and the top spot among Arab countries according to many ICT indicators

society a reality and lay the ground for the development of national capacity to utilise ICT in numerous fields. Organisations have been founded charged with formulating national strategies and programmes for the utilisation of ICT applications, particularly in the areas of government services, business, and education.

Apart from a few isolated bright spots, however, strategic planning for the ICT sector by Arab countries and creation of the legal framework needed to regulate its utilisation has taken place relatively slowly, as this chapter makes plain. A second look at these strategies and laws is obviously called for. This is not only due to the speed of development of these technologies, but because these strategies and laws have ignored, or not used the necessary care when dealing with, a number of key issues without which it is not possible to make ideal use of technology applications. Strategic decisions taken in many Arab countries have given the greatest share of attention to infrastructure issues and legislation and have not given equivalent attention to issues related to applications, digital content, and development of the use of the Arabic language on the net.

Strategic decisions taken in many Arab countries have given the greatest share of attention to infrastructure issues and legislation and have not given equivalent attention to issues related to applications, digital content, and development of the use of the Arabic language on the net

THE ICT SECTOR IN THE ARAB COUNTRIES

The technology sector in the Arab countries has witnessed considerable growth, the telecommunications branch providing the lion's share. The liberalisation of the telecoms sector has resulted in the emergence of large companies, some of which have become active in the regional Arab and international arenas. However, the contribution of these companies in most Arab countries to knowledge production remains weak, even in terms of the content related to their operations. There is some evidence indicating a trend for some companies in this sector to offer grants directed at economic and social development. Once the foundations, institutions, and supporting legislation are in place, this sector will help to produce digital content, especially that related to their own marketing, as is done by similar companies elsewhere. It is noticeable that most Arab countries have created institutions to incubate, direct, and disseminate ICT. What they offer, however, is in its early stages. The existence of sponsoring institutions is reckoned a necessity if the successful utilisation and expansion of usage levels of technology is to be guaranteed, provided this is accompanied by legislation and practices that grant extensive freedom of use of these technologies.

Securing low cost computers is considered one of the essential conditions for the broadest possible dissemination of technology and access to information and knowledge sources

HARDWARE PRODUCTION OR ASSEMBLY

Activities connected with ICT are limited to the production or assembly of hardware for personal computers and other ICT related devices on the one hand, and software production on the other. Some Arab countries–Egypt and Saudi Arabia in particular–have witnessed tangible private sector investment in setting up assembly lines, generally for low-specification computers. Securing low cost computers is considered one of the essential conditions for the broadest possible dissemination of technology and access to information and knowledge sources. To achieve this there is no alternative to the reliance on new forms of cooperative initiative. The "Computer for $100" initiative recently launched by the UNDP in cooperation with the Massachusetts Institute of Technology secures a starting point to enable limited income sections of society to purchase computers. Nevertheless, securing $100 to buy a computer still remains an impossible goal for tens of millions of students and other Arab citizens who could–and ought to–benefit from such projects. Hence, to make such initiatives succeed, particularly in the high-population, low-income Arab countries, partnerships between government, the private sector, and civil society organisations are essential. The Saudi project "A Computer in Every Home" provides, in principle, an example

of national partnerships aimed at similar ends.[14] However, it will also be necessary to reduce the cost of securing the computers produced within this project to a much greater extent so that they become available to those with middle and low incomes.

THE SOFTWARE INDUSTRY

Since the end of the last century, the software industry has grown within the environment and economics of the internet. Control of the software market by multinational companies has made it difficult for local market requirements to provide a base for the introduction of a software industry. In many cases, this has been made possible by exploitation of qualified human resources in developing countries like India. In developing countries in general, the role of government is limited to facilitating the operation of multinational companies through the creation of legal frameworks favourable to the protection of their software from piracy and securing a climate that allows its widest possible distribution.

The software industry is still embryonic in the Arab countries in comparison with other countries or with what it ought to be. One news report[15] even describes the state of the software industry in the Arab countries as pitiable, pointing to the continued absence of the Arabs from the world software map despite the availability of material and human capabilities and the tangible returns that this industry–which has revived the economies of many countries–could achieve. There are promising opportunities to make returns on the local and regional markets by meeting, in the first place, Arabic software requirements. The world markets are also brimming with opportunities. Computers are not the sole focus of the software industry. Indeed, they account for a declining share of its attention due to the increasing proliferation of computer components in a broad spectrum of products and applications across telecommunications, defence, security, transportation, and media, in addition to growing product lines of office and domestic devices intended for general use in sectors like tourism, banking, and the engineering industries.

Lack of awareness of its importance and of the returns it could generate is a key impediment to an Arab software industry. Hence investments directed at the national software industry are limited, while ready-made, and even arabized, software is imported from abroad. However a number of Arab countries including Egypt and Jordan have over the last few years begun to take steps to activate software manufacture and guarantee accessories supply. Included, for example, within Egypt's ICT strategy are items designed to support export-oriented software manufacture. Egypt has also created a body devoted to developing the ICT industry. The number of dedicated software houses in Egypt is estimated in the hundreds. Sources indicate that these companies have, since the beginning of the decade, exported software worth hundreds of millions of dollars annually. The volume of their sales was expected to reach $500 million in 2005. Statistics going back to 2005 report that up to 25,000 software engineers work in the sector. Egyptian universities are also estimated to produce approximately 20,000 graduates specialised in the software field every year. However statistics from the beginning of the current decade indicate that returns per programmer from software industries elsewhere in the world are several times greater than those achieved by Egyptian programmers. Per programmer returns in Egypt reach $10,000 per year, which is less than that generated by a programmer in India ($15,000), and many times less than that generated by programmers in Ireland ($38,000) or Israel ($140,000).[16]

In Jordan, local universities and international companies have entered into partnership to cooperate in software production. In 2006, one of the pioneering programmes in this field[17] developed plans that aim to attract direct foreign investment

Control of the software market by multinational companies has made it difficult for local market requirements to provide a base for the introduction of a software industry

The software industry is still embryonic in the Arab countries in comparison with other countries or with what it ought to be

valued at $170 million in the field of software development, create thousands of job opportunities in that sector, and generate local returns valued at $500 million.

In general, the Arab countries are clearly underdeveloped in their use of technology applications to provide education, health, and government services and in their utilisation in media and business

One solution put forward to stimulate the Arab software industry is the design of regional projects to generate demand for industry products that aim to spread essential applications in fields such as government services, education, business, and healthcare. An incubator system primarily concerned with creating and supporting small businesses active in the various areas of the software industry is a possibility. It is worth pointing out here that expenditure on such projects does not have to equal expenditure on readymade software imports, if the projects are flexibly run and expertly managed.

ICT APPLICATIONS AND BUILDING THE KNOWLEDGE SOCIETY

ICT applications fulfil a tremendously important role in the production and reconstruction of knowledge in Arab countries. Although some advance has been made in the utilisation of this technology, the Arab scene is not at all encouraging. The Arab countries in general, with the exception of GCC members, are clearly underdeveloped in their use of technology applications to provide education, health, and government services and in their utilisation in media and business. Indeed, advanced applications, in the field of healthcare in particular, are almost totally absent in all Arab countries.

Low-population Arab countries with high capacity resources could–with appropriate policies and practices–enjoy rates of technology application utilisation equivalent to or exceeding those currently enjoyed by some advanced nations

Accelerating advances in applications of ICT in the Arab countries are expected to cause gradual transformations within a growing number of sectors, the business sector chief among them. In the majority of cases this is likely to come about in response to external trends and pressures rather than as a result of internal initiatives. Business administration and marketing via e-commerce systems on the internet are proliferating and becoming more secure in many of the world's countries. The trend towards electronic transaction systems will extend to other sectors including education and distance working.

Utilisation of ICT applications will certainly require the creation and consolidation of new rules to regulate them, control their quality, and guarantee the general deployment of their benefits. Despite this technology offering solutions that will strengthen demand for its applications, technological solutions are not enough on their own. They do not guarantee the rights and duties of users who come with disparate tastes and aims and do not necessarily guarantee the enrichment of knowledge. Closely linking technological solutions to updated regulations is imperative in order to produce knowledge content in Arabic, particularly in the area of knowledge dissemination via education and training and by the generation of new job opportunities in fields connected with knowledge production and utilisation. The spread of new standards that ensure the upgrading of the knowledge archive in terms of its quality and range is also vital.

Low-population Arab countries with high capacity resources could–were they to put in place appropriate policies and practices–enjoy rates of technology application utilisation equivalent to or exceeding those currently enjoyed by some advanced nations. This would help improve ICT utilisation in the other Arab countries.

E-GOVERNMENT SERVICES

Over the last decade, the computerisation of the functions of government has been limited to spreadsheets and use of the computer as a high-spec typewriter for document retrieval and manipulating and storing statistical data. E-government services made their appearance in the world with the beginning of the spread of the internet.[18] These services generally aim at two goals: facilitating the needs of citizens and improving the efficiency of government processes via dedicated websites on the internet. Sites are classified

TABLE 4-2

Readiness of Arab countries to adopt e-government applications

Country	Index 2005	Index 2008	Ranking 2005	Ranking 2008	Change in ranking 2005, 2008
UAE	0.572	0.630	42	32	10
Bahrain	0.528	0.572	53	42	11
Jordan	0.464	0.548	68	50	18
Qatar	0.490	0.531	62	53	9
Kuwait	0.443	0.520	75	57	18
Saudi Arabia	0.411	0.494	80	70	10
Lebanon	0.456	0.484	71	74	-3
Egypt	0.379	0.477	99	79	20
Oman	0.341	0.469	112	84	28
Syria	0.287	0.361	132	119	13
Libya	..	0.355	..	120	..
Algeria	0.324	0.352	123	121	2
Tunisia	0.331	0.346	121	124	-3
Morocco	0.277	0.294	138	140	-2
Iraq	0.333	0.269	118	151	-33
Djibouti	0.238	0.228	149	157	-8
Sudan	0.237	0.219	150	161	-11
Yemen	0.213	0.214	154	164	-10
Mauritania	0.172	0.203	164	168	-4
Comoros	0.197	0.190	155	170	-15
World	0.427	0.451	..	..	..

Source: United Nations, 2008

TABLE 4-3

Readiness to adopt e-goverment applications in some comparable countries

Country	Index 2005	Index 2008	Ranking 2005	Ranking 2008	Change in ranking 2005, 2008
Cyprus	0.587	0.602	37	35	2
Turkey	0.496	0.483	60	76	-16
Azerbaijan	0.377	0.461	101	89	12

Source: United Nations, 2008

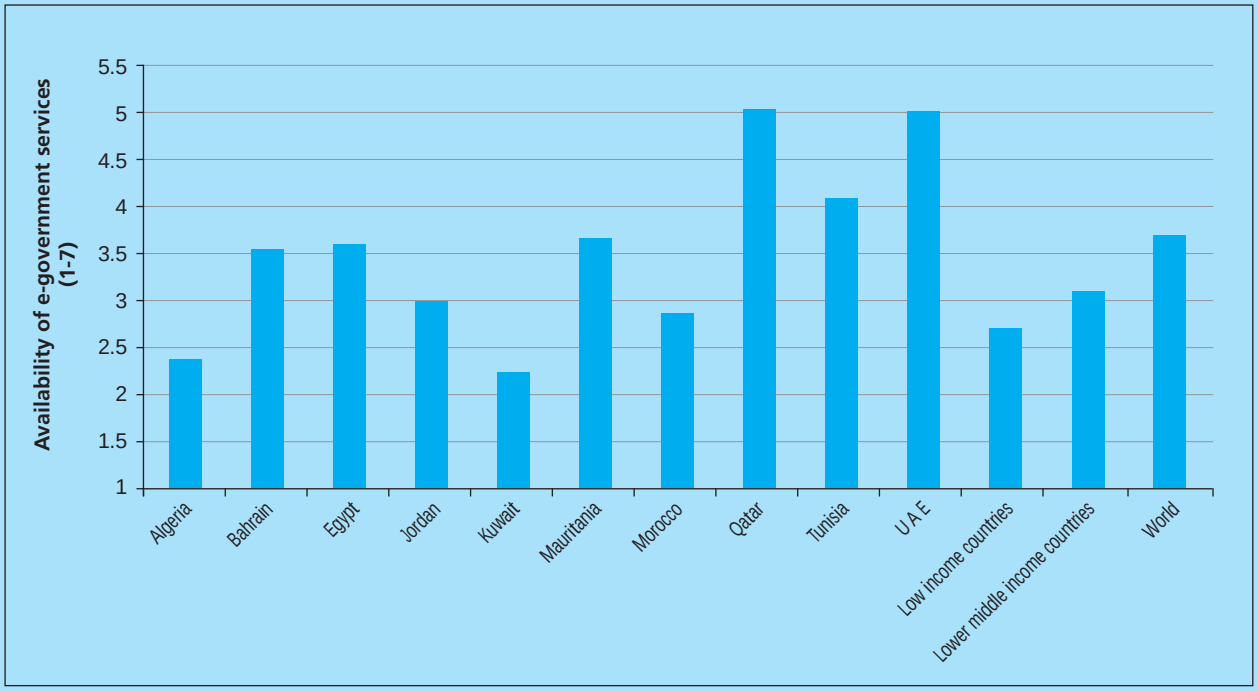
Review of sites that have been updated to offer e-government services in the Arab countries over the last few years reveals that most of them remain at the informational stage

into groups according to the nature of the services provided, such as informational, one-way interactive or two-way interactive. The last of these extends to include sites that handle financial transactions and sites that allow networking with other sites. A review of sites that have been updated to offer e-government services in the Arab countries over the last few years reveals that most of them remain at the informational stage.

Table 4-2 presents the values of the indicator that measures the state of readiness of the Arab countries to adopt

FIGURE 4-8

Availability of e-government services (2006 values)



Source: World Bank database, Knowledge Assessment Methodology (KAM). http://info.worldbank.org/etolls/kam2/KAM_page5.asp. on 12 December 2008

The advanced nations have accumulated a wealth of knowledge connected to e-government initiatives because major consulting firms in these countries are planning and implementing e-government initiatives that revolve around the priorities and requirements of the citizen

e-government applications in the years 2005 and 2008.[19] The table makes clear that five GCC countries (the UAE, Bahrain, Qatar, Kuwait, and Saudi Arabia) lead in their readiness to adopt e-government applications. Jordan and Lebanon also occupy advanced positions in this regard.

Figure 4-8 gives indicator values for a group of Arab countries pertaining to availability of e-government services as used by the World Bank within the Knowledge Assessment Methodology (KAM) framework.[20] It also gives the average performance for some selected groups of countries. On the basis of the figure, the Arab countries can be divided into three classes. In the first are those that enjoy a high level of e-government services (the UAE and Qatar). These are followed by a second group (Mauritania, Egypt, and Bahrain) that have been able to secure a medium level of these services. The third group (Kuwait and Algeria) provide lower levels of e-government services than these two groups.

Figure 4-8 reveals that the average value for the second group of Arab countries approaches the global average value on the indicator of availability of e-government services. It also makes clear that for the Arab countries for which data is available the level of e-government services exceeds that of the countries with average scores on the HDI and also exceeds the level of other groups of countries of the world.[21]

The advanced nations have accumulated a wealth of knowledge connected to e-government initiatives because major consulting firms in these countries are planning and implementing e-government initiatives and are supported by other institutions devoted to research and software development. These initiatives revolve around the priorities and requirements of the citizen. It is essential to build a similar knowledge framework to put government services in the Arab countries on the same level as those of other countries of the world. This will require the acquisition of knowledge on a number of levels as well

as the implementation of programmes to monitor the development of e-government services and the modernisation of the frameworks for government operations themselves according to the needs of administrative reform.

Despite the importance of the ICT infrastructure, cognitive and behavioural factors such as user skills, political will, and the commitment of leaders in the relevant administrations have more influence on e-government initiatives than technological factors. E-government is a means to reengineer the operation of government, and its initiatives are usually designed with the purpose of integrating and managing information in the best fashion. For this reason, they are resisted by parties that oppose administrative reform. Factors that ought to strengthen the proper application of e-government programmes include ('Abd al-Ilah al-Diwahji, 2006, in Arabic):

- Responsiveness to citizens' requirements and readiness to utilise available services in the best possible way.
- Adoption of stable strategies to solidify the link between e-government programmes and initiatives to develop the working of government and administrative reform.

With regard to initiatives aiming to apply methods of e-government, the government should play a facilitating rather than controlling role and sponsor partnership between stakeholders–citizens, the private sector, and civil society–to spread e-government applications and improve the offerings available. Improvement initiatives usually come from users first. This requires the creation of channels to elicit public opinion via surveys, regular consultations, and many other means whose deployment is facilitated by the new technology.

ICT AND EDUCATION

ICT provides many opportunities to raise the quality of educational materials and programmes, as well as their means of delivery and development, in addition to benefits in administering the educational process. Technological inputs now available include, in the first place, hardware and software for word processing, spreadsheets, and the preparation of slideshows and video clips as explanatory aids. On a more advanced level, they include use of the internet for direct communication between students and their teachers, and between schools and official bodies concerned with overseeing educational activities.[22] On a yet more advanced level, it is possible to use smart programmes to produce study materials and to make use of virtual reality technology to raise the skills of students at a pace suitable to their capacity to absorb and in conformity with other educational programmes they are following. Forthcoming telecommunications devices will permit access to "asynchronous" educational content via mobile telephones or personal digital organisers. Here students will be able to reach educational materials at any time and in any place. Students will also be able to follow in real time lectures given in universities thousands of miles away. Native language discussion with the lecturer will become possible thanks to expected advances in the field of automated simultaneous translation.

Even though there are no absolute indicators of the success of ICT in the education sector, the results of a number of studies[23] indicate that its use in curricula has been of benefit in developing student problem-solving skills. Teachers' use of the tools of information has also had positive effects on the outputs of the educational process. The Organisation for Economic Cooperation and Development (OECD) countries have developed comprehensive policies for use of these technologies in the education sector in the context of the transformation towards knowledge societies and the knowledge economy. These policies deal with the introduction of technology into the education sector along main axes that include the eradication of information illiteracy[24] via continuing education for all members of the workforce on various levels, provision

E-government is a means to reengineer the operation of government, and its initiatives are usually designed with the purpose of integrating and managing information in the best fashion. For this reason, they are resisted by parties that oppose administrative reform

of ICT infrastructure, securing internet access by using broadband networks to make use of the net in classrooms and libraries, providing multimedia systems, and lowering the ratio of pupils to computers in schools. Programmes designed to implement these policies try to provide opportunities for internet access to educational institutes in marginalised urban and rural regions and communities and take effective advantage of sources available on educational websites in regions that enjoy better resources. As for less advanced countries, implementation policies are focused on improving pupil-to-computer ratios and securing content by linking libraries at acceptable speed over the internet.

Developing digital content related to educational and training programmes is considered a high priority for the coming stage for countries that have made some progress in laying infrastructure. These countries should encourage partnerships with publishers, television channels, museums, and national libraries to develop digital educational content. Among modern methods used in developing content are "learning objects" based on modules and educational content units that contain a specific portion of content in the form of texts, pictures, audio recordings, or video clips; the time required to present a unit does not go beyond a few minutes. Modules can be linked together to form an integrated part of the desired curriculum.[25] In all of this, reliance on the open source method leads to tangible development in interactive educational materials (see Box 4-1).

Some Arab states have taken initiatives to use ICT in the various stages of education. These efforts, in spite of their importance, remain less than what is required and possible

Despite the advances achieved through expenditure in many of the world's countries, current levels in the area of information tools in the education sector are not sufficient to achieve the ends promised by available technology. Technology is still used simply to digitise school textbooks, while computerised curricula comprising dynamic and interactive methods do not find the support they deserve.

As is the case in other areas, technology is not sufficient to develop the educational process. It must be combined with other behavioural, structural, and organisational factors to achieve ideal results. Relying only on digital indices to measure performance is also not of value in isolation from a concern for qualitative effects, despite the difficulty of coming to grips with these.

Some Arab states have taken initiatives to use ICT in the various stages of education. However these efforts, in spite of their importance, remain less than what is required and possible. Computer-per-pupil ratios in pre-university education are still low, and schools generally lack the ability to access the internet. By comparing school access to the internet in the Arab countries with that of all the countries of the world for which data are available, we find that some Arab countries (UAE, Qatar, and Tunisia) placed (at 5, 4.8, and 4.9 respectively) higher than the global score of 3.74,[27] while some other countries, such as Egypt and Jordan placed close to the latter (at 3.1 and 3.9 respectively), and yet others, such as Mauritania (at 1.9) , placed in the lower ranks and far below the global average in this field. However, the international community has not made great strides either to date in securing internet access for their schools. The corresponding score

BOX 4-1

Open Source Software and Educational Content

Most open source software is available for use by anyone who can access the internet and has an acquaintance with the software field. Open source software comprises a range of products which are devised, developed, and publicly deployed free of charge, on condition that anyone who is able to make improvements to the source code makes them freely available. Among the software systems belonging to the open source array are content authoring and deployment tools that have significant, direct applications in the various stages of education. These include the Open Office package which contains most of the applications found in Microsoft Office,[26] in addition to content authoring and deployment tools and blogging software which can be very easily utilised in educational activities that require interaction between students and teacher, and systems to design study curricula that are of use in building educational content. Open source systems also include Arabic spellcheckers and whiteboards that are of use in giving ideas visual form within texts. There are also programmes to arabize software and translate operating manuals and others to design academic tests that help the teacher to come up with questions and exams and permit the design of mental exercises with educational applications.

BOX 4-2

Evaluating the Performance of Projects to Network Educational Institutions

The world's universities were active throughout the 1980s and 1990s in the creation of networks linking their campuses and faculties and in linking their research laboratories with counterparts worldwide. A number of Arab countries over the last decade have created computer networks to link their universities. The dominant pattern in the work of these networks is directed at displaying summary information around educational activities and scientific research. Content on many websites of these networks and the universities they comprise has also not been kept up to date.

On the other hand, some Arab countries[29] are partners in implementing regional projects and initiatives aimed at creating a network infrastructure that links their scientific and research institutions globally. Among these is the Consortium of Arab Mediterranean Research and Education Networks (CAMREN), which aims to set up the infrastructure for e-services and applications to assist researchers in the region (Nawwar al-'Awwa, background paper for this Report, in Arabic). It is planned that this project will allow the utilisation of computing resources available in the partner institutions via networked computing applications. Such projects secure the high computing power necessary to utilise specialist software such as simulation and virtual reality applications. They help to create new learning environments based on multimedia applications, online lectures, and other means to enrich Arabic content on the net and escape the traditional approaches prevailing in many Arab educational institutions.

One of the potential benefits of the availability of internet services is to make it possible for schools to communicate with each other and with the government bodies concerned with supporting them and monitoring their performance. A very important initiative on this level is the endeavour by the Supreme Education Council in Qatar to monitor the performance of schools that offer basic educational services on the internet and to publish regular reports that review their progress in a range of respects.[30]

for upper-income countries is 5.26.[28] In terms of the immediate future, the current plans of the Arab states for the provision of computers to schools and through these of internet access cannot be described as overly ambitious.

The link between ICT use and higher education in the Arab countries is weak. This makes it imperative to provide computers at low cost, and to orient educational curricula design in a direction that stimulates computer and internet use within the educational process, as is the case in many countries. The number of virtual universities in the Arab World remains low.[31] The first virtual university was founded in Syria in the last decade. A virtual university has also been set up in Tunisia.[32] Cairo University in cooperation with UNESCO has founded virtual faculties. Ain Shams University is also cooperating with the Mediterranean Virtual University to offer a collection of study materials via the internet. The e-academy in Jordan can be considered a model for virtual universities created in the Arab countries. The Arab Open University adopts some forms of e-learning since it uses multimedia computer resources.

ICT also offers valuable opportunities for communication between educational institutions of various levels and with the bodies concerned with evaluating their performance (see Box 4-2). Such communication has the greatest influence in knowledge dissemination and in performance evaluation on the national, regional, and international levels.

The lessons derived from a review of global trends in exploiting ICT in education can be summarised as follows:

1. Introduction of wholesale changes to educational curricula to make it possible to offer them on the internet.
2. Eradication of computer illiteracy for workers in all aspects of education and educational administration.
3. Provision of schools with appropriate computer hardware and internet access, and reliance on open source software at all educational levels.
4. Development and deployment of the concepts, tools, and software of self-learning.
5. Strengthening the partnership between school, home, and community by utilising available technology.

The link between ICT use and higher education in the Arab countries is weak

The number of virtual universities in the Arab World remains low

E-COMMERCE

In contradiction to the call to restrict the role of the state in all matters impinging on economic activity, government bodies in the Arab countries must play a direct role in facilitating and organising e-commerce activities and find legal solutions that allow challenges to be confronted

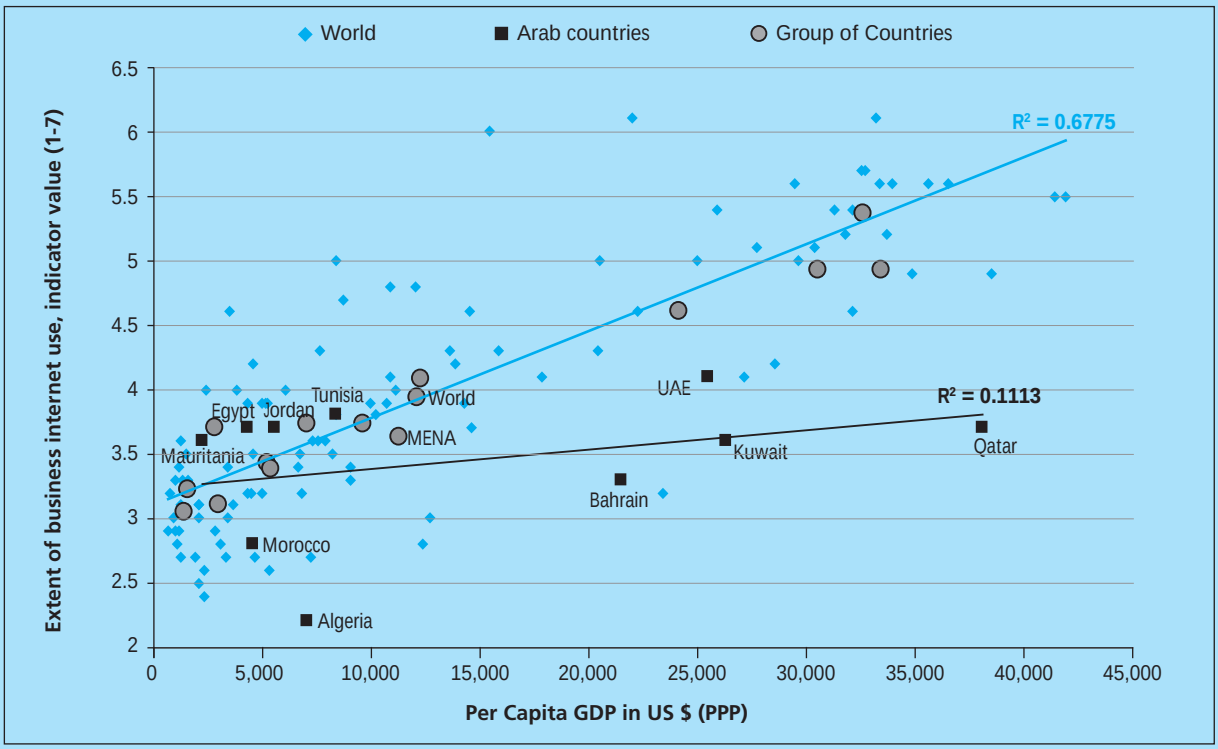
While "e-commerce" is a relatively recent term, use of computers, communications networks, and what is called electronic data interchange goes back to the 1960s. At that time however, it was restricted to large institutions, companies, and banks using mainframe computers. Regardless of the problems that still confront e-commerce, it is expected to continue to proliferate and generate expanded opportunities for trade exchange and competition. These will be followed by attempts to develop methods of production, expand choices available to the consumer, and open up access by small and medium businesses to wider markets.

Figure 4-9 sheds light on the growth of internet use by businesses–in most of the world's countries (the blue dots) and some Arab countries (the larger squares)–when plotted against growth in per capita income. The graph also shows the position for some groups of countries (the circles). The correlation coefficient, which measures the strength of the relationship between pairs of variables in such cases, reveals that for most of the world's countries there is a marked positive correlation between the indicator score and per capita income. However, the graph also shows that the distribution of scores on the indicator of the extent of business internet use for the Arab countries does not strongly correlate with per capita income.[33]

In contradiction to the call to restrict the role of the state in all matters impinging on economic activity, government bodies in the Arab countries must play a direct role in facilitating and organising e-commerce activities and find legal solutions that allow challenges to be confronted and the opportunities they present to be exploited. In this context, the formulation

FIGURE 4-9

Change in business internet use plotted against per capita income in some Arab countries and worldwide



Source: World Bank database, Knowledge Assessment Methodology (KAM), http://info.worldbank.org/etools/kam2/KAM_page5.asp

of common principles that guarantee the compliance of e-commerce systems with national development policies is incumbent upon all Arab states. At the same time they should adhere to international standard solutions laid down for the application of taxation systems and the protection of the rights and privacy of citizens.

TECHNOLOGY APPLICATIONS FOR HEALTHCARE

The reliance on ICT applications by health sector agencies is growing. A host of positive effects have arisen from this including the improved performance and lower cost of equipment, the possibility of transferring it from one environment to another, and the speed of information exchange and data storage. These applications can be classified into groups including:

- Administrative and statistical applications that institutions such as hospitals, clinics, and insurance companies make use of to keep medical records. Such applications have proliferated in a number of Arab countries.
- Raising awareness of health matters via multimedia and the internet. The health sector is considered among the first sectors to exploit ICT to produce and distribute a multitude of documents via web pages with the aim of raising awareness of user groups.
- Medical consultation at a distance using video-conferencing in diagnosis and treatment.
- Use of robotics in surgery. A number of experiments have been undertaken to connect hospitals in developing countries with those in other, advanced, nations, either to perform surgical operations or to guide surgical work.

There are many examples and observations that reveal growth in the use of ICT systems related to medical care in the Arab countries in the first three fields mentioned above. However the level of use differs from one country to another and varies within a single country between one treatment institution and another and between the capital and other cities. Electronic systems may be in broad use in the advanced hospitals in the GCC countries, Jordan, Lebanon, and Egypt, but are much less widely used, or totally absent, in small hospitals and clinics, particularly in the countryside, where many medical clinics still resort to traditional paper files despite the rapid transition towards electronic files in all other fields.

The various fields of e-health include tangible knowledge content that must be produced and deployed in Arabic, particularly in the domain of awareness. Some e-health applications provide fertile ground for the activity of small local businesses, on the one hand, and relevant professional associations on the other. Partnership between these parties is expected to lead to the implementation of many laudable initiatives and programmes, particularly in relation to endemic diseases and the health of pregnant women and children. To take the best possible advantage of such programmes, the available infrastructure must be upgraded and broadband services extended to various rural and peripheral regions, which in most cases suffer from the underdevelopment of their healthcare systems. The ongoing decline in the prices of computer and wireless network devices will make these goals achievable even in the medium and low income Arab countries. Systems conducive to the preservation of patients' rights and the improvement of professional practice related to e-health services should also be put in place. In this context the regional office of the World Health Organisation has set out the basics needed for the launch of e-health programmes.[34]

The various fields of e-health include tangible knowledge content that must be produced and deployed in Arabic, particularly in the domain of awareness

Systems conducive to the preservation of patients' rights and the improvement of professional practice related to e-health services should be put in place

TECHNOLOGY AND SOCIAL DEVELOPMENT

Many local development projects worldwide testify to the positive role ICT fulfils in setting frameworks, founding

businesses, and creating new employment opportunities. The role of ICT in this domain acquires particular importance within marginalised local environments and communities and those facing crises (see Box 4-3). A prominent lesson to be derived from an analysis of success and failure in this respect is the importance of partnership between parties active within the local community, among the most conspicuous of which are associations of farmers and agricultural laborers, women's groups, officials in local government departments and concerned parties in central government, civil society organisations, and private sector institutions. Here emphasis has to be placed on the importance of a deep understanding of the specificities of the local community and the points of strength and weakness that characterise each participating or affected party. For the most part, projects where the local community helps to provide a share of the resources necessary for operation–such as a piece of land or use of a building dedicated to the project groups or its administration–are crowned with success.

The experiences of both developing and advanced countries emphasise the importance of providing flexible sources of funding to secure loans to set up small business projects that rely on ICT within the local community

The experiences of both developing and advanced countries emphasise the importance of providing flexible sources of funding to secure loans to set up small business projects that rely on ICT within the local community. Such flexibility does not lead to laxity on the part of borrowers. Such experiences also indicate the importance of the contribution of women in the community as trainers and trainees in the ICT domain and of the participation of universities and scientific research centres in these projects to provide technical assistance and help improve and upgrade the technical skills of trainers.

One promising application of ICT is its use to develop the human resource base on the national and local levels. Such projects remain rare in the Arab countries. Some, however, have launched initiatives that merit study and follow-up. Among these is the project of the Jordanian National Centre for Human Resources Development (Al-Manar)[35] which collects

The experiences of other countries indicate the importance of the contribution of women trainers and trainees in the ICT domain and of the participation of universities and scientific research centres in these projects

BOX 4-3

ICT and Local Development: Examples from Arab countries

The Smart Communities Project: the Smart Communities Project was launched by the UN Economic and Social Commission for Western Asia (ESCWA) at the beginning of the decade and aims to deploy integrated technological inputs to help upgrade skills. Skills particularly targeted are those leading to opportunities for decent and rewarding jobs for women and young people and subsequent poverty reduction within local social, economic, and environmental conditions. The project has been implemented at sites in Syria, Yemen, and Iraq. All the Smart Community Projects comprise two key facilities: a unit to manufacture and market agricultural and food products using modern standards of safety and quality and a multifunction technology centre for the local community that provides the community with access via computers and the internet to a number of services. These include professional training, skill acquisition, and community awareness. The achievements of the project include:

- Creation of units that offer training services and help to introduce new technology for the manufacture of agricultural and food products, water treatment, utilisation of solar energy, and utilisation of interactive software in vocational training.
- Spreading basic ICT skills.
- Consolidating the bases for cooperation and networking that include municipal councils, community colleges, civil society institutions, and non-governmental organisations so as to make it possible to adapt new technological inputs to harmonize with the priorities of the targeted locations.

Syria's Countryside Net website (reefnet.gov.sy): This project aims to provide information to citizens in rural areas of benefit in their daily lives via an internet portal that includes a website for each of the villages participating in the project. In the course of one year websites were set up for eighteen villages participating in this portal, which has received more than 30,000 visitors.

The Risalah website: an interactive website developed as an initiative by students at the Faculty of Engineering at Cairo University and then transformed into the nucleus of a virtual charitable association that offers social care to the poor and sick. The activity of this association has expanded to encompass more than fifteen Egyptian governorates and a number of branches in Cairo. The website provides facilities for the collection and distribution of donations.

data from various sources and then adapts, standardises, systematises, stores, and distributes it to interested parties. It also sponsors the utilisation of its information archive to undertake studies and research and its use in formulating human resource strategies. The project also provides opportunities for employers to advertise vacancies for free. The Ministry of Manpower in Oman is working to build a labor force database that collects data and information with the aim of guiding human resource policies by drawing up plans, designing appropriate measures to implement these policies, and evaluating their effect on economic and social development.

ICT also presents wide-ranging opportunities of deep impact through distance working. Despite the absence of reliable data, it is expected that the flourishing of business in the GCC countries will help distance working opportunities proliferate. This is particularly clear in the areas of authoring, media, research, translation, web design, and technical consultancy. There is currently a golden opportunity to nurture companies that promote this kind of work. The proliferation of distance working is anticipated to realise valuable opportunities for women in the Arab countries, where the social environment continues to restrict their participation in national labor markets–despite women having achieved advance levels of vocational and academic qualifications–and so limits opportunities for them to guarantee a decent living.

ARABIC DIGITAL CONTENT PRODUCTION

Digital content production offers many opportunities to move towards the knowledge economy and lessen the knowledge divide among countries and among the various sectors of society within each. It is based on three pillars: content production, processing, and deployment. Production accounts for the greater economic returns on the global level. Production and utilisation of digital content are obviously linked to the language of the society. The inputs and outputs of digital technologies are information, and to make it circulate rapidly and easily within the society it must use the society's language. Despite the economic capacity of the Arab countries and the size of their population, they are unable to impose their requirements on hardware and software manufacturers. This mandates self-reliance and the creation of formats to enable technology to deal with the particularities of the Arabic language in line with the needs of its societies.

One ESCWA study (Samir al-'Ayta, 2008, in Arabic) states that the size of the market for Arabic content on the internet and through books, the press, and the various media is around $9 billion annually at the beginning of the present decade. This study estimates the annual growth rate for this industry to be between 5 and 10 per cent. These estimates were based on three content areas: media and entertainment, business and trade, and public services. There is no doubt that the true current figures far outstrip these estimates, but there are no available data or recent surveys to rely on to estimate the current size of the Arabic content market

The proliferation of distance working is anticipated to realise valuable opportunities for women in the Arab countries

Arab countries are unable to impose their requirements on hardware and software manufacturers. This mandates self-reliance and the creation of formats to enable technology to deal with the particularities of the Arabic language in line with the needs of its societies

BOX 4-4

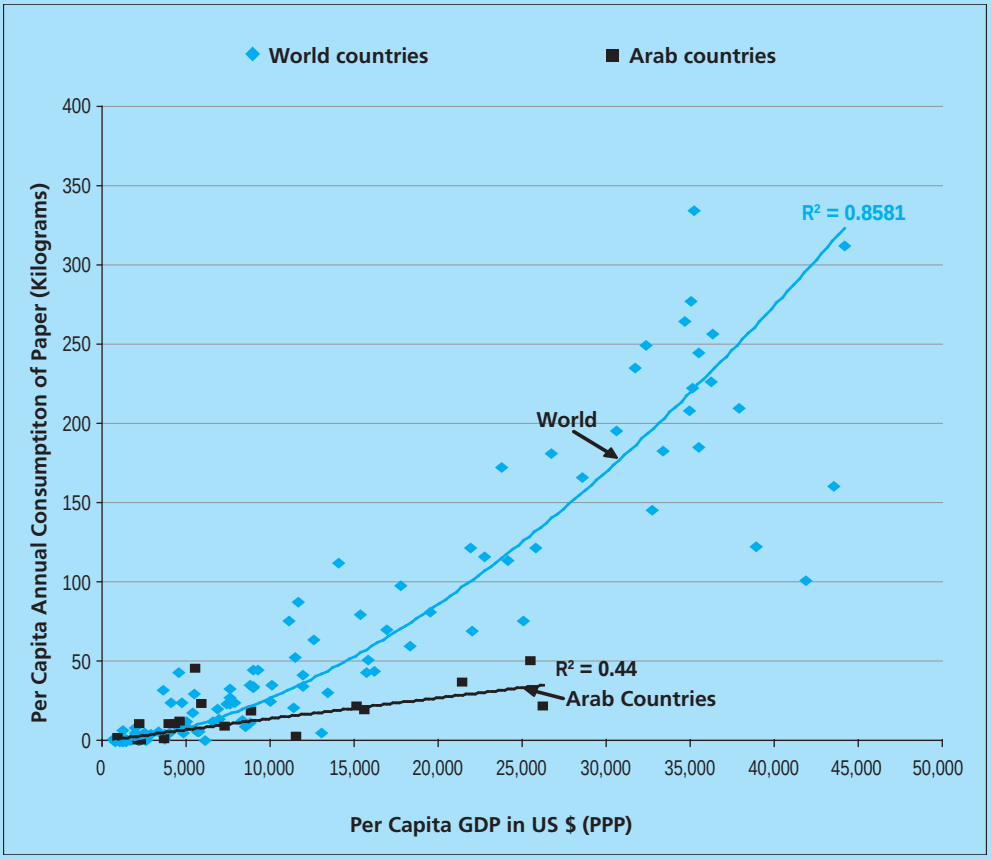
ICT Incubators and Arabic Digital Content

Business incubators are not new to the Arab region. Some Arab governments have set up incubators to assist in the launching of small business enterprises, and some have taken an interest in ICT projects. Examples of these initiatives are the Jordanian Technology Incubator, which is run by Jordan's Higher Council for Science and Technology and which specialises in computer games projects and publishing audio guides for tourists; the Network of Moroccan Incubators, which collaborates with universities and faculties of engineering, in particular the Technology Park of Casablanca University, set up in mid-2004 at a cost of more than $100 million; the Elgazala Pole of Communication Technologies in Tunisia; the Palestine ICT Incubator set up within the Islamic University in the West Bank; and the ICT Incubator in Syria, whose eight projects in 2007 were distributed between a number of content areas. Two of them deal with Arabic content through projects for television and cinema direction in the culture and entertainment sector, while another project deals with the provision of services for university students not provided by government agencies. However, these incubators do not, it appears, plan to carry through integrated projects specifically directed towards enriching Arabic content in particular or in responding to the problems of the presence and utilisation of Arabic on the net. Indeed a number of their websites do not contain information in Arabic.

Content creation in the Arab countries is modest in comparison with the promising internal market

FIGURE 4-10

Paper consumption worldwide and in some Arab countries by per capita GDP



Source: http://www.swivel.com/data_sets/columns/1000512 on 18 March 2009. Per capita GDP data derived from the World Bank database.

With regard to traditional publishing, consumption rates for writing and printing paper in the Arab countries are an order of magnitude lower than those in the advanced industrial nations, and doubly lower when the least developed Arab countries are taken into account

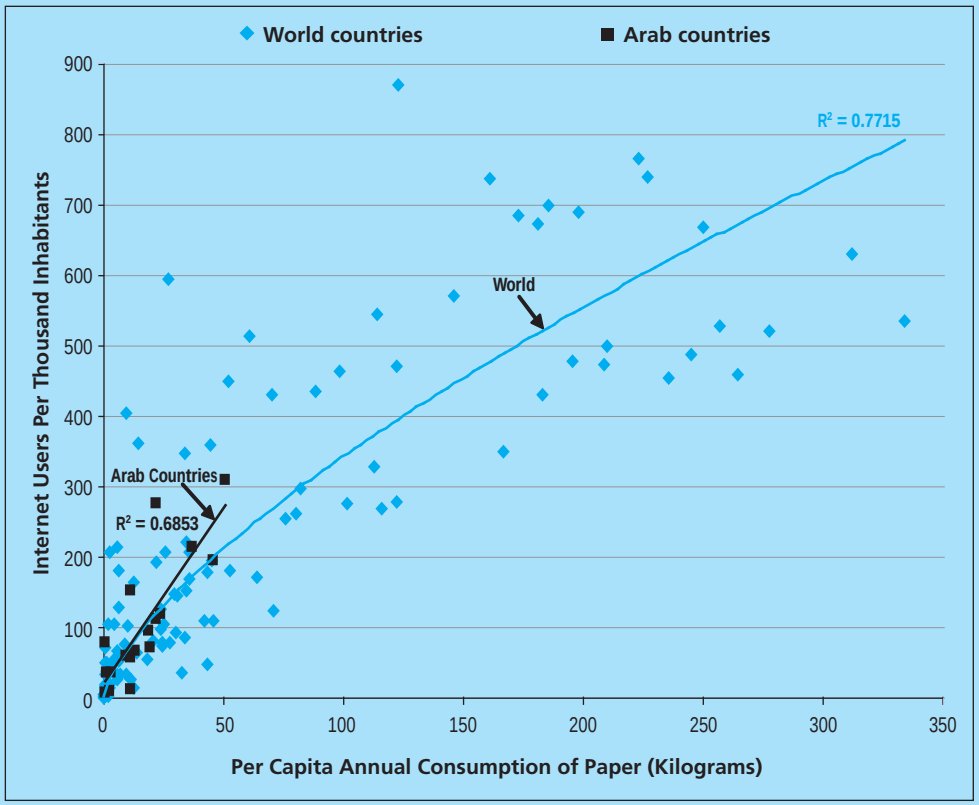
at the present time.

In relation to technical and entertainment content in particular, the Arab countries–like many others–have, for decades, fallen victim to foreign content creation. While the public and private sectors in many countries of the world are playing a role in resisting this dominance, a number of factors hinder such efforts in Arab countries. Among the most prominent of these are the lack of political will and the weakness of the enabling environment (ESCWA, 2003, in Arabic). Business incubators aimed at ICT development and utilisation, when well administered and furnished with the necessary incentives to produce and distribute content, are capable of overcoming many of these obstacles (see Box 4-4).

It can be said that content creation in the Arab countries is modest in comparison with the promising internal market, though Arabic-speaking expatriate communities around the world are an exception. As mentioned above, a brief look at the presence of Arabic on the internet compared with other international languages is enough to reveal the weakness of Arabic content creation, one of whose components is Arabic digital content. With regard to traditional publishing, consumption rates for writing and printing paper in the Arab countries are an order of magnitude lower than those in the advanced industrial nations, and two orders of magnitude lower when the least developed Arab countries are taken into account. These rates are also markedly

FIGURE 4-11

Paper consumption and internet use worldwide and in some Arab countries, 2004-2005



Source: http://www.swivel.com/on 18 March 2009.

lower than predicted by the levels of GDP in comparison with other countries of the world. See Figure 4-10, which plots paper consumption against per capita GDP for most of the world's countries (blue dots) and some Arab countries (squares).[36]

Figure 4-11 depicts the correlation between paper consumption and internet use worldwide, revealing the shortfall in content production, in both its traditional and digital formats, in the Arab countries (ESCWA, 2007, in Arabic). The current situation is not expected to improve in the absence of strategies to deal with a whole series of inhibiting factors such as lack of cadres specialised in the production of a range of content, scarcity of resources, limited cooperation to confront these, and the rarity of research and development programmes related to the technical obstacles and other issues that hinder content production. Marked efforts have been recently made in Arab countries to support the generation and distribution of Arabic digital content in traditional modes and on the internet. These efforts, however, are still insufficient in comparison with those made by other countries. Numerous indicators taken from other fields point to the fact that the Arabic presence on the net remains limited compared with that of other languages.

Marked efforts have been recently made in Arab countries to support the generation and distribution of Arabic digital content in traditional modes and on the internet, but they are still insufficient in comparison with those made by other countries

ARABIC LANGUAGE INTERNET CONTENT AND PROBLEMATICS

The production and distribution of Arabic content are beset by many and varied obstacles which become more severe when confronted by the new obstacle of internet penetration. This is because the distribution of Arabic digital content via the internet

The distribution of Arabic digital content via the internet requires the adaptation of a number of available technologies to make them Arabic compliant

A system for machine parsing Arabic sentences is considered a key requirement for Arabic to catch up with second generation applications of natural language processing

requires the adaptation of a number of available technologies to make them Arabic compliant. Technical solutions have to be found too to certain questions, which fall into two groups, the first connected with the Arabic language itself, the second with the preparation of Arabic content for in-depth processing. An example of the first group of issues is optical character recognition technology for Arabic letters and for reading from the screen. The second group contains spellchecking and grammar checking systems. Developing the software necessary to perform these tasks is extremely difficult. Automated grammar checking for example must handle the difficulty posed by the excessive length and flexible word order of Arabic sentences when compared to the strict word order of English, for example. Some difficulties are attributable to the lack of a standard punctuation system and to the need–for grammar checking–for a coherent system to parse sentences as a basis for error checking. Preparing Arabic texts for deeper processing (preparatory to indexing or searching for example) requires the development of software that permits morphological analysis, automatic vocalisation,[37] and automated parsing. A system for machine parsing Arabic sentences is considered a key requirement for Arabic to catch up with second generation applications of natural language processing. These include systems for machine comprehension and narrative structural analysis of the languages. Some Arab and foreign businesses are making notable efforts in these fields, but the pace of work and the results achieved remain insufficient (see Box 4-5).

Discussion of the Arabic language is not limited to the generation and unification of technical terms among groups of those working in ICT but includes everything connected to Arabic-language word

BOX 4-5

Arabic Language Processing Systems: machine translation, grammar checking, and searching

The production and deployment of Arabic digital content on the net requires the availability of translation systems to and from the main languages. More effective Arabic search engines are also required. Technologies to mine, process, and retrieve content also require automated indexing and summarising systems.[38] In addition, it is essential to develop advanced systems for automatic speech processing including automated speech analysis, generation, and recognition in Arabic.[39]

Machine translation systems: a number of software systems for machine translation to and from Arabic exist. One prominent example is the Google system. This adopts statistical methods which make it impossible for the quality of its translations of texts to go beyond very modest limits, rendering it unfit for serious translation. There is also software that adopts an overly simple linguistically and lexically based analytical model. Since their launch around three decades ago, attempts to improve the performance of such machine translation systems have failed. Another system developed by an Arabic company is based on a transformational model and relies on a limited base of linguistic rules and lexical data, which limit the possibilities of improving its performance.

Grammar checking: neither of the two grammar checking systems in use uses an automated parser, relying instead on a store of contextual examples. They are thus incapable of recognising grammatical errors that occur when the words and syntactical elements in question are far apart and of adding the syntactically significant final vowels to words, especially in the long sentences prevalent in Arabic texts. Of the three systems for morphological analysis, two are distinguished by complete linguistic coverage of the whole of the Arabic lexicon and one of these enjoys a coherent linguistic foundation which makes it capable of deriving semantic elements from morphological and lexical aspects. Among the faults of the third system is the errors it generates when dealing with words with multiple and compound affixes.

Arabic search engines: there are an extremely limited number of search engines for Arabic texts on the internet. Many of the sites which allow the discovery of Arabic texts are no more than directories comprising lists of Arabic website addresses (the portal www.arabsgate.com is a prime example). The Google Arabic search engine is reckoned to be the most used Arabic search engine on the net. In addition to being far from meeting most of the search requirements for cultural and educational applications, it also enjoys only modest success in meeting most of the requirements of the ordinary user. This search engine does not take into account the complex derivational and morphological formation of Arabic words in comparison with the simple formation of English words for which the system was designed. It searches for a word as it appears in the text without paying attention to its lexical lemma, which may appear in as many as a thousand forms as a result of the affixing of prefixes and suffixes to the Arabic word. This search engine is also incapable of broadening the scope of a search on the basis of the users search terms. Thus, when the user enters a word like "boy" (*fata*), "desert" (*sahra'*), or "tree" (*shajara*), the search engine will not return texts containing the plurals "boys" (*fityan*), "deserts" (*sahara*), or "trees" (*ashjar*). And when searching for a verb, if the user enters a third-person form "[he] condemns" (*yudin*), Google will not return other related morphological forms like "[you/she] condemn/s" (*tudin*), "[we] condemn" (*nudin*), and "condemners" (*mudinun*).

Adapted from the draft background paper for the Report by 'Abd al-Ilah al-Diwahji, in Arabic

processing and the methods and tools for operationalization, in-putting, and out-putting. With regard to the inputs and outputs, the Arab countries have been unable, since the 1960s, to rely on a unified encoding of the Arabic letters and symbols, even though such encoding is no more than a method for computers to deal with Arabic. The excessive attention devoted to fonts, which display a wide degree of variability from one site to another, to the detriment of attention to the linguistic content of the text, and the refusal to accept a balanced interplay between language and technology have led to wide-scale underdevelopment in machine-processing methods for Arabic. Similarly, the delay in setting a uniform standard for Arabic letters and vowels is considered one of the causes of underdevelopment in research, studies, and applications related to the language, including applications pertaining to linguistics and the authentication and retrieval of information. As a result, searching for information in Arabic using semantic keywords and phonetic approximation remains backward when compared with the achievements of such applications in other living languages.

Upgrading the production and distribution of Arabic digital content requires intensive efforts rather than the usual talk about the dangers of foreign cultural incursion and the importance of preserving the Arab identity. Media and entertainment content forms an appropriate entryway for the proliferation of technology and knowledge (see Box 4-6); however, it will be necessary from the outset to adopt strategies for the production and deployment of content in both its traditional and digital forms (ESCWA, 2007, in Arabic). Arab countries have suffered from the absence of such strategies and Arab attempts at content production have, as a result, conflicted with each other and have mostly stumbled due to the lack of specialist cadres, resources, and cooperation, and the weakness of research and development programmes aimed at surmounting the technical obstacles faced by various kinds of content production, digital in particular.

Proposed strategies must start with a clear vision of the future, define measurable goals, and include mechanisms to develop the human resources needed to found and support an Arab software industry and stimulate research and development activities in all fields related to content, its applications in Arabic, and its use on the internet. They must lay the foundations for the creation of technology incubators in the universities and research centres to transform technological innovation into marketable products and services (see the major elements of the general working vision in Chapter 6). Content relating to education and Arabic culture must be given priority in the proposed working strategy. Laws must be enacted that safeguard intellectual property without

Upgrading the production and distribution of Arabic digital content requires intensive efforts rather than the usual talk about the dangers of foreign cultural incursion and the importance of preserving the Arab identity

BOX 4-6

Digital Content in Entertainment and the Media

In all parts of the world the market in media and entertainment materials is facing sweeping changes characterised by unprecedented growth in digital platforms, be it on the level of products or of services; this growth is also reliant on the convergence of disparate industries. Competing in the new market emerging from this convergence are cable TV companies, telecom companies, consumer electronics companies, and ICT companies. The model used by businesses to provide integrated products within this market is known as the "triple play" model since access to audio and visual applications and digital data is achieved through one subscription. This convergence leads quite specifically to direct competition between telecom companies and television broadcasters. This requires the availability of infrastructures that enable the utilisation of broadband technologies. Hence it is expected that the proliferation of convergent services will be restricted to the Arab countries that have acquired compliant infrastructures, as is the case with the Gulf countries. Among these is Qatar where Qtel has launched "triple play" services to enable its customers to access the internet and obtain TV and telephone services via the net. The UAE's Etisalat is also trying to combine cable TV services with the telecommunications operations they offer to the consumer. It also offers TV services via the internet. More than two-thirds of Arab satellite TV companies have websites. Yet it seems that only a few of these companies have strategies to generate revenues through these sites. These companies also vary in the degree to which they have integrated the material ordinarily broadcast by the satellite channel with the possibilities for accessing media content and related services via the internet.

Technological convergence coupled with the transformation of entertainment and media platforms into digital space permits broader-scoped knowledge distribution than previously. However, the utilisation of these two trends requires the drawing up of dynamic and comprehensive strategies to train cadres, establish laws and infrastructures suitable for generating and deploying Arabic digital content, and overcome the various obstacles to its ideal deployment and utilisation.

BOX 4-7

Preserving Tradition through Digitalization

Egypt's Centre for Documentation of Cultural and Natural Heritage (CULTNAT) was created to archive digitally Egypt's cultural and natural heritage. The centre is implementing the Egyptian Cultural Heritage Project, which includes drawing up an archaeological map of Egypt and documenting Egypt's architectural, musical, and manuscript heritage. The project uses multimedia software, geographical information systems, 3D modelling, and virtual reality. The centre cooperates with a number of international organisations and companies such as UNESCO and UNDP. It is also helping to deploy multi-lingual information system using the internet to document the cultural and civilisational heritage of the Mediterranean basin countries within the scope of a programme sponsored by the EU and implemented by Arab and Mediterranean countries.

impinging on the opportunities needed to set up small businesses that can play an effective role in content production and deployment. One of the first tasks such businesses could fulfil is to digitise the Arabic cultural heritage (see Box 4-7). This could be done in cooperation with the national libraries and funded by relevant government bodies such as ministries of culture or by unconditional donations from large private sector institutions.

Strategies for digital content should assign appropriate importance to the utilisation and development of open source software given its importance in the distribution of content at exiguous cost

Strategies for digital content should assign appropriate importance to the utilisation and development of open source software given its importance in the distribution of content at exiguous cost. One feature of much of this software is that a large portion of it was originally designed to make it easily adaptable to the requirements of different languages and modes of utilisation. Its utilisation in the Arab countries, however, remains limited to a small number of institutions, some companies offering VOIP telephony services, and Arabic blogging sites. Isolated initiatives are being taken by websites to coordinate efforts and offer support to open source software developers with a focus on arabization (http://arabeyes.com, for example). Other Arab initiatives, which deserve to be supported to the greatest extent, are also undertaking the arabization of such software and adding plug-ins to other software to support the Arab user.

Among the obstacles which prevent the broader deployment of open source software is the reluctance of a number of Arab governments to use it, in contrast with the global trend which has seen many government institutions throughout the world adopt this software in order to remove sensitive government systems from the sway of readymade software packages.[40] The Arab governments, however, have submitted in many cases to the offerings of the world's large software companies and, because of the availability of technical support packaged up with readymade products, preferred to rely on them rather than to embrace open source software, even though the latter offers greater hope of establishing a national software industry. This is because open source requires users to employ in on-going fashion the technical cadres needed to maintain and modify the software they use. In principle this ought not to form a major obstacle. Many Arab countries have the critical mass of technical cadres to ensure the utilisation of open source software. As a group, they have the necessary human and material resources to participate in the development of these systems and make ideal use of them. Some Arab countries may be more likely candidates than others to rid themselves of the phobia of open source software. It seems that Syria, Lebanon, and Egypt include a good proportion of Linux OS users. Promising associations of open source developers have also been set up in all these countries.[41]

Ideal deployment and utilisation of open source software requires interested parties in the Arab countries–including government institutions, universities, private sector institutions, national computer associations, and networks of open source developers–to draw up strategies. Such strategies should allow the information of working groups to set down the rules and ethics of intra- and extra-mural conduct while seeking enlightenment from the policies laid down in this respect on the global level.[42] They must also offer incentives to workers, particularly in relation to human capacity development.

TECHNOLOGICAL ADVANCE AND FUTURE INITIATIVES

Making progress in the field of knowledge distribution, generation, and utilisation in the Arab countries requires that national development strategies include initiatives that seek to realise an integrated vision of knowledge. They must be guided on this path by studies that analyse the strong and weak points in the prevailing economic, social, and cultural dynamic, that define the requirements needed to revive and accelerate this dynamic, and that draw up working plans to develop technology capacity. These initiatives should press for improvement to legal and regulatory environments and support for backbone networks and the means to access them to make best use of ICT. To achieve sustainable goals in these areas, investment in ICT infrastructure should be encouraged, to ensure its conformity with next generation technologies and its compatibility with new applications and services.

Many factors hinder the devising of such policies, strategies, and plans. Among the most prominent are the absence of a unified vision, within the limits of the possible, on the national and Arab levels to oversee future directions and set the ground rules for common action and constructive interaction within the regional and global environments. The absence of such a vision leads to a host of difficulties in drawing up policies for developing ICT. These difficulties are compounded by the accelerating dynamic towards technological advance on one side and the entanglement of technological development with many aspects of social development on the other. Many Arab countries are confronting difficulties that hinder the prioritization of technological development on a list of development goals crammed with pressing priorities, foremost of which is the securing of such basic necessities of life as food, water, shelter, and social services. Drawing up the open policies required, in particular, by the spread and use of ICT faces major difficulties, one of the most important of which may be the high level of government control over this technology and its development on the pretext of national security.

There is no essential difference between sector-based development policies (which include the social services sectors including education, health, and others) before and after the deployment of ICT and its expanded application. A prime characteristic of the current era is the unprecedented involvement of policies for technology capacity development within sector-based policies–something not taken into account before by the relevant parties in most Arab countries. As long as this weak spot is not treated by integrating technology capacity development policies with sector-based policies, isolated programmes, fragmented efforts, and their ever-growing negative consequences may be expected to continue.

Initiatives aimed at the indigenisation and development of ICT applications also strengthen, and do not conflict with, economic and social development efforts, except when left exposed to exploitation by hardware promotion as an end in itself, and to the achievement of various temporary gains. These initiatives must be formulated so as to respond to the needs of development rather than to the desire of the promoters of technology equipment and the government officials who support them for rapid material returns. It must also be aimed at building capacity on various levels, with decision making centres and NGOs concerned with development matters taking priority.[43] Also necessary are capacity building in integrated form to cover both supply and demand, as well as deepened technological know-how with reasonable possibilities for exploring the horizons of technological progress in the future.

The accelerating march of progress in many aspects of ICT requires, on the one hand, the creation and support of specialist research and development institutes able to compete with their counterparts in the

Progress in knowledge distribution, generation, and utilisation in the Arab countries requires that national development strategies include initiatives that seek to realise an integrated vision of knowledge, guided by studies that analyse the strong and weak points in the prevailing economic, social, and cultural dynamic

Initiatives aimed at the indigenisation and development of ICT applications strengthen, and do not conflict with, economic and social development efforts

advanced and emerging nations and, on the other, an effort to probe the expected economic, social, and cultural effects of these new technologies. More research should be directed towards exploring the effects of technological development on the Arabic language and how new technology will handle recognition, speech, and semantics in a way that ensures the preservation of the language and dedicates a pivotal role to it in regional development and the building of human civilisation. The proliferation of ICT applications in fields closely connected with scientific research, education, culture, and social services is expected to lead to a boost for Arabic digital content on the internet in terms of its volume and content.

More research should be directed towards exploring the effects of technological development on Arabic and how new technology will handle recognition, speech, and semantics to ensure the preservation of the language

Arab countries cannot undertake on their own the many tasks aimed at utilising the continuous and accelerating innovation within ICT and thus consolidating the role of knowledge in development on an individual basis, however large the resources available to any one of them. Cooperation between relevant national institutions must be strengthened, cooperation between the Arab countries and their intercommunication with international organisations must be activated, and the human resources needed to design and implement common initiatives in various fields must be secured. Successful acquisition and deployment of new technology is today connected to a great extent with the ability to cooperate within multidisciplinary teams in the concerned state and with partners at the regional and the global levels. Most production of new forms of knowledge does not now take place within the walls of a single institution, but is the fruit of cumulative efforts made by groups belonging to various schools of thought which can be in constant touch with each other and with the various external sources of knowledge. Herein lies the latent importance of ICT. The role it fulfils in facilitating cooperation between institutions, wherever they are, and individuals, wherever they work, is a basic factor in the achievement of the goals of sustainable development in various domains. It is therefore essential that national policies and regional strategies designed to build capacity in these technologies include elements favourable to the success of the new models of cooperation provided by ICT, such as "virtual research laboratories." It is possible that such research centres will cooperate to carry out research related to specific aspects of a given problem in priority fields at the national and regional level. Among the most pressing such problems are those related to broader and smarter uses of the Arabic language on the net, development of interactive digital content in the various branches of knowledge, and broadening the scope of Arabic content in the fields of education,[44] scientific research, healthcare, environmental protection, government services, and heritage preservation.

Cooperation between Arab national institutions must be strengthened, and their intercommunication with international organisations must be activated

It is widely acknowledged that the creation of an environment favourable to internal and regional cooperation will generate opportunities to grow and develop an active private sector that invests in the means of production of technology, the fields of knowledge related to it, and its applications. It will also open the gates to Arab investments in joint research and development projects related to technology, its applications, and the services connected to it. This is especially the case in relation to the knowledge content required and generated by such applications. In this, the creation of legal frameworks and laws that contain the open and transparent measures necessary to ensure the success of applications and enable all sectors of society to benefit from access to technology and its applications must be given special attention, lest the digital and knowledge gap among countries widen, while an improvement in the familiar overall indices serves simply to improve the image of these countries relative to others. Here it is necessary to emphasise support for initiatives designed to gain acceptance for the open source methodology while at the same time guaranteeing data privacy and security and protecting intellectual property

within bounds that do not hinder business growth and provision of employment. In spite of weaknesses–which must be taken suitably seriously–it is possible to outline a number of strong points that will bolster the Arab countries' attempts to make ideal use of technology and its applications. Among the prominent strong points are:

- The enthusiasm of Arab political leaderships to give impetus to technological development.
- The availability of the necessary expertise and reference cadres–thanks to the regional and international conferences[45] dedicated to promoting and spreading technology–to ensure the formation of an Arab strategic vision to indigenise and make good use of ICT in the Arab countries.
- The investment opportunities made available by oil wealth, and more specifically those that enable the region's economies to make the transformation to knowledge-based economies.
- The youthfulness of the human capital, which will without doubt be able to keep pace with global developments and meet the ambitions of the peoples of the region when employed in projects to indigenise and develop technology and knowledge production.

CONCLUSION

The dilemmas of Arab development are, as we have said, epistemological in essence. The response to these challenges, although requiring the acquisition of basically technological capabilities, will never bear fruit if restricted to these alone. In the first place, this requires specific political choices. The efforts directed at the deepening and broadening of the scope of knowledge content in the Arab countries demand the optimal use of available technologies within a strategic perspective congruent with comprehensive sustainable development goals aimed at reducing inequality in all its forms. At the same time, they require affiliation with Arab internal, regional, and international initiatives[46] that endeavour to develop modern technologies and adapt and apply them to participate actively in the drawing up of the aims and directions of such technologies. However, none of this will lead to ideal outcomes unless, from a third angle, they are linked to persistent action to formulate national initiatives that build, complement, and support the components of the knowledge economy and society. Countries such as Finland, Norway, Ireland, Malaysia, and South Korea have recently succeeded in utilising the advance in the various branches of ICT and the innovations based on this advance. They have achieved this through national and sector-based policies and initiatives aimed at bringing about major qualitative and integrated transformations in their own capabilities, rather than resorting to gradual and piecemeal improvement in their capabilities in disparate directions. At the same time, these countries have introduced wholesale reforms encompassing the institutional cadres who implement ICT activities and the innovations arising from them. They have also taken a second look at many of the legislative, regulatory, and legal frameworks that control these activities, the resources devoted to supporting them, and the approaches followed in taking pivotal decisions in this respect. The experiences of these countries also indicate the necessity of adopting mechanisms that permit ongoing coordination of institutional capacity within national borders in parallel with serious attempts to ratify active and effective international and regional alliances to produce the scientific and technological knowledge connected with these technologies. These alliances will, in the end, lead to the utilisation of the latest knowledge within new products and services that can be used to confront the competition raging on the world market.

The chasm that divides the developing Arab countries from the advanced nations does not justify the adoption by the former of the position of "spectator" and

The dilemmas of Arab development are epistemological in essence. The response to these challenges, although requiring the acquisition of basically technological capabilities, will never bear fruit if restricted to these alone

The chasm that divides the developing Arab countries from the advanced nations does not justify the adoption by the former of the position of "spectator" and passive recipient of whatever knowledge is thrown at them

The possession of information and communication technologies by limited or socially isolated groups will not suffice to realise the benefits of globalisation and deter its dangers; rather, it will ensure the deepening of fragmentation, poverty, ignorance, and extremism

It falls on the shoulders of the governments of the Arab countries and concerned NGOs to play founding and creative roles that deal with the formulation of policies, strategies, and initiatives for the production, distribution, and utilisation of knowledge

passive recipient of whatever knowledge is tossed to them. Rather, a restructuring and review of numerous concepts and practices is required so as to make knowledge production and distribution take place within these countries and through cooperation among them. The role of the political and intellectual leaderships here is vital, alongside that of NGOs. When planning these initiatives and the projects they may comprise, it is essential to take into account the ever shorter time frame for scientific discoveries to make it possible to include them in innovative products and processes. The railway took 120 years to spread worldwide, while mobile telephone penetration reached 80 per cent of the population of certain countries within four years. Anticipated technological evolution, be it on the level of processors, computers, networks, or network technologies, will offer rare opportunities to acquire and distribute knowledge, as signalled by past experiences in the evolution of other modern technologies. Current trends are expected to lead to private sector institutions having greater influence over individuals. The former possess greater technological knowledge aptitude in addition to superior capacities for technological adaptation and learning. The ability of companies to measure and analyse the behaviour of consumers of their wares or users of their services using the technological resources and expertise in their possession will multiply, making the results more accurate.[47] This will give various institutions unprecedentedly comprehensive powers to monitor the behaviour of consumers of their wares, users of their particular services, and internet users in general. This also applies to potential surveillance of citizens by government bodies, which mandates the establishment of national and regional institutions concerned with studying the trends in technological evolution, and in particular the changes in terms of patterns of use of the internet, the structures and resources available on it, and the pace of content development. There should also be ongoing analysis of the risks and challenges posed by internet use, exploration of the violations it may be exposed to, and the development of approaches, methodologies, and tools to ensure that information on the range of levels is used in conformity with agreed standards for the protection of human rights and individual freedom.

In the light of globalisation, ownership of ICT has become a pivotal requirement for driving the various aspects of development. Its use will also lead to a reduction in the resources needed to build scientific and technological capacity and to utilise numerous other technologies in the various sectors of production by condensing, and reducing the cost of, many of the measures that traditional production and service activities require. This trend is expected to continue, and even to accelerate and expand. However, the possession of these technologies by limited or socially isolated groups will not suffice to realise the benefits of globalisation and deter its dangers; rather, it will ensure the deepening of fragmentation, poverty, ignorance, and extremism. For this reason, projects for national development must strengthen the role of knowledge and the sectors and social and economic activities connected to it so that all sectors of society share in its benefits. The private sector–and the tripartite partnerships between it, the government sector, and civil society organisations–is expected to have a major role in carrying these tasks. In the context of such partnerships, it falls on the shoulders of the governments of the Arab countries and concerned NGOs active in them to play founding and creative roles that deal with the formulation of policies, strategies, and initiatives for the production, distribution, and utilisation of knowledge in areas where the private sector cannot get involved or with which it should not perhaps be entrusted.

In conclusion, will current and future technologies lead to a decline in the status of Arab cultural identity? Or will they provide opportunities that enable its

preservation and the consolidation of its position on the map of human civilisation? A positive answer is conditional upon the digital presence of the Arab countries and their citizens on the current and future internet. When the Arab universities, for example, offer their educational services in electronic form, when the communications infrastructure is designed to conform with multimedia applications, and when all sectors of society are given access via all platforms, the Arab identity will in all probability preserve its essence, or even make marked gains that will ensure it opportunities for communication, innovation, and progress over the long term. Applications of ICT are expected to bring about profound and wide-ranging social and economic effects. However the nature and extent of these effects will be determined by the efforts made by the active parties to build and support the various kinds and models of Arabic content. If governments and other interested parties fail to generate and distribute knowledge content closely linked to social and economic conditions, cultural structures, and the expectations of citizens, then it is likely that most of these effects will have negative ramifications. The opportunities offered by new technologies are accompanied by risks that mandate enlightened approaches which keep pace with accelerated technological evolution and put it to use in the effort towards comprehensive, balanced, and sustainable social and economic development. Only when this is achieved will the Arab countries be able to look forward to a glowing future in which new technology will play a supportive role in responding to the region's chronic crises with its twin swords of knowledge and development.

If governments and other interested parties fail to generate and distribute knowledge content closely linked to social and economic conditions, cultural structures, and the expectations of citizens, then it is likely that most of these effects will have negative ramifications

End Notes

1 According to the majority of available indicators, including the World Bank report on Knowledge Assessment Methodology (KAM), published in 2008.

2 The World Bank's KAM comprises twelve indicators with respect to the ICT index. Three of these indicators are used to calculate the above mentioned index: fixed and mobile telephones, computers, and the internet. Index values range from zero to ten and express the position of the country relative to that of all other countries for which the index has been calculated. The top 10 per cent of countries are those ranked between nine and ten; the next top 10 per cent are those ranked between eight and nine, and so on. A decline in the value of the index with regard to a given country does not necessarily mean a decline in the values for the indicators entered to create the index. It may simply be a product of the fact that the values of these indicators have risen but to a lesser degree than those of other countries that are jockeying for their place on the scale.

3 Website of the World Bank, database of the Knowledge Assessment Methodology (KAM), http://info.worldbank.org/etools/kam2/KAM_page5.asp on 13 February 2009.

4 Reports on the spread of third generation mobile telephone technology in Egypt for example predict that a proportion that may reach 70 per cent of the population will not be able to afford such devices. Other factors may lead to slow progress in the introduction of 3G to the Arab markets. For example the lack of technological preparedness may open the door to illogical practices and delay the securing of applications and services suitable for Arab societies. The restrictions imposed by some states, on the pretext of security in many cases, will also hinder the use of technologies that form key incentives for migration to 3G such as geographical positioning technology based on satellite connected systems.

5 Bandwidth is used as a measure of the rate of data transfer on the internet. It is measured in bits per second. The report uses the measure of bit per person to indicate citizens' ability to access the net via the national infrastructure and the links it has with the international network by means that include satellites, optical fibre networks, and traditional copper wire. While transfer of data across these networks occurs at different speeds, overall bandwidth is a product of the bandwidth characteristic of each medium.

6 In this context, and as is made clear in the paragraphs dealing with anticipated advances in ICT, coming generations of communications technology will provide greater possibilities and opportunities for internet access for a broader spectrum of user groups via mobile telephone.

7 According to the World Population Prospects/2006 revision published in 2007 the population of the Arab states is 328.6 million. However, statistics from the website used to derive information on language use on the net indicate a total number approaching 357 million. This variance does not affect the calculated proportions and hence the deductions and analysis.

8 Statistics from Madar, the Digital Economy Research Centre in Dubai, Study presented to ESCWA, 2007, in Arabic.

9 English, Chinese, Spanish, and French.

10 These processors will also fulfil a pivotal role in adding "smartness" to numerous consumer devices without a marked increase in cost. The processors come in two types: those usually used in computers and specialist ones to control industrial devices and various consumer products.

11 Among the most prominent uses of semantic web technology are in e-learning and research and development.

12 Reference in the background paper for the Report by Nawwar Al-'Awwa, in Arabic : Cardoso, Jorge, "Semantic Web Vision: Where are we?" in IEEE Intelligent Systems, Sept. 2007, pp. 22-7.

13 For example, it will be essential to combine the various data transfer networks within a single network based in internet protocols. This will mean, shifting voice telephony services from the telephone network to services based on internet protocol.

14 A monthly $25 fee added to the telephone bill for a period of two years (a total of $600) is a condition for taking part in this project.

15 Website of Al-Jazirah for Press, Printing, and Distribution, http://www.al-jazirah.com.sa/digimag/03092006/add21.htm on 28 January 2009.

16 This paragraph relies on data given in a lecture by Rakan Zarruq of the Department of Computer Engineering at the University of Damascus and Mahmud 'Anbar of the Software Industry Forum at the 2005 dialogue forum on the software industry organised by the Syrian Computer Association.

17 The REACH programme.

18 This is counter to the prevailing belief that the concepts and origins of e-government in the advanced nations arose with the proliferation of the internet in the mid-1990s.

19 Some sources call this index "e-readiness." The concept of "e-readiness" provides an objective means to measure various factors that enable the adoption of e-government and set a point of reference for governments to observe their progress in this field. The assessment mechanism includes hard factors such as measures of the telecoms infrastructure and other soft factors such as the economic, social, and behavioural level of the country.

20 Data are not available on the KAM site for a number of Arab states such as Syria, Yemen, Comoros, Djibouti, Libya, and Saudi Arabia.

[21] As a result of the nature of composite indices that are relied upon to evaluate the availability of e-government services or the readiness to provide them to citizens and the need for surveys on the ground to define the value of their component parts, it is necessary to read the trends revealed by these indicator values with a considerable amount of caution and circumspection. It is worth pointing out the variation in values given on "e-Government Readiness Index" developed by UNPAN for Mauritania, for example, in comparison with the scores achieved on the index of "availability of e-government services" adopted by the Knowledge Assessment Methodology (KAM) for the same states. While the two indices differ from each other, they are without doubt connected in various aspects, and it would therefore be expected that at least in terms of ranking the states they would conform to each other within reasonable limits. Yet what can be observed is Mauritania coming in 162nd place out of 182 states according to the UNPAN index, with Jordan in eighteenth place and Egypt twentieth for comparison, while the KAM index ranks Mauritania above Jordan and Egypt.

[22] Without the knowledge giver and receiver being restricted to the same site.

[23] World Bank, Information for Development Programme (InfoDev), 2005; British Educational Communications and Technology Agency (BECTA), 2004; and Tinio, 2003.

[24] To this end European states have relied on programmes such as the "European Computer Driving Licence" (ECDL) as a means to make teaching and administrative frameworks in schools acquire the appropriate skills. OECD plans also include subjecting ICT to develop teaching and learning methods.

[25] Joint study on ICT in education, ESCWA and UNESCO regional office in Beirut.

[26] Comprising word processing, spreadsheet, presentation, and drawing software, a calculator, and project management software.

[27] Based on a country performance assessment scale ranging from one to seven.

[28] World Bank, KAM database, http://info.worldbank.org/etools/kam2/KAM_page5.asp on 12 December 2008.

[29] At the time of its inception this project included Syria, Jordan, Morocco, Algeria, Egypt, and Palestine.

[30] See the website of the Supreme Education Council in Qatar, http://www.english.education.gov.qa/content/general/detail/7117 on 26 January 2009.

[31] Some sources consider open universities to be virtual universities. This is not necessarily the case, however, though open universities tend to use some of the methods of virtual universities. On this basis, it is possible to deem the Arab Open University a virtual university. It was launched in 2002 with headquarters in Kuwait and branches in Jordan, Bahrain, Lebanon, Egypt, and Saudi Arabia.

[32] See the website of the Virtual University of Tunisia, www.uvt.rnu.tn.

[33] If Morocco and Algeria are disregarded, the graph permits the relationship between business internet use and per capita income in the Arab states to be represented by a straight line almost parallel to the horizontal axis. This indicates that there is no significant correlation between business internet use and per capita income.

[34] Website of the World Health Organisation, Regional Office for the Eastern Mediterranean, http://www.emro.who.int/Arabic on July 2008.

[35] Website of al-'Arab al-Yawm newspaper, http://www.alarabalyawm.net/pages.php?news_id=101464 on 28 January 2009.

[36] This graph shows consumption rates for paper in all its forms. Recent data on consumption of paper exclusively for writing and printing are not available, and this is of greater significance in terms of the various forms of content. However, the quantity of paper used for writing and printing is estimated at half of total consumption. The figure relies on 2004 data.

[37] Unambiguous machine understanding of Arabic texts requires their vocalisation. Naturally, before being vocalised, the sentences of an Arabic text must be parsed.

[38] One Arab company has launched automated indexing and summarising systems, based on purely statistical foundations, that summarise the words present, define the subject of the text, and summarise the collection of sentences that contain significant content. These systems, however, were developed on the basis of out-dated technologies, in terms of their use of either statistical linguistic models or analysis of the Arabic narrative structure.

[39] The Sakhr company has developed an Arabic speech engine. A large US company has also developed an Arabic speech recognition system using a statistical basis. This system has been used to develop an automated dictation (speech to text) system, but the error level remains high and it is in need of automated systems for morphological, syntactical, and lexical processing in order to correct a larger proportion of errors.

[40] The Chinese government has been a frontrunner in the use of open source software on all government computers. It has developed the Chinese version of the Linux open source operating system through the Chinese Linux Extension (CLE) project. Local government and city councils in many EU cities are also making use of open source software.

[41] The University of Aleppo has convened two conferences on open source software. These discussed aspects related to the arabization of open source software and means to promote it within Arab societies.

[42] E.g., the Taiwanese plan for the introduction of open source.

[43] Building national capacity in a wide series of information and communication technologies represents a key aim of development policies in all the countries of the world. The attempt to achieve this goal in the Arab states must be accomplished with an eye to priorities that take into consideration manifest and latent challenges.

Technology research and development in fields closer to the key concepts and the frontiers of knowledge must be undertaken in support of high quality qualifications and in preparation for coming stages that aim to develop hardware and software systems and introduce them to regional and international markets. It is necessary at the same time, however, to focus in the early stages of strategic action to build national capability for the ideal utilisation of available technologies.

44 ICT provides valuable opportunities to improve the efficiency of the educational process in addition to the support it offers to e-learning programmes. Networks and virtual incubators could also be created to work in this field. Among the features enjoyed by such solutions to the research and development crisis and the education crisis in the Arab states are the possibilities they offer for many researchers of Arab origin who occupy distinguished positions in universities and laboratories in the advanced nations of the world to participate in such networks. As previously indicated, the net is overflowing with learning resources, in the form of units and modules, that can be arabized and exploited to develop interactive curricula.

45 Among the most prominent of these is the World Summit on the Information Society, which was held in two stages, the first in Geneva in 2003, the second in Tunis in 2005.

46 There are many institutions within the private, public, and NGO sectors whose areas of operation are distributed across a series of fields including higher education, scientific research, and technological development and which are charged with drawing up programmes and launching regional initiatives in the ICT domain that aim to stimulate the development and growth of this sector and the utilisation of its results to benefit partner nations. There are many examples of such programmes in the EU. These programmes and initiatives mostly handle the linkage of partner states by regional communications networks or by modernising the backbone networks. International coalitions are also formulating regional policies aimed at finding ideal solutions to the technical or economic problems afflicting the partner states or completing national strategies, consolidating the position of the region on the global level, cooperating in the use of open source software, developing applications of these technologies in the media, entertainment, and healthcare fields, providing job opportunities, or reducing poverty.

47 Technological development in the area of data mining technology will permit more detailed and deeper understanding of service user behaviour and the prediction of web surfers' demands.

CHAPTER FIVE
ARAB PERFORMANCE IN RESEARCH AND INNOVATION

CHAPTER FIVE

ARAB PERFORMANCE IN RESEARCH AND INNOVATION

Introduction

The term "innovation" is used here in an expanded sense that embraces both the idea of "inventiveness," with its connotations of scientific and technical ingenuity, and "creativity," with its associations with culture and the arts, inspiration, intelligence, emotional sensitivity, and the imagination. This expanded definition makes the word that best suited to denote the subject of the current chapter and meet our goal of widening the significations of the knowledge society concept and the central concepts associated with it currently circulating among Arabs. This chapter will not, then, treat only the factors usually addressed with regard to innovation in the knowledge society and will not limit itself simply to monitoring the state of innovation in scientific and technical knowledge. Nor will it restrict itself to indicators derived from the social environment such as are commonly used in reports dealing with the knowledge society. Rather, it will seek to build upon these basic elements and develop other indicators applicable to the Arab world. It draws on research in the human and social sciences despite the problematic issues thus raised and despite the lack of the detailed data that would facilitate the study, classification, and formulation indicators. Cultural, imaginative, and symbolic production also have a role to play in the analysis, since this chapter surveys innovation in the art forms that we believe have contributed to enriching Arab sensitivities and developing the aesthetic and affective values of our societies. Our goal is to provide an overview of how innovation manifests itself and to diagnose where it is lacking in terms of the current state of Arab knowledge.

In this chapter, then, we set forth for discussion a number of points that will allow us to examine the limitations of the dialectics of absence and aspiration, of dependency and intimations of independence and development. Discussion of innovation in the context of Arab knowledge requires an interrogation of these dialectics, just as it does the construction of their components into an approximate picture of the current status and future trajectories of Arab knowledge.

INNOVATION AND THE KNOWLEDGE ECONOMY

The Arab world lacks a pan-national monitor that could prepare quantitative and qualitative indices for the Arab region and guarantee the credibility of data on research and the dissemination of science and innovation within it

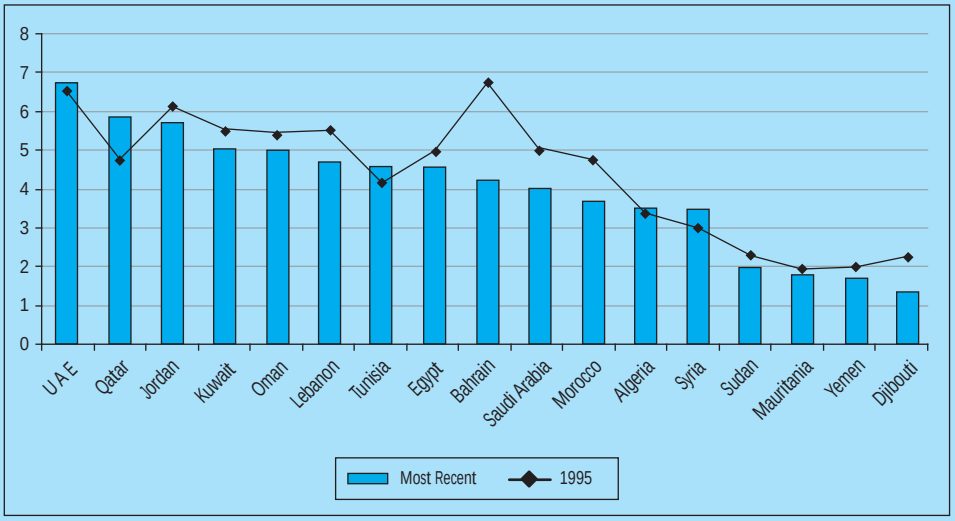
The Arab world lacks a pan-national monitor that could prepare quantitative and qualitative indices for the Arab region and guarantee the credibility of data on research and the dissemination of science and innovation within it. International institutions similarly suffer from a severe shortage of information from the Arab world. Despite persistent follow-up from the United Nations Educational, Scientific, and Cultural Organisation (UNESCO), only six Arab countries have provided complete and official data on their status with regard to the dissemination of science and innovation (Kuwait, Algeria, Tunisia, Morocco, Jordan, and Sudan). Six other countries have provided partial information (Saudi Arabia, Bahrain, Oman, Egypt, Lebanon, and Mauritania) and data remains almost completely lacking for ten Arab countries.[1]

The available data indicate that, in all Arab countries, performance in the field of innovation is weak in comparison to that of the other pillars of knowledge

Regardless of precision and currency, the available data indicate that, in all Arab

FIGURE 5-1

Innovation system index for the most recent period in comparison to 1995



Source: World Bank database, Knowledge Assessment Methodology (KAM), http://info.worldbank.org/etools/kam2/KAM_page5.asp.

Most studies on innovation place the performance of scientific research and research centres at the heart of the development process and production cycle

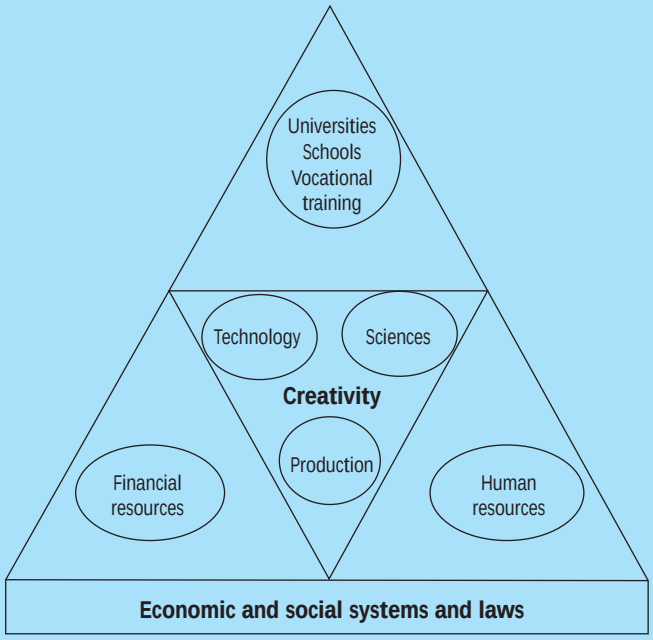
countries, performance in the field of innovation is weak in comparison to that of the other pillars of knowledge.[2]

Figure 5-1 shows that the UAE ranks highest among Arab countries on the innovation system index, followed by Qatar and then Jordan. In comparison to 1995, twelve Arab countries show a decrease in their index value for this pillar, and only five Arab countries show an increase. Three of these five countries are in the group of those with a high level of readiness for the knowledge economy, and two are in the group of those with a medium level of readiness for the knowledge economy. It should be noted that the innovation system index value of a number of developing countries rose in 2005 in comparison to 1995.[3] China achieved the highest increase in this value (1.06), followed by Turkey (0.71) and then Malaysia (0.63). Globally, the ranking of the Arab region decreased, whereas Southeast Asia achieved the highest increase due to the improved levels reached by India and Sri Lanka (Mohammed Bakir, background paper for the Report, in Arabic).

Most studies on innovation place the performance of scientific research and research centres at the heart of the development process and production cycle, as illustrated by Figure 5-2. This figure applies to innovation in science and technology more than to innovation

FIGURE 5-2

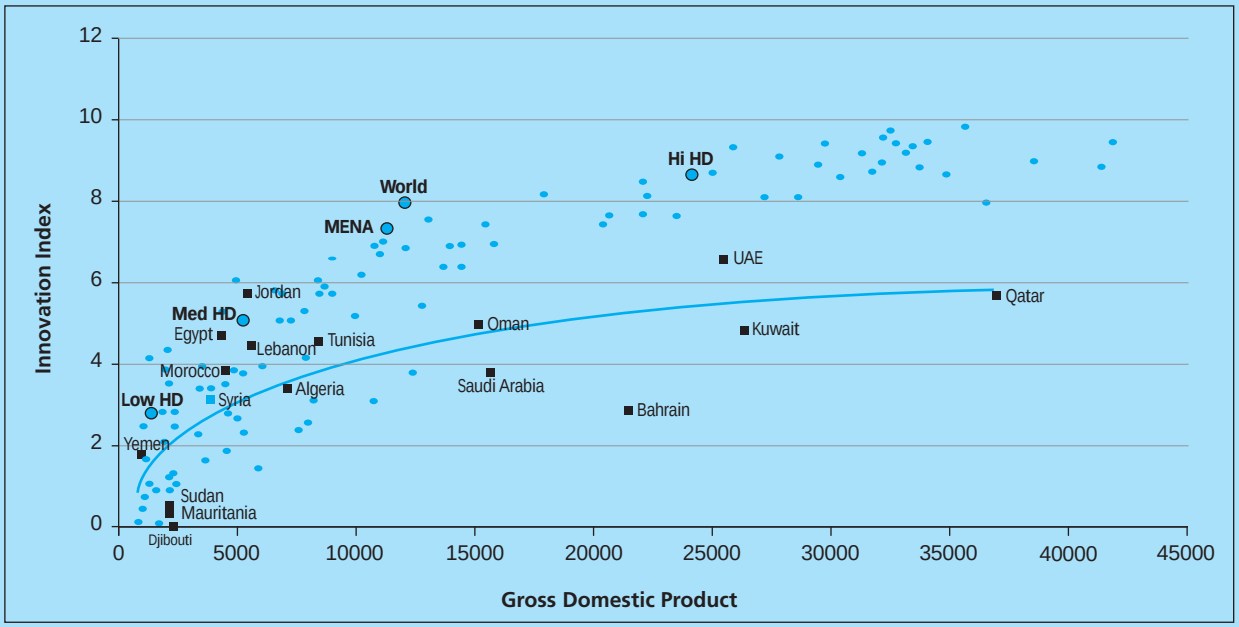
Innovation and development



Source: Estime Programme, 2007. http://www.estime.ird.fr, 2 September 2008

FIGURE 5-3

Per capita GDP and the innovation system index



Source: World Bank database, Knowledge Assessment Methodology (KAM), http://info.worldbank.org/etools/kam2/KAM_page5.asp

in culture and the human and social sciences.

THE CORRELATION BETWEEN GROSS DOMESTIC PRODUCT AND INNOVATION IN THE ARAB REGION

The world's countries can be classified according to the correlation between their Gross Domestic Product (GDP) and innovation. In Western industrial countries and those with growing industrial economies, this typically is a positive correlation, for these countries' positions on the innovation index rise in step with their GDPs. Arab countries, however, do not show a positive correlation between GDP and innovation. Despite the high GDP in oil-producing Arab countries, their ranking on the innovation and scientific research index remains low in comparison to other Arab countries with lower incomes but which are more productive with regard to research and innovation (Figure 5-3).

DEMOGRAPHICS AND THE CHALLENGE OF INCLUSION OF YOUTH

Arab countries face the challenge of a population whose youth and adolescents (ten to twenty-four years of age) now form two thirds of the total and who are expected to number between 120 and 150 million by 2025 (Population Reference Bureau, 2006). Under ideal circumstances, this high percentage would translate into the creative energy of a youthful society, yet many of these Arab young people suffer from unemployment and a brain drain that includes even professionals and highly-qualified individuals.

In early 2008, experts confirmed that the Arab countries were expected to spend more than $3,000 billion in the following few years on construction, development, and infrastructure projects that would require innovation and reliance on scientific products and services and advanced technology. Effective employment of the capacities of youth would alleviate the unemployment crisis in the Arab world,

Despite the high GDP in oil-producing Arab countries, their ranking on the innovation and scientific research index remains low in comparison to other Arab countries with lower incomes but which are more productive with regard to research and innovation

but the integration of innovation, youth, and accumulated wealth requires innovative policies for improving Arab knowledge performance (Zahlan, background paper to the Report).

SCIENCE AND TECHNOLOGY POLICIES

The extremely low amounts spent by Arab countries on research and development have had a negative impact on Arab innovation performance in both quantitative and qualitative terms

Despite the efforts exerted by Arab scientists and researchers, the extremely low amounts spent by Arab countries on research and development have had a negative impact on Arab innovation performance in both quantitative and qualitative terms. Another outcome of this situation is the weak impact of this performance and the limited applicability of its outcomes. In most Arab countries, scientific research agencies are attached to higher education systems rather than to production and service sectors as they are in industrial countries. This has contributed to the creation of a wide gap between education and research on the one hand and economic and social needs on the other.

Science and technology policies require cultural, social, and economic environments that promote participation in a competitive economy and the presentation of outstanding products based upon the outcomes of scientific research. This is what will make a reality of the complementary relationship between innovation and development, allowing innovation to feed the development process and serve as a permanent source for regeneration and progress. At the same time, development will embrace innovation and realise its primary role in both encouraging development and deriving maximum benefit from its results. Creating policies that support science and technology is thus one of the most important steps that Arab countries need to take in order to respond practically, competently, and seriously to the challenges of unemployment among youth, human capital flight, and the increasing drain of financial resources to

BOX 5-1

Official Arab Initiatives for Invigorating Research and Development

The Arab Economic and Social Summit, convened in Kuwait from 19 to 20 January 2009, affirmed the Arab countries' commitment to continue working towards economic and social integration, the encouragement of the private sector and civil society institutions to play a greater role in the advancement of the economy and development; and the initiation of projects that support infrastructure and protect the environment, as well as electricity and road network extension projects. The Kuwait declaration granted particular importance to improving education, human development, and health, while reducing unemployment and combating poverty. It also granted importance to the development of trade and industrial cooperation, as well as to the encouragement of youth and the empowerment of women. Among its most important recommendations were the following:

- Attention to the development of national statistics agencies and the provision of the detailed data and statistical indices necessary for formulating policies and taking appropriate decisions in the fields of development.
- Strengthening the role of the private sector and providing economic and environmental legislation appropriate for it and removing obstacles that prevent the private sector from playing an active role in economic development and in working towards economic integration.
- Pursuing the goal of human development and raising the human capacity of Arab citizens within the framework of the Millennium Development Goals while expanding the scope of empowerment of women and youth and increasing their work opportunities.

Developing educational and scientific research to keep pace with global developments while improving and equipping educational institutions to allow them to perform their missions competently; supporting implementation of the education and scientific research development plan approved at the Khartoum and Damascus summits; funding scientific research budgets; strengthening ties between Arab research centres; indigenising modern technologies; and making optimal use of the skills of scientists. On a separate front, ministers of higher education and scientific research in the Arab world meet every two years to discuss issues of common concern. They have agreed that "the Arab world faces a serious challenge in the fields of higher education, scientific research, and information technology as it enters an era of comprehensive advancement and integrated knowledge. International and regional circumstances call on us to engage with change from a holistic viewpoint and with an open mind, for the scope of these cultural challenges is greater than our capacity to face them." Although Arab ministers agreed on these recommendations eight years ago, they have yet to be implemented. Arab officials continue to insist that scientific research forms a complement to higher education, whereas Western and newly developed countries have moved beyond this limited understanding to tie research directly to industry, trade, and services.

Source: The Arab League Educational, Cultural, and Scientific Organisation, recommendations issued at the meetings held in Abu Dhabi in November 2007 and Sana'a in December 2005. Recommendations of the Arab Economic and Social Summit, Kuwait, 19-20 January 2009.

the import and consumption of ready-made technical products.

ARAB INITIATIVES AND STRATEGIES

Despite repeated official Arab calls to bridge the gap between scientific research and development projects, these recommendations have translated only weakly into reality (see Box 5-1).

National scientific research centres have often relinquished, or been distanced from, their responsibility to develop a national research vision and have left creation of their strategic work plans to the political leaders of their countries. In several Arab countries, however, this orientation began to change at the beginning of the decade, and a number of research centres have now laid out a national research vision tied to development issues. This has occurred in Lebanon (see Box 5-2), Saudi Arabia, Jordan, Tunisia, Morocco, Algeria, Qatar, and the UAE. Yet these efforts remain in their early stages, and their outcomes and impact are difficult to assess at present.

A review of the most prominent strategies prioritizing scientific and technical research in some Arab countries (The Arab League Educational, Cultural, and Scientific Organisation, 2005, in Arabic) leads us to conclude that most have adopted orientations that respond to the needs of food and water security, sustainable development, and technological development. These strategies aim to support innovation and improve competitiveness in sectors such as the petrochemical, communications, information, and renewable energy industries, public health, the medical sciences, and epidemic control, and the social sciences. These orientations reveal a real understanding of the priorities demanded by Arab circumstances, as well as close review by Arab scientists of new fields and specialisations in the arena of science and innovation.

Progress in strengthening research and development policies requires a commitment from the state to establish agencies and institutions dedicated to devising science and technology strategies. National polices must be built, in the first place, upon the state's social and economic development plans in such a way as to achieve the greatest possible degree of partnership between research and development centres on the one hand, and government and private sectors that benefit from their findings on the other. Research and development experience in Saudi Arabia, Lebanon, Jordan, and Morocco has shown that the best policies are those that are built upon collective forecasting and forms of collaboration that are based on solid information.

BOX 5-2

A Policy for Science, Technology, and Innovation in Lebanon

The Science, Technology, and Innovation Policy (STIP) plan in Lebanon is the outcome of three years of work by numerous Lebanese scientists and professionals, and international experts. The documents they produced are marked by both an objective local vision and regional and international ambitions for the future of technological and research development.

Experts analysed the strong and weak points of Lebanon's economic and social forces, as well as the challenges facing them and the opportunities available to them. This allowed the experts to determine the needs of Lebanese society and to formulate recommendations for the priorities of scientific research programmes to be included in the plan. The reports of specialised work groups were integrated into the final plan, which calls for a fundamental shift in the work of relevant parties in the private and public sectors and in universities. The plan seeks to present a holistic vision that ties community, economic, and social needs to the country's human capacities that are capable of creating solutions. It focuses on partnership and consultation among all concerned parties of Lebanese society in both planning and implementation.

The plan recommends specific initiatives in a number of scientific fields that have a direct impact on various economic and production sectors, including a noticeable increase in the material and human resources allocated for research and the upgrade and development of infrastructure. In the mid-range, this approach will lead to obvious economic results. It will drive the Lebanese economy to become knowledge-based and possessed of clear competitive advantages on the regional and international levels through the use made of the youthful human capital that forms Lebanon's primary natural wealth.

Source: Science, Technology, and Innovation Policy Plan, the National Council for Scientific Research, Lebanon, 2006.

National scientific research centres have been distanced from their responsibility to develop a national research vision and have left creation of their strategic work plans to the political leaders of their countries

THE PRODUCTION AND DISSEMINATION OF SCIENTIFIC KNOWLEDGE

In the context of a growing awareness of economic and development challenges, the three Arab Summits held since 2006 have,

It has become clear that the wager on technology transfer, so common in the last century, has ended in failure

Constraints on scientific research in Arab countries are not limited to the absence or weakness of institutional structures or their lack of staff. They also include the weakness of relevant administrative arrangements and legal frameworks

for the first time, approved important resolutions in the area of the production and dissemination of scientific knowledge. These resolutions urge Arab countries to "cooperate in the field of scientific research, increase expenditure on scientific research to 2.5 per cent of Gross Domestic Product (GDP) within the next ten years, encourage government-private partnerships, and establish scientific centres of excellence in socially and economically significant fields such as water, desertification, nutrition, the environment, information technology, agriculture, renewable energy, disease, poverty, and peaceful uses of nuclear energy."[4] These resolutions were included in the ten-year plan for scientific research and development approved by the 2007 Arab Summit held in Saudi Arabia.

The Arabs have an opportunity to join the mainstream of scientific research and innovation, which moves according to its own laws and mechanisms and does not tarry for those who make no effort. It has become clear that the wager on technology transfer, so common in the last century, has ended in failure. The production of knowledge and the mechanisms for its assimilation depend on, in addition to transfer, an environment that supports the researcher's quest for new ideas, and the economic and social applications that they are guaranteed to produce.

PARTNERSHIP WITH THE PRIVATE SECTOR

Partnership between the state, the private sector, and civil society is necessary for the development of scientific research and innovation in any society. Attention must be given to the role of the state as a primary partner in the production and exploitation of local innovation, as experiences in a number of developed countries and in China and Malaysia have proven. This partnership can take the form of either of two intersecting and complementary models. The first comprises active partnership between research and development institutions and institutions of higher education, so that universities provide research institutions with human resources and then research findings are incorporated into educational curricula. The second model is that of active partnership between industry (economic and social service and production sectors) on the one hand, and research and development institutions and institutions of higher education on the other. Such a partnership works toward defining social needs and research priorities, and translates research findings into useful applications.

Military research in Western and Asian countries forms an important sub-field to both research and development and the marketplace. Important data on this area is sometimes made available on expenditure, levels of technological development, and the significance of commercial returns, as well as the role of technological developments in the adjustment of global military and political balances. Yet Arab indices, like international ones, lack precise data on the extent and orientation of research conducted for security, military, and defence purposes. According to the scarce information available in this field, this research is limited to improving military performance and to developing advanced applications of information technology and genetic research with the aim of upholding security, combating crime and terrorism, and maintaining the regime. Some countries, such as Egypt, Saudi Arabia, Syria, Iraq, Algeria, and Morocco, have at various periods established military industries locally by building upon imported technologies.

THE REALITY OF ARAB RESEARCH CENTRES

Constraints on scientific research in Arab countries are not limited to the absence or weakness of institutional structures or their lack of staff. They also include the weakness of relevant administrative arrangements and legal frameworks, and this impacts on the efficiency and effectiveness of these institutions.

FIGURE 5-4

Arab-international cooperation in scientific dissemination, 2004

Source: Estime Programme, 2007

Although Arab countries have public and private scientific research institutions and centres, they are heavily informed by the notion of technology transfer and do not work to indigenise existing knowledge so as to allow for innovation and local knowledge production. As a result, these institutions have not succeeded in determining societal needs and setting research priorities, and this in turn has lowered their actual impact on higher and technical educational curricula. In the context of these structural problems, the complaint is increasingly heard that most researchers fail to show interest in publishing and disseminating their results and thus increasing their benefit to society. Others complain about the weakness of electronic communications with global scientific research networks, with a resulting falling behind by institutions and researchers in following and benefiting from global developments.

Yet the picture is not all that bleak. Strong points do exist, as do initiatives that merit attention and a little hope, if not also a great deal of concern. Arab research centres are diverse and endow qualified individuals with an appropriate education and a considerable accumulation of contemporary experience. These individuals may become prominent heralds of science and innovation if provided with material and moral support.

Arab research centres at first focussed on the basic sciences but subsequently diversified their programmes to include medical and agricultural sciences among other applied specialisations. During the last two decades, human, social, and environmental sciences have been added. There is a focus on locally significant specialisations in some centres, such as

Arab research centres are diverse and endow qualified individuals with an appropriate education and a considerable accumulation of contemporary experience. These individuals may become prominent heralds of science and innovation if provided with material and moral support

BOX 5-3

Expenditure on Research and Development

The fourth annual analysis of expenditure on research and development conducted by the consulting firm Booz and Company showed that the world's largest companies spent 492 billion USD on research and development in 2007, a noticeable increase of 6.7 per cent of compound annual growth rate since 1999. These companies spent an average of 45 per cent of their research and development expenditure in their home countries, and invested the rest in other countries in order to benefit from the latter's experience and skills and their proximity to growing markets. The companies that invested more than 60 per cent of their funds allocated for research and development outside of their home countries recorded a better performance with regard to returns to shareholders, operating margins, and market share.

Source: Barry Jaruzelski and Kevin Dehofff, 2008. "Beyond Borders: The Global Innovation 1000," on the website http://www.strategy-business.com/media/file/sb53_08405.pdf, on 17 December 2008.

Joint research projects among Arab scientific research institutions working in similar fields remain extremely rare even within the same country

palm tree research in a number of Gulf countries, agricultural research in Egypt, Syria, Morocco, and Sudan, and linguistic research in the Maghreb. Surprisingly, joint research projects among Arab scientific research institutions working in similar fields remain extremely rare even within the same country. The joint projects currently being implemented focus on partnerships with Western industrial states (Figure 5-4) and the exchange of scientific visits and training, especially when funding is available. This situation results in persistently weak impact.

The largest and most significant proportion of funding for most Arab research centres comes from the state

With regard to the structure of Arab research and development centres, they function through ministries of higher education and scientific research (eight countries), ministries of education (three countries), and a ministry of planning (one country), in addition to some specialised ministries (agriculture, health, industry). Five Arab countries (Lebanon, Kuwait, Bahrain, the UAE, and Qatar) show an exception to this trend, having assigned the task of research and development to relatively independent councils and academies (Nabil 'Abd al-Majid Salih, 2008, in Arabic). Egypt currently has the largest number of research centres (fourteen specialised government research centres, 219 research centres under the auspices of ministries, and 114 centres at universities). In Tunisia, there are thirty-three research centres comprising 139 laboratories and 643 branch research units. Technological research cities are few and are limited to Egypt, Saudi Arabia, and Tunisia (UNECA, 2008, in French). Other serious attempts exist in the Arab region, such as the Science and Technology Oasis that functions under the umbrella of the Qatar Foundation and sponsors numerous scientific and developmental studies.

The obstacles to funding and the lack of incentive-driven work opportunities for researchers are among the reasons for most Arab countries' weakness in research. This is compounded by a dearth of research, and the scarcity of support offered by public and private industry

The largest and most significant proportion of funding for most Arab research centres comes from the state. In Morocco, Tunisia, and Algeria, for example, research institutions enjoy close relations with the public sector and the state, which in return expects from them a considerable contribution to social and economic development programmes. These institutions have recently begun to take an important step toward developing self-evaluation tools, yet they also continue to suffer from centralised decision-making and their ties to state funding, despite their increasing access to bilateral European programmes and Euromed programmes. The obstacles to funding and the lack of incentive-driven work opportunities for researchers are among the reasons for most Arab countries' weakness in research. This is compounded by a dearth of research, and the scarcity of support offered by public and private industry.

Based on the analysis of the available data on research and innovation practices and outputs, Arab countries can be classified in one of three models:[5]

Model one: Countries whose research centres are characterised by a highly centralised administration and a bureaucratic relationship with the public sector. The funding for these research centres is limited to state contributions, and they show no diversity in their financial or human resources. The missions of these research centres and their programmes are burdened with scientific services required by public utilities. As such, their contribution to the production of original research and patents are limited and they do not include all scientific specialisations (Syria, Libya, Algeria, Sudan).

Model two: Countries whose centres are characterised by flexibility in their relationship with the public sector and diversity in their funding sources and human resources. Their most significant research production, however, remains within the institutions that are able to draw international support and build partnerships with industry. The institutions within this model show promising dynamism, yet they are also characterised by the frequently brief tenure of their experts and their intensive domestic and international travel (Tunisia, Lebanon, Jordan).

Model three: Countries whose centres

are characterised by flexibility towards, and sometimes independence from, the public sector, as well as by diversity of funding sources, and the ability to attract specialists from abroad and guarantee the relative stability of national specialists. A significant percentage of their scientific production comes from universities and private centres, and they are able to benefit from international cooperation programmes and from partnerships with service and industry sectors, as well as from independent national support funds (the UAE, Qatar).

THE CAPACITY OF RESEARCH CENTRES FOR INNOVATION

Due to the lack of detailed and reliable data, it is difficult to conduct a comprehensive evaluation of the capacity of scientific research institutions for innovation, both for the Arab countries in general and on an individual country basis. The reports of the World Economic Forum (World Economic Forum, 2008-2009) list a number of composite indicators that provide a preliminary ranking of Arab countries on the basis of the quality of their research centres' production and the assimilation of information technology into their activities (Tables 5-1 and 5-2).

Tables 5-1 and 5-2 above rank fourteen Arab countries that contain more than three-quarters of the Arab region's population; Malaysia and Turkey are added for comparison. The most conspicuous facts reflected by the data are the following:

- Qatar obtained a relatively acceptable ranking on the global level and first place among the Arab countries (rank, thirty), while four Arab countries (Tunisia, Jordan, Saudi Arabia, and Kuwait) attained middling ranks (forty-second, fifty-first, fifty-second, and fifty-fourth respectively) with regard to the quality of their research institutions. The remaining Arab countries covered by the report placed lower on the list. Malaysian research centres, known for

TABLE 5-1

The quality of Arab research institutions[6]

Country	The quality of Arab research institutions	
	Rank among 134 countries	Rank among Arab countries
Qatar	30	1
Tunisia	42	2
Jordan	51	3
Saudi Arabia	52	4
Kuwait	54	5
Oman	59	6
UAE	74	7
Syria	89	8
Morocco	94	9
Egypt	96	10
Bahrain	100	11
Algeria	108	12
Turkey	52	..
Malaysia	20	..

Source: The World Economic Forum, 2008b

TABLE 5-2

Ranking of Arab countries in the Assimilation of Technology index[7] **(out of 134 countries)**

Country	Technology assimilation at the institutional level	Networked readiness
UAE	14	27
Qatar	40	29
Tunisia	34	38
Bahrain	36	37
Oman	95	50
Kuwait	28	57
Jordan	35	44
Egypt	63	76
Morocco	70	86
Syria	87	94
Libya	97	101
Algeria	128	108
Mauritania	79	109
Saudi Arabia	44	40
Malaysia	21	28
Turkey	48	61

Sources: World Economic Forum website http://www.weforum.org/pdf/gitr/2009/rankings/pdf on 12 June 2009.

Theoretically, the more researchers there are, the higher the quality and quantity of research. Yet this correlation between the number of researchers and the yields of scientific research does not hold true of the Arab region

their quality, ranked twentieth globally.

- The UAE obtained a relatively high ranking (fourteen) among the thirty top nations heading the institutional technology assimilation list, outperforming the comparison countries (Malaysia and Turkey). Kuwait came twenty-eighth, surpassing the second comparison country (Turkey). Some other Arab countries (Tunisia, Jordan, and Bahrain) were close behind, coming in at thirty-fourth, thirty-fifth, and thirty-sixth respectively, while the rest of the Arab countries lagged behind. UAE and Qatar also recorded relatively high ranking technology preparedness indicator at the global level, occupying twenty-seventh and twenty-ninth place respectively and higher than the remaining Arab countries.
- Most of the Arab countries occupied medium ranks (from thirtieth to one hundredth) for all indicators, with noticeable improvement in the indicators of technology assimilation and technological preparedness in the Arab Gulf countries (Kuwait, UAE, Qatar, Bahrain, Oman). This points to the presence of a number of special factors in these countries, including financial prosperity and the role of global oil and gas companies in introducing modern technologies to the oil-producing Arab countries.

TABLE 5-3

The number of researchers in the Arab region[9]

Country	Researchers per million inhabitants		Availability of researchers (out of 134 countries), World Economic Forum 2008-2009
	ESTIME 2007	COMSTECH 1998-2007	
Tunisia	492	1013	10
Algeria	170	..	41
Egypt	..	..	47
Morocco	166	782	68
Jordan	280	1927	39
Kuwait	..	69	62
Libya	..	361	44
Syria	..	29	40
Saudi Arabia	..	..	43
Qatar	..	1236	53
UAE	..	..	75
Oman	..	..	95
Bahrain	..	..	94
Iraq	..	..	..
Lebanon	200	..	..
Sudan	..	263	..
Occupied Palestinian Territories	..	..	..

World Economic Forum, in English, 2008b
World Bank Database, Knowledge Assessment Methodology (KAM), on 10 June 2009
ESTIME, in English 2007
COMSTECH, 2007

THE PERFORMANCE OF ARAB RESEARCHERS

Theoretically, the more researchers there are, the higher the quality and quantity of research. Yet this correlation between the number of researchers and the yields of scientific research does not hold true of the Arab region, partly due to the difficulty in defining the role of the researcher there, even within a single country. The concept and specifications of the researcher's mission vary in the Arab region, just as international descriptions vary for the full-time researcher and the research professor. Countries need to produce comparable and analysable indicators for these kinds of issues.

Teaching staff at Arab universities, who constitute the majority of researchers in the Arab region, are burdened with teaching duties of twice the scope of those of their colleagues in Western universities. It is rare for the actual research activity of teaching staff in government and most private universities to exceed 5 to 10 per cent of their total academic duties, whereas it forms 35-50 per cent of academic duties in European and American universities, which consider this high percentage a marker of the practical value of higher education and of the effective role played by university professors.[8] The lack of clear guidelines and incentives for full-time scientific research and development as a profession may explain why most

researchers prefer to remain in universities, turn to other professions that realise higher returns, or join the caravan of migration from the Arab region.

The data available on the Arab countries demonstrates clearly that the relationship between the quality of research centres and the number of researchers is not always positive; Tunisia is an exception. Tunisia, Qatar, and Morocco are distinguished by their relatively high numbers of scientific researchers, as shown in Table 5-3.

According to World Economic Forum statistics, Tunisia holds the highest rank for the number of researchers, both among Arab countries and globally, ranking ninth among 134 countries. Jordan, Algeria, Libya, and Saudi Arabia hold acceptable ranks (less than forty-fifth), while the remaining countries hold lower ranks. A recent study that relies primarily on government data from ten Arab countries (Nabil 'Abd al-Majid Salih, 2008, in Arabic) shows Egypt as having the highest number of full-time researchers (13,941 at universities and research centres) and that these researchers show the greatest diversity of research interests (agriculture, materials sciences, manufacturing, metals, oil, water, energy, and medicine). In this study, Egypt was followed by Algeria (5,943), Tunisia (5,625), Morocco (4,699), and Jordan (2,223), while the number of full-time researchers was less than 1,000 in each of Qatar (789), Kuwait (634), Oman (548), Yemen (486), and Mauritania (411). On the basis of a survey of nine Arab countries, women accounted for 40 per cent of researchers in Egypt and Kuwait, 30 per cent in Algeria and Qatar, and 20 per cent in Morocco and Jordan. Their numbers fell to as low as between 14 and 4 per cent in Oman, Yemen, and Mauritania.

Despite the low percentage of women among scientific researchers, female Arab researchers have excelled globally in numerous fields. Among them are Algerian Asya Jabbar, elected to the French Academy, Jordanian Huda al-Zughbi, elected to the

BOX 5-4

Pioneering Arab Innovators in Genetic Science

Lihaz al-Ghazali, who works in the paediatrics department of the medical school at Al-Ain University in the UAE, helped establish the first Arab medical centre for clinical genetics in Dubai and the Arab Centre for Genome Studies, which is dedicated to studying genetic composition from the biological and medical perspectives. Her regional academic and medical experience is apparent in her research, which has uncovered the natural history of many of the genetic syndromes found in the Arab region. The international medical journal Lancet devoted its biographical page on famous doctors to her in its 25 March 2006 issue, and she was awarded the 2008 UNESCO-L'OREAL award for the Arab region. The statement accompanying this award praised the team she supervised for its identification of fifteen regressive genes and the mapping of seven genes. It stressed the need to know what genes are and the effect on society of genetic diseases such as haemoglobin disorder, birth defects resulting from regressive genes, and metabolic disorders, and their relation to the high percentage of consanguineous marriages in the Arab world.

The lack of clear guidelines and incentives for full-time scientific research may explain why most researchers prefer to remain in universities, turn to other professions that realise higher returns, or join the caravan of migration from the Arab region

BOX 5-5

The Ten Commandments for Researchers in Low-income States

Scientific research shares common academic characteristics around the world. These include the capacity to study the natural world, a commitment to the concerns of society, acceptance of criticism, productivity, and transparent teamwork based on solid scientific methodology. In a number of Arab countries, success in the profession requires that scientific researchers additionally meet a number of other specifications that can be summarised by the following Ten Commandments:

- Fully understand the conditions of the country and society.
- Focus on beneficial scientific research, and do not become preoccupied with trivial matters.
- Carefully select research projects and methodologies.
- Improve communication skills in foreign languages (English is a must).
- Build local and regional / international networks of cooperation.
- Commit to involving young researchers in research projects, and also to training them.
- Write highly competitive research proposals, and submit them in requests for support from international institutions.
- Publish in respected international journals.
- Persistently pursue self-education.
- Believe in and be proud of the scientific research profession.

This text draws on Moreno and Gutiérrez, 2008.

Despite the low percentage of women among scientific researchers, female Arab researchers have excelled globally in numerous fields

American Academy of Sciences, Lebanese Rabab Karidiya, elected to the Canadian Academy of Science, and Iraqi Zuha' Hadid, who has won global awards. The performance of female Arab researchers has also been distinctive in medical and public health research, with females appearing in higher numbers than males in Egypt, Jordan, Morocco, and Oman. These indicators are significant in that they reflect the development of the role of Arab women in building the field of research and innovation, as well as their direct participation in the development of social sectors, particularly by eradicating some forms of discrimination and securing equal employment opportunities in a field that requires many years of effort and persistence.

Average expenditure on scientific research does not exceed 0.3 per cent of the GDP in most Arab countries

It is clear from the above that the number of Arab countries that have invested human resources in full-time scientific research remains limited, and they score lower on the basis of this criterion than similar countries around the world. Yet the failure of these statistics to include Arab countries with extensive research experience and the lack of a unified instrument for surveying researchers may have led to an underestimation of the critical scientific mass that is capable of directing future research and development.

SCIENCE RESEARCH FUNDING IN THE ARAB WORLD

The annual share per Arab citizen of expenditure on scientific research does not exceed $10, compared, for instance, to the Malaysian citizen's annual share of $33

Average Arab expenditure on scientific research does not exceed 0.3 per cent of Gross Domestic Product (GDP) in most Arab countries, exceptions being Tunisia, Morocco, and Libya, whose spending rates are in excess of 0.7 per cent.[10] However, averages reach 3.8 per cent in Sweden, 2.68 per cent in the USA, 3.51 per cent in Finland, and 3.18 per cent in Japan. Rarely is average expenditure on scientific research lower than 1.8 per cent of the GDP in the European or the young Asian countries.[11] Yet added to this funding crisis for government and private research institutions in the Arab world are complications created by the administrative and financial systems that most of them deal with and which make them captive to bureaucratic routines in approving expenditures, equipment procurement, salaries, and bonuses. Some countries have additionally placed new restrictions on science-related expenditure such as appropriating a percentage of foreign aid allocated for scientific research projects and imposing taxes on science-related purchases similar to those imposed on commercial or consumer goods. In Egypt and Lebanon, for example, tariff laws and statutes do not distinguish between consumer goods and research materials. Such modest funding cannot help to improve Arab performance in innovation and research. What Arab research institutions need most are financial resources to fund the infrastructure of research and development.

In contrast to advanced industrial states, funding of scientific research in Arab countries depends on a single source—the government. This amounts to approximately 97 per cent of the funding available for scientific research in the region (Sasson, 2007). In contrast, government funding does not exceed 40 per cent in Canada, 30 per cent in the USA, and is less than 20 per cent in Japan.[12]

To get an idea of the status of Arab countries in comparison to developed states with regard to the extent of government spending on research and development, we provide data that shows that spending by the private sector in developed states (Britain, France, Germany, and the USA) is nearly twice that by the public sector. In Arab countries, the situation is not merely reversed; the private sector contribution amounts to barely 5 per cent, even though total spending on research amounted to a meagre 0.2 per cent of GDP in 2002 (Adib Kulu, 2006, in Arabic). In the Arab world, support for research and development programmes is generally concentrated in direct government funding and in official university programmes. There is a clear inability to attract substantial funding from foreign programmes or the private sector.

Arab countries can be ranked in terms of expenditure on scientific research using the data shown in Table 5-4 below, which demonstrates the following:

- Tunisia holds first place among Arab countries, with spending on research and development exceeding 1.3 per cent of GDP. Morocco follows, with 0.75 per cent spent on research and development thanks to the allocation of a significant portion of mobile phone revenue and that of some agricultural and industrial production sectors to this end.
- The private sector makes a relatively active contribution to funding research in Oman, Tunisia, Qatar, and Saudi Arabia, with an indicator ranging from 3.5 to 3.9 (with 1 being the lowest and 7 the highest.)
- In the same context, Qatar, Tunisia, Saudi Arabia, and Oman held first place among Arab countries, followed immediately by the UAE. The rest of the Arab countries placed below fiftieth (out of 134 countries).

It is worth pointing out the exceptional Arab initiative approved by Qatar in mid-September 2008 that calls for the allocation of 2.8 per cent of the general budget to support scientific research (Law Number 24 of 2008 regarding support and regulation of scientific research).

When the average per capita share of total expenditure on scientific research is calculated as a measure of a state's scientific and technological advancement, the results for the Arab region are disappointing overall, despite the significant differences between countries. The annual share per Arab citizen of expenditure on scientific research does not exceed $10, compared to the Malaysian citizen's annual share of $33. Record levels are spent in small European countries such as Ireland and Finland, where annual expenditures on scientific research per capita reach $575 and $1,304 respectively.[13]

The availability of only modest government funding may lead to the consideration of alternative sources and

TABLE 5-4

Expenditure on research in the Arab region

Country	Government spending as a percentage of 2006 GDP[1]	Private sector spending (scale of 1-7)[1]	Corporate spending on research (out of 134 states)[2]
Oman	..	3.9	44
Tunisia	1.3	3.8	38
Qatar	..	3.6	35
Saudi Arabia	..	3.5	43
UAE	..	3.3	50
Morocco	0.75	3.2	69
Egypt	0.2*	3.1	57
Kuwait	0.18	3.1	93
Jordan	0.34	3.1	79
Algeria	..	2.8	116
Syria	..	2.7	115
Bahrain	..	2.6	82
Libya	0.7*	..	124
Lebanon[3]	0.2	..	..
Sudan	0.3	..	..

Sources:
[1] World Bank Database, Knowledge Assessment Methodology (KAM), on 10 June 2008
[2] The World Economic Forum, 2008b
[3] The National Council for Scientific Research, Lebanon
*COMSTECH, 2007

TABLE 5-5

Expenditure on research and development and percentage contributions from private and public sectors in comparison countries

Country	Spending on research and development (percentage of GDP)	Percentage private sector contributions (percentage of GDP)	Percentage public sector contributions (percentage of GDP)
Sweden	3.73	2.79	0.94
Japan	3.39	2.62	0.77
Finland	3.37	2.46	0.91
United States	2.61	1.84	0.77
Germany	2.53	1.77	0.76
France	2.09	1.34	0.75
European Union (27 states)	1.84	1.11	0.73
China	1.42	1.01	0.41
Spain	1.20	0.67	0.53
Italy	1.09	0.54	0.55

Source: The Organisation for Economic Co-operation and Development (OECD); the European Statistical Service Groups; UNESCO; the National Institute of Scientific Research (Quebec); Science and Technology Observatory, 2007.

BOX 5-6

Jordan's "A Professor in Every Factory"

This pioneering project aims to benefit from the wealth of knowledge among academics and to strengthen the experience of researchers by solving practical problems in the industrial sector, creating opportunities for the formulation of development projects, and strengthening the competitive skills of small and medium-sized industrial companies. The project selects industrial institutions and then organises visits to them by a university professor or researcher, after which a preliminary report is produced on the technical and administrative problems faced by the institutions. The project secures the presence of a researcher in each factory throughout the academic summer vacation for at least 10 hours each week. The Supreme Council of Science and Technology covers 80 per cent of the researchers' costs, and the industrial institutions cover the other 20 per cent. The fields currently covered include engineering, business administration, agriculture, science, and information technology, though the project is open to any other fields in which the production sectors may need assistance and will provide them with relevant local experience. Among the most significant indicators of this project's success is the continued participation of supporting agencies since its launch in 2003. Supporting agencies, convinced of the project's role in developing the academic and industrial sectors, have increased in number from four to eleven, while the value of support has increased tenfold.

Source: Jordan University of Science and Technology http://www.just.edu.jo/fff/intro.htm

Production and service sectors of Arab countries typically rely on imported, ready-made technology, on the basis of turn-key agreements

invigorate the contributions of the private sector, whose contributions to scientific research have in fact increased recently. However, this increase remains modest, and includes that spent on research and development within companies. The primary reason for this may be that production and service sectors typically rely on imported, ready-made technology, on the basis of turn-key agreements.

While the World Trade Organisation has placed tight restrictions on state support for production sectors, spending on research and development is exempted from these restrictions.As such, most advanced states have approved the allocation of large budgets for research and development, and have granted a clear priority to research projects that include effective partners in the production and service sectors. Within this context, most industrial states consider spending by production and service sectors on research and development to be tax exempt, which creates an additional incentive for companies to spend in this field and thus maintain their competitive strength in international markets.

Foreign funding may lead to distancing researchers and their teams from research that is tied to national policies and priorities

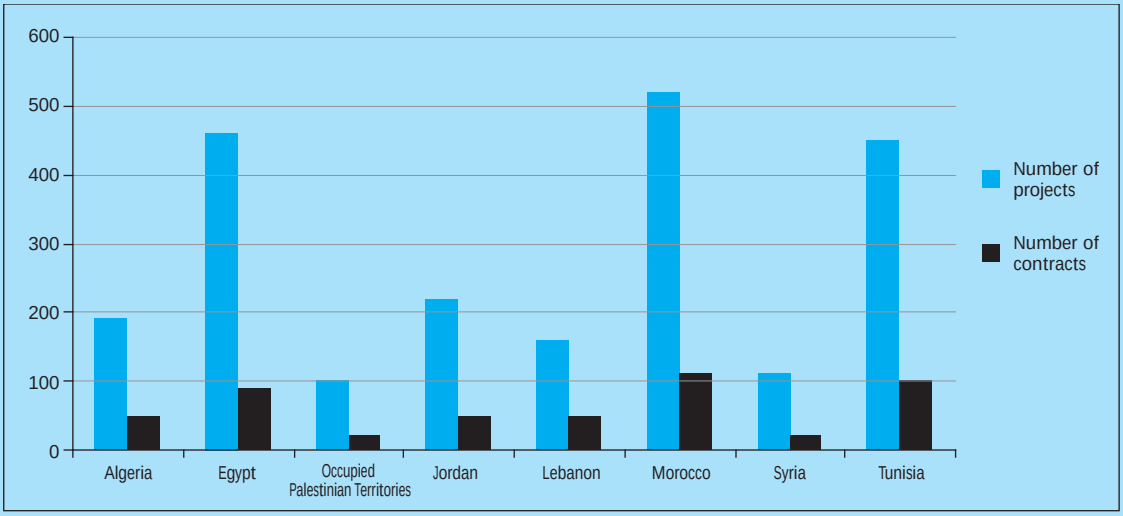
The reliance of scientific research centres on internal resources requires that they make efforts–with no guarantee of their results–to market their scientific and technological services and to offer their experience in helping to solve problems faced by the industrial, agricultural, and service sectors in return for financial compensation. The few research centres around the world that have been successful in this approach have not been able to cover more than a small amount of their annual expenditure. Thus researchers in Arab countries strive to obtain foreign funding for their projects and fail when their research falls outside the priorities of international programmes. Typically the targets set by such programmes are limited to cooperation and the establishment of research networks among states in the global North and South.

There is growing interest among most Mediterranean Arab countries in benefiting from the significant support offered by Europe as part of the programmes launched through the Barcelona Process. Morocco, Egypt, and Tunisia submitted the largest number of research proposals to the call of the European Union's Sixth Framework Programme for Research and Technological Development (2002-2006) for proposals and received the highest number of acceptances. Yet European-Arab scientific partnership remains slow-moving in Palestine, Syria, Lebanon, Jordan, and Algeria (Figure 5-5).

Bilateral international support is often offered to fund research centres on the basis of the political relations between

FIGURE 5-5

Arab participation in the European Union's Sixth Framework Programme (2002-2006)[14]



Source: European Union, Sixth Framework Programme, 2007, www.ec.europa.eu/research/fp6

the countries involved. Foreign funding may lead to distancing researchers and their teams from research that is tied to national policies and priorities. This often affects the most competent of researchers because these are best able to attract foreign support. Thus the ability of the Arab world to benefit from the experience and efforts of its most competent scientists is decreasing. Open-competition programmes of international support prioritise limited social, developmental, and scientific goals, leading some Arab researchers to avoid them, particularly when they address sensitive issues such as the manifestations of religious

The ability of the Arab world to benefit from the experience and efforts of its most competent scientists is decreasing

BOX 5-7

The European Growth Strategy

In early 2008, Europe decided that the greatest challenge facing its twenty-seven states lay in its ability to transform itself into the most competitive and dynamic knowledge economy in the world by 2010. Following a technology setback at the beginning of the new millennium as a result of the gap imposed by the development of internet systems and the economic ramifications of the USD exchange rate, the European Union bounced back and drew up strategies for competitive growth based on innovation and supported by competent human resources. For two decades, Europe had striven for economic, environmental, and social achievement, while goals accumulated, interests clashed, and the necessary financial resources remained unsecured. Since early 2005, policies have focussed on growth and employment opportunities, and each state has committed to socially acceptable reform programmes. Intense efforts have been exerted in scientific research and higher education.

The most significant outcomes of this approach are represented in the European Union's Seventh Framework Programme for Research and Technological Development (for 2007-2013, with a budget of 53.2 billion euro), the European Research Council (2006), and the establishment of the European Institute of Innovation and Technology. Investment in research and higher education is one of the primary entrance points for growth in the knowledge economy, and is fundamental to the unified European budget planned for 2012. Among other approved initiatives is the facilitation of the movement of researchers between European states (the ERA-NETS Programme), the funding of transnational research projects, the establishment of major centres of excellence, and a focus on research that directly reflects social needs, such as containing climate change, population ageing, and incurable diseases.

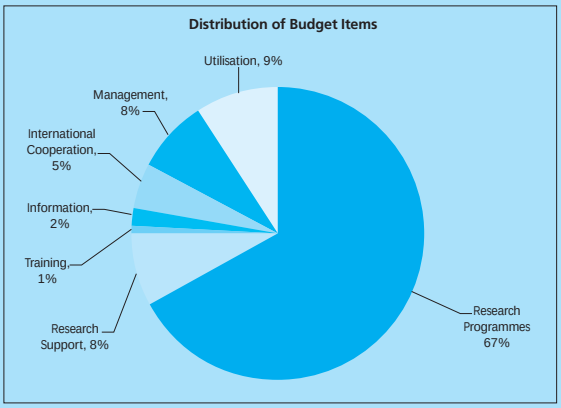
Source: European Commission, Sixth and Seventh Framework Programmes, http://cordis.europa.eu/fp6/dc/index.cfm?fuseaction=UserSite.FP6HomePage, http://cordis.europa.eu/fp7/cooperation/home_en.html

BOX 5-8

ICARDA

For the last three decades, the International Center for Agricultural Research in the Dry Areas, ICARDA, (Aleppo) has been committed to issues such as agricultural research development, open exchange of germ plasma and data for use in research, protection of intellectual property rights including the local knowledge of farmers, development of human resources, sustainable use of natural resources, and lessening the burden of poverty in dry areas all over the developing world (Western Asia, North Africa, Central Asia, the Arabian Gulf, and the Horn of Africa). ICARDA receives most of its private budget from the Consultative Group on International Agricultural Research, CGIAR, and a large number of international and Arab funds (totaling forty-one in 2007), in addition to direct support for private projects. ICARDA is run by an independent board of trustees that includes a number of prominent figures from developing and newly developed countries in addition to a director general. The centre is distinctive in its balancing of resources and spending and in its annual development, as well as in its high percentage of allocations to research projects and its ability to draw support as an international authority in dry region research the world over.

Source: The International Center for Agricultural Research in the Dry Areas (ICARDA), http://www.icarda.cgiar.org/AboutICARDA.htm



Source: ICARDA Annual Report, 2007, http://www.icarda.cgiar.org/Publications/AnnualReport/ICARDA_AR2007.pdf

fundamentalism, issues related to minorities, and the development of democracy.

In light of the above, researchers are—rightly—asking for increased funding for their research, while the public sector, pro-active funding agencies, and private institutions are—again rightly—stipulating greater impact and more creative and dependable returns. There is no solution to this problematic other than building clear, programmatic partnerships between knowledge-producing institutions and researchers on the one hand and those who benefit from their research on the other.

The achievements of Arab institutions are considered meagre both by international standards and by their own self-evaluation and that of their societies

The achievements of Arab institutions are considered meagre both by international standards and by their own self-evaluation and that of their societies. It can be argued that this weakness substantiates the claim that while financial support comprises a primary component of scientific research, it does not guarantee its quality or usefulness. If the funding of research and the capacity to attract additional funding are part of the basic enterprise constituting scientific knowledge and inventiveness, they are tied ultimately, at the institutional and human resources levels, to the assured presence of the following:

- Scientific research institutions that are credible and transparent in their administration and enjoy good relationships with the higher education system and the economic and social sectors. These institutions must be actively involved in solving development problems.
- The institutions should be administrated by decentralised bodies that include experts and figures drawn from various sectors of society and known for their distinction and credibility.
- Flexible financial systems must be approved and must be subject to close monitoring by independent agencies. This is in addition to systems for accountability, oversight, and on-going evaluation.
- The institutions should have the ability to take initiative and to represent the scientific community at national and international events through innovative programmes and projects that have positive, short-term local impact in the context of regional and global scientific concerns.

THE OUTPUTS OF ARAB SCIENTIFIC RESEARCH

While the outputs of research and innovation are numerous, peer-reviewed publications and patents are the most common and expressive indicators of scientific activity. Among the many global databases on the quantity and type of scientific articles published in peer-reviewed journals the most prominent are France's Pascal (CNRS-INIST) database and the Science Citation Index (SCI) database published by the Thomson

Institute in the USA. By analysing the quantitative indicators for Arab scientific publications contained in these databases, as well as those in the World Bank's KAM 2008 indicators and the studies of the Standing Committee on Scientific and Technical Cooperation (COMSTECH), a number of significant facts can be gleaned on what the Arab world has and has not accomplished. The most significant of these is that Egypt, Saudi Arabia, Tunisia, and Morocco lead the Arab countries in scientific publishing.

The total number of scientific articles published in sixteen Arab countries in 2005 was 4,859.[15] Egypt held first place with 34 per cent of the total number of publications, followed by Saudi Arabia and Tunisia with 11.8 per cent, while the percentages held by Morocco, Algeria, Jordan, Lebanon, Kuwait, and the UAE ranged from 4.7 to 9 per cent. As such, and following a lengthy Arab absence from scientific publishing that has only recently come to an end, Arabs now account for 1.1 per cent of global scientific publishing (TWAS, 2005).

Since the mid-1990s, Arab scientific publishing has recorded a clearly rising trend in Egypt and the Maghreb, and to lesser degrees in the Mashreq (eastern) and the Arabian Gulf countriesstates (Figure

TABLE 5-6

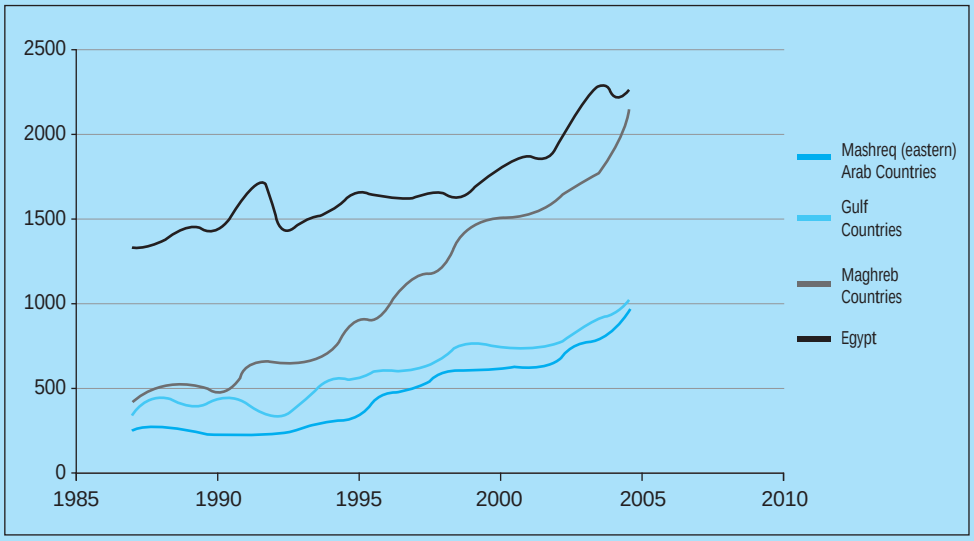
Number of scientific publications in selected Arab Countries[16]

Country	Number of scientific publications, 2005[1]	Scientific publications per 1,000 global publications[2]
Egypt	1658	2.83
Saudi Arabia	575	..
Tunisia	571	0.80
Morocco	443	0.87
Algeria	350	0.49
Jordan	275	0.55
Lebanon	234	0.35
Kuwait	233	..
UAE	229	..
Oman	111	..
Syria	77	0.11
Sudan	43	..
Bahrain	29	..
Qatar	19	..
Yemen	10	..
Mauritania	2	..

Sources:
[1]The World Bank, Knowledge Assessment Methodology, KAM, 2008
[2]Thompson Reuters, Scientific Citation Index, http://scientific.thompson.com/products/co. on 30 August 2008

FIGURE 5-6

Number of scientific papers published in the Arab region

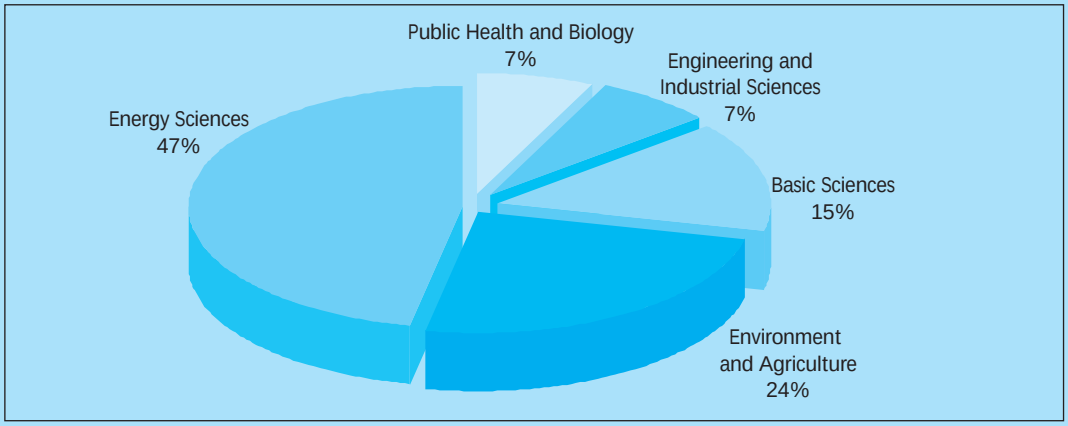


Source: UNESCO, 2008b

Arabs now account for 1.1 per cent of global scientific publishing

FIGURE 5-7

Published scientific articles according to specialisation (1998-2007), based on Table 5-7



Source: COMSTECH, 2007

TABLE 5-7

Number of scientific articles published in the Arab world, 1998-2007

Country	Number of scientific articles published from 1998-2007						Number of articles per one million inhabitants (2005)
	Environment and agriculture	Public health and biology	Basic sciences	Energy Sciences	Engineering and Industrial Sciences	Total	
Egypt	827	205	720	2276	245	4273	50.9
Jordan	474	113	202	523	113	1425	177.3
Morocco	366	78	317	614	69	1444	39.1
Saudi Arabia	352	111	183	846	182	1674	72.3
Tunisia	264	95	179	622	56	1216	146.2
Kuwait	240	56	70	216	81	663	267.2
Algeria	206	20	190	737	67	1220	27.1
Syria	183	30	25	92	9	339	12.8
Lebanon	160	158	83	201	53	655	347.3
Oman	145	20	52	152	39	408	117.2
Sudan	62	29	3	32	4	130	4.4
Libya	31	8	10	39	9	97	14.7
United Arab Emirates	29	6	5	39	8	87	66.3
Bahrain	26	7	7	54	16	110	189.7
Iraq	26	3	8	57	13	107	3.8
Qatar	24	7	16	50	6	103	226.2
Yemen	18	6	2	24	7	57	2.7
Mauritania	18	6	2	6	..	32	7.5
Occupied Palestinian Territories	12	2	4	13	4	35	17.3
Comoros	4	..	..	..	..	4	8.2
Djibouti	2	..	..	..	..	2	6.3
Somalia	1	..	..	..	..	1	0.3
Total	3470	960	2078	6593	981	14082	..

Source: COMSTECH, 2007

5-6). A tabulation of all the Arab peer-reviewed scientific publications in forty-seven scientific and technical specialisations published over the last ten years (1998-2007) reveals a total of 14,000 articles (Figure 5-7 and Table 5-7), while Turkey alone published 9,800 studies during the same period. Close inspection of the content of these scientific publications allows us to categorise it into five research foci. Energy studies comprise a high percentage of these publications, followed by the agricultural and environmental sciences and then the basic sciences. Engineering and industrial science publications are on a par numerically with those of public health and biology.

TABLE 5-8

Arab-international cooperation in scientific publishing

Rank	Tunisia Country	%	Egypt Country	%	Lebanon Country	%
1	France	77.0	United States	27.9	France	37.0
2	United States	5.7	Germany	14.9	United States	32.3
3	Germany	4.1	Saudi Arabia	12.4	United Kingdom	10.1
4	Italy	3.7	Japan	10.3	Canada	6.9
5	Belgium	3.6	United Kingdom	8.6	Bahrain	4.5
6	Canada	3.6	Canada	5.3	Italy	3.8
7	United Kingdom	3.1	Italy	4.1	Saudi Arabia	3.2
8	Morocco	2.2	Belgium	3.1	Germany	..
9	Spain	2.1	France	2.9	Australia	..
10	Algeria	1.5	Spain	2.2	Egypt	..

Source: Thomson Reuters and the Science and Technology Observatory (Observatoire des Sciences et Technologie - OST, Quebec, Canada), 2007

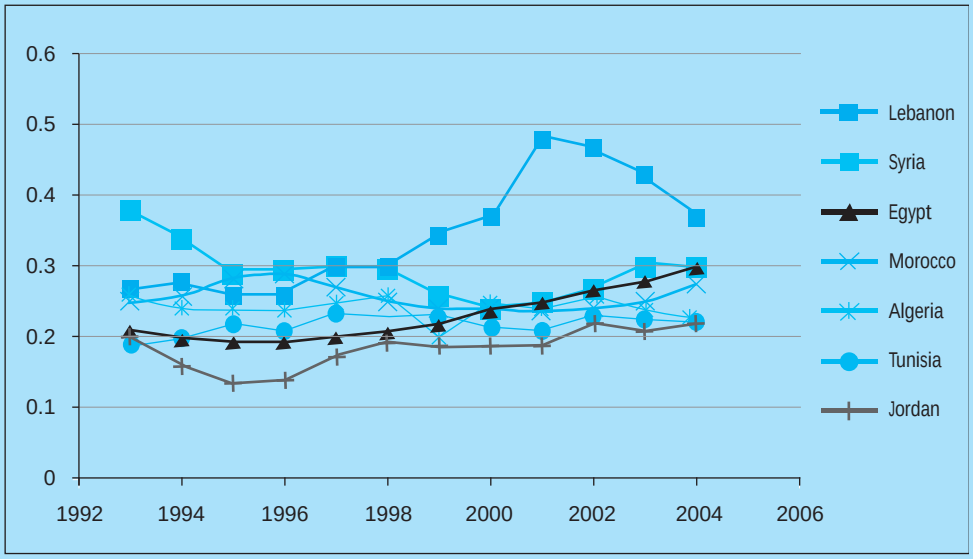
GLOBAL ENGAGEMENT

In contrast to the above, there are also positive signs that attract attention, the most striking of which is the increase in joint publications between Arab researchers and their peers in European countries and North America. A study of three Arab countries known for their ability to cooperate with foreign programmes (Table 5-8) shows that France is Tunisia's primary scientific partner. Egypt has a conspicuous scientific partnership with the USA, and shows reasonable degrees of scientific partnership with Germany, Saudi Arabia, Japan, and Britain. The percentages of Lebanon's research partnerships with France and the USA are similar. These partnerships can perhaps be interpreted as

There are positive signs in the area of Arab scientific research, the most striking of which is the increase in joint publications between Arab researchers and their peers in European countries and North America

FIGURE 5-8

Scientific impact of Arab publications[17]



Source: Thomson Reuters, Science Citation Index, 2007, and ESTIME Programme, 2008

A review of the period from 2002 to 2006 shows that, out of thirteen Arab countries, Saudi Arabia had the highest average number of patents issued, at 14.8 per year, followed by Kuwait and Egypt, and then the UAE, Lebanon, and Jordan

In order to register and protect their patents in preparation for marketing them to production sectors and turning them into high-quality products, goods, or services, Arab researchers are forced to seek out fictitious partnerships with foreign scientific institutions

an outcome of the historical and cultural relations between Lebanon and the Maghreb on the one hand and France on the other, in addition to Lebanon's recent economic relations with the USA. Arab-Arab relationships are noticeably weak with the exception of a few successful partnerships such as those between Egypt and Lebanon on the one hand and Saudi Arabia on the other, as a well as to a lesser degree between countries in the Maghreb.

To clarify further the scientific value and importance of Arab scientific publications, the Science Citation Index (SCI) lists only a relatively limited number of citations for studies by Arab researchers in comparison to those published from other regions of the world. Whereas the average citation of a single paper from the USA is 3.82, and from South Korea 1.51, the average number of citations from the Arab region ranges from 0.99 for Lebanon and 0.60 for Egypt, and goes as low as 0.01 for other Arab countries.

Similarly, the indicator of the scientific impact of articles published by Arab researchers has also brought low results since the early 1990s, approaching 0.5 only in rare cases, most notably in Lebanon, which has shown some distinction in this regard since 2000. The global average for the indicator, in comparison, is between 0.8 and 1.0 (Figure 5-8).

Arab science periodicals not included in international databases number no more than 500, about a third of which are published by Egyptian universities and research centres and the rest of which are distributed among Morocco, Jordan, and Iraq.[18] Arab science journals suffer from fundamental problems such as irregular publishing, lack of objective peer review of the articles accepted for publication, and resort to the unedited publication of the proceedings of conferences and seminars. Additionally, some of these periodicals are not regarded as credible for academic promotion purposes, which makes many researchers and academics prefer to publish in international, peer-reviewed journals.

The situation is similar with patents, which are another vital indicator of innovative performance and one that more accurately reflects the capacity of scientific research to produce innovative outcomes than does the status of Arab scientific publishing. The number of patents registered with national institutions is minimal, but in any case national institutions do not have the jurisdiction to protect rights internationally. Although comprehensive statistics are not available, a recent study (Nabil 'Abd al-Majid Salih, 2008, in Arabic) notes that Egypt and Morocco lead the Arab countries in this regard, with a total of 500 registered patents per year, whereas the six other countries covered by the study produce less than fifty patents annually. Numbers are available for the patents registered with the United States Patent and Trademark Office (USPTO) during 2005 and 2006 for only seven countries (Figure 5-9). Saudi Arabia stands out among these countries with thirty-seven patents, followed by the UAE, Egypt, and Kuwait (around ten patents each).[19]

A review of the period from 2002 to 2006 shows that, out of thirteen Arab countries, Saudi Arabia had the highest average number of patents issued, at 14.8 per year, followed by Kuwait and Egypt, and then the UAE, Lebanon, and Jordan. The rest of the Arab countries averaged less than one patent per year. For comparison, the annual average of patents issued during the same period in Turkey was 18.6, in Malaysia it was 74.4, in Ireland 170.8, and in Finland 854.8.[20]

In the same context, the utility patents indicator does not differentiate the achievements of oil-producing from those of other Arab countries, with Kuwait, Saudi Arabia, Jordan, and Egypt at the forefront. In contrast, the ranking of the other eight countries fell to seventy and below out of 134 countries. Most Arab researchers are challenged by the exorbitant costs associated with registering patents with American and European institutions, and are forced to seek out fictitious

partnerships with foreign scientific institutions in order to register and protect their patents in preparation for marketing them to production sectors and turning them into high-quality products, goods, or services.

Analysis of the outcomes of Arab scientific research shows weak yields for most indicators in comparison to other regions of the world. Despite the relatively high GNPs of some countries of the Arab region, Arab innovative, scientific, and research performance is not faring well in comparison to that taking place in the rest of the world. The picture grows more negative still when attention is turned to the output of scientific research in terms of publications and patents, as well as with regard to the number of researchers working to produce it and the estimated value of Arab spending on research and development.

For example, it is clear that no positive correlation exists between the number of researchers in the Arab region and the number of scientific publications produced there. The number of scientific papers published per 100 researchers each year was only two in four countries, was six and thirty-eight in two further countries, and was around 100 in Kuwait. If the total number of Arab university teaching staff is calculated at 180,000 doctorate-holding university professors, and if we add around 30,000 researchers working full-time in specialised centres, then the academic-scientific corps working in Arab research and development is estimated at 210,000 researchers. Yet this corps produces only 5,000 academic papers per year, equalling twenty-four scientific papers per 1,000 university professors and full-time researchers.[21]

Data related to national income of seventeen Arab countries show that Arab GDP was $1,042 billion in 2006, and yet annual gross expenditure on scientific research did not exceed two billion USD, an average of 0.2 per cent. This expenditure produced only 38 invention patents and 5,000 scientific papers, meaning that the cost of one scientific paper came to around $400,000. This estimated cost for the production of a scientific paper or patent is clearly exorbitant, and weakens the trust of society and its production sectors in Arab research programmes and their researchers. In comparison, Malaysia spends on research and development 22.5 per cent of gross Arab expenditure, while Finland spends 1.75 times as much as the Arab region and registers 855 invention patents at the cost of $4.1 million each, equalling 8 per cent of the cost of one patented Arab invention.

TABLE 5-9

Patents registration with the USPTO by seven Arab countries

State	Number of patents (2005-2006)[1]	Average annual number of patents (2002-2006)[2]	Utility patents (out of 134 countries)[3]
Saudi Arabia	37	14.8	51
UAE	11	4.6	132
Egypt	11	5.6	70
Kuwait	10	5.6	37
Syria	3	0.8	80
Oman	1	0.2	121
Jordan	1	1.4	63
Bahrain	0	0	90
Qatar	..	0.4	124
Algeria	..	0.4	89
Tunisia	..	0.6	130
Morocco	..	0.8	82
Lebanon	..	2.8	..

Source: [1] USPTO, http://www.uspto.gov, on 29 August 2008; [2] World Bank Database, Knowledge Assessment Methodology (KAM), 2008, on 10 June 2009; [3] The World Economic Forum, 2008b

SOCIAL SCIENCE POLICIES AND ARTISTIC INNOVATION

Here we shall attempt to broaden the significations generally given the concept of the knowledge society, based on the requirements for the development of knowledge in the Arab nation. It would, after all, be unreasonable for indicators, many of which do not encapsulate the

No positive correlation exists between the number of researchers in the Arab region and the number of scientific publications produced there

Social science research holds a special significance in the Arab research and innovation scene because it addresses local issues that directly touch on the concerns and realities of Arab citizens

Despite the proliferation of colleges of social and human sciences, as well as public and private research centres, social science remains the "poor cousin" of Arab research and is not paid sufficient attention in knowledge reports on the Arab nation

various dimensions of the Arab knowledge society, to remain the unchanging foundation for such development, or for quantitative criteria to be the sole deciding factor for all knowledge and all societies. The significance of this attempt will be obvious from the fact that efforts aimed at analysing the conditions of Arab knowledge performance and identifying its gaps require that we pay close attention to the existing vestiges of its earlier forms, despite the methodological quandaries and other issues that this poses.

This section brings research in the human and social sciences together with everything that is generally classified in the broadest sense as culture, including the products of what we have grown accustomed to calling artistic innovation (novels, the fine arts, cinema, and so forth). This combined perspective, we believe, allows us to view knowledge from an angle commensurate with the nature of the output in circulation in contemporary Arab knowledge circles. It also will allow us to examine at close quarters the limited nature of existing innovation and the legitimacy of the aspiration to discover means of knowledge production that correspond to the various forms of symbolic production and epistemological activity currently present in society and which express its aspirations. It will also allow us an opportunity to consider ways of raising this vital knowledge component to a higher plane.

SOCIAL SCIENCE RESEARCH

Social science research holds a special significance in the Arab research and innovation scene because it addresses local issues that directly touch on the concerns and realities of Arab citizens. Yet despite the proliferation of colleges of social and human sciences, as well as public and private research centres, social science remains the "poor cousin" of Arab research and is not paid sufficient attention in knowledge reports on the Arab nation. This stems in part from the difficulty in determining the scope of social and human science research in the Arab region. Yet the available data suggest a weakness in production and dissemination, and in quantity and in quality, compared to research in basic and applied sciences. Maghreb countries show the highest output of social and human sciences research, whereas Egypt and the Mashreq (eastern) Arab countries are characterised by relative stagnation in this field (El Kenz, 2005, in French). Taking the total number of projects supported in all fields in Lebanon, for example, we find that support for projects in human and social science research did not exceed 9 per cent at the American University in Beirut and 5 per cent at the National Council for Scientific Research.[22] The situation is comparable in most Arab countries. The reason for this may not lie in a lack of financial or human resources, or in the absence of research priorities tied to the daily concerns of members of society, but in weak academic incentives for researchers and university professors especially in the fields of the human and social sciences.

Researchers in the social sciences prefer to conduct their research outside the frameworks usually relied upon by researchers in basic and applied sciences, and outside of government institutions. This may allow for productive research in thorny social issues. Although universities continue to play a primary role in social science research in the Maghreb, Syria, Libya, and Lebanon, more than 80 per cent of social science research is produced through research centres or consultative agencies outside of universities, especially in Palestine, Jordan, and Egypt, and to some degree in the countries of the Gulf.

The interests of researchers in the social and human sciences focus mostly on literature, law, and history, followed by sociology and then economics and political science. The ranking of the human sciences in published studies supported by Western funding agencies has changed, in that publications in political science, economics, history, and Islamic studies have increased, but those in sociology

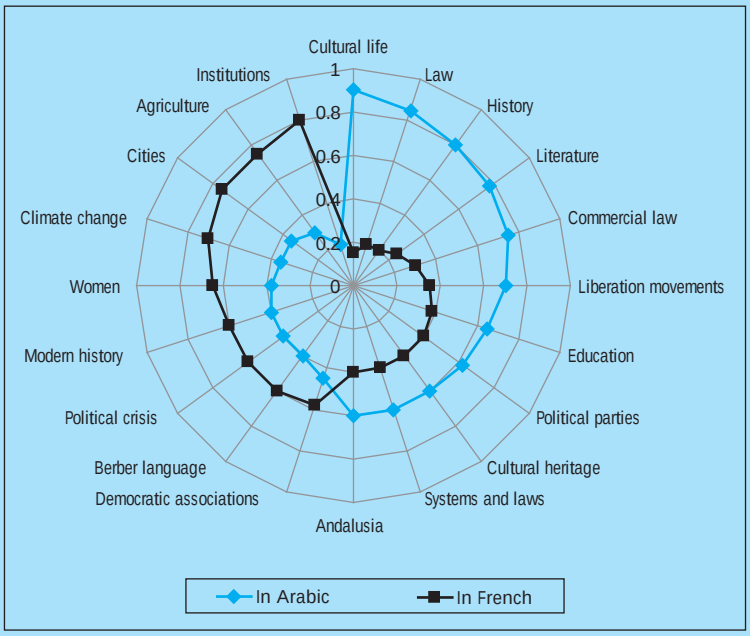
and anthropology have decreased (Hanafi, 2008). The topics addressed in the social and human sciences in the Arab region include development, democracy, social transformations, migration, governance, gender, violence, and Islamic movements. These studies have replaced studies of social class and the problematics of human society.

THE ARABIC LANGUAGE AND INNOVATION

One of the most important signs of development in Arab social and human science research is that the number of Arabic-language publications in the Maghreb increased by 60 per cent between 1980 and 2007, while French-language publications formed only 30 per cent. This improvement did not include basic and applied science research, which continued to rely upon foreign languages (Figure 5-9). Among 34,000 papers published by researchers in the Maghreb during the last decade, French was the most commonly used language, out-ranking Arabic (Figure 5-10). As for the Mashreq (eastern) Arab countries, with the exception of Lebanon and Palestine, the overwhelming majority of research papers in the human sciences were published in Arabic, which explains the dearth of Arab social science

FIGURE 5-9

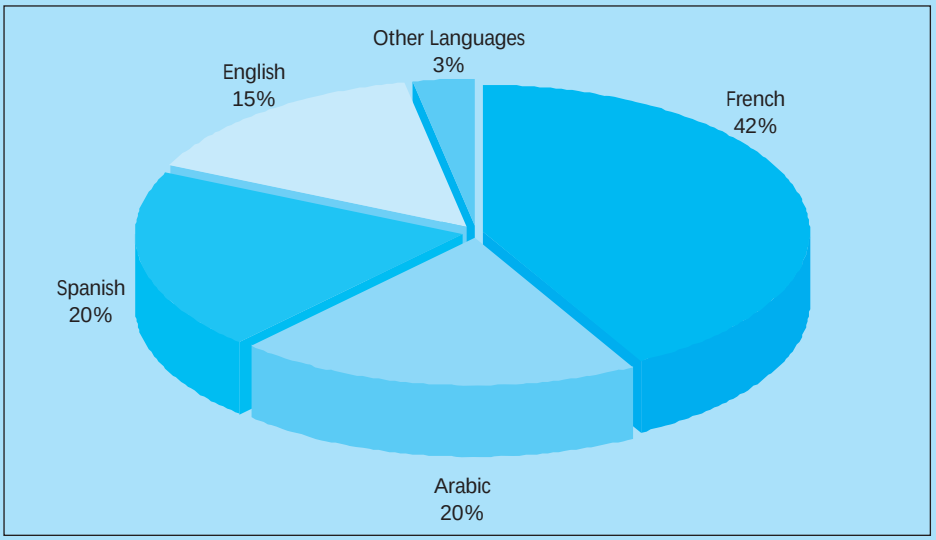
Percentage of Arabic language-use in research papers published in the Maghreb, 1980-2007



Source: Waast et al., 2007, in French.

FIGURE 5-10

Languages used in human and social science research publications in the Maghreb, 2007



Source: ESTIME Programme, 2007

Among 34,000 papers published by researchers in the Maghreb during the last decade, French was the most commonly used language, out-ranking Arabic

publications in global databases. A survey of twenty-two journals published during 2007 in the USA, Canada, and Europe, four of which were specialised in the Arab region, showed that only two studies were published by Arab researchers residing in Arab countries. Yet most Arabic-language periodicals in the social sciences are of extremely poor quality by global standards, are highly local in nature, and do not adhere to neutral peer-review methods (Hanafi, 2008).

Most Arabic-language periodicals in the social sciences are of extremely poor quality by global standards, are highly local in nature, and do not adhere to neutral peer-review methods

In summary, the development of the human and social sciences in the Arab world remains dependent on the fostering of an enabling environment for knowledge that guarantees the freedom of expression and the flow of information and strengthens the political participation of both citizens and researchers. While it is true that some Arab countries have seen promising activity in human and social science research, it is also true that this improvement remains much weaker than the development of research in the basic sciences and technology. It is also ironic that while Western agencies show increased interest in social sciences in the Arab world and offer direct and generous funding for it, such interest is absent among Arab governments and institutions. Thus the increasing marginalisation of social science research drives serious researchers towards increasing dependence on foreign programmes and funding.

LITERARY AND ARTISTIC INNOVATION

Artistic and literary production occupies a knowledge space that is intimately linked to reality. It constitutes theoretical activity based on the employment of the imagination to create symbolic worlds imbued with open-ended and creative resonance. It reformulates an imaginary reality that may not bow to digital systems or positivist logic, but which rather constructs additional spaces that enrich the mind and the soul. The knowledge society for which we aim must go beyond quantifiable scientific knowledge to embrace creative knowledge in all its literary, artistic, and cultural forms. Unlike the sciences and technology, artistic innovation contributes to enriching the symbolic existence of humankind. Despite differences in definitions, concepts, processes, and results, creative knowledge forms a primary component of contemporary human knowledge and an element of regeneration for its concepts and tools. While the effect of a painting, piece of music, novel, poem, or play cannot be quantitatively measured, a statistical measure of the number of literary writers, musicians, and theatre professionals provides a general idea of the scope of cultural activity, although it fails to capture the human and aesthetic dimensions of creative production. Contemporary studies of how concepts are passed on within widely separated fields of knowledge have shown that concepts significantly increase in value as they are transferred from one field of knowledge to another.

Arab cultural production faces numerous challenges related to the climate of freedom and stability, the need for sustained institutional and financial support, and the need to raise the awareness of the public (see Chapter 2). Among its most prominent challenges are the limited publication of books in proportion to the Arabic-reading population and the weak quality of these books, and, more significantly, the extremely limited base of actual readers among the Arabic-reading population. On average, the individual Arab reads very little annually. The first Arab Report on Cultural Development, published by the Arab Thought Foundation, states that "if we distributed all the books published every year among the population, for every 11,950 Arab citizens there would be one book, whereas there would be one book for every 491 British citizens and every 713 Spanish citizens. This means that the Arab citizen's share in published books equals 4 per cent of the British citizen's share and 5 per cent of the Spanish citizen's" (Mu'assasat al-Fikr al-'Arabi, 2008, in

If we distributed all the books published every year among the population, for every 11,950 Arab citizens there would be one book, whereas there would be one book for every 491 British citizens and every 713 Spanish citizens

Arabic). Aversion to reading is connected to a high illiteracy rate, low purchasing power, low quality of education, and the lack of cultural development plans, all of which facilitate the spread of easier, simpler, and less costly commercial media whose knowledge content becomes central to mainstream culture.

As for Arab architecture, it faces the problem of the relationship between local architectural heritage and contemporary architectural concepts and technologies. And yet the experiences of innovative architects have been a success when they have been able to strengthen the relationship between heritage and the production, industry, and technology markets. In contrast, certain attempts to transfer or copy architectural models that do not take Arab particularities into consideration have failed.

In contrast, the cinema scene is both lively and full of variety. Arab cinema has a lengthy history that began in the early twentieth century in Egypt, which still remains the leader of Arab cinematic production today. Arab interest in cinema has expanded since then, however, to include Morocco, Lebanon, and some Gulf countries, which now have advanced cinema production studios. Arab cinematic productions participate in international festivals even as some Arab countries continue to ban public movie theatres.

A telling sign that cultural and artistic innovation is opening up in the Arab world is the growing number of cinema screens and audiences. Data on cinema audiences shows that Egypt, Bahrain, and Morocco take the lead with regard to the seven Arab countries for which detailed data is available in both the number of viewers and their ratio to the number of cinemas (Figure 5-10). In so far as film-making is a

TABLE 5-10

Sizes of cinema audiences and numbers of cinema screens, 2004-2005

Country	Size of audience (in millions)	Cinema screens	Number of cinema goers (in thousands) per cinema screen
Egypt	26.8	250	107.2
Bahrain	1.3	26	48.1
Morocco	3.8	115	33.2
United Arab Emirates	6.3	202	31.4
Lebanon	2.1	87	24.1
Tunisia	0.3	29	10.3
Algeria	0.7	69	10.1

Source: The European Audiovisual Observatory, www.obs.coe.int, 15 December 2008

A telling sign that cultural and artistic innovation is opening up in the Arab world is the growing number of cinema screens and audiences

BOX 5-9

Arab Innovators in Architecture and Music

As set forth in his book *Building with the People*,[23] Hasan Fathi's view of the relation between architecture and the human led him to establish an alternative form of architecture that rejects the copying of Western buildings. In Egyptian rural architecture he found artistic, technical, and environmental solutions for facilitating daily life and maintaining a relationship with the land.

The works of Rif'at Chadirji are characterised by a deep theoretical and practical assimilation of local roots of expression and their translation into the technical terms of modernity. Chadirji has also made theoretical and critical contributions through his writings that address debates in the field of architecture and has established an annual award for pioneering Arab architects.

Fairuz and the Rahbani brothers

The second half of the twentieth century is marked by the pioneering experience of the late Rahbani brothers, Asi and Mansur, which culminated in their collaboration with the enchanting voice of Fairuz, imprinted in the imagination of successive generations as an accompaniment to their joys, sorrows, rituals, and longings. The Rahbani school has had a radical impact on Lebanese art in its reliance on short songs, subtle vocal expression, and high-level orchestral and theatrical performance, as well as inspiring poetic images and a revival of Lebanese rural heritage in compositions that vary from the romantic and traditional to the modern. After performing hundreds of their songs and scores of musical plays every year, and after exploring new vocal horizons with her son Ziyad, Fairuz remains an innovator today. She shines in the hearts of her public, remaining at the heart of public taste, despite the shifts in generations, technologies, and artistic preferences.

mass art, the flourishing of a commercial, consumer-oriented cinema sets the pattern for public taste, and it is a pattern that, in this case, makes no contribution to the development of the cinema as an art form. Films recorded on video and compact disc in violation of intellectual property laws have contributed significantly to the decreasing percentage of the public that attend Arab cinemas.

Arab societies are filled with examples of distinguished literary and artistic expression of the highest standards, but these continue to be disproportionately small in comparison to the size of the Arab world and the range of its natural and human capacities

The issue of freedom of expression arises more often in the fields of cultural and artistic innovation than it does in the pure sciences, due to the latter's direct connection to political issues, to the public, and to people of all social and cultural levels, as well as to the ease and speed of its dissemination and the possibility of its transmission through the modern media. The danger lies in the possibility of innovators adapting to the intellectual limits placed upon them by modern media, and in persecution. "Exile" literature and music flourish as a result because innovators are drawn abroad; they migrate to the broad spaces of freedom in order to express their innovation honestly, daringly, and distinctively. Although Arab societies are filled with examples of distinguished literary and artistic expression of the highest standards, these continue to be disproportionately small in comparison to the size of the Arab world and the range of its natural and human capacities. The delivery of creative products to the people and their dissemination throughout the Arab world remain restricted by the limited nature of its freedoms and the meagreness of its opening up to and communicativeness with both inside and outside.

The delivery of creative products to the people and their dissemination throughout the Arab world remain restricted by the limited nature of its freedoms and the meagreness of its opening up to and communicativeness with both inside and outside

THE INNOVATION GAP AND ITS INDICATORS IN THE CURRENT STATE OF ARAB KNOWLEDGE

THE INNOVATION GAP

Awareness of and interest in investment in research and innovation as pillars of knowledge have increased in Arab countries since the early 1980s. Arab scientific research centres have made consistent and noticeable progress in all specialisations, and whereas in the mid-twentieth century only Egypt, Iraq, Morocco, and Lebanon had research centres and institutions, now most Arab countries have them. When Arabs were once entirely absent from the global arena of scientific publishing, their publications now constitute up to 1.1 per cent of the world's total (TWAS, 2005). This presence, even though modest, is a step in the right direction. Most peer-reviewed scientific publications come from a small number of Arab countries, Egypt at their head, and a significant portion of it consists of joint scientific publications between Arab researchers and researchers from Europe and the USA.

According to UNESCO's definition, "scientific research and development includes all innovative activities carried out according to a methodology and systematic procedures with the aim of enriching the store of human knowledge, which embraces knowledge of man, of nature, of culture, and of society, and makes use of this store of knowledge in pioneering applications to serve holistic human development." It is now widely accepted that the concept of science encompasses the natural sciences, engineering, agriculture, medicine, technology, the social and human sciences, and a society's cultural heritage (UNESCO, 2005, in Arabic).

The primary mission of the sciences is to find solutions to problems faced by humankind. Advanced technologies meanwhile drive the process of change, while innovation is the true indicator of a shift to the stage of effective impact in the areas of social action and production. Policies in many countries have mandated scientific research as a means of producing innovation and developing the production, service, environment, and public health sectors. Yet innovation is not to be measured only in terms of the outcomes of research, for it is an active process characterised by dynamism and openness, and its sustainability depends on its ability

to attract a number of invested partners at all stages.

Available data show a large increase in the number of universities, colleges, and institutes, as well as scientific research centres and institutions of various specialisations and capacities. These data also show a growing number of researchers, technicians, engineers, and architects working in scientific endeavours, as well as a slight increase in spending on scientific research in countries such as Qatar, Tunisia, Morocco, and some of the Gulf Cooperation Council countries that have begun to invest greater interest in the knowledge sector. Yet despite the positive developments made on the research and innovation pillar index in some Arab countries over recent years, especially in quantitative terms, performance remains the weakest point in current Arab knowledge, and the scientific research and innovation gap between the Arab region and the rest of the advanced world remains the clearest, deepest, and most dangerous.

The Arab world's spending on scientific research in relation to Arab GNP is the global lowest, and its research and development institutions have weak ties to production cycles. The development impact of Arab scientific research is out of proportion in its weakness to the annual Arab expenditure of two billion USD, which from 2002 to 2006 produced only about 38 invention patents, 14.8 of which were from Saudi Arabia, and 5,000 scientific papers.[24] Expenditure in the Arab world on scientific research hovered at around 0.2 per cent of GDP and was limited almost entirely to the government sector; the private sector played almost no role in this regard, for its view of scientific research remains limited to its potential economic significance. In developed states in contrast, the matter is entirely different, with an average spending of 2.5 per cent of GDP on research and development, and with 80 per cent of funding coming from the private sector (Al-Mu'assasa al-'Arabiyya lil-'Ulum Wal-Tiknulujya, 2008, in Arabic).

Rates of Arab human capital flight and migration of skills are among the highest worldwide. A total of 45 per cent of Arab students who study abroad do not return to their home countries after obtaining their university degrees because of the Arab political and intellectual environment that repels innovation and creative individuals. The irony is that Arab countries celebrate the achievements of successful Arab migrants more than they do success stories at home.

These facts on Arab innovative performance confirm that it is impossible to remain silent over the need to change these circumstances if our goal is to improve Arab knowledge performance and develop a positive connection to the global knowledge arena. The greatest challenges facing the Arab countries with regard to knowledge include the following:

- Modernising the environment and structures of innovation.
- Possession of scientific knowledge and production of advanced technology, cultural knowledge, and knowledge in the area of the human sciences through more generous investment in research and development and through setting policies for the indigenisation of science and the creation of an atmosphere conducive to innovation and innovators.
- Realisation of partnerships between government, private research centres, and institutions that benefit from the outcomes of innovation, with the goal of improving scientific research and employing its applications in ways that support production and development cycles.

Despite the positive developments made on the research and innovation pillar index in some Arab countries, "innovation" remains the weakest point in current Arab knowledge status

A total of 45 per cent of Arab students who study abroad do not return to their home countries after obtaining their university degrees because of the Arab political and intellectual environment that repels innovation and creative individuals

FLIGHT OF HUMAN CAPITAL

The flight of human capital forms an important component of the flow of knowledge in the age of globalisation, and is affected by both the push and the pull elements of its enabling environments. The attitudes of countries toward human

capital flight has changed over time, for the need for skills, experience, and human resources has grown considerably during the last ten years all over the world, including in Europe and the USA, which are no longer capable of generating sufficient skills locally and thus have begun to search for them elsewhere, and particularly in developing countries. These global orientations strengthen the notion of "stealing" human capital, including those Arab human intellectual assets that are prepared to migrate to countries of the North.

Human capital is among Arab countries' major exports, possibly equalling oil and gas in value

The Arab region is considered one of the most active in terms of the export of highly qualified human capital equipped with university degrees. Indeed, human capital is among its major exports, possibly equalling oil and gas in value. The little data available on this indicates that 45 per cent of Arab students who study abroad do not return to their home countries, that 34 per cent of skilled doctors in Britain are Arabs, and that the Arab world has contributed 31 per cent of the skilled migration from developing states to the West, including 50 per cent of doctors, 23 per cent of engineers, and 15 per cent of scientists (Zahlan, 2004).[25]

The data in Table 5-11 differentiates two groupings of Arab countries on the basis of their ability to attract or repel national skills and talents.[26] According to the official indictor for measuring human capital flight, the first group, which scored between 3.5 and 7 points and includes six oil-producing Gulf countries and Tunisia, are the countries capable of holding on to innovative national human capital. The second group includes six Arab countries, including Algeria and Egypt, that are incapable of persuading human scientific capital to remain in its home country. Five Arab countries that are not included in the table suffer from chronic human capital flight due to their political and security crises and the deterioration of their living conditions. These are Lebanon, Sudan, Iraq, Yemen, and Palestine.

Opinions concerning the desirability of human capital flight from the Arab region vary; some consider it a curse, others a blessing. Human capital flight offers employment opportunities to university graduates whom domestic markets cannot absorb, and secures important financial resources that range between 5 and 10 per cent of the GDP of some Arab countries. The financial remittances sent by Arab migrants are considered among the most important factors contributing to development and the provision of foreign currency in a large number of impoverished Arab countries. The total sum of financial remittances sent to the Arab region in 2006 was over 25 billion USD.[27]

Finally, attention must be drawn to the movement of Arab skills and human capital within the Arab world. This phenomenon is new to Arab intellectual life and can be viewed in the context of inter-Arab cooperation, allowing us to speak of a circulation of human capital rather than human capital flight. The financial incentives and stable political

BOX 5-10

Knowledge Transfer via Migrant Scientists

Arab human capital flight creates an opportunity not only to obtain financial resources, but also to transfer knowledge via migrants. This is the goal of the TOKTEN programme launched by the UNDP in 1977, in an attempt to turn "brain drain" into "brain gain." The TOKTEN programme began by surveying Arab human capital found abroad, developing a database of information on these professionals' academic and practical experience, establishing a network of direct relations between them and their home countries, and supporting the costs of their travel home for limited periods. TOKTEN is an arm of international technical cooperation relations that aims to lessen the negative effects of human capital flight. It is characterised by an open attitude to home societies and relies on the ties of shared language and tradition, the feelings that migrants hold for their homelands, and their desire to return favours to them, especially since most of these migrants were raised in their homelands and completed their education in them. The number of experts who have served their countries through the programme over the last decade is over 4,000; they have also offered consultative services to government agencies and the private sector, and some of them have returned to live in their home countries. Lebanon and Palestine are the Arab countries that have benefited most from this programme.

Other networks like TOKTEN exist that connect scientific and intellectual communities abroad with their home countries, some of which were established by Arab scientific and academic communities abroad, such as the network of Maghreb researchers living in France (Migration et Recherche) and the Arab Scientists and Technologists Abroad network. With UNDP-support, the Palestinian Ministry of Planning and International Cooperation launched in the 1990s the Palestinian Scientists and Technologists Abroad (PALESTA) network, and this has developed a database on 1,200 Palestinian diaspora scientists.

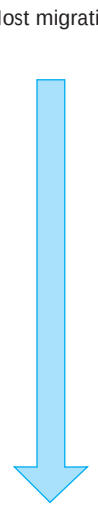
Source: Muhammad 'Arif, background paper for the Report, in Arabic

and security conditions offered by oil-producing Arab countries have become a pull factor for Arab and global human capital that competes with the attractions of Western states. Moreover, these oil-producing countries are in close geographic proximity to a number of Arab countries that are incapable of holding on to their human capital. The circulation of Arab human capital has in recent years helped to develop Gulf universities and knowledge-based and research institutions that in turn have helped to improve Arab knowledge performance. The circulation of Arab human capital is an alternative in the field of knowledge to the flight of human capital from the Arab region. For the sake of objectivity, it must be acknowledged that the movement of scientists within the Arab world is, overall, a positive phenomenon: it does not deplete the store of Arab knowledge but maintains it and contributes to its circulation and development.

TABLE 5-11

Human capital flight index[28]

Country	Human capital flight (scale of 1-7)
Syria	2.3
Egypt	2.3
Mauritania	2.4
Algeria	2.4
Jordan	2.8
Morocco	3.1
Oman	3.9
Tunisia	3.9
Saudi Arabia	4.6
Bahrain	4.7
Kuwait	5.4
UAE	5.6
Qatar	5.7



Source: World Bank, Knowledge Assessment Methodology (KAM), 2008

THE SOCIAL AND ECONOMIC IMPACT OF INNOVATION

Production in the fields of knowledge, science, and technology is not sufficient to guarantee the application of that production to the relevant economic sectors. The transfer of knowledge from an innovator to a beneficiary consists of many complicated stages. These include the assimilation of new developments and their positioning within frameworks that

The movement of scientists within the Arab world is, overall, a positive phenomenon: it does not deplete the store of Arab knowledge but maintains it and contributes to its circulation and development

BOX 5-11

Corporate Funding of Research and Development

Among the Arab examples of successful cooperation between scientists and the industrial sector in Arab Gulf countries are the partnerships between King Abdul Aziz City for Science and Technology (KACST) and pharmaceutical companies, and between Aramco and Saudi academic institutions and universities (120 projects in 2002), as well as the cooperation between Sultan Qaboos University and the Muscat Knowledge Oasis, between the Kuwait Institute for Scientific Research (KISR) and the Kuwaiti oil company, among Zayed University, IBM corporation, and the Innovation Centre in the Dubai Internet City (Smart Square), and among UAE University and several petroleum companies and aluminium factories.

As part of its cooperation with the Arab Science and Technology Foundation in al-Shariqa, Abdul Latif Jamil Limited, a Saudi Arabian company, has offered since 2005 competitive funding for projects proposed by Arab researchers working in technological research and development. The value of support offered annually to each project is $50,000, totalling a sum of a million dollars of funding a year for research in the medical sciences, engineering, and other related applied sciences. Intellectual property rights and patents ensuing from this research follow specific programme regulations. To date, funding has been provided for fifty-three projects, and cooperation between the institute and the company has been ongoing for four years. In addition, a third of the Abdul Latif grants are to be allocated for research proposals that put forth solutions to problems faced by the poor, which supports the idea adopted by this report, that knowledge should be used for development.

Source: The Arab Science and Technology Foundation/the Abdul Latif Jamil Grant for Funding Scientific Research and Innovation in Technology in the Arab World, http://www.astf.net/site/arabic/zone/zone.asp?ogzid=10195; King Abdel Aziz City for Science and Technology, http://www.kacst.edu.sa/ar/default_ar.aspx; Kuwait Institute for Scientific Research, http://www.kisr.edu.kw/default.aspx?pageId=104.

TABLE 5-12

Trade in technological products

Country	Supply chain presence (scale of 1-7),[1] 2007	Hi-tech exports as a percentage of all manufactured exports, 2005[1]	Total trade in manufactured goods (percentage of GDP),[1] 2005	Venture capital availability (scale of 1-7)[2]
Saudi Arabia	4.3	1.3	20.8	3.7
Kuwait	3.4	1.0	19.0	3.8
UAE	3.9	10.2	74.7	4.3
Qatar	3.9	1.2	25.5	4.1
Bahrain	3.5	2.0	25.5	4.0
Oman	4.4	2.2	..	4.1
Algeria	2.6	1.0	15.6	2.2
Egypt	3.9	0.6	14.7	3.4
Tunisia	4.4	4.9	63.2	3.8
Morocco	3.8	10.1	37.7	3.0
Syria	3.9	1.0	22.2	2.5
Lebanon	..	2.4	32.9	..
Jordan	3.9	5.2	72.0	3.4
Mauritania	2.8	..	18.9	2.2
Malaysia	5.0	54.7	151.0	4.2
Turkey	4.3	1.5	38.6	2.5

Sources: [1] World Bank, Knowledge Assessment Methodology (KAM), 2008, on 10 June 2008; [2] The World Economic Forum, 2008b.

During the last two decades, the Arab world invested approximately $4,000 billion in gross fixed capital formation and more than $1,000 billion in human resources, without these major investments leading to growth at the same rates in the GNP

facilitate their adjustment and application to new innovative fields that ultimately form the practical measure of the social and economic impact of acquired knowledge.

The ability of countries to earn economic and social returns on knowledge in general is measured by the Competitive Industrial Performance index, which focuses, according to the United Nations Industrial Development Organisation (UNIDO) on four indicators: manufacturing value added per capita; manufacturing exports per capita; share of medium- and high-tech activities in manufacturing value added; and the share of medium- and high-tech products in manufactured exports (UNIDO, 2003).

One Arab expert estimates that, during the last two decades, the Arab world invested approximately $4,000 billion in gross fixed capital formation and more than $1,000 billion in human resources, without these major investments leading to growth at the same rates in the GNP (Zahlan, 2004).

Reviewing the Arab World Competitiveness Report 2007 and the 2008 World Bank indices, we see noticeable improvement by Gulf countries on the global competitiveness index. The Arab World Competitiveness Report placed the Arab countries within three groups, the third of which comprised forty states worldwide with innovation-driven economies that are in the third stage of development and which included four Arab countries (UAE, Qatar, Kuwait, and Bahrain). The second group, comprising countries with efficiency-driven economies, included five Arab countries (Tunisia, Oman, Jordan, Libya, and Algeria), with Egypt, Syria, Morocco, and Mauritania holding various ranks in the first group, which comprises countries with factor-

driven economies that are in the first stage of development (World Economic Forum, 2007, in Arabic).

The readiness of Arab production and service institutions for innovation is measured by a number of indicators (Table 5-12) that can be analysed as follows.

- The percentage of GDP made up of manufactured exports is declining in most Arab countries when compared with otherwise similar countries, with the exception of the UAE, where such exports account for 75 per cent of all trade, and Jordan and Tunisia, where it comprises 72 per cent and 63 per cent respectively. Perhaps the reasons for the success of these countries is the increased number of free industrial zones and preferential trade partnership agreements with European Union countries, the USA, and some Asian emerging economies .
- According to World Bank statistics, the UAE rated highest for hi-tech exports as a percentage of all manufactured exports (10.2 per cent), followed by Morocco (10.1 per cent) and Jordan (5.2 per cent).
- Most Arab countries score positive yet average rankings with regard to their supply chain presence via their engagement with the post-extraction stages of materials or their production, including the design and marketing of products and the provision of post-sale services. This is due to the growing conviction in the private sector that the competency of production institutions in assimilating new technologies must improve in order to maintain competitive positions in local and global markets.
- The position of most Arab countries hovers around the mid-point on the "venture capital availability" index,[29] with positive exceptions in the UAE, Qatar, Bahrain, and Oman. This mid-point ranking indicates the persistence of cautious policies among investors in Arab countries and their hesitancy to invest in new, innovative projects. Some signs of change are, however, beginning to appear, as manifested in initiatives sponsored by newly developed Gulf countries to bring together innovative Arab researchers and venture capitalists in the region to fund the shift from innovative projects to production.

THE DISSEMINATION OF KNOWLEDGE AND INNOVATION

Outside of educational institutions, Arab countries have made only modest efforts to transfer knowledge to the general public or to transfer either locally produced or imported knowledge to the production and service sectors. The mechanisms of knowledge transfer remain limited in number and type, and even more so in impact on mainstream society. Among the most prominent mechanisms that have proved their viability and positive impact for the transfer of knowledge in newly developed and industrialised states alike are the following: industrial and technological cities; joint programmes between scientific research institutions and production sectors; business incubators; business development centres; specialised centres of excellence; houses of expertise; standardisation bodies; quality assurance certificates; general and specialised scientific media and information diffusion centres; international trade points; export promotion centres; industrial subcontracting centres; and exhibitions, seminars, and conferences, in addition to well-qualified and capable chambers of commerce and industry, and professional unions.

There is insufficient information on these mechanisms in Arab countries to allow a study of their development over time, especially with regard to efficiency and effectiveness. Nevertheless, a number of signs demonstrate a growing interest in such things, such as the organisation of a number of global technology exhibitions, organised by production or import companies, especially in the Gulf countries or Egypt, as well as major projects for

Outside of educational institutions, Arab countries have made only modest efforts to transfer knowledge to the general public or to transfer either locally produced or imported knowledge to the production and service sectors

With the exception of the UAE, the percentage of GDP made up of manufactured exports is declining in most Arab countries when compared with otherwise similar countries

the construction of industrial cities that focus on the establishment of industrial infrastructure. However, these do not include the required mechanisms to select, transfer, and indigenise technology.

In the Maghreb and some Gulf countries, there are signs that some national companies and institutions are becoming convinced of the importance of investing in innovation by focusing on the training of specialised human resources, transferring and indigenising technology, and relying on local expertise. Thus in recent years, some Gulf countries have established strategic partnerships with a number of the world's best universities with the aim of establishing branches in the Gulf. Examples include the King Abdullah University of Science and Technology, Education City in Qatar, and the Dubai Knowledge Village. These partnerships include the establishment of specialised departments for scientific research in advanced fields of knowledge, as well as establishing research partnerships to form a "coalition of great minds, grand ideas, and daring ambitions, as a forum for thinkers from the East and West that will allow them to overcome the limits of geography, culture, and specialisation" in scientific research. While it is still early to judge these initiatives and their impact on the production of knowledge in the region, these are truly innovative initiatives, and it is hoped that they will include specific and realistic mechanisms for guaranteeing their sustainability, transferring the knowledge produced within them to the Arab world, and indigenising this knowledge in Arab institutions and society.

It is ironic that although the Arab world contains a wealth of skilled professionals and human capital, it is incapable of deploying this wealth optimally in production and development

BOOSTING ARAB RESEARCH AND INNOVATION PERFORMANCE

The innovation pillar forms a major weak point in Arab knowledge performance. It is ironic that although the Arab world contains a wealth of skilled professionals and human capital, it is incapable of deploying this wealth optimally in production and development. This irony poses questions that can no longer be ignored: How has it been possible to make a relative quantitative breakthrough in the higher education system without that reflecting positively on innovative research activities? How is it possible to conceive of innovation without accumulating knowledge through scientific research? How can policies be devised for sustainable development, social security, and increased competitiveness without building on target-oriented scientific research programmes? How can scientific knowledge be built up without linking it to Arab and global stores of knowledge? How should we think about the preceding questions in light of the gaps in data, statistics, and indicators? How is it possible to be content to benefit from information and communications technologies without contributing to their production and development? How can we think about a qualitative breakthrough in research and development without establishing an effective partnership between the public and private sectors and among the constituencies of society, both men and women?

Perhaps no convincing answers to these questions exist, but it is time that they were posed and thought given to them. If a general plan to improve Arab knowledge performance is to be proposed, the starting point lies in a move from the current major dependence on natural resources and an attempt instead to build a new economy. This would be based on knowledge and rely on the following pillars:

If a general plan to improve Arab knowledge performance is to be proposed, the starting point lies in a move from the current major dependence on natural resources and an attempt instead to build a new economy

- A large repertoire of human and intellectual capital based on a culture of competency and quality; a critical, capable, and proactive approach to thinking, and the capacity to deal with the complicated demands of a society that is growing increasingly dependent on knowledge.
- An efficient institutional system characterised by clearly defined and innovative mechanisms that function in effective and enabling environments capable of achieving knowledge growth and sustainable social development.

- Real and deep-rooted development in Arab education and scientific research, including a sufficient store of investment to guarantee quality education, the local production of knowledge, the assimilation and indigenisation of imported knowledge, and the rise of a culture that encourages innovation and initiative.
- Planning for the gradual transfer to an economy based on knowledge. This is a long-term ambition that requires a new, innovative, initiative-taking Arab mindset based on a positive approach to dealing with information and its technologies, highly competitive skills, professionalism in labor and production, and commitment to professional ethics.

Any strategy for improving Arab innovation and research performance must follow two parallel approaches. One is the short- and mid-term rationalization approach that requires infusing key economic sectors with high-level technology, with the goal of generating added values to their outputs and absorbing imported innovations. The other is the long-term innovative approach that revolves around indigenising new and advanced technology and then partnering in its local production. This strategy must draw on the general development goals of each Arab state, be accompanied by Arab cooperation in knowledge, and form a linked extension of the global knowledge store (see Chapter 6).

If scientific research and innovation suffer from a lack of funding in the Arab region, the time has come for the Arab private sector to provide it, not only as a national duty but as a necessity if the region is to be propelled in the direction of globalism. Numerous other methods exist for the funding of innovation. For example, one of the possible means of securing additional resources for scientific and innovative activity is to impose a fee of no more than one US cent per cellular phone call to be drawn automatically by operating companies and transferred to a joint fund to support scientific research. The goal of this direct participation in funding scientific research, however modest it may be, would be to achieve an added value that would contribute to improving Arab innovative performance.

A research and innovation strategy requires the ordering of priorities in a way that addresses the concerns shared by most Arab countries and which faithfully reflects the consensus of Arab and global literature in this field. Improving innovation performance, like improving knowledge performance, requires a political decision. This must be supported by vision and will that move in the direction of an opening up to democracy, political reform, and the liberation of intellectual and academic freedoms that will raise to international levels the standard of work in centres of knowledge production and innovation, be they universities or research centres.

Improving innovation performance, like improving knowledge performance, requires a political decision supported by vision and will that move in the direction of an opening up to democracy, political reform, and the liberation of intellectual and academic freedoms

Such institutions are the engines of national growth. They are bastions of critical thought and research, and they guarantee the creation of hi-tech companies. They also guarantee the generation of the products and ideas upon which society's security and progress depend. These institutions develop human resources that are distinctive in their professionalism and leadership, and which are capable of taking wise decisions. In contrast to companies, computers, factories, airplanes, and advanced service sectors, one cannot import universities or scientific centres of excellence, for such institutions can only be developed through an accumulative and interactive process between society and its human forces, reinforced by far-reaching vision, and in an open environment of professional commitment and high ethical standards.

In the final chapter of this report we seek to develop a general vision for the knowledge society and its establishment, including measures that will help in shifting the proposed vision from the level of aspiration to that of a search for channels and procedures necessary to facilitate its achievement.

End Notes

1 UNESCO Institute for Statistics online database, http://stats.uis.unesco.org/unesco/tableviewer/document.aspx?ReportId=143, on 13 January 2009.

2 As categorised by the World Bank's KAM, one of the most widely referred to and up-to-date indices. According to KAM, the four pillars of knowledge are innovation, education, information technology, and the knowledge environment/economic incentive regime. Index values range from zero to ten and express the relative position of the country in question compared to all other countries for which the index has been calculated. A decline in the value of the index with regard to a given country does not necessarily mean a decline in the values for the indicators entered to create the index. It may simply be a product of the fact that the values of these indicators have risen to a lesser degree than those of other countries that are jockeying for their place on the scale.

3 The innovation system consists of three variables: royalty payments, patents granted by the US Patent and Trademark Office (USPTO), and number of scientific and technical journal publications.

4 Resolutions of the 2007 Arab Summit, held in Riyadh.

5 Classification and analysis by Mu'in Hamza, Report core team member.

6 "The quality of scientific research institutions" is based on the ability of researchers to publish peer-reviewed scientific articles in international journals, to transfer the results of their research to production sectors, to preserve the environment and protect public health, to establish effective partnerships with various social sectors, and to attract funding from international programmes.

7 "Technology assimilation and technology readiness": the capacity of a private or public productive establishment to make the most benefit from the outputs of research and invention. The indicator likewise reflects the presence of an atmosphere conducive to research, the availability of specialised human assets, and the material and academic incentives that lead to innovation and invention.

8 The numbers in this paragraph are the estimates of Report core team member Mu'in Hamza, and derive from university bylaws and the evaluation instruments for full-time professors in most Arab countries.

9 As mentioned earlier, discrepancies exist among different international data sets. Such discrepancies may be attributable to differences in the definition of the term "researcher."

10 Website of the Standing Committee on Scientific and Technological Cooperation (COMSTECH) of the Organisation of the Islamic Conference, http://www.comstech.org/links/posters.htm, on 10 June 2009.

11 World Bank, Knowledge Assessment Methodology (KAM) database, http://info.worldbank.org/etools/kam2/KAM_pages5.asp, on 13 February 2009.

12 Statistical Institute, UNESCO, http://stats.uis.unesco.org/unesco/TableViewer/tableView.asp on 10 June 2009.

13 Analysis and calculation by Mu'in Hamza, Report core team member, based on data from COMSTECH and KAM.

14 The Sixth Framework Programme is the European Union's programme for research and technological development. It consists of initiatives undertaken by the EU to fund and promote research.

15 These include basic and applied, but not human and social sciences.

16 A significant proportion of research published in some Arabs countries is the work of researchers from other Arab or non-Arab countries. The reason for this is either the authors' residence in these countries or the fact that the incentives and facilities they offer are superior to that offered in the authors' home countries. As such, the numbers in this chart may give an exaggerated picture of the reality in some states, including those of the Gulf, and an underestimation of other states, such as Egypt and Iraq. The publication of scientific periodicals was stopped in Iraq during the decade of economic sanctions of 1991 to 2002, forcing Iraqi researchers either not to publish or to publish outside Iraq.

17 The scientific impact indicator reflects the value of scientific articles and their social impact.

18 Estimate of Report core team member Mu'in Hamza, based on a number of sources of information on Arab scientific publications from universities, research centres, and some private agencies that are repeated in most Arab studies without mention of a specific reference due to the lack of reliable statistics.

19 The numbers for patents registered with the USPTO found in the World Bank KAM indices may differ from those found in the national databases of various countries that are used in some regional studies.

20 The World Bank, KAM, http://info.worldbank.org/etools/kam2/KAM_page5.asp, on 13 February 2009.

21 These results were calculated based on data found in various chapters of the Report.

22 The National Council for Scientific Research, http://www.cnrs.edu.lb, on 12 December 2008

23 This book was later re-published under the title Architecture for the Poor: An Experiment in Rural Egypt.

24 World Bank, KAM database, http://info.worldbank.org/etools/kam2/KAM_page5.asp on 25 December 2008.

25 Studies published by Arab research centres (the League of Arab Countries, the conferences of Arab ministers concerned with human capital and its flight, and the Gulf Centre for Strategic Studies) show that the countries that draw the most human capital are Arab Gulf countries, some European countries (France, Germany, Spain, Italy, the Netherlands, Switzerland), the USA, Canada, and Australia. Scientifically qualified Arab human capital that migrates to the USA, Britain, and Canada forms 75% of all migrants, and the annual percentage of Arab university graduates who migrate is 25%. Global estimates suggest that the Arab countries suffer annual losses

of $1.57 billion due to human capital flight.

26 The human capital flight indicator is to be found amongst the data in the World Bank's KAM database.

27 The figure of $25 million is taken from World Bank data and includes Arabs working in all fields including scientific research. More research is needed on the circumstances of Arabs working in the field of research and innovation and the impact of their work, including their remittances, to Arab countries versus the economic, social, and scientific costs of their education and training and the resultant real cost of Arab human capital flight.

28 The human capital flight index scores on a scale of 1 to 7 the responses of survey participants on their opinions as to whether the human capital and talent of a given country has migrated to seek better opportunities (1) or typically stays in its home country (7).

29 Since the indicator runs from one to seven, the mid-point is 3.5.

CHAPTER SIX
BUILDING THE KNOWLEDGE SOCIETY IN THE ARAB WORLD: A VISION AND A PLAN

CHAPTER SIX

BUILDING THE KNOWLEDGE SOCIETY IN THE ARAB WORLD: A VISION AND A PLAN

Introduction

In this chapter we aim to bring a set of elements together into a working plan based on the principles and action mechanisms required to close the knowledge gap in the Arab countries, bringing their people into the knowledge society as participants in knowledge production. It is true that the analysis of the preceding chapters has revealed the existence of some progress in certain aspects of the knowledge society. It has, however, also highlighted many gaps which must be dealt with seriously and resolutely. At this point, we will seek to put together a vision and a programme of action designed to make a contribution to filling the gaps in the landscape of Arab knowledge.

We do not wish to confront the knowledge gap by complacently repeating suggestions for self-reliance or dependence on the past and our existing knowledge reserves; the knowledge revolution requires us to transcend such reactions, for Arab society faces a major challenge in the field of knowledge, and concerted efforts are called for if we are to build the knowledge society.

If knowledge is to be acquired and a society built around it, if it is to be deployed in the service of development and progress, certain demands must be met. In this chapter, we will content ourselves with sketching a general architecture of our vision and making proposals intended to assist in closing the knowledge gap in the Arab countries. This architecture will allow us to construct a body of elements related to the enabling environment and the indigenisation of knowledge, as well as to assemble recent data that clarify the requirements for innovation in the field of knowledge, so that the best may be extracted to serve human development.

This proposed Arab plan is the result of the investigation and diagnosis we have undertaken in the Report. We do not claim that the demands and priorities we will put forward are either comprehensive or exhaustive, nor do we claim to hold a monopoly over the truth or the right answers in this field. We do intend to set down comprehensible and motivating markers to indicate the route.

As we have stated in the other chapters of the Report, the right to knowledge should be considered the cornerstone of human development. This right requires the generalisation of the benefits of knowledge and of participation in its reproduction according to the needs of our societies, and it is within this context that the body of elements of the proposed plan take form. The plan's higher aim is to spur public debate and positive movement towards a knowledge society built on solid foundations and under the firm control of Arab society through the partnership of its various components. Thereafter the strategies and mechanisms formulated and ranked by consensus can be adopted.

The demands and priorities put forward are neither comprehensive nor exhaustive, nor do they claim to hold a monopoly over the truth or the right answers in this field. The programme intends to set down comprehensible and motivating markers to indicate the route

THE ARAB KNOWLEDGE GAP: DEFICITS AND HOLES

In the Report we have identified the nature of the Arab knowledge gap and highlighted a body of data and conclusions, the most important of which are:

- **An understanding of the defining characteristics of the knowledge society, which is under continuous formulation,** by an investigation of its most prominent components and problematics. In the first and second chapters, the Report has attempted to survey the difficulties of the subject and lay the groundwork for their solution by investigating the environments that assist

The plan's higher aim is to spur public debate and positive movement towards a knowledge society built on solid foundations and under the firm control of Arab society through the partnership of various sectors

in the birth and formation of the knowledge society.

The most conspicuous feature of the knowledge society is its relationship to networking and networks, which play prominent roles in the various aspects of the life of modern societies

In its theoretical framework, the Report aims to survey the poles that define the boundaries of the knowledge society. It summarises these as three–technology, economy, and society–and highlights the interconnection and interaction among them. The report also points to the most conspicuous feature of the knowledge society, which is its relationship to networking and networks, which play prominent roles in the various aspects of the life of modern societies. Chapter 1 also endeavours to formulate an operational definition to help formulate specific choices as to indicators and indices for the knowledge society appropriate to Arab aspirations.

The Report could never have addressed the reality of knowledge in the Arab world without linking the right to knowledge to the right to development

Chapter 1 also aims to construct the general theoretical frames of reference for the indicators, classifying the features ascribed to the knowledge society into two broad orders. The first of these is related to philosophical positivism and its quantitative predilections based on technological determinism. The second is the modernising and liberal trend contained in the systems of the international human rights conventions. The chapter puts forward a synthesis of a sample of new questions and challenges raised globally and in our Arab nation, which we assume is not isolated from the changes underway elsewhere at the beginning of the twenty-first century, with its defining revolutions in and transformations of knowledge. These include those related to the question of identity, political participation, gender, and the development of the Arabic language. Likewise, the chapter raises the need for a new code of ethics equal to the demands of this task and prioritizing humankind, and outlines the features of Arab solidarity and cooperation, in addition to the values of openness to, and intercommunication with, humanity at large.

Knowledge is freedom and development and there can be neither knowledge nor development without freedom

The Report could never have addressed the reality of knowledge in the Arab world without linking the right to knowledge to the right to development. These two form the underpinnings of the concepts in question. Equally, this chapter sketches the major features of the knowledge society, to provide a framework for the diagnosis and study of our own situation. Based on this framework, this situation should be reconstructed in the light of local specificities linked to Arab reality and the efforts required to indigenise the mechanisms of the knowledge society in the service of the hoped-for Arab development project.

Chapter 2 concerns itself with a discussion of the enabling environment required in order to put the knowledge society in place. Such a discussion is a necessity given that the different manifestations of the knowledge society in the contemporary world have roots and foundations that are essential to its existence. The chapter goes on to address the issue of relationship of knowledge to freedom, starting from the assumption that knowledge is freedom and development and that there can be neither knowledge nor development without freedom. This link does not, however, imply that the two are mechanically and inseparably bound. The chapter also goes beyond this controversial diagnosis and surveys the general conditions that help to build the knowledge society. These are to be found in environments that assist in bridging the knowledge gap. These call for political and institutional, and equally cultural and intellectual, reform, in addition to reform of the media and renewal of communications and ICT platforms.

Arab societies cannot cross the thresholds of the knowledge society and launch themselves into knowledge production and creation without nurturing environments and supporting institutions. The experiences of states that have entered the knowledge society before us affirm this necessity. Hence the Arab societies are called upon to prepare the ground appropriately for the possession of knowledge and the absorption of its innovations and benefits.

This can only come about through the allocation of the necessary financial, human, and institutional resources, plus the development of a convincing vision of the role of knowledge today in achieving comprehensive development. Appropriate environments, institutions, laws, policies, and manpower are all requisites for the production of knowledge that contributes to human welfare.

• **An attempt was made throughout the following chapters of the report to survey and synthesise the evidence of the most important indices and indicators of the knowledge society in the Arab world** in relation to education, the condition of ICT, and innovation. Taken together, these chapters seek to address two issues. The first concerns the synthesis of the reality of Arab knowledge performance in these fields and the question of how to approach the large gaps that exist between what is happening there in our own region versus the accumulated experience of societies that have entered the knowledge society before us. The second is comprised of the need to understand the deficits and formulate the proposals that will help us to enter that same society, with all the baggage we have gathered during the second half of the twentieth century and the beginning of the third millennium, and with all the aspirations that motivate us today to improve our position on the new world maps of knowledge.

Chapter 3, which is devoted to education, reviews the knowledge capital accumulated by educational institutions in the Arab countries today in an attempt to comprehend its quantitative and qualitative dimensions at the various levels and stages of education. This capital is organised by generation (children, youth, and adults) and an analysis is offered of the structure of Arab knowledge capital and the gaps that differentiate it from modern knowledge capital, which has integrated the educational innovations that the new mechanisms, laboratories, and technology are starting to provide. The same chapter also ponders the defects that typically accompany educational reform projects in the Arab countries and highlights some of the limitations and uncertainties of the Arab educational scene.

Chapter 3 also puts forward an analysis of the formation of knowledge capital through education. While most Arab societies have recorded a number of tangible achievements on the quantitative level in terms of educational opportunities for children and of gender parity, the qualitative performance of the children of the Arab countries as a whole is rarely comparable to that of their peers in the rest of the world. Large portions of the youth generation–more than 35 per cent in nine Arab countries–have not progressed beyond basic education. It is therefore difficult for them to engage with the knowledge-based economy, which demands theoretical and technological knowledge that can only be acquired at post-basic educational stages. Nor does the knowledge makeup acquired by many young people during secondary and higher education necessarily conform to the demands of the transition to a knowledge economy that is essentially dependent on the specialised sciences, modern technologies, communications revolutions, and openness to the advances made by knowledge. This situation forms an obstacle to the formation of even the lowest estimated critical mass of high performance human capital capable of discovering, creating, and innovating, and of leading the processes of ongoing development needed by Arab societies.

The Report confirms that the light of knowledge does not fall on all adults equally. Rather, it remains in all the Arab countries the prerogative of an elite, broader at times and narrower at many others. Today, the large variation in knowledge capital acquired through education appears not only among countries themselves, but also within each Arab country individually, between men and women, and between younger and older adults. Such divisions are also to be

Most Arab societies have recorded a number of tangible achievements on the quantitative level in terms of educational opportunities for children and of gender parity, but the qualitative performance of the children of the Arab states as a whole is rarely comparable to that of their peers in the rest of the world

The light of knowledge does not fall on all adults equally. Rather, it remains in all the Arab states the prerogative of an elite, broader at times and narrower at many others

found between the city and the country and among the economic segments of society.

Chapter 4 deals with ICT as a central pillar of the knowledge society. It devotes attention to the state of this technology in the Arab countries as revealed by the data available in international reports, despite the major weaknesses of these. The chapter aims to address the demand for the revitalisation of the Arabic language to make it the nurturing vehicle required if the issue of Arabic knowledge and digital content are to be taken truly in hand, and one capable of formulating new symbols that will facilitate the operations of the digital industry and help to create Arab knowledge horizons that can deal collaboratively and advantageously with new knowledge systems. The chapter reveals the general importance of ICT in the health, economic, social and knowledge fields. It highlights the deficits and gaps that exist in the Arab countries and formulates a set of proposals and initiatives that will help to raise ICT in the Arab countries from its current level to one capable of operationalizing knowledge through institutions capable of ensuring that it is exploited to the utmost in the Arab countries' various areas of productive activity.

A review of national plans in the Arab states, particularly those with middle and low incomes, clearly reveals obstacles that prevent the inclusion of technological development as high priority

The Report makes clear that one of the chief features of the current era is the unprecedented interrelationship between the development of technological capabilities and the various aspects of economic and social development. However, a review of national plans in the Arab states, particularly those with middle and low incomes, clearly reveals obstacles that prevent the inclusion of technological development as high priority. The open policies required for the effective deployment and utilisation of ICT confront major obstacles arising in many cases from excessive government control and the complex relationship of technological development to many other issues. The Report affirms the necessity of focusing more research on the effects of technological progress on the Arabic language and how new technologies may deal with it in terms of recognition, speech, and semantics, so as to preserve it and enshrine its role as a vehicle for culture, an axis for development, and a building block of human civilisation.

An ideal utilisation of ICT in building the Arab knowledge society lies beyond the capabilities of the individual Arab states

The chapter explains that an ideal utilisation of ICT in building the Arab knowledge society lies beyond the capabilities of the individual Arab states. Cooperation among concerned institutions must be strengthened on all levels. Success in acquiring and deploying modern technologies is dependent on the ability of multi-specialist teams to cooperate within each Arab country and with regional and global partners. National policies and regional initiatives designed within this frame must take account of the tools provided by ICT, such as virtual research labs and open source methodologies.

Chapter 5 deals with innovation in the Arab world, starting with a review of the concept of innovation that expands the indicators developed by certain international reports in this respect. The chapter conducts its review according to three major axes. The first relates to policy for innovation in scientific and technological knowledge. Highlighting the innovation gap in these arenas and clarifying the limitations of existing Arab research centres, it contends that the latter are incapable of participating actively in building the knowledge society or of coordinating and cooperating either among themselves or with leading international institutions in this respect. The second axis treats the specifics of Arab creativity in the arts, literature, humanities, and social sciences from a new perspective, making clear that the concept of creativity goes beyond the concept of inventiveness, which is linked to technology and its tools and underlining the contribution of imagination and thought to the creation of realms and concepts that enrich the life of the emotions and fertilise the mind. The third axis of the chapter discusses the question of revitalising Arab performance in innovation and puts forward a set of

proposals intended to give impetus to innovation and link it to production.

The chapter highlights the fact that Arab research will never gain a noteworthy position in the third millennium as long as it remains outside the global context of research and innovation. Scientific and technological discoveries are accelerating and proliferating within a broad spectrum of specialisations and applications. This makes it impossible for any of the world's countries, whatever their human and material resources, to pursue them all at the same time. Thus the global trend is to establish major societal and scientific groupings and engage with them, to expand networking for scientific research, and to form partnerships for the implementation of projects and exploitation of their outputs.

The chapter also takes it as a given that, in the face of the plethora of requirements to achieve a qualitative breakthrough on the level of research and innovation, serious political decision-making capable of engaging with the march of research and creativity is a fundamental principle that must be openly adopted at the level of the state, and indeed at the Arab regional level, in active partnership with the institutions and sectors of society.

• **Throughout, the Report has consistently highlighted the importance of the epistemological intercommunication with the self and with the world.** Such intercommunication will help to build to new reality of knowledge in the Arab world that draws on both its own reserves of knowledge and the gains in knowledge to be derived from contemporary knowledge revolutions.

The Report considers that a positive openness to the knowledge revolution, and the benefits arising from it in the fields of development and the expansion of people's options for decent lives, are an essential foundation for the project of the transfer, indigenisation, and innovation of knowledge. There is also an assumption that the existing Arab knowledge deficit will lead to our continuing general backwardness. For this reason, the Report is insistent that the principle of intercommunication with the rest of the world must be an inherent feature of all aspects of knowledge in the Arab world, including education, technology, and general culture. It must be stressed that the defence of intercommunication means neither dependence nor selectivity. Equally it does not mean borrowing. At its most basic, it is a desire and aspiration to prepare the means to bring into being a knowledge-enabling environment and the indigenisation and creation of knowledge. This must occur through the assimilation of contemporary knowledge values and their development in the interests of the Arab individual, in order to support his dignity and realise his well-being.

THE KNOWLEDGE GAP CAN BE OVERCOME

The chapters of the Report reveal important aspects of the reality of Arab knowledge performance. They also examine the general principles that have guided the chief positions and conclusions resulting from this analysis. Having tried to identify the general features of the Arab knowledge gap–be it in terms of the enabling environment or the actual production and deployment of knowledge–we may now formulate a strategy that will help us to narrow and close this gap in such a way as to enable the Arabs to join the knowledge society, and to do so in positive fashion.

> "In the twenty-first century, classification will be on the basis of information: societies with knowledge and others without."
>
> His Highness Sheikh Mohammed bin Rashid Al Maktoum.

Arab knowledge underdevelopment, observable in the areas of both acquisition and production, widens the existing knowledge gap. As is the case with the other peoples of the world, the Arabs over the course of their history have built up a vast stock of knowledge that expresses

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The Report is insistent that the principle of intercommunication with the rest of the world must be an inherent feature of all aspects of knowledge in the Arab world, including education, technology, and general culture

The positive achievements in the Arab region are constrained by many societal, cultural, and political restrictions, most of which can be ascribed to the limitations placed on freedom in its broadest sense

their ways of life and their skills in work and production. The existence of a knowledge gap today means that, despite this, Arab societies have been unable to access the gains made by technological progress, and unable to indigenise new media and mechanisms capable of taking advantage of new forms of knowledge in the development field. This lack extends to the social and cultural milieus. Despite the many cultural bright spots in the Arab region in its modern era, this achievement must seem modest and timid in comparison with the achievements of other regions of the world. At the same time, it is constrained by many societal, cultural, and political restrictions, most of which can be ascribed to the limitations placed on freedom in its broadest sense and on productive intercommunication with the self and with the world.

Careful observation of the state of knowledge in the Arab world, as set forth in the report, calls us to speed up the preparation of the appropriate means to consolidate the foundations for building the knowledge society. In particular, the acceleration in the rates of global progress in technology, culture, economy, and society calls on us to engage, without hesitation, in an attempt to seize the reins of knowledge. This means providing it with enabling environments, supporting its general diffusion–through advantageous partnerships–and making available its tools and technologies, with the aim of effectively deploying them in the service of human development and the defeat of the aspects of underdevelopment prevailing in our societies.

The new possibilities for permanent human development furnished by the

BOX 6-1

Rationalist Critique and Historical Vision

The only way to participate in the battle over the Arab present is through our shared endeavour to defeat the crisis in our thinking and our reality. We are suffering from a crisis of underdevelopment and of dependence. It is a crisis of knowledge, of development, of governance, of stark divisions between levels of wealth, civilisation, living standards, democracy, and culture, a crisis in the relationship between political society and civil society and a crisis of exploitative foreign hegemony over our life potentials and the bases for our social, cultural, and national development. In the end, it is a crisis of thought resulting from these interrelated crises and of our lack of a comprehensive strategic vision to change and renew reality.

This is not to deny the efforts, achievements, and innovations in the different intellectual, social, productive, literary and artistic fields to which hundreds of Arab cultural figures have contributed. I am talking here about the prevailing structures in our thought, reality, and institutions generally [...]

We will only transcend our backwardness and dependence through a rationalist critique and historical vision of the roots of this backwardness and dependence as they exist both in our thought and our reality.

We will only transcend our backwardness and dependence by taking intellectual ownership of the facts of the new scientific revolution–the information revolution–without waiting to complete our belated, limited, and abortive attempts to take intellectual ownership of earlier scientific revolutions.

We will only transcend our backwardness and dependence through a comprehensive development project for the Arab nation with economic, social, educational, cultural, media, and moral dimensions, a project that rational and critically incorporates our Arab and Islamic heritage and adds to it, and that rationally and critically takes account of the facts of our present era as well, and brings something new to it.

We will transcend the past, attain liberation, and achieve progress by being conscious of the facts of our reality and trying, with consideration and respect for the difference and diversity of our particularities and specific conditions, to forge unity without at the same time closing ourselves off to the world around us in the name of national unity and identity. Our identity is not a self-sufficient, readymade essence but a continuous process and a project ever open to renewal. Thus we must remain open to the world, so as to enrich and deepen our identity and to participate as an active player [...]

We must remove the fetters on the freedom to think, criticise, and differ, and to form various popular and community bodies and organisations that provide outlets for the vital, productive, and creative actors in society, be they women or men, and give them the legal right to participate in fateful decisions, to oversee their implementation, and to defend their interests and rights.

Authority does not trump society; the political does not trump the ideological; the ideological does not trump the epistemological; nor are we making from the epistemological an elitist, condescending enlightenment divorced from the spirit of rational, objective criticism and the desire for change and revitalisation.

When all is said and done, the issue is not simply an ideological project for renaissance–many indeed are projects like this in our lives and recent history. The issue, rather, is one of a strategic, foundational, theoretical, epistemological vision deriving from the facts of our reality and age and their needs and challenges, a vision armed with knowledge and a conscious popular collective will on the level of the Arab nation as a whole and on that of each Arab country individually.

It is not a utopia but a necessity innate within the available possibilities, one that is waiting only for the consciousness, will, organisation, and initiative at the heart of our civil societies to make it a reality.

Source: Mahmud Amin al-'Alim, in Qadaya Fikriyya no. 15, 16 July 1995.

knowledge society must be considered to be one of the greatest incentives to closing the knowledge gap. Currently available ICT, for example, provides the opportunity to diffuse forms of knowledge that will help to build an economy based on knowledge, an education for all linked to the different stages of life, and technologies in many fields such as medicine, treatment, and agriculture. All of the latter are knowledge mechanisms that cannot be divorced from the prospects for comprehensive development, with all the latter's promises of well-being for humanity.

A PROPOSED VISION FOR BUILDING THE KNOWLEDGE SOCIETY

Confronting the complex knowledge gap in the Arab world requires a vision that comprises key features for work and action. This proposed vision should build on existing achievements in order to narrow this gap, since some Arab societies have indeed taken steps towards joining the knowledge society.

This proposed plan, whose general features we shall attempt to formulate, should be in harmony with the understanding of the knowledge society as we envision it, going beyond technological determinism to bring to the forefront the overall human dimension, and others associated with aspiration, will, criticism, and history; in this way, we shall avoid reductionist, positivist perceptions that seek to standardise human knowledge. Before sketching the major features of this plan, let us stress that it is both based on defined principles and also is a form of long-term action and initiative whose central aim is in harmony with the Report's conception of the aims of the knowledge society to build overall human development.

This vision is a structure identified through doing and translated through action. Before any of this, however, it is an aspiration. It is an initiative intended to observe the reality of knowledge in the Arab region and aimed at the formulation of strategies that will help to indigenise that knowledge and equip the Arabs to reach the threshold at which innovation and creation begin. At its deepest level, this vision falls under the rubric of efforts aimed at intercommunication and indigenisation, and subsequently of production and innovation. These efforts form the axes of the vision, for its goal is a further expansion of Arab knowledge performance in pursuit of the desired aim of a knowledge development that will place us at the threshold of social and economic development. The desire for such development formed the cornerstone for our initial deliberations on the topic of the knowledge society.

The general spirit of this proposed plan resides in a set of pre-requisites and principles. It also includes major fronts and axes for action. It explains priorities for the action and movement needed to prepare for the steps which, we assume, will translate its features, and which, we hope, will help to sketch out the landmarks marking the route to the knowledge society.

Confronting the complex knowledge gap in the Arab world requires a vision that comprises key features for work and action. The proposed vision should build on existing achievements in order to narrow this gap, since some Arab societies have indeed taken steps towards joining the knowledge society

PRINCIPLES AND FOUNDATIONS FOR MOVEMENT TOWARDS THE CONSTRUCTION OF THE KNOWLEDGE SOCIETY IN THE ARAB WORLD

The proposed vision is based on three major foundations, to be understood as forming an interrelated whole, as follows:

BROADENING THE SCOPE OF FREEDOM

The Report has highlighted the fact that freedom and knowledge are inseparable, as are knowledge and development, in spite of the many forms that this linkage takes. As a consequence, when we make the principle of freedom a requirement for action, we aim also to defend another duality, namely the inseparability of freedom and

Freedom and knowledge are inseparable, as are knowledge and development, in spite of the many forms that this linkage takes

One of the key foundations of the vision necessitates permanent positive interaction between the strategies and mechanisms of the drive for development and action to establish the knowledge society in the Arab region

creativity and innovation. Accordingly, freedom in all its manifestations is a principle central to knowledge and a pillar that must be in place if we are to reach the threshold for the realisation of human welfare. Hence to call for an expansion of the scope of freedoms and a reduction of the restrictions and limits upon them is to call for Arab society to equip itself to engage with the knowledge society.

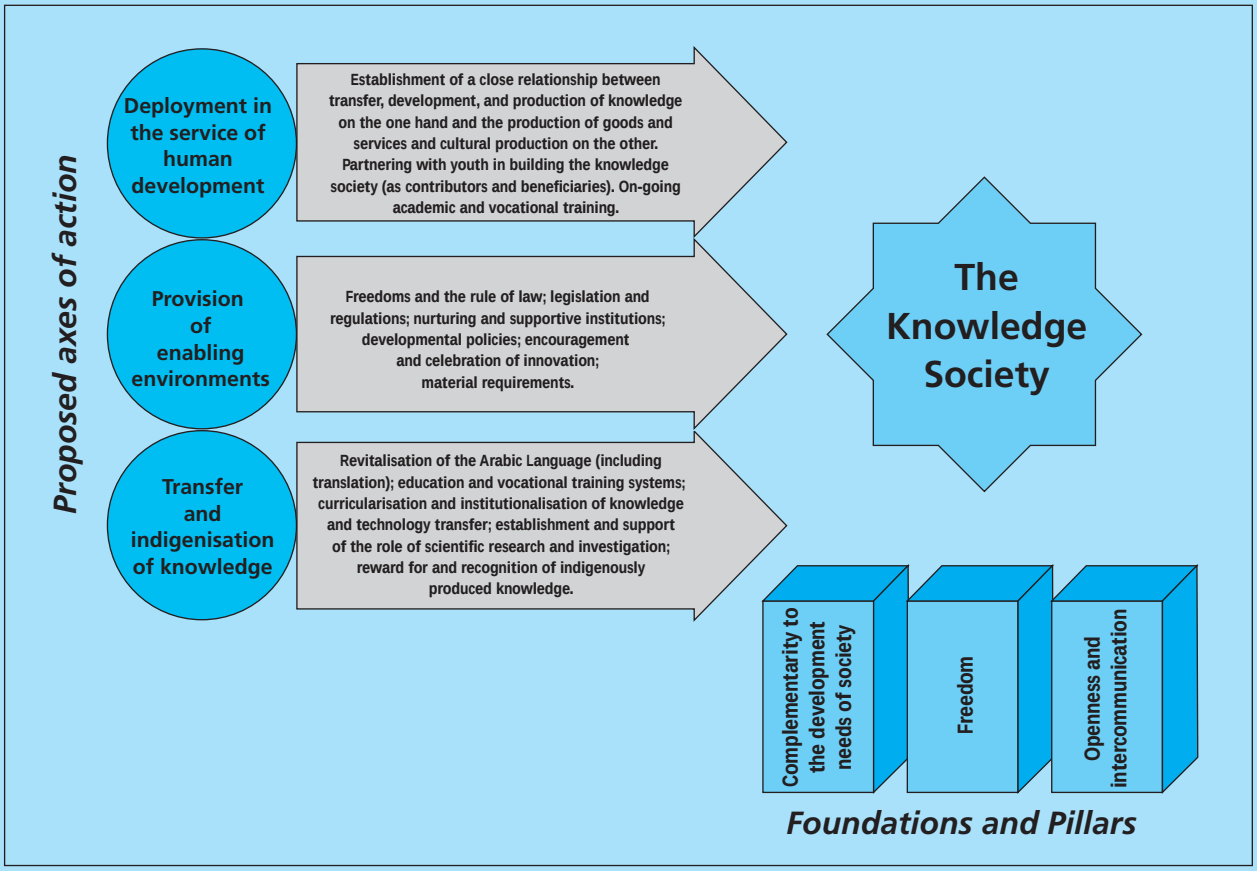
'Freedom' here has a meaning far wider than that of its political or economic significations. Freedom, in the context of being one of the foundations for the building of the knowledge society, is a horizon that equips society to participate collectively in building the path to knowledge and engaging in the production, deployment, and expansion of the Arab individual's gains in overall human development.

POSITIVE INTERACTION WITH THE GROWING NEEDS OF SOCIETY

Starting with the organic connection between knowledge and the developmental needs of Arab societies–whether in the economic, social, or cultural development spheres–one of the key foundations of our vision decrees the necessity of permanent positive interaction between the strategies and mechanisms of the drive for development and action to establish the knowledge society in the Arab region. This permanent interaction built on the accurate identification of developmental needs places the efforts to establish the knowledge society within their correct framework. That framework consists of which is that of support and agitation for human development and of expansion of

FIGURE 6-1

Mechanism for movement towards the Arab knowledge society



the Arab individual's options to reach the better conditions that she or he deserves. This continuing positive interaction between development and knowledge will also inevitably lead to more accurate targeting of the efforts to set up the knowledge society and to the rational use of the available energies, and in consequence to greater benefit being derived from them. There is no benefit in a science which has no use, or in knowledge which does not correspond with the needs of the society in which it has been nurtured. Clearly, it is essential to provide the appropriate mechanisms, and these can be provided and will operate, as we envisage, only in the presence of a genuine political will and a climate of freedom.

OPENNESS AND INTERCOMMUNICATION

While the first pillar invokes the demand for freedom as a central principle in all activities aiming at the revival of knowledge in our society, and the second rests on the initiation of action derived from the reality of the needs of human development in Arab society, the third comprises two other positions that complete the above. The first relates to openness, the second to intercommunication as a central tenet in the field of knowledge.

The word "openness" stands in opposition to "closure," which is synonymous with stasis. Transcending the flaws in knowledge in the Arab world requires arming oneself with the principle of openness to the achievements and lessons of contemporary knowledge. 'Intercommunication' alludes to joint action oriented to the absorption of the benefits and revolutions of knowledge without giving excessive approval to the out-dated reserve of heritage. We in the Arab world are required to support our old epistemological reserve and general popular culture with that built up by the contemporary revolutions in knowledge. If we fail to do this, we shall continue to talk about an intellectual reserve that preoccupies itself fruitlessly in dealing with facts that the passage of time may have caused to lose their relevance and that fall into the category of antiquarian knowledge. While this may provide sustenance for the memory and the soul, it may not enable us to understand what is happening in the world and to absorb innovations in knowledge, or help us to achieve comprehensive human development.

Intercommunication, as we understand it, is a process of partnership and reconciliation with the world and the self so that our own knowledge can be reconstructed in the light of the revolutions in knowledge and sciences as they occur in the modern world. We see it as a process of partnership and interaction because it constitutes one of the means for transfer and indigenisation that lead to the knowledge society, as well as contributing to the production and innovation of knowledge.

BOX 6-2

The Legitimacy of Ambition

When one faces the future, seeking to pull the present towards it and give it an upward and efficacious trajectory, ambition would seem to be an essential quality. At the instant the self takes its aspirations seriously, transforms them into a practical project, and insists on shifting them from imagination to reality, it is transformed into an entity with ambition that places its present on the line between success and failure. What ambition adds to aspiration then is the will to action, and not merely some specific form of desire. I mean that desire–however strong, profound, burning, or fixed on lofty goals for a near or distant future–does not on its own create ambition. Thus ambition is aspiration borne by a practical will insistent on its realisation. For without aspiration–that is desire directed towards a possible ideal or, at least, towards a state better than that existing–there is no ambition in the first place.

Source: Nasif Nassar, 2008. Al-Dhat wal-Hudur (Self and Presence). Beirut: Dar al-Tali'ah, pp.548-9.

PROPOSED AXES OF ACTION FOR THE CREATION OF THE KNOWLEDGE SOCIETY

Responding to the chief current requirements in the arena of knowledge in the Arab world, the proposed vision depends on three major axes. These encompass the provision of the necessary enabling environments, the transfer and indigenisation of knowledge, and the

The word "openness" stands in opposition to "closure," which is synonymous with stasis. This means that transcending the flaws in knowledge in the Arab world requires arming oneself with the principle of openness to the achievements and lessons of contemporary knowledge

deployment of knowledge at the service of sustainable human development and the well-being and dignity of the individual Arab. Fundamental to each of these axes are specific sector-based programmes connected to the propulsion of our societies towards seizing ownership of the knowledge society. It must be stressed here that the axes are composite, based on results and conclusions of the observation of the state of knowledge in its various domains as formulated within the Report.

Freedom and institutionalisation are complementary

THE FIRST AXIS: THE CREATION OF ENABLING ENVIRONMENTS

The construction of the Arab knowledge society mandates first the preparation of appropriate enabling environments. This is because such a society is nurtured and developed in the shadow of these environments, which embrace the expansion of the scope of freedoms, the establishment of nurturing institutions, and the shaping of legal systems to give backing to the props and vision of the knowledge society. This also mandates the creation of incentives and initiatives to help revitalise spaces for innovation, by fostering traditions that celebrate innovation and innovative people.

The enabling environment is one condition for the achievement of the knowledge society. Without it, the continuity and development of any results achieved cannot be guaranteed. Institutions and legislation are thus the basic guarantee for all areas of innovation in the knowledge arena. Provision of a climate of freedom also equips actors in the field of knowledge to give and innovate more. Freedom and institutionalisation are complementary. The impoverishment in the sphere of innovation in scientific research in the Arab world reflects the absence of the institutions that should furnish the conditions necessary to implant the mechanisms of innovation in our countries. While in knowledge societies today we speak about laboratories and joint research workshops mediated by the new forms of ICT, the few, isolated, collective scientific laboratories in our universities have yet to reach the level of institutionalisation that would ensure that the means, tools, and incentives of research become permanent. Equally, existing relationships of cooperation among Arab universities reveal the absence of any clear plan for fruitful cooperation capable of halting the waste of capacities arising from the ongoing brain-drain of Arab researchers and experts.

By way of example, the enabling environment for ICT requires concern for most basic forms of human capital, due to its importance in terms of technical and administrative skills and knowledge, in addition to its role in education, scientific research, and technology.

In the Arab world, the transfer and indigenisation of knowledge are a historical process that requires stamina and a will to work on numerous fronts

THE SECOND AXIS: THE TRANSFER AND INDIGENISATION OF KNOWLEDGE

Entering the knowledge society cannot be achieved without the transfer of its tools and technologies and their diffusion through the various structures of society. In the Arab world, the transfer and indigenisation of knowledge are a historical process that requires stamina and a will to work on numerous fronts. The development of the Arabic language, the revitalisation of Arab thought, and the adoption of the historical and comparative pre-requisites of modern thought can be considered priorities in the process of indigenisation and implantation and in preparing society to learn from the achievements of the knowledge society. To development of the Arabic language it will be necessary to pay greater attention to translation, for example. Here the cross-fertilisation required by the knowledge society occurs between languages, innovations, and modes and methods of thought—hence its importance as a process of interaction that reinforces intercommunication

and the distribution of the benefits of knowledge. Translation contributes to the development of indigenised intellectual production and opens it to the possibility of looking at phenomena and reality from new angles.

Indigenisation is not, therefore, simply transfer. It is a composite operation that combines transfer, translation, education, training, and all activities that transform what is transferred from an imported action into a well rooted action. New environments give this action other features that make it conform with and appropriate to existing needs. Indigenisation, without exaggeration, is a way of qualifying ourselves to reproduce, and also to engage with, the circles in which innovation occurs, for innovation is contingent on indigenisation, and indigenisation is contingent on the enabling environment. Equally, reform of the rules of language, reform of educational systems, and synthesis of the gains of ICT all represent key mechanisms on the axis of indigenisation. All of the foregoing is to come into being within a defined vision and as a result of a defined action, a vision that seeks to make knowledge a contributor to human development.

Indigenisation is a very complex process that calls for the establishment of new structures in the social milieu and massive material resources, in addition to new skills and new patterns of labor. All of these mandate the nurturing of new mentalities capable of adapting to new mechanisms of labor and production. It follows that in the medium and long term, the breaking of frozen patterns of labor and their replacement with new rhythms of intercommunication and achievement are guaranteed. This implies that the subject should not be viewed from a perspective from which transfer is seen as sufficient and which ignores the importance of tailoring what is being transferred to its new milieu. The process of adaptation can occur only if means are found that keep pace with and are responsive to the requirements and platforms of the knowledge society.

THE THIRD AXIS: DEPLOYMENT OF KNOWLEDGE

This axis follows the realisation of enablement and indigenisation. It is related to the deployment of knowledge and its technologies in society, the economy, and the various areas of life. It means linking the new knowledge gained with the arenas of production and progress in society, for new forms of knowledge enable us to build the new economies, which have already begun to form spaces for various kinds of labor and production and to accumulate innumerable material and moral goods. Deployment is reflected in societal development and contributes to the participation by different societal groups, particularly youth, in the advantages offered by the expansion and innovation generated by the mechanisms of the new knowledge technologies in the field of labor and production. When deployment of these knowledge mechanisms begins in the economies that now dominate today's world, it becomes possible for our own societies, through their economic actors, to engage with, for example, the economic networks, electronic markets, and methods of financial intercourse required by today's new global economy. By this means, we shall become able to join the transnational economic cycle through the media made available by ICT, with all their advantages and disadvantages.

Indigenisation is not simply transfer. It is a composite operation that combines transfer, translation, education, training, and all activities that transform what is transferred from an imported action into an implanted action

AXES AND BASES: INTERSECTION AND INTERACTION

The axes that we have listed as separate entities should be considered as interrelated and interactive, and not as discrete areas. Rather, these axes intersect as they form and coalesce. As between enablement, indigenisation, and deployment, enablement communicates, indigenisation consolidates, and deployment expands. The outcomes of all these processes is that the people of the knowledge society are nurtured and new entrepreneurship and commodities

Indigenisation is a way of qualifying ourselves to reproduce, and also to engage with, the circles in which innovation occurs, for innovation is contingent on indigenisation, and indigenisation is contingent on the enabling environment

are born. The rhythm of labor in the knowledge society is fast and continuous. If we are conscious that the challenges facing us in the Arab world pertaining to the knowledge society are major and complex, then taking the road of the aforementioned axes and engaging with them is also included among these complex activities. Hence our insistence on the intersection, interrelation, and interaction among them.

Priorities are subject to a great degree of flexibility since they are open to numerous possibilities and could be adjusted to different realities. They are measures that start from the acceptance of the general vision set out above, and attempt to find routes to modify them based on the varied environments of Arab reality

ASPECTS OF ACTION TOWARDS BUILDING THE COMPONENTS OF THE KNOWLEDGE SOCIETY

We now move on to identify a set of suggested actions and sketch the broad outlines for adopting and translating the preceding vision and ambition. From the start of our presentation of the axis of priorities we have affirmed that what we are putting forward remains bound to the requirements of current Arab reality in the knowledge arena as it has been propounded in the preceding chapters of the Report. Here we aim to formulate precise suggestions, capable of application when the will is available and the resolve becomes firm enough to undertake this move.

It is difficult to rank these issues in order of importance, by virtue of the different positions of the Arab countries on the scale measuring their mastery of the systems and foundations of the knowledge society. We have therefore decided to set them down according to the timeframes realistically needed for their application and the absorption of the features necessary to build up momentum. There are three timeframes:

It is no longer possible for today's societies to draw up development plans without reference to the knowledge gains in various activities and practices on the local, regional, or international levels

Immediate, covering the current and present.

Medium-term, which covers a timescale determined by the facts of each country individually, according to its specifics and the ways it deals with the innovations and tools of the knowledge revolution.

Long-term, which looks to the horizon of ongoing and long-term activity for the consolidation of the values and mechanisms of the knowledge society.

The ongoing nature of the task has been alluded to in discussing a number of the axes in recognition of the interactive nature of these goals and the necessity of renewal and review.

Needless to say, this chronological elucidation does not exclude intersection, interrelation, and reformulation so as to equip actors to find the appropriate programmatic formulas and the suitable and appropriate ordering of priorities for action. Priorities, thus, are subject to a great degree of flexibility since they are open to numerous possibilities and their pace could, as we have explained, be tuned to different situations. They are measures that start from the acceptance of the general vision set out above, and attempt to find routes to modify them based on the varied environments of Arab reality. Thus any of these elements and actions can be dealt with either on the level of the single state or the region, or on the level of the Arab world as a whole, in a way that suits that state of the region's level of knowledge performance.

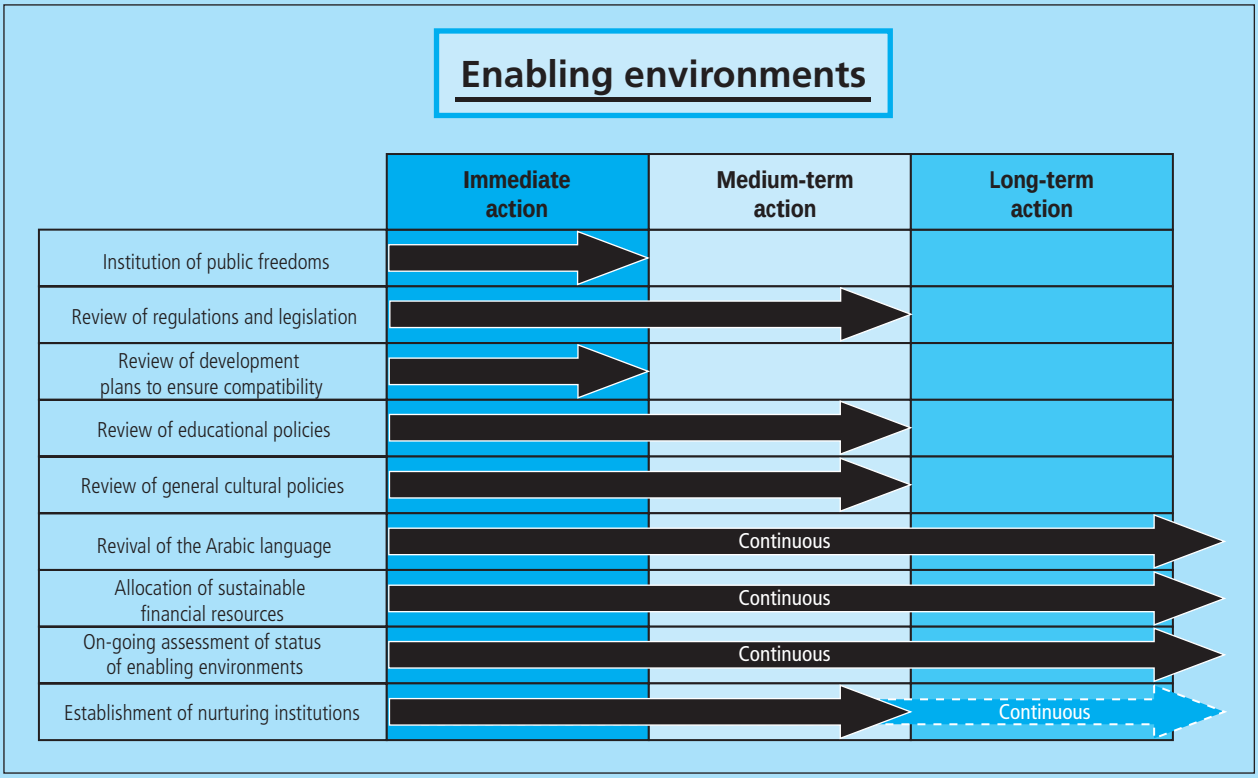
ACTION IN THE AREA OF THE ENABLING ENVIRONMENT

We take as a starting point for the programme of suggested actions a sketch of the major features of the field which is supposed to form the incubator appropriate to the knowledge society. We consider that, in the immediate term, the preparation of this environment requires facing up to the Arab present by, in particular, expanding the sphere of general freedoms and reviewing existing development plans to find ways to harmonise them with the demands of the knowledge society.

These two steps have special significance, for freedom is the hoist by which knowledge and development are raised. Also, when formulating development plans or reviewing those that exist, it should be borne in mind that it is

FIGURE 6-2

Priorities for action to build the elements of the knowledge society in the Arab world



no longer possible for today's societies to draw up such plans without reference to the knowledge gains in various activities and practices on the local, regional, or international levels.

In the medium term, the proposed priorities are related to educational and cultural policies, and also to institutions and legislative frameworks. Preparing an environment to make and frame the knowledge society requires a re-examination of all related policies, including general cultural policies and existing educational policies. It also calls for a review of the reality of the institutions and legislative frameworks consistent with efforts aimed at supporting entry into the knowledge society. When we know that Arab culture in general is suffering from the dominance of certain stagnant forms of thought and based upon perceptual styles ill-suited to the requirements of the age, the need for plans that take into account the prevailing and dominant cultural reality in the Arab region becomes apparent. Hence, the need to expand the circles of enlightenment and to form spaces for free thought continues to call for mechanisms for their diffusion and generalisation within Arab societies. Certainly, this is no easy task. Nevertheless, it is possible to orient the channels, institutions, and platforms that practice cultural work so that they formulate, diffuse, and generalise new intellectual values. Educational institutions, for example, play a central role in this respect. We have, therefore, linked cultural policy to educational policy in our review due to the profundity of the relationship between them.

Preparing organisations, institutions, and laws to support and embrace motion towards the knowledge society is a priority capable of furnishing the enabling environment with frameworks for action that are independent of the involvement

Preparing organisations, institutions, and laws to support and embrace motion towards the knowledge society is a priority capable of furnishing the enabling environment with frameworks for action that are independent of the involvement of individuals and create accumulation

of individuals and create accumulation. The institutional nature of knowledge acts sidelines transient characteristics, and grants them the solidity that allows them to gather and develop successes as they proceed.

If we admit that language is a vehicle–as well as a medium–for culture and knowledge, then we must consider the development of the Arabic language as of high priority in the area of preparing an enabling environment for the knowledge society

To the overviews we have mentioned, we can add that regarding the priority of developing the Arabic language. This intersects with both educational and cultural policies. The development of the Arabic language and the upgrading of its formal aspects and grammar has become an urgent matter, especially in light of the upheavals being experienced in the ICT field, where an operational language has formed that is composed of a set of symbols related to instruments and devices of the highest precision. This has led to the creation of a language within the language. It has also led to the widening of the existing linguistic divide between our language and the new forms of knowledge and their technologies. If we admit that language is a vehicle–as well as a medium–for culture and knowledge and that the linguistic actor has the capacity to build an operational language that produces knowledge and can share in its creation, then we must give development of the Arabic language high priority in the preparations for an enabling environment for the knowledge society.

We connect indigenisation with the principle of inscribing local, specific, and intrinsic character, so that transferred information becomes part of the structure of the society to which it has been transferred

We add to this the necessity for immediate, medium, and long term action in two matters of the utmost priority. The first is related to the allocation of sustainable financial resources, and the second concerns the need for ongoing assessment of the state of the enabling environment, and even the state of knowledge in its various dimensions and elements. Action in these areas will enjoy special significance because financial resources are the foundation stone of the plans necessary to allow the enabling environment to take off and realise success for its programmes. The second point addresses the need for ongoing review and assessment to reveal the degree of progress in the enabling environment and the degree of success of the framework provided by these environments and of building the institutions that ensure the transfer and indigenisation of knowledge.

ACTION IN THE FIELD OF TRANSFER AND INDIGENISATION OF THE KNOWLEDGE SOCIETY

We should point out here that the word indigenisation has a range of synonyms. There are synonyms that employ geographical, agricultural, or psychological metaphors such as transfer, implantation, or absorption. Each of these ascribes to the signification of indigenisation a specific meaning, or variety of meanings, which expand its general semantics, particularly when what is intended, in the context of the present Report, is an allusion to material and also other, symbolic, elements. "Material elements" here refers to the platforms and tools, while "symbolic elements" refers to pure information transferred from the environment where it originated to other spaces for reproduction.

No one should think that the issue is purely mechanical. We connect indigenisation with the principle of inscribing local, specific, and intrinsic character both during and after the process of indigenisation, so that transferred information becomes part of the structure of the society to which it has been transferred and it does not remain simply a piece of information that has been copied and is alien to its new environment. Indigenisation is the absorption and testing of what is transferred. In the proposed strategy, it is a composite and ongoing act. It is an act and an activity that we assume launches itself immediately and takes on specific forms over the medium term. However, it is not an act that ceases when knowledge assumes a productive and creative presence within Arab society. Rather, it continues as a realisation of the principle of intercommunication with the self and with the world. Before reviewing, therefore, some diachronic

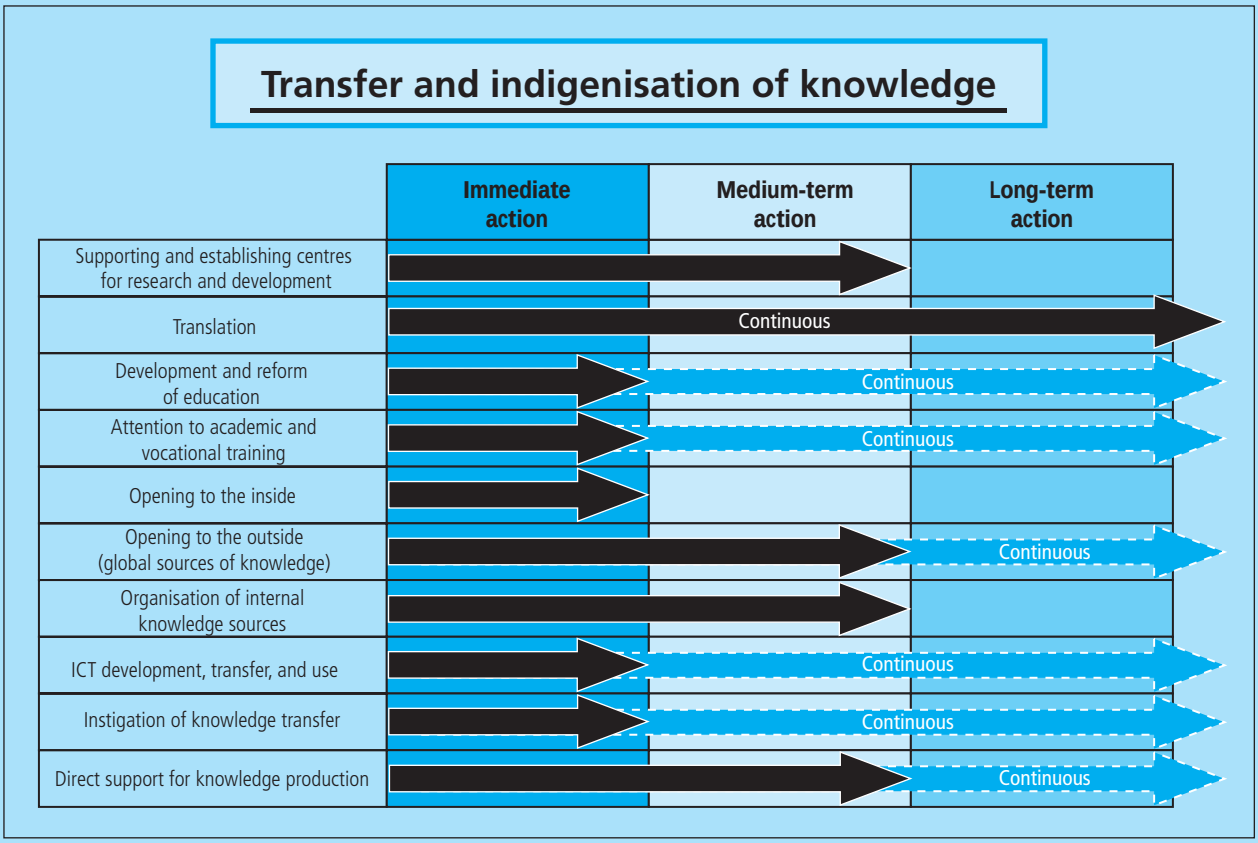
priorities in the area of movement towards indigenisation of knowledge, we confirm that openness and intercommunication together form the major principle in the field of indigenisation, given that intercommunication depends on openness, and openness aims to prepare the apparatus appropriate for the transcendence of existing limitations. Hence, the use of all means conducive to support of this choice and that stimulate transfer will help speed up the pace of indigenisation. Creating, for example, research centres, openness to global sources of knowledge, and concern with training and qualifications are all key steps on the road to implanting the elements that will set in motion the development of knowledge in our society. The steps we have just indicated may perhaps fall under the rubric of the framework of immediate action. They also impinge on the medium-term context, and are priorities for the long term, which is to say for the transitional periods required to close the Arab knowledge gap in all its dimensions and fields.

The implantation of ICT mechanisms and the expansion of ICT usage levels form a groundbreaking and exemplary step in this regard. The reform of individuals' mental perspectives, which is linked to the reform of education and the development of culture in society, also forms an essential means for the consolidation of indigenisation. The knowledge revolutions in today's world rest on significant precedents in terms of the conception of man and nature. In our Arab culture, we still lack these precedents. This serves to entrench the knowledge gap and make the paths of indigenisation more complex. Indigenisation, for example, can happen through reform of education, and likewise requires

The knowledge revolutions in today's world rest on significant precedents in terms of the conception of man and nature. In our Arab culture, we still lack these precedents. This serves to entrench the knowledge gap and make the paths of indigenisation more complex

FIGURE 6-3

Priorities for action to build the elements of the knowledge society in the Arab world



The major challenge lies in changing the general culture of society and the priorities of officialdom throughout the Arab world, so that there is a universal conviction that building solid knowledge capital requires the creation of learning curricula in accordance with a solid educational philosophy and a clear vision

the promotion of translation, which gives Arab thought the opportunity for cultural cross-pollination through which to reformulate itself in light of the gains and achievements of modern knowledge.

Thinking about knowledge indigenisation in the Arab world calls for work on two levels: the institutional, which is included in the framework of the enabling environment, and the systemic, which takes into consideration the various dimensions of society. We thus face a project on the level of society as a whole, and not a project specific to a particular sector or interest. Given that the current picture of Arab knowledge performance is characterised by the absence of a comprehensive perspective, this sort of action will benefit us by linking together the different components of the knowledge field. Indigenisation the spirit of the new initiative, expanded reliance on ICT, and the building of institutions of creativity and innovation will serve as hoists to raise the level of knowledge, skills, technologies, and the various material and non-material resources that, we assume, will multiply within a knowledge society that aims to overcome the challenges of human development.

Some Arab countries of limited financial means will undoubtedly find it difficult to make a rapid transition towards the knowledge society. Quantitative expansion in some fields of knowledge requires not only the availability of large financial and material resources; the major challenge is latent in the availability of qualified human resources capable of developing policies, strategies, plans, and educational curricula, implementing these, and evaluating them. The need to place investment in human educational resources at the top of the priorities for action throughout the Arab world is consequently obvious.

The above must be accompanied by attention to the quality of education and its outcomes and to ensuring its quality at its various stages. In this context, we envisage that attention should be given to ensuring quality in higher education and its fit with societal needs, given that it forms the main locomotive for responding to the requirements of the knowledge economy and in securing comprehensive integrated development.

The major challenge here lies in changing the general culture of society and the priorities of officialdom throughout the Arab world, so that there is a universal conviction that building solid knowledge capital requires the creation of learning curricula in accordance with a solid educational philosophy and a clear vision. The consolidation of a culture of productivity, efficiency, and quality, a culture of responsibility and accountability, and a culture of information and decision-making based on reliable knowledge are all particularly important in this regard.

Confronting these challenges will undoubtedly require the reinforcement of intercommunication and cooperation among Arab states to a much greater extent than is now the case through relevant regional and international organisations. These states are still working in isolation, each failing to take advantage of the expertise of the others and only rarely turning to the examples of successful practices dotted here and there on the Arab educational scene.

BOX 6-3

The Indigenisation of Science

Science is not the sum of knowledge and results acquired and transported from one place to another. Rather it is the effort for indigenisation that springs from the need of society itself; it is a spirit and a method, i.e., standards, values, and interactions. It is not to be possessed by derivation, borrowing, transportation, or purchase, but by effort, the effort to implant, indigenise, and deploy, taking into consideration local environmental and societal needs and the possession of the ability to formulate scientific, technological, and national policies. Science and technology have a structural systemic dimension whereby they interact with the surrounding environment, and so the measure of their progress is the level of self control that this environment achieves [...]

Science and technology are not commodities that can be exchanged and imported. They are, before anything else, the organisational process of indigenisation that implants traditions of creation and innovation in the systems and institutions of society, for technological progress does not lie in the acquisition of imported hardware, but in the creation of local skills that can secure an industrial efflorescence with deep roots in society.

Source: Salim Yafut, Makanat al-'Ilm fi al-Thaqafa al-'Arabiyya (The Place of Science in Arab Culture), Dar al-Tali'a, Beirut, pp.39-41.

ACTION TO DEPLOY KNOWLEDGE

Action on the axis of knowledge deployment–with its various fields and activities–is linked to action on the two previous axes, of enablement and of indigenisation. Perhaps this division is an outcome of methodological necessity, for enablement is indigenisation and indigenisation is deployment. The process of building knowledge and a knowledge society in the Arab world is composed in interrelated fashion of the three axes under discussion. We should not expect indigenisation to bring about deployment; rather, we should practice deployment through indigenisation. Similarly, the enabling environment lets us achieve indigenisation. However, division of the composite and inteactive project in the proposed plan is included within the implementing mechanisms, which we assume will be continuous.

Perhaps the acts of enablement, indigenisation, and deployment taken together absorb other linked processes, even though they may occur, collectively or individually, according to a methodology of separation.

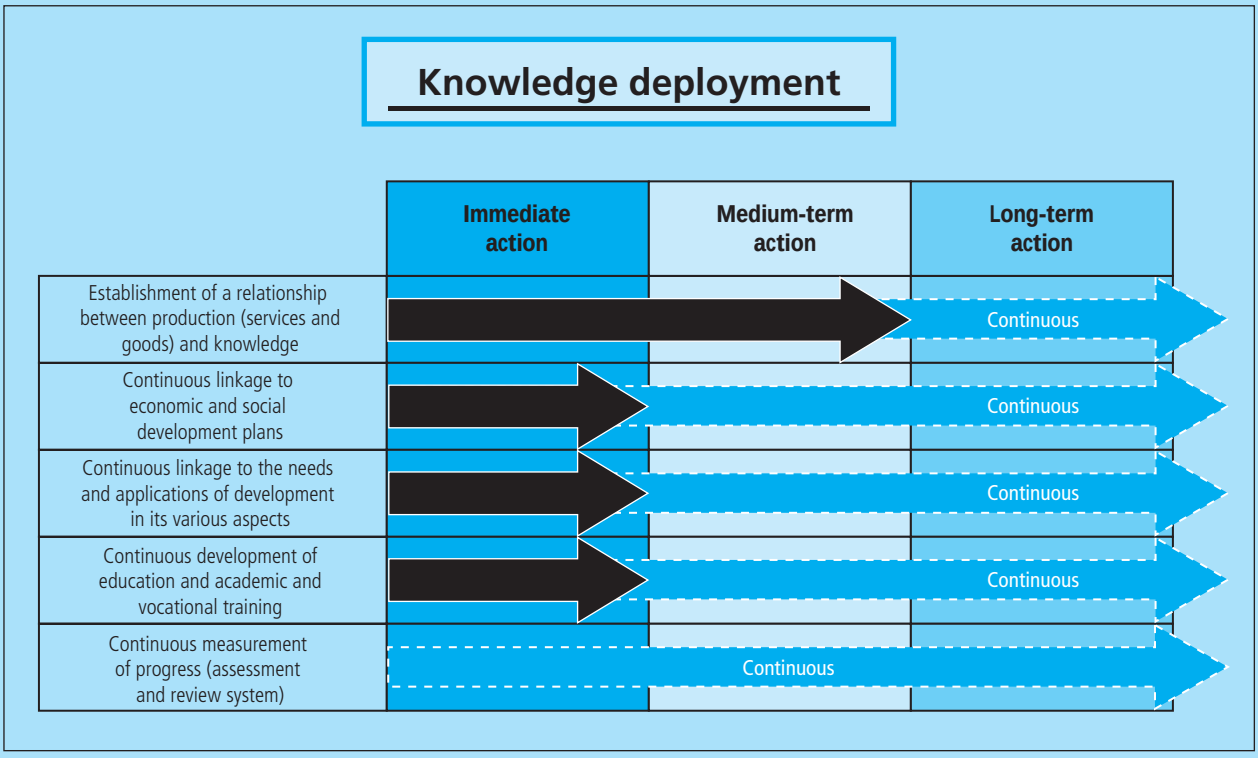
There is an element that regulates the different actions. This is related to the principle of openness to the knowledge gains of the age, intercommunication with its achievements, and preparation of the material, institutional, and educational apparatus to qualify our societies to close knowledge gaps and enter the new knowledge society.

In the sense of this axis, the word "deployment" means the use of new mechanisms, information, and approaches to work, deriving from the knowledge revolution in the economy and society. Its resonances, however, may fall short of comprehending the entirety of the task with which it is charged. From this follows our insistence that what is meant

We should not expect indigenisation to bring about deployment; rather, we should practice deployment through indigenisation

FIGURE 6-4

Priorities for action to build the elements of the knowledge society in the Arab world



Deployment is linked to the creation and reproduction of methods capable of turning the knowledge society and economy in a direction that confronts the needs and satisfies the growing desires of people

by deployment transcends the merely mechanical and imitative use of tools to assist knowledge and the service economy. It is linked to the creation and reproduction of methods capable of turning the knowledge society and economy in a direction that confronts the needs and satisfies the growing desires of people in a world marked increasingly by the phenomena of consumption. In response to these desires, the rhythm of production is rising, and companies, entrepreneurs, and minds are in competition to create markets that follow particular cycles in order to accommodate the increase in production.

Most of the actions in this axis are split between the medium and long term and operate in the field of planning and implementation with regard to economic, social, and cultural development, the strengthening of ties between production and knowledge, and the fields of academic and vocational training. Here, aim is to make us capable of successfully deploying the fruits of the knowledge society and economy in the service of human development in its broadest sense. One of the most important of these goals is the establishment of a strong relationship between production and society's developmental needs on the one hand, and knowledge on the other, since it is no longer possible for new modes of the service and commodity economy to develop—in societies whose needs and aspirations are developing at break-neck speed—without being based on gains in knowledge. Economic movements in the tourism sectors, in market creation, and e-commerce, for example, have begun today to create economic, social, managerial, and financial spaces whose laws and prospects of liberalisation we cannot yet regulate. There must, therefore, be greater deployment of these methods and mechanisms if we are to empower ourselves to enter the new fields of the knowledge society and economy, with all the horizons that this opens for work and development.

A further action whose effect will be felt over the long term with regard to knowledge deployment is the strengthening of channels of support for criticality in Arabic culture

A further action whose effect will likewise be felt over the long term with regard to knowledge deployment is the strengthening of channels of support for criticality in Arabic culture. The achievements of the new knowledge and the new methods for the deployment of

BOX 6-4

Scientific Progress and Social Progress

It cannot be denied that any society can only overcome poverty, ignorance, and disease by means of the acquisition of modern science, hence science has basically come to mean the increase in the returns of human labor [...]

There is [...] a real question posed by the scientific revolution's relationship with the social revolution: is the first conditional on the second–as asserted by Marxists and other social scientists? Or is the first capable of suppressing the second–as hoped by the conservative and liberal leaders of the West?

This is a major problem, but an accidental one, if that is the right expression. The political and social revolution removes the barriers and obstacles without itself solving the tangible existing problems. Revolution does not make the poor rich, educate the ignorant, or cure the sick, but it opens the way to the science that alone can undertake these tasks.

Revolution distributes inherited good: science alone creates new good. Revolution generalises preformed culture: modern science alone expands the horizons of knowledge and increases the number of specialisations. It is true, therefore, that in all circumstances and conditions, scientific progress and social progress are in balance. However, in the light of current global conditions, what is the use of saying that science will in the long term solve all human difficulties? Today's world is divided into cultural and national blocs, and debate must therefore be confined to the scope of each bloc. With respect to the Arab bloc the question posed is, what is the role of modern science in the Arab conception of the present and the future–bearing in mind that this general formulation comprises many subsidiary issues, most important among which are the role of science in Arab society and thought, the share of the Arabs in scientific progress in the past and present, the contribution of science to the solution of Arab problems, and the current Arab concern for science.

Source: 'Abdalla al-'Urawi, Thaqafatuna fi Daw' al-Tarikh (Our Culture in the Light of History), Arab Cultural Centre, Beirut, 1983, pp.116-17.

knowledge technologies and their methods create many of the positive aspects of our age. These have reduced the stagnation of knowledge that dominates many aspects of life and thought in Arab reality. We assume that the new plans in the programmes of education and cultural media will in their turn engage in practices that enable the consolidation of new traditions of thought, work, and production.

The priorities for action on the deployment axis are to be carried through with an awareness of the difficulty of reaching the goal of human development. Actions in this field are to be directed towards the expansion of levels of Arab knowledge performance and its generalisation to the various productive and developmental sectors. They are also to be directed to opening up of the formulation of social and economic development plans using the means and tools provided by today's knowledge revolutions. Human development strategies require a multiplication of efforts, deepened intercommunication and openness, an inflow of resources, institution building, and the spread of a culture of rationality and success at work, in the family, at school and university, within factories and on worksites.

TOWARDS A NEW MECHANISM TO MEASURE ARAB KNOWLEDGE

Since we are suggesting work along a number of lines and directions, we cannot ignore the importance of finding a practical mechanism to measure progress towards the knowledge society that helps society as a whole. Such a mechanism would assist decision makers and specialists to recognise the stages of knowledge acquisition that have already been traversed and identify the gaps in them, so as to reach a more precise definition of markers of progress. Within this context, finding an integrated system to monitor the reality of knowledge in the Arab world today is a basic need. Indeed, in the Arab present, it forms the first step towards a revival in Arabic knowledge performance and the acquisition of the principles of innovation, since programmes cannot be devised without measuring the gaps and knowing the degrees of imbalance that prevail in the various fields of knowledge.

THE ARAB KNOWLEDGE INDEX

We call for the creation of a new index designed to give a more accurate picture of the state of Arab knowledge

There is no way to revive knowledge without a careful and objective check of the range of defects and gaps that have begun to broaden in the absence of a clear plan to overcome knowledge flaws in our society. We call, therefore, for the creation of a new index designed to give a more accurate picture of the state of Arab knowledge by transcending the traditional perspective of measuring knowledge production on the basis of indices that do not conform to the reality of Arab knowledge. We conceive of the proposed index as being distinguished by its exhaustive investigation of the state of information in circulation and by its formulation of indicators able to collate and interpret the various relevant interactions existing within the conditions of Arab knowledge.

Creating such an index will require collective work in which the various concerned societal bodies should participate. Should this be the case, the new index will emerge from the very core of Arab reality and agreement will be achieved on adopting it in analysis and approach and, consequently, on the formulation and application of policies and plans.

The index is considered a central step in preparations for the building of the Arab knowledge society: the foundations will be laid, the data compiled, and the indices devised in the framework of intercommunication with the self and its knowledge conditions, without ignoring the benefit of previous experiences in this field

The index is a central step in preparations for the building of the Arab knowledge society, in that the foundations will be laid, the data compiled, and the indices devised in the framework of intercommunication with the self and its knowledge conditions, without ignoring the benefit of previous experiences in this field. This is because the creation of a proposed Arab knowledge index does not mean forsaking the gains built up by

experiences prior to ours so much as it means building an index that responds to the requirements of Arab reality and seeks to give knowledge a status that will equip it to act as the locomotive for renaissance and development. This suggestion should not be considered utopian, albeit utopias have their significance. Rather, it is included within the plans to help overcome the Arab knowledge gap through a step by step process of construction that assumes that an Arab knowledge index is only a first step on a long path.

CONCLUSION

The various proposals included in this vision and related to the establishment of the knowledge society in the Arab world are in alignment with the spirit and choices of human development

The various proposals included in this vision and related to the establishment of the knowledge society in the Arab world are in alignment with the spirit and choices of human development. At the same time, mention must be made of expanding the significations of the features associated with the knowledge society. Those linked to the containment of technological determinism and of the transformation of ICT into a replacement for the mechanisms of critical knowledge and historical investigation, which evokes both the total human dimension and historical specificities, are of particular importance here. In the measures for action that we have laid out in general fashion in the previous pages, we have been content to point to the major landmarks on the path leading to the highway of the knowledge society.

From time to time, along the three axes whose priorities for action we have been concerned to expound, we have paused to consider examples drawn from certain key sectors without going into detail. The Report considers that current knowledge performance has in common shared requirements, which may be subsumed under the major heading of the knowledge gap, which we consider to be dissimilar in the different parts of the Arab world. This calls for greater understanding of the Arab knowledge reality in each country separately in order to sketch the specific features in advance of the kind of action required according to the size and nature of the gap.

In the vision and plan proposed here, we have been content to remain at the general and common level. We have identified the demand for a comprehensive perspective on the knowledge society. We have also sketched the essential requirements for integration with the knowledge society, namely, human and material resources, working tools, and horizons to which to aspire. The centre of gravity of this report has been the defence of the principle of "intercommunication" through partnership and productive and creative integration. The Report's vision has been translated into an achievable proposal and includes markers along the route to intercommunication, a route that will lead to integration into spaces of knowledge that fly the flag of humanity and human intelligence in the name of partnership and creativity.

> *"And I say that life is indeed darkness save when there is urge,*
>
> *And all urge is blind save when there is knowledge,*
>
> *And all knowledge is vain save when there is work..."*
>
> **GIBRAN KHALIL GIBRAN**

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ANNEX 1. LIST OF BACKGROUND PAPERS (AUTHOR NAME; PAPER TITLE)

IN ARABIC:

- ‘Abd al-Fadil, Mahmud – In‘ikasat al-Azma al-Maliyya al-‘Alamiyya ‘ala al-Iqtisadat wal-Mujtama‘at al-‘Arabiyya: Al-Khasa’ir wal-Furas (The Ramifications of the World Financial Crisis for Arab Economies and Societies: Losses and Opportunities).
- ‘Ali, Nabil – Furas al-Isham al-Ma‘rifi al-‘Arabi: Nathra Mustaqbaliyya (Opportunities for Arab Knowledge Contributions: A Look at the Future).
- ‘Ali, Sa‘id Isma‘il – Mawqi‘ al-Ta‘lim fi Mujtama‘ al-Ma‘rifa bil-Mashriq al-‘Arabi (The Role of Education in the Knowledge Society in the Arab Mashriq).
- ‘Arif, Muhammad – Harakat al-Kafa’at al-‘Arabiyya al-Iqlimiyya wal-Dawliyya (The Regional and International Mobility of Arab Trained Professionals).
- Afaya, Nur al-Din – Mujtama‘ al-Ma‘rifa wa-Ishkalat al-Huwiyya wal-‘Awlama (The Knowledge Society and the Problematics of Identity and Globalization).
- Al-‘Awwa, Nawwar – Mustaqbal Taqniyyat al-Ma‘lumat wal-Ittisalat fi al-‘Alam al-‘Arabi (The Future of ICT in the Arab World).
- Al-Ayoubi, Zalpha – Al-Waqt al-Mukhassas li-Ta’lim kul min al-Mawad al-Ta’limiyya Fi Manaheg Marahel al-Ta’lim al-’am ma Qabl al-Jame’, fi al-Duwal al-’Arabiyya (Time Allocated for Each School Subject in the Curricula of Public Education Systems in the Arab Countries).
- Al-‘Azmeh, ‘Aziz – Al-Ma‘rifa, Mujtama‘ al-Ma‘rifa, al-Hurriyyat (Knowledge, the Knowledge Society, Freedoms).
- Al-Dawway, ‘Abd al-Razzaq – Afkar min Ajl Mudawwana Jadida li-Akhlaqiyyat Mujtama‘ al-Ma‘rifa (Thoughts on a New Code of Ethics for the Knowledge Society).
- Al-Diwahji, ‘Abd al-Ilah – Ada’ al-Buldan al-‘Arabiyya fi al-Tatbiqat al-Ma‘lumatiyya (The Performance of the Arab Countries in ICT Applications).
- Al-Musaddaq, Ruqayya – al-Mar’a al-‘Arabiyya wa Mujtama‘ al-Ma‘rifa (Arab Women and the Knowledge Society).
- Al-Sa‘id, Muhammad and Ahmad ‘Abd al-Latif – Itahat al-Ma‘rifa wa-Tashri‘at Himayat al-Milkiyya al-Fikriyya fi al-Watan al-‘Arabi: Al-Tawajjuhat wal-Tahaddiyat (Access to Knowledge and Legislation on the Protection of Intellectual Property in the Arab World: Trends and Challenges).
- Al-Sellini, Naila – Islah al-Ta‘lim fi Duwal al-Maghrib (Educational Reform in the Maghrib Countries).
- Al-Sharif, Hasan (a) – Al-Mardud al-Mujtama‘i wal-Iqtisadi lil-Ma‘rifa (The Social and Economic Return on Knowledge).
- ––– (b) – Intaj wa-Nashr al-Ma‘rifa al-‘Ilmiyya (The Production and Publication of Scientific Knowledge).
- Al-Wafi, al-‘Arabi – Marja‘iyyat Mujtama‘ al-Ma‘rifa (Frames of Reference for the Knowledge Society).
- Bakir, Mohammed – Qiyas wa-Tahlil al-Ma‘rifa fial-Duwalal-‘Arabiyya Ihsa’iyyan (The Measurement and Analysis of Knowledge in the Arab Countries, a Statistical Approach).
- Bin ‘Abd al-‘Ali, ‘Abd al-Salam – Mujtama‘ al-Ma‘rifa, al-Fada’at al-Iftiradiyya wa-‘Asr al-Taqniyya (The Knowledge Society, Virtual Spaces and

the Age of Technology).
- Binsa'id, Idris – Mujtama' al-Ma'rifa: Min Mujtama' al-I'lam ila Mujtama'at al-Ma'rifa (The Knowledge Society: From the Media Society to Knowledge Societies).
- Diyab, Asif and 'Amr al-Armanazi – Malamih 'Amma li-Barnamaj Nuhud bil-Wad' al-'Arabi al-Rahin lil-'Ulum wal-Thaqafa wal-Ibtikar (General Features of a Programme to Improve the Current Arab Situation in the Sciences, Culture, and Creativity).
- Fahs, Hani (a) – Al-'Asabiyyat 'A'iqan Ma'rifiyyan (Fanaticism as an Obstacle to Knowledge).
- ––– (b) – Al-Nuhud al-Ma'rifi al-'Arabi bayn Darurat al-Wifaq wa-Mashhad al-Shiqaq (The Arab Knowledge Renaissance between the Need for Agreement and a Landscape of Division.
- Firjani, Nadir (a) – Al-Taghayyur fi al-Siyaq al-Mujtama'i lil-Ma'rifa mundhu al-'Am 2003 (Change in the Social Context of Knowledge since 2003).
- ––– (b) – Al-Taghayyur fi Ma'alim Nasaq Iktisab al-Ma'rifa mundhu al-'Am 2003 (The Change in the Features of Knowledge Acquisition Systems since 2003).
- Ghubash, Rafi'a 'Ubayd and Fathi Mustafa al-Zayyat – Qadaya Tatwir al-Ta'lim bayna Ta'addud al-Mubadarat wa-'Ajz al-Aliyyat (Issues in the Development of Education: Multiple Initiatives and Ineffective Instruments).
- Hanafi, Sari – Dawr Abhath al-'Ulum al-Ijtima'iyya fi al-Duwal al-'Arabiyya fi al-Ibtikarat al-'Ilmiyya wal-Tanmiya al-Tiknulujiyya (The Role of Social Science Research in Scientific Innovation and Technological Development in the Arab World).
- Huwaydi, Fahmi – Al-Tatarruf wa-Atharuhu 'ala Mujtama' al-Ma'rifa (Extremism and Its Effect on the Knowledge Society).
- 'Imara, Muhammad – Turathuna wa-Ma'arif al-'Asr (Our Heritage and the Knowledge of the Age).
- Kallab, Ilham – Al-Ma'rifa al-Ibda'iyya (Creative Knowledge).
- Kubursi, 'Atif (a) – Al-Iqtisad al-Jadid (The New Economy).
- ––– (b) – Iqtisad al-Ma'rifa al-'Arabi: Al-Ada' al-Hali wa-Nazra 'ala al-Mustaqbal (The Arab Knowledge Economy: Current Performance and a Look to the Future).
- Labib, al-Tahir – Tatwir al-Thaqafa al-'Arabiyya: I'tibarat Asasiyya (Developing Arab Culture: Fundamental Considerations)
- Lebanese Association for Educational Studies, The – Taqwim Intaj al-Ma'rifa al-Tarbawiyya fi al-Duwal al-'Arabiyya: Tatbiq 'ala Madmun 'Ayyina min al-Adabiyyat al-Tarbawiyya al-'Arabiyya al-Sadira fi al-'Am 2007 (Evaluation of Educational Knowledge Production in the Arab Countries: A Content Analysis of a Sample of Arabic Educational Literature Published in 2007).
- Tarabishi, George – Al-Turath wa al-Tanmiyya al-Ma'refiyya (Heritage and Knowledge Development).
- Yaqtin, Sa'id (a) – Min al-Ma'rifa ila Mujtama' al-Ma'rifa (From Knowledge to the Knowledge Society).
- ––– (b) – Al-Lugha al-'Arabiyya wa-Tahaddiyat Mujtama' al-Ma'rifa (The Arabic Language and the Challenges of the Knowledge Society).

IN ENGLISH:

- Sakr, Naomi – The Impact of Media Laws on Arab Digital and Print Content.
- Waked, Dina – Competition Law and its Impact on Knowledge Creation in the Arab World.
- Zahlan, A.B. – Some Observations on Science Policy in the Arab World.

ANNEX 2. PROJECT FOR A DATABASE ON KNOWLEDGE IN THE ARAB REGION

Over and above its inadequacies, the available data on knowledge in the Arab region is characterised by being widely scattered, difficult to obtain, and unavailable in aggregated form at the regional level or at that of groups of Arab countries. Because of the weakness or absence of coordination between producers of such data, or between them and users of the data, the data varies in its methodological underpinnings, its chronological attribution, its classification, and other specifications. For the most part, knowledge data in the Arab countries is prepared in a fashion similar to that in non-Arab countries without any attempt to draw up definitions, methodologies, and measurements that conform to the reality of knowledge in the Arab region. These factors set major constraints to the possibility of using available knowledge data for comparative purposes among the Arab countries and for preparing measurements and analyses that serve the knowledge economy in the Arab region.

The vital role played by statistical data in the knowledge economy demands that the shortcomings in the data on knowledge for the Arab region -- its fragmentation, its methodological unsuitability, and the weakness in the coordination of efforts to make it available -- be dealt with. The best step to achieve this at present may be to set up an integrated database on knowledge in the Arab region that is subject to ongoing update and development and that opens up prospects for cooperation and development. Creating and maintaining such a database could play an important role in strengthening interest in knowledge in the Arab region, stimulate debate and dialogue among concerned parties, and provide a scientific basis for pertinent decision-making and for follow-up on these decisions. The current trend towards the publication of periodic Arab knowledge reports strengthens the importance of the mentioned database. It is expected that these reports will, on the one hand, greatly benefit from the proposed database and will participate, on the other, in supporting the database through the data they gather, synthesize, and analyse, and the measurements, comparisons, and analyses they draw from these data.

In addition to the role of the proposed database in facilitating the acquisition and use of knowledge data, it is proposed that it play the supplementary roles of creating opportunities for dialogue between producers and consumers of knowledge data, and equally among producers of this data, so as to serve the development of knowledge data regarding the Arab countries and its linkage with other data. From another perspective, it is proposed that the suggested database participate in creating an awareness of the significance of this data and of the role it can play in drawing up and implementing policies for knowledge development and in strengthening capacity for their production and use. Nevertheless, the present proposal goes beyond the traditional construct of a statistical database to encompass various other tasks and activities for the development of knowledge data in the Arab region, the outcome of which will be an advanced database providing a highly effective service to producers and consumers of these data.

The most important beneficiaries of the proposed database project are producers and users of knowledge data on the Arab

regional and international levels and on the level of the government, private, and foreign sectors. In particular, it is proposed that the database be oriented towards researchers in the fields of knowledge, academics, policy makers, decision makers, those working in the media, and statisticians working to gather, develop, and publish knowledge data.

The most important goals of the proposed database project can be summarised as follows:

- The assembly, standardisation, and presentation of the knowledge data about the Arab countries provided by various national, regional, and international sources. This is to be done in an up-to-date and user-friendly fashion that conforms to the needs of users and producers of this data.
- Participation in the provision of new data on knowledge in the Arab countries by carrying out statistical surveys or polls on the key issues connected to knowledge.
- Participation in the publication of knowledge data on the Arab countries via a website, compact discs, pamphlets, posters, and briefs to the media and others.
- Participation in the development of knowledge data on the Arab countries via the development of concepts, methods of data collection, statistical classifications, formulae to prepare indicators and indices, and other issues compatible with the reality and needs of the Arab countries.
- Participation in the cementation of cooperation between producers of knowledge data on the Arab countries, and between them and users of this data, to increase availability and foster the capacity to benefit from what is available.

To achieve the above goals, the proposed project is committed to the following tasks and principles:

- The contents of the database and its manner of operation will be defined in light of the needs of users and preparers of knowledge data for the Arab countries, and by making use of the expertise and wide knowledge related to the reality of these data and the prospects of their development.
- In addition to data on the level of the Arab countries, the database will undertake the preparation and presentation of aggregated data on the Arab regional level, or on the level of groups of Arab countries. The database will also include detailed data to show the disparity among geographical regions, among economic activities and sectors, and among the social, economic, and other segments of the population. The database will also emphasize the preparation of time series data thus making possible the comparison and analysis of changes through time.
- The database will devote particular attention to the specificities of the Arab region and, in particular, matters connected to the use of the Arabic language for knowledge purposes and cultural and artistic aspects peculiar to the Arab region.
- In addition to data, the database will contain illustrative figures and maps, forecasts, and methodological indices based on statistical references and sources.
- The database project aims to identify the gaps in knowledge data and statistics pertaining to the Arab countries in terms of availability, up-to-dateness, detail, methodology, effectiveness in expressing the knowledge reality, and other factors. This is with the aim of defining the steps required to raise the level of these data and statistics. To achieve this, the project may make use of researchers or research teams, hold meetings, or take other steps to serve this goal.
- The database will be put online and will take an interactive and user-friendly form that will provide users with the possibility of downloading data and creating explanatory diagrams. It will

include search engines, hyperlinks to relevant websites, and other advanced website features.

- Initially, Arabic and English will be used, with other languages to be added subsequently.
- The database will be periodically updated, and its contents developed and expanded in ongoing fashion.
- Access to and utilisation of the database and participation in its interactive features will be open to all with the exception of some specific portals where access will be restricted to specific groups who will be issued passwords.
- Within the database website, a special area will be created for the Arab Knowledge Reports that will contain the published reports, their background papers, feedback from the discussions and opinions of database users, and news related to the reports. This area will also contain a special section with access restricted to those preparing the Arab Knowledge Reports and those directly concerned with them. Work in progress, guidelines, the minutes of meetings, announcements, and other material of use for those mentioned above during the preparatory stages of the Arab Knowledge Reports will be placed in this area.
- A portal for dialogue, cooperation, coordination, and learning concerning knowledge in the Arab world will be provided within the database's website.
- The database project will hold training workshops and meetings of experts and form working teams for producers and users of knowledge data to serve the goals of the project.
- Statistical professional best practice, neutrality, and impartiality will be followed in collecting, classifying, and presenting data as in all aspects of the database, with the aim of ensuring that it is characterised by objectivity, accuracy, and efficiency.
- The project will seek to cooperate with parties interested in data and indicators related to knowledge in the Arab region. The most important of these bodies are, on the national level, the national statistical agencies, on the regional level, the Economic and Social Commission for Western Asia (ESCWA), and, on the international level, UN agencies and the World Bank.

The founding and sustainability of the proposed database require the provision of the services of specialists in statistics and ICT. This is on the basis of fulltime employment, part-time work, or on a project basis. This also requires the provision of computer hardware and software, connection to the internet, a base for those working on the database and its equipment, and facilities for holding meetings and workshops. Advantage should also be taken of the experience of related databases such as those of the World Bank's Knowledge Assessment Methodology, the UNDP's Higher Education Project, the UNDP's Programme on Governance in the Arab Region (POGAR), as well as others at regional institutions such as the Mohammed bin Rashid Al Maktoum Foundation on account of its particular interest in knowledge as embodied in the Arab Knowledge Reports, which it will publish, and in its activities related to writing, translation, publishing, study opportunities, and others.

ANNEX 3. MEASUREMENT OF THE ARAB COUNTRIES' KNOWLEDGE ECONOMY (BASED ON THE METHODOLOGY OF THE WORLD BANK)*

The World Bank uses the Knowledge Assessment Methodology with the object of measuring and analysing the knowledge economy. This methodology is based on the supposition that the knowledge economy comprises four pillars: economic incentive and institutional regime, education and human resources, the innovation system, and ICT. The methodology currently comprises a total of eighty-three indicators that are constantly being updated on the World Bank's website.[1]

According to this methodology, the knowledge economy is quantified by means of a numerical index known as the Knowledge Economy Index (KEI). This is calculated from the data of twelve indicators, three of which form a single pillar. Table A-1 presents these indicators and their values with regard to the Arab countries. To calculate the index, the values of the indicators are transformed into normalised values. The normalised value for an indicator for a specific country

TABLE A-1

Indicators of the knowledge economy index for the Arab countries

Country	Economic Incentive and Institutional Regime			Innovation System			Education and Human Resources			Information and Communication Technology		
	Tariff and non-tariff barriers	Regulatory Quality	Rule of Law	Royalty and License Fees Payments and Receipts ($ per person)	Patent Applications Granted By the US Patent and Trademark Office per million people	Scientific and Technical Journal Articles	Adult Literacy Rate (% of those over 15)	Secondary Enrolment (%)	Tertiary Enrolment (%)	Telephones per 1000 people	Computers per 1000 people	Internet users per 1000 people
Algeria	68.8	-0.6	-0.6	..	0.0	10.7	69.9	83.2	21.4	494	11	58
Bahrain	80.8	0.7	0.6	..	0.0	45.6	86.5	101.2	33.1	1301	169	213
Djibouti	28.2	-0.9	-0.8	..	0.0	0.0	..	22.8	2.2	69	24	13
Egypt	66	-0.4	0.0	4.3	0.1	22.8	71.4	86.2	34.8	325	38	68
Iraq	15.6	-1.4	-1.9	..	0.0	40.0	74.1	45.2	12.1	432	56	35
Jordan	74.8	0.4	0.5	..	0.3	50.8	91.1	87.4	39.9	419	57	119
Kuwait	81	0.5	0.8	0.0	2.4	91.9	93.3	88.7	18.8	1140	237	276
Lebanon	77.4	-0.1	-0.5	0.0	0.8	58.3	86.5	81.4	46.3	554	115	196
Libya	39.6	-1.0	-0.6	..	0.0	27.4	84.0	98.5	..	174	..	36
Mauritania	70.2	-0.2	-0.4	..	0.0	0.8	..	20.8	3.2	256	14	7
Morocco	62.6	-0.2	0.0	1.9	0.0	14.7	52.3	49.2	11.4	455	25	153
Oman	83.6	0.8	0.7	..	0.1	44.3	81.4	88.6	18.3	623	47	111
Qatar	70.8	0.5	0.9	..	0.5	32.2	89.0	96.6	18.7	1135	171	269
Saudi Arabia	76.8	0.0	0.2	0.0	0.6	24.9	82.9	94.2	29.2	740	354	70
Sudan	..	-1.2	-1.3	..	0.0	1.3	60.9	32.7	..	69	90	77
Syria	54	-1.2	-0.6	..	0.0	4.1	80.8	67.3	..	307	42	58
Tunisia	71.8	0.2	0.4	2.2	0.1	56.9	74.3	83.3	30.1	692	57	95
UAE	80.4	0.8	0.7	..	1.2	55.8	88.7	85.7	23.2	1273	116	308
Yemen	66.4	-0.7	-1.0	..	0.0	0.6	54.1	45.6	9.4	135	15	9

is arrived at by specifying the country's ranking on the index. Thus the best performing country appears in first place, the next best performing country in second place and so on. The normalised value for an indicator for a particular country is equal to the number of countries ranked lower than that country divided by the total number of countries multiplied by ten. The index for each pillar is calculated on the basis of its being the simple arithmetic mean of the normalised values of the three

TABLE A-2

Knowledge Economy Index for the Arab countries compared to other countries

Country	Economic Incentives and Institutional Regime	Innovation System	Education and Human Resources	Information and Communication Technology	Knowledge Economy Index	Difference between the highest and lowest pillar
KEI value among 135 countries of the world						
Algeria	2.6	3.5	3.7	3.2	3.3	1.1
Bahrain	6.9	4.3	5.8	7.2	6.1	2.9
Djibouti	1.2	1.4	0.5	1.7	1.2	1.2
Egypt	3.6	4.5	4.4	3.5	4.0	1.0
Iraq	0.3	4.2	2.4	3.6	2.6	3.9
Jordan	5.8	5.7	5.5	4.6	5.4	1.2
Kuwait	7.0	5.0	5.1	7.3	6.1	2.3
Lebanon	4.8	4.7	5.0	5.8	5.0	1.1
Libya	1.5	3.9	5.6	2.5	3.4	4.1
Mauritania	4.0	1.8	0.7	1.9	2.1	3.2
Morocco	3.9	3.7	2.0	4.2	3.4	2.2
Oman	7.4	5.1	4.2	4.9	5.4	3.1
Qatar	6.0	5.8	5.3	7.1	6.0	1.8
Saudi Arabia	5.4	4.0	5.0	5.9	5.1	1.9
Sudan	0.7	2.0	1.3	3.5	1.9	2.8
Syria	1.6	3.5	3.0	3.5	2.9	1.9
Tunisia	5.3	4.6	4.1	5.0	4.7	1.2
UAE	7.0	6.8	4.6	7.1	6.4	2.5
Yemen	1.8	1.8	1.8	1.7	1.8	0.1
Ranking among 135 countries						
Algeria	109	91	94	99	96	18
Bahrain	48	76	53	38	48	38
Djibouti	123	134	132	118	132	16
Egypt	91	71	80	93	83	22
Iraq	135	78	106	89	108	57
Jordan	55	55	57	73	62	18
Kuwait	43	66	66	36	47	30
Lebanon	69	68	72	62	68	10
Libya	120	83	56	106	93	64
Mauritania	83	125	129	115	116	46
Morocco	87	88	109	78	92	31
Oman	37	65	87	66	63	50
Qatar	52	54	61	43	49	18
Saudi Arabia	61	80	71	57	67	23
Sudan	131	122	120	96	120	35
Syria	118	94	100	95	104	24
Tunisia	65	69	88	65	72	23
UAE	45	43	77	42	43	35
Yemen	116	126	114	116	122	12

indicators that make up the pillar. The KEI is then calculated on the basis of its being equal to the simple arithmetic mean of the index values for the four pillars. The value of each index falls in the range 0-10 and is an expression of the relative position of a country in comparison with all the countries whose index is calculated. On this basis, the index values of the top 10 per cent of countries fall in the range 9-10, the index values of the second highest 10 per cent of countries fall in the range 8-9, and so on.

INDICATORS AND INDICES OF THE KNOWLEDGE ECONOMY FOR THE ARAB COUNTRIES

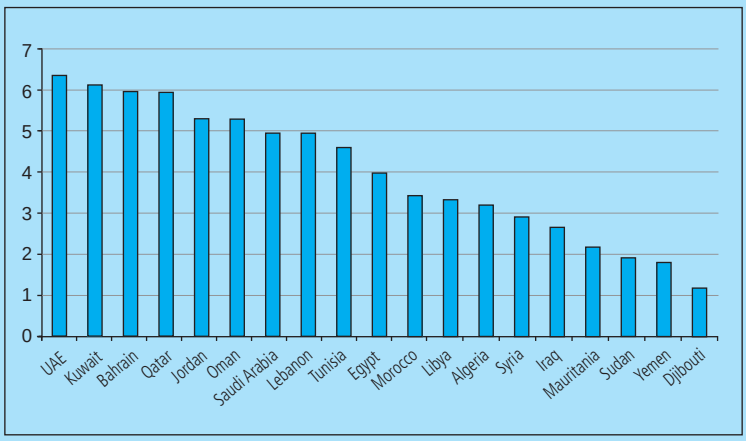
Data for the indicators of the Knowledge Assessment Methodology are currently available with respect to 140 countries, including seventeen Arab countries. For the purposes of the present report, data for the indicators has been made available for two other Arab countries, Iraq and Libya, and the data for Sudan is rounded out, to make a total of nineteen Arab countries for which it is possible to calculate the KEI and the indices of its four pillars. The three Arab countries for which the minimum level of data needed to calculate the indices is not available are Palestine, Somalia, and Comoros. Table A-2 presents the KEI values, the index values of its pillars, and the relative position for each Arab country globally.[2]

VARIATION IN THE KNOWLEDGE ECONOMY AMONG THE ARAB COUNTRIES AND IN COMPARISON WITH OTHER COUNTRIES

Variation in the knowledge economy with regard to the Arab countries is visible on three main levels: within the individual Arab country, among the Arab countries, and between the Arab countries and the countries of the world. Given the lack of sufficient data to calculate the KEI at the level of the geographic or demographic divisions within each Arab country, the presentation of variation with respect to each Arab country will be limited to that between the indices of the four pillars within the country. From the final column of Table A-2, it is to be noted that, for seven Arab countries (Jordan, Lebanon, Tunisia, Egypt, Algeria, Djibouti, and Yemen) the index values for these pillars are close together, with the difference between the highest and lowest not being greater than 1.2. In contrast, seven other Arab countries (Bahrain, Iraq, Libya, Mauritania, Oman, Sudan, and the UAE) display a relatively large variation, of not less than 2.5, in the index values for the pillars. The reason for this high level of variation in the case of five of these countries goes back to the Economic Incentive and Institutional Regime pillar whose index is higher than that of the other three pillars with respect to Mauritania and Oman, while it is lower than the other three with respect to Iraq, Libya, and Sudan. Given that each of the four pillars of knowledge forms an essential element for achieving the knowledge economy, it is necessary to achieve a balance between the levels of the pillars within one country, since underdevelopment in one of the pillars forms an obstacle to performance by the other three pillars of their role in

FIGURE A-1

The Knowledge Economy Index for the Arab countries



Source: World Bank databas, Knowledge Assessment Methodology (KAM).

the knowledge economy. On this basis, one of the priorities for the development of the knowledge economy within each Arab country is to pinpoint its weakest pillar and then work to develop it to close the gap between the four pillars.

Within the Arab region, there is relatively large variation between the Arab countries with respect to the KEI. Table A-2 and Figure A-1 indicate that the KEI for the Arab countries ranges from 6.4 for the UAE to 1.2 for Djibouti. Thus the Arab

TABLE A-3

Economic performance and KEI indicators for the Arab countries compared with the world's geographic regions

Indicator or index	Arab region*	Middle East and North Africa	Africa	East Asia and the Pacific	Europe and Central Asia	The G7 group of nations	Latin America	South Asia	Western Europe	The World	Number of regions higher than the Arab region
Overall economic performance											
Annual GDP growth (%)	5.7	5.1	4.9	5.9	6.9	1.9	3.9	5.5	2.7	4.9	2
Human Development Index	0.73	0.76	0.51	0.8	0.8	0.95	0.77	0.6	0.94	0.74	6
Economic Incentives and Institutional Regime											
Tariff and non-tariff barriers	65	70	68	77	80	84	74	49	85	74	7
Regulatory Quality	-0.2	-0.1	-0.5	0.4	0.1	1.3	-0.1	-0.4	1.4	0.1	6
Rule of Law	-0.2	0.1	-0.5	0.3	-0.3	1.4	-0.4	-0.4	1.6	0	4
Innovation System											
Royalty and License Fees Payments and Receipts ($ per person)	1	23	6	258	22	240	15	0	645	127	7
Scientific and Technical Journal Articles per million people	31	86	6	234	107	591	21	5	634	160	5
Patent Applications Granted by the US PTO per million people	0.3	10.0	0.1	44.6	1.2	146.5	0.9	0.1	77.6	22	6
Education and Human Resources											
Adult Literacy (%)	78	80	59	93	98	100	87	60	99	85	6
Overall enrolment in secondary education (%)	72	79	38	82	91	103	81	51	107	76	6
Overall post-secondary education enrolment (%)	21	26	5	43	47	63	29	7	62	34	6
Information and Communication Technology											
Telephones per 1000 people	557	682	174	823	804	1407	596	115	1542	705	6
Computers per 1000 people	91	137	36	274	142	585	84	13	492	183	5
Internet users per 1000 people	114	152	30	314	207	522	164	29	521	210	6
Indices for the pillars											
Economic Incentives and Institutional Regime	3.8	4.6	2.8	5.7	5.4	8.2	4.7	2.7	8.7	5.2	6
Innovation System	4.4	6.8	5.3	8.8	6.9	9.9	6.5	7.2	8.7	8.8	8
Education and Human Resources	3.4	3.8	1.5	5.3	6.7	8.6	4.3	1.9	8.0	4.4	6
Information and Communication Technology	5.1	5.9	2.6	7.0	6.4	8.8	5.3	1.8	8.9	6.5	6
Knowledge Economy Index	4.2	5.3	3.0	6.7	6.3	8.9	5.2	3.4	8.6	6.2	6

* The Arab region overlaps the Middle East and North Africa region and the Africa region as eighteen Arab countries fall within the Middle East and North Africa region, while the other four Arab countries – Mauritania, Somalia, Sudan, and Comoros – fall within the Africa region.

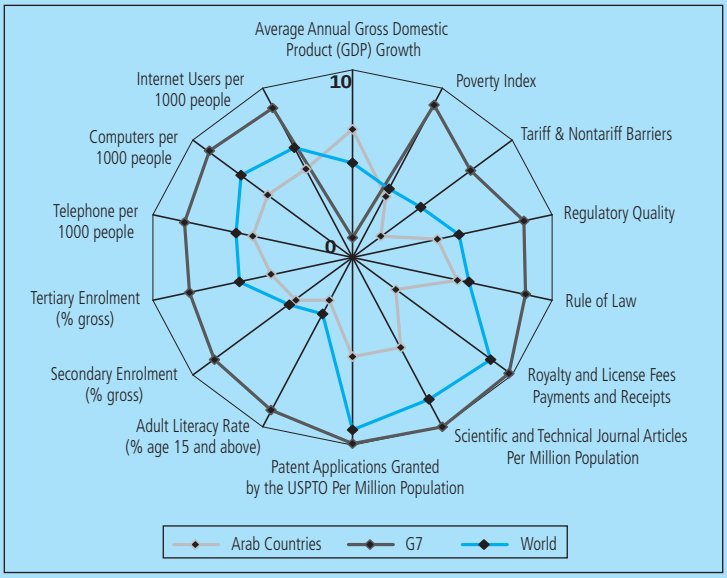
countries' rankings among the countries of the world vary from forty-third place for the UAE to 132nd place for Djibouti–which is fourth from bottom among the world's countries.

When the countries of the world are divided into four quartiles by KEI, it is to be noted that not one Arab country appears in the top quartile–that among countries whose KEI is 7.5 or more. In fact, no Arab country appears in the top 35 per cent. Eight Arab countries fall within the second highest quartile–countries whose KEI ranges from 5.0 to 7.5–and these are the six Gulf Cooperation Council states and Jordan and Lebanon. Seven Arab countries fall in the third quartile with KEI scores of 2.5 to 5.0: Tunisia, Egypt, Morocco, Algeria, Libya, Syria, and Iraq. The Occupied Palestinian Territories, in all probability, also come within this group. The remaining Arab countries come within the bottom quartile of the world's countries in terms of the knowledge economy, with index scores of less than 2.5, and these countries are Mauritania, Sudan, Yemen, and Djibouti. Somalia and Comoros would also be expected to come within this group.

Regarding the variation between the Arab countries and the rest of the world's countries, Table A-3 comprises, for the twelve indicators of the KEI and for two indicators of overall economic performance, a comparison of the Arab region as a whole with the world's eight geographic regions. From the last column of the table, it is noted that the Arab region scores lower than seven of these eight regions with respect to two indicators, scores lower than six of these regions with respect to eleven indicators, scores lower than five regions with respect to two indicators, and scores lower than four with respect to one indicator. The sole indicator for which the Arab region performs better than half of the world's geographic regions is the annual rate of GDP growth, where it achieved the third highest level after the East Asia and Pacific region and the Europe and Central Asia region. The high level of this indicator goes back in large part to the rise in world crude oil prices.

FIGURE A-2

Normalised values for indicators concerning knowledge for the Arab countries, the G7, and the world



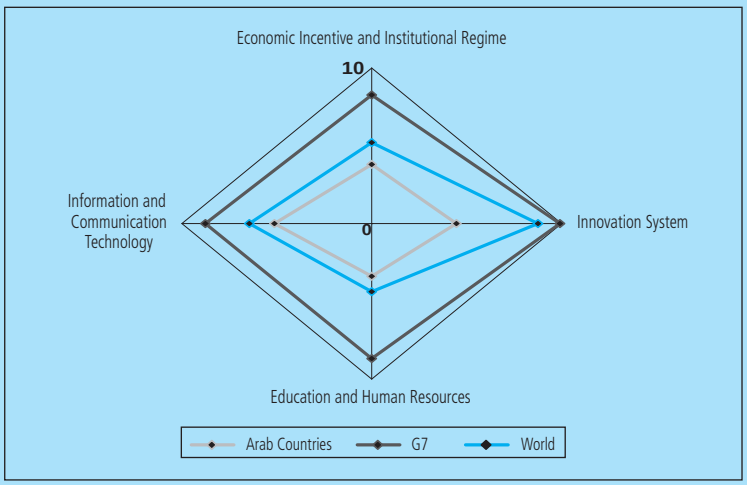
Source: World Bank databas, Knowledge Assessment Methodology (KAM).

Figure A-2 presents a comparison of the normalised values of the above indicators between the Arab region, the world as a whole, and the G7 group of nations (Canada, France, Germany, Italy, Japan, UK, and US). This last group was chosen because it comprises the countries with the highest levels within the knowledge economy. The figure shows that the Arab region falls below the world median on all indicators with the exception of annual GDP growth rate. It also shows that the gap between the Arab region and the world median is particularly marked for the indicator on tariff and non-tariff barriers and for the three indicators of the Innovation System.

With respect to the pillars of knowledge, it is to be noted, from Figure A-3, that the Arab region comes lower than almost all other regions of the world on the Innovation System index. Regarding the indices of the other pillars of the knowledge society, there are only two regions, South Asia–which includes

FIGURE A-3

Index values for the pillars of the knowledge economy for the Arab countries, the G7, and the world

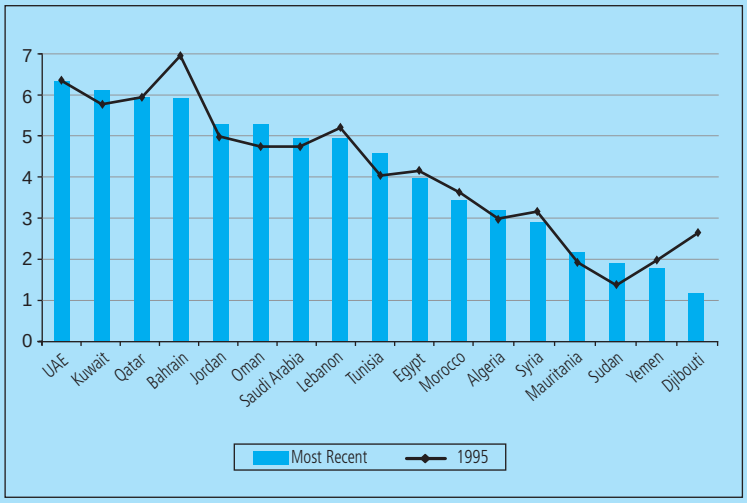


Source: World Bank databas, Knowledge Assessment Methodology (KAM).

Bangladesh, Nepal, Sri Lanka, India, and Pakistan – and Africa, on a lower level than the Arab region. Figure A-3 clearly shows the depressed levels of the pillars of the knowledge economy in the Arab countries with respect to the average for the world's countries as a whole and for the G7 group of nations. This low performance is especially pronounced for the Innovation System pillar.

FIGURE A-4

The latest KEI compared to 1995



Source: World Bank databas, Knowledge Assessment Methodology (KAM).

THE EVOLUTION OF THE KNOWLEDGE ECONOMY IN THE ARAB COUNTRIES SINCE 1995

Figure A-4 compares KEI values for the most recent period for which data is available with 1995 levels for the Arab countries for which this index is available for both periods (see Statistical Annex, Table 4). The Arab countries are ranked in the figure according to the most recent index value. It is to be noted that the KEI score has risen for nine of the seventeen Arab countries included in the comparison. Oman and Tunisia achieved the highest increase, the KEI score for each increasing by 0.6. On the other hand, the KEI scores of seven Arab countries fell back. Djibouti stands out with its score falling from 2.7 in 1995 to 1.2 according to the most recent data. It should be pointed out here that a drop in the value of a particular indicator, and consequently in the value of a particular pillar or of the KEI, from one time period to another, does not necessarily mean a drop in the absolute score for the indicator. Rather it means that the relative position of the country for this indicator has fallen. Such a drop may occur even when the indicator value has risen, if the proportional increase is less than the proportional increases achieved by other countries that are contending with this country in terms of ranking.

THE APPROPRIATENESS OF THE INDICATORS AND INDICES OF THE KNOWLEDGE ECONOMY FOR THE ARAB COUNTRIES

The indicators and indices of the knowledge economy were designed to make international comparisons that conform to the reality of the world's countries as a whole, and in particular from the perspective of the availability of data. On this basis, these indicators and indices do not take into account the specificities

of the Arab countries and suffer from many shortcomings when applied to these countries. The most important of these follow.

- Certain dimensions of knowledge deemed significant with respect to the Arab countries, such as the arts, culture, literature, and translation, are not part of the indicators and indices of the knowledge economy.
- The knowledge economy indicators concentrate on the quantitative and do not lend sufficient importance to the qualitative. The education indicators, for example, concentrate on the numbers of students enrolled in education but do not deal with the qualitative requirements of education in terms of qualified teachers, purpose-built buildings and science labs, the suitability of curricula and the extent of their implementation, and the fit between the specialisations of graduates and the requirements of the knowledge economy.
- Many of the indicators pay attention to the provision of the inputs and environments required to achieve knowledge, but not to its outputs. That is, they are biased towards the supply side in terms of the requirement for achieving the knowledge society and do not devote enough attention to the social and economic fruits of knowledge and to other aspects that are reflected in the life of society. Provision of ICT equipment and infrastructure, such as telephones, computers, the internet, and television, does not necessarily mean that these will contribute to the generation of knowledge. Indeed they may encourage time-wasting in futile activities at the expense of those related to knowledge. Similarly, increased research and development does not necessarily imply that the latter is put to use for the generation of economic returns and benefits to society.
- Some indicators included within the Knowledge Assessment Methodology do not express the variable targeted for measurement. For example, the indicator on the number of patents granted by the US Patent and Trademark Office does not express the actual number of patents, because it does not include patents granted by national patent and trademark offices or by international offices outside the US.

STATISTICAL DATA ON KNOWLEDGE IN THE ARAB COUNTRIES

The data related to knowledge indicators in the Arab countries very often suffer from gaps, inaccuracy, datedness, or irrelevence. These shortcomings in the data make it impossible or difficult to make accurate comparisons, to identify the factors linked to the points of strength and weakness in the state of knowledge, and to perform in-depth and in-detail analyses. These negative effects are particularly concentrated in the indices and countries which suffer to a high degree from the scarcity or datedness of the available data or from its weak capacity to express what is to be measured, while at the same time these very indices and countries are the ones most in need of development based on accurate statistical measurement and analysis.

The importance of statistical data in relation to knowledge is not limited to the purposes of measurement and analysis for which they have been used in this report. Rather, these data form one of the major elements of knowledge, particularly in those areas susceptible to quantitative assessment, such as the economy, sociology, medicine, and engineering, since it plays a vital role in coming to know and analyse reality, in predicting the future, and in decision-making.

AVAILABILITY OF KNOWLEDGE DATA FOR THE ARAB COUNTRIES

To become familiar with the scope of knowledge data available in the Arab countries, we will use here the data of the

TABLE A-4

Availability of knowledge indicators for the Arab countries included by the World Bank

Kind of indicator	Number of indicators	Availability of index indicators for latest period in 19 Arab countries		Number of Arab countries lacking data for the index in 17 Arab countries	
		Number of countries (country/ indicator)	Availability rate (%)	Latest period	1995
Overall economic performance	9	16.1	85	..	..
Economic Incentive and Institutional Regime Index	19	16.9	89	1	8
Innovation System Index	24	11.4	60	11	9
Education and Human Resources Index	19	14.1	74	4*	0
ICT Index	12	14.8	78	0	0
All Knowledge Economy Indicators	83	14.3	75	11	13

* The four countries that lack data for the index of the Education and Human Resources pillar for the latest period but did not lack such data in 1995 are Djibouti, Mauritania, Sudan, and Syria.

World Bank's Knowledge Assessment Methodology indicators in view of their clear features and the effort spent in collecting and updating them. According to the latest release of indicators, the number of indicators to have been calculated for each Arab country ranges from thirty-four to seventy-eight out of a total of eighty-three indicators, with an average of 61.2 indicators for each Arab country, in comparison with 74.0 indicators for the non-Arab countries. There are four Arab countries for which data is available for fewer than fifty indicators, nine Arab countries for which data is available for fifty to seventy indicators, and only six Arab countries for which data is available for more than seventy of the indicators. This is with respect to the nineteen Arab countries where it has been possible to calculate the KEI; the remaining Arab countries–Palestine, Somalia, and Comoros–suffer greater shortcomings in the data.

On the level of the pillars of the knowledge economy, Table A-4 shows that the pillar most lacking in data is the Innovation System, where the average number of Arab countries for which the data for the indicators of this pillar is available amounts to 11.4 out of nineteen countries. That is, the percentage of data available for this pillar reaches only 60 per cent. It is worth pointing out that of the indices of the knowledge economy, this, at twenty-four, consists of the largest number of indicators, in comparison with twelve to nineteen indicators for the remaining pillars. This demonstrates the significance of this pillar in the Knowledge Assessment Methodology. The index for which data is most available is the Economic Incentive and Institutional Regime pillar, for which the data availability rate reaches 89 per cent.

SOURCES OF KNOWLEDGE DATA ON THE ARAB COUNTRIES

Sources of data about knowledge are either national or foreign. The foreign sources are represented by international organisations; foremost among these are the UN organisations, the World Bank, research centres such as the American

Freedom House and Heritage Institute, government offices such as the US Patent and Trademark Office, and other bodies. These bodies undertake the preparation of knowledge data by gathering and collating data available from other sources or by carrying out surveys or polls or on the basis of their administrative records.

The chief national sources for knowledge data in the Arab countries are the specialist statistical bureaux attached to government departments. At the forefront of these bodies is the national central statistical agency of the state which provides technical oversight and works to coordinate statistical activity within the state. Statistical departments are also usually to be found in some state agencies relevant to knowledge, such as the educational institutions, institutions concerned with ICT, and agencies that regulate industrial activity, foreign trade, investment, and intellectual property rights. The private sector in the Arab countries plays a limited role in the provision of knowledge data, although this role is starting to grow in some institutions operating in fields connected with knowledge, such as the private universities, mobile phone companies, and banks. The foreign sector also contributes to the provision of data concerning knowledge in the Arab countries, especially in the Gulf countries where this sector is active in education, commerce, technology transfer, ICT, finance, and others.

It is possible to divide sources of knowledge data into two main kinds on the basis of how they gather this data: administrative data and statistical survey data. By administrative data is meant the data extracted from the records of the bodies that provide services, such as educational institutions, phone and internet companies, banks, and the agencies concerned with regulation of trade, industry, property rights, and others. The most significant feature of administrative data is its availability in detailed form and for time periods that may extend many years into the past. However this data, being a by-product of undelimited specifications and unsorted with regard to its relevance to knowledge, may not be expressive. It is frequently not ready for use and statistical processing and tabulation may be required in order to render it of use. Administrative data from some agencies also overlaps with data from other agencies or is incomplete and limited to the activity of the specific agency.

Knowledge data extracted from statistical surveys includes the data from periodic sector-based surveys, such as those of industrial, service, and financial institutions that are implemented seasonally or annually, comprehensive censuses such as population, residential, and economic institution censuses, opinion polls, and specialist statistical surveys. In the Arab countries, statistical surveys and publications devoted to knowledge are rare, with the exception of the basic attempts of some Arab countries to gather and publish data related to science and technology, which for the most part concentrate on the numbers of those working in research and development activity and expenditure on these activities. In comparison with data extracted from administrative records, knowledge data extracted from statistical surveys is distinguished by its greater conformity to the requirements of the data users, having been designed to serve these. However, collection of such data requires the devotion of financial resources and the availability of statistical expertise and other requirements which make most of it available only for limited time periods and for limited areas of knowledge.

The sources of data for the knowledge indicators in the Arab countries differ according to the indicator. Data for some indicators is available from a number of sources, while at the same time data for other indicators is available from only one source or not available at all. It is of course preferable for data for an indicator to be available from more than one source, provided that such data are mutually complementary and consistent. However, data for the same indicator from different sources are often mutually inconsistent or

even contradictory. For example, data for the indicator on enrolment in a specific stage of education extracted from the records of the educational institutions may not be consistent with those extracted from family surveys because of the difference in the time period, the beginning or end of the school year, how enrolment is defined, the coverage of those enrolled, and other methodological factors.

In general then, there are severe shortcomings in knowledge data within the Arab countries, because interest in collecting these data remains recent. At the time when these data are becoming relatively available with respect to some fields of knowledge, such as education and communications, they remain almost non-existent in other fields, such as those connected to research and development, the publishing industry, patents, literary and artistic production, the media, and translation. In the face of these shortcomings in knowledge data about the Arab countries, it was decided, for the purposes of the present Report, to conduct a statistical survey to examine the opinions of those concerned with knowledge. Implementation was, however, postponed because of the delay such a survey would cause to publication of the Report, and because postponement may be beneficial in light of the increasing fine-tuning of the diagnosis of the reality of knowledge in the Arab countries, of the priorities and subjects on which data should be gathered, and of the best formulations for gathering and tabulating this data that the current Report sets out.

Endnotes

* This annex was prepared by Mohammed H. Bakir in the third quarter of 2008.

1 World Bank website (Knowledge Assessment Methodology), http://info.worldbank.org/etools/kam2/KAM_page3.asp?default=1.

2 The values given in the table differ slightly from the values shown on the World Bank website. This is because the addition of data concerning Iraq, Libya, and Sudan alters the total number of countries included, and in consequence their rankings, which means a change to the normalised values of the indicators.

STATISTICAL ANNEX

STATISTICAL ANNEX

GENERAL INDICATORS

Table 1: Total population, population growth, and proportion of children in the Arab region

Country	Total population 2007 (millions)	Population growth rate 2005-2015 (predicted) (%)	Proportion of the total population under 15 years old 2005 (%)
Algeria	33.8	1.5	29.6
Bahrain	0.7	1.7	26.3
Djibouti	0.8	1.7	38.5
Egypt	75.4	1.7	33.3
Iraq	28.9	2.2	41.5
Jordan	5.9	2.2	37.2
Kuwait	2.8	2.2	23.8
Lebanon	4.0	1.0	28.6
Libya	6.1	1.9	30.3
Mauritania	3.1	2.4	40.3
Morocco	31.2	1.2	30.3
Occupied Palestinian Territories	4.0	3.1	45.9
Oman	2.5	1.9	33.8
Qatar	0.8	2.0	21.7
Saudi Arabia	24.7	2.2	34.5
Somalia	8.6	2.9	44.1
Sudan	38.5	2.2	40.7
Syria	19.9	2.2	36.6
Tunisia	10.3	1.0	26.0
UAE	4.3	2.5	19.8
Yemen	22.3	2.9	45.9
Arab Countries	328.6	2.0	33.7

Source: World Population Prospects 2006 Revision, published 2007. http://www.un.org/esa/population/publications/wpp2006/WPP2006_Highlights_rev.pdf on 12 February 2009.

Table 2: Human Development Indices

Country	Human Development Index value 2006	Human Poverty Index (%)	GDP 2005 (US$ billions)	GDP Per capita 2006 (Purchasing Power Parity US$)	Adult illiteracy rate (% aged 15 and above 1999-2006)	Gender empowerment measure (value)	Gender empowerment measure (rank)
Algeria	0.748	18.1	102.3	7426	25.4	0.312	105
Bahrain	0.902	8.3	12.9	34516	11.7	0.627	35
Comoros	0.572	21.2	0.4	1152	25.8	..	..
Djibouti	0.513	26.5	0.7	1965	..	..	..
Egypt	0.716	20.0	89.4	4953	28.6	0.283	107
Iraq	..	22.6	..	..	25.9	..	..
Jordan	0.769	6.1	12.7	4654	7.3	..	..
Kuwait	0.912	..	80.8	46638	6.7	..	..
Lebanon	0.796	8.5	21.9	9757	..	..	..
Libya	0.840	13.6	38.8	13362	13.8	..	..
Mauritania	0.557	35.9	1.9	1890	44.8	..	..
Morocco	0.646	31.8	51.6	3915	45.3	0.316	104
Occupied Palestinian Territories	0.731	6.7	4.0	..	7.6	..	..
Oman	0.839	15.0	24.3*	20999	16.3	0.434	89
Qatar	0.899	7.2	42.5	72969	10.2	0.380	99
Saudi Arabia	0.835	12.5	309.8	22053	15.7	0.297	106
Somalia	..	..	..	..	..	..	..
Sudan	0.526	34.3	27.5	1887	39.1	..	..
Syria	0.736	13.0	26.3	4225	17.5	..	..
Tunisia	0.762	16.1	28.7	6958	23.1	..	..
UAE	0.903	7.8	129.7	49116	10.2	0.698	24
Yemen	0.567	36.6	15.1	2262	42.7	0.136	108
Arab Countries	0.713	..	1043.4	7760	28.2	..	..

* 2004 data

Source: UN, Statistical update of the tables of the Human Development Report 2007-2008, Fighting Climate Change: human solidarity in a divided world. http://hdr.undp.org/en/media/HDR_20072008_EN_Complete.pdf and http://hdr.undp.org/en/media/HDI_2008_EN_Tables.pdf on 13 April 2009.

Table 3: Economic Indicators

Country	Annual GDP growth 2007 (%)	Inflation rate 2007 (%)	Net foreign direct investment (US$ millions)		Overall surplus/deficit in budget 2006 (US$ millions)	Military expenditure (% of GDP) 2007	Balance of trade 2006 (US$ millions)	Population living without electricity 2006 (millions)
			2004	2007				
Algeria	3	3.7	882	1665	15039	2.9	34060	0.6
Bahrain	8[a]	3.4[b]	865	1756	1471	3.6	3138	0.0
Djibouti	4	5.0[b]	39	195	..	4.2[c]	-294	..
Egypt	7	11.0	2157	11578	-8512	2.8	-8438	1.5
Iraq	..	..	300	448	..	..	6380	22
Jordan	6	5.4[b]	816	1835	-626	5.3	-5004	0.0
Kuwait	10[a]	5.0[b]	24	123	23514	4.8	44284	0.0
Lebanon	2	4.1	1993	2845	-3238	4.5	-5755	0.0
Libya	7	6.7[b]	357	2541	19415	2.0	24306	0.2
Mauritania	2	7.3	392	153	968	3.6	199	..
Morocco	2	2.0	895	2577	-1253	4.5	-9396	4.5
Occupied Palestinian Territories	-3	..	49	21	..	..	..	..
Oman	6[a]	5.5[b]	229	2377	1450	11.9	11274	0.1
Qatar	6[a]	13.8[b]	1199	1138	641	..	15617	0.2
Saudi Arabia	3	4.1[b]	1942	24318	74763	8.2	149116	0.8
Somalia	..	..	-5	141	..	..	..	..
Sudan	10	8.0	1511	2436	-690	2.3[c]	-847	25.4
Syria	7	7.0[b]	275	885	-1698	5.1	-2240	1.9
Tunisia	6	3.1	639	1618	-512	1.6	-2589	0.1
UAE	8[a]	11.0[b]	10004	13253	19732	2.0	48877	0.4
Yemen	4	12.5[b]	144	464	174	7.0	2595	13.2

(a) Figures from 2005. (b) Estimated inflation rate for 2007. (c) Figures from 2006.

Sources:

Column 1: World Bank, http://ddp-ext.worldbank.org/ext/DDPQQ/member.do?method=getMembers&userid=1&queryId=135 on 12 February 2009.

Column 2: IMF, http://www.imf.org/external/pubs/ft/weo/2008/01/weodata/download.aspx on 12 February 2009.

Columns 3 and 4: UNCTAD database, http://stats.unctad.org/FDI/TableViewer/tableView.aspx?ReportId=1254.

Column 5: Arab Monetary Fund, 2008 http://www.amf.org.ae/pages/XlsToHtmlViewer.aspx?filename=uploads/Docs/ECONOMIC%20DEPT/Eco_Ind/INDFRM08.xls on 12 February 2009.

Column 6: UNDP, Office of the Human Development Report, http://hdr.undp.org/en/statistics on 12 February 2009.

Column 7: OAPEC, Annual Statistical Report 2007, http://www.oapecorg.org/publications/ASR/A%20S%20R%202007.pdf on 12 February 2009.

Column 8: UNDP, Office of the Human Development Report, http://hdr.undp.org/en/statistics on 12 February 2009.

Table 4: World Bank Knowledge Economy Index* (most recent compared to 1995)

Country or region	Most recent period	1995	Change
Arab countries			
Algeria	3.25	2.90	0.35
Bahrain	6.02	6.89	-0.87
Djibouti	1.15	2.65	-1.50
Egypt	4.03	4.20	-0.17
Jordan	5.53	5.08	0.45
Kuwait	6.01	5.71	0.30
Lebanon	4.86	4.99	-0.13
Mauritania	2.35	1.79	0.56
Morocco	3.45	3.68	-0.23
Oman	5.37	4.71	0.66
Qatar	6.15	5.81	0.34
Saudi Arabia	5.15	4.66	0.49
Sudan	..	1.40	..
Syria	2.90	3.04	-0.14
Tunisia	4.73	4.10	0.63
UAE	6.66	6.22	0.44
Yemen	1.80	1.83	-0.03
Neighbouring and comparison countries			
Iran	3.39	3.15	0.24
Turkey	5.61	5.41	0.20
Israel	8.22	8.45	-0.23
Cyprus	7.55	7.49	0.06
Malaysia	6.06	6.03	0.03
India	3.12	3.14	-0.02
China	4.35	3.43	0.92
Top-ranking countries			
Denmark	9.58	9.59	-0.01
Sweden	9.52	9.48	0.04
Finland	9.37	9.56	-0.19
Holland	9.32	9.49	-0.17
Canada	9.21	9.23	-0.02
US	9.08	9.50	-0.42
UK	9.09	9.39	-0.30
Geographic regions of the world			
Middle East and North Africa	5.38	5.48	-0.10
Africa	2.80	3.13	-0.33
East Asia and the Pacific	6.59	7.05	-0.46
Europe and Central Asia	6.35	6.06	0.29
G7	8.76	9.07	-0.31
Latin America	5.07	5.40	-0.33
South Asia	2.53	2.57	-0.04
Income level			
High-income states	8.31	8.61	-0.30
Upper-middle-income states	6.21	6.11	0.10
Lower-middle-income states	4.10	4.18	-0.08
Low-income states	2.08	2.29	-0.21
World	**8.01**	**8.18**	**-0.17**

Source: World Bank database, Knowledge Assessment Methodology (KAM), http://info.worldbank.org/etools/kam2/KAM_page6.asp on 13 February 2009.

* The Knowledge Economy Index is calculated from twelve indicators. Values are on a scale of 0-10; the top 10 per cent of states score in the range 9-10, the next highest 10 per cent of states score in the range 8-9 and so on.

Table 5: Relationship of Arab market competitiveness with knowledge production 2008

Country	Intensity of local competition	Extent of market dominance	Effectiveness of antitrust policy	Compound score	Comprehensiveness of competition laws (legislation)	Independence of the competition agencies (institutions)
	(1)	(2)	(3)	(4)	(5)	(6)
Algeria	4.2	3.9	3.1	3.7	15	2
Bahrain	5.3	4.2	4.2	4.6	..	..
Djibouti	..	..	..	..	..	..
Egypt	4.6	3.4	3.3	3.8	13	1
Iraq	..	..	..	..	..	..
Jordan	5.6	4.6	4.5	4.9	23	2
Kuwait	5.1	4.1	3.6	4.3	..	..
Lebanon	..	..	..	..	..	..
Libya	4.0	3.5	3.7	3.7	..	..
Mauritania	4.1	2.4	3.6	3.4	..	..
Morocco	4.6	3.9	4.2	4.2	17	1
Occupied Palestinian Territories	..	..	..	..	..	..
Oman	4.7	3.8	3.9	4.1	..	..
Qatar	5.1	4.6	4.2	4.6	..	1
Saudi Arabia	5.2	4.4	4.3	4.6	20	3
Somalia	..	..	..	..	..	..
Sudan	..	..	..	..	..	..
Syria	5.1	3.7	3.8	4.2	..	2
Tunisia	5.4	4.8	5.0	5.0	14	3
UAE	5.6	4.6	4.1	4.8	..	..
Yemen	..	..	..	..	..	1

Sources:

Columns 1-3: World Economic Forum, Global Competitiveness Report 2008/2009 and Arab Competitiveness Report, http://www.weforum.org/en/initiatives/gcp/index.htm and http://www.weforum.org/en/initiatives/gcp/Arab%20World%20Competitiveness%20Report/index.htm on 12 February 2009.

Column 4: Simple Average of columns 1-3.

Column 5: Keith Hylton created this index for the Antitrust World Reports (http://antitrustworldwiki.com). The results for the indicator are calculated by measuring the breadth of the overall competition law on a positive scale of 0-30.

Column 6: The ratings on this index are based on the results of the analyses in the background paper by Deena Waked (in English). A rating of 1 indicates fully dependent, 2 indicates semi-independent, and 3 indicates fully independent.

Table 6: Worldwide governance indicators in the Arab region and comparison countries 2007

Country	Voice and accountability	Political stability and absence of violence	Government effectiveness	Regulatory quality	Rule of law	Control of corruption
Algeria	-1.01	-1.18	-0.52	-0.66	-0.72	-0.47
Bahrain	-0.82	-0.28	0.41	0.89	0.66	0.60
Djibouti	-1.06	-0.05	-0.98	-0.80	-0.51	-0.48
Egypt	-1.24	-0.77	-0.44	-0.31	-0.13	-0.58
Iraq	-1.29	-2.82	-1.68	-1.35	-1.89	-1.39
Jordan	-0.64	-0.29	0.27	0.35	0.51	0.32
Kuwait	-0.46	0.40	0.20	0.29	0.69	0.49
Lebanon	-0.45	-2.09	-0.61	-0.21	-0.66	-0.65
Libya	-1.94	0.47	-1.07	-0.98	-0.62	-0.83
Mauritania	-0.75	-0.33	-0.68	-0.36	-0.60	-0.50
Morocco	-0.62	-0.52	-0.07	-0.11	-0.15	-0.24
Occupied Palestinian Territories	-1.28	-2.07	-1.24	-1.38	-0.84	-0.77
Oman	-1.03	0.76	0.38	0.63	0.73	0.62
Qatar	-0.64	0.81	0.06	0.55	0.89	1.00
Saudi Arabia	-1.59	-0.59	-0.18	-0.10	0.27	-0.10
Somalia	-1.89	-3.01	-2.35	-2.72	-2.64	-1.87
Sudan	-1.73	-2.30	-1.18	-1.25	-1.46	-1.25
Syria	-1.77	-0.61	-0.88	-1.22	-0.55	-0.88
Tunisia	-1.22	0.10	0.46	0.15	0.32	0.08
UAE	-0.89	0.76	0.86	0.70	0.66	1.00
Yemen	-1.06	-1.48	-1.02	-0.71	-0.94	-0.62
India	0.38	-1.01	0.03	-0.22	0.10	-0.39
South Korea	0.66	0.45	1.26	0.88	0.82	0.36

Source: World Bank, Worldwide Governance Indicators 2007: (Voice & Accountability - Political Stability & Absence of Violence - Government Effectiveness -Regulatory Quality - Rule of Law - Control of Corruption).

http://info.worldbank.org/governance/wgi/index.asp on 14 February 2009.

Table 7: Press Freedom Index in the Arab region 2008

Country	Ranking (among 173 states)	Press freedom index
Kuwait	61	12.63
Lebanon	66	14.00
UAE	69	14.50
Qatar	74	15.50
Comoros	89	20.00
Bahrain	96	21.17
Mauritania	105	23.88
Algeria	121	31.33
Morocco	122	32.25
Oman	123	32.67
Jordan	128	36.00
Djibouti	134	41.50
Sudan	135	42.00
Tunisia	143	48.10
Egypt	146	50.25
Somalia	153	58.00
Yemen	155	59.00
Iraq	158	59.38
Syria	159	59.63
Libya	160	61.50
Saudi Arabia	161	61.75
Occupied Palestinian Territories	163	66.88

Remark: The lower the value of a state's press freedom index, the better the situation for press freedom.

Source: Reporters without Borders, Report on Worldwide Freedom of the Press 2008, http://www.rsf.org/article.php3?id_article=24025 on 10 June 2009.

Table 8: World Bank Economic Incentive and Institutional Regime Index* (most recent compared to 1995)

Country or region	Most recent period	1995	Change
Arab countries			
Algeria	2.53	1.87	0.66
Bahrain	6.84	7.22	-0.38
Djibouti	1.19	4.00	-2.81
Egypt	3.57	3.71	-0.14
Jordan	5.77	5.49	0.28
Kuwait	7.01	5.64	1.37
Lebanon	4.70	4.36	0.34
Mauritania	3.89	1.68	2.21
Morocco	3.80	4.53	-0.73
Oman	7.32	6.46	0.86
Qatar	5.99	5.75	0.24
Saudi Arabia	5.39	4.57	0.82
Sudan	0.61	0.53	0.08
Tunisia	5.26	4.44	0.82
UAE	6.95	7.14	-0.19
Yemen	1.72	1.78	-0.06
Neighbouring and comparison countries			
Iran	1.18	0.79	0.39
Turkey	7.02	6.40	0.62
Israel	8.16	8.85	-0.69
Cyprus	7.77	8.39	-0.62
Malaysia	6.18	7.21	-1.03
India	3.67	3.48	0.19
China	4.01	3.31	0.70
Top-ranking countries			
Denmark	9.66	9.57	0.09
Sweden	9.18	8.84	0.34
Finland	9.47	9.43	0.04
Holland	9.18	9.50	-0.32
Canada	9.42	8.41	1.01
US	9.16	9.20	-0.04
UK	9.28	9.40	-0.12
Geographic regions of the world			
Middle East and North Africa	4.63	4.40	0.23
Africa	2.80	2.61	0.19
East Asia and the Pacific	5.71	5.90	-0.19
Europe and Central Asia	5.44	4.22	1.22
G7	8.24	8.76	-0.52
Latin America	4.70	5.15	-0.45
South Asia	2.72	2.67	0.05
Western Europe	8.69	8.90	-0.21
Income Level			
High-income states	8.03	8.70	-0.67
Upper middle-income states	5.78	5.57	0.21
Lower middle-income states	3.41	3.26	0.15
Low-income states	1.88	1.95	-0.07
World	**5.18**	**4.87**	**0.31**

Source: World Bank database (Knowledge Assessment Methodology),http://info.worldbank.org/etools/kam2/KAM_page6.asp on 14 February 2009.

* The index value falls on a scale of 0-10 and is calculated from three key indicators: Tariff and non-tariff barriers, regulatory quality, and rule of law. The top 10 per cent of states score in the range 9-10, the next highest 10 per cent of states score in the range 8-9 and so on.

EDUCATION

Table 9: Adult literacy rates by gender in the Arab states 1980 and 2005

Country	1980 (or closest three years)				2005 (or closest three years)			
	Male (%)	Female (%)	Total (%)	Gender parity index **	Male (%)	Female (%)	Total (%)	Gender parity index
Algeria	55	24	39	0.44	83	64	74	0.77
Bahrain	80	60	72	0.75	90	85	88	0.94
Comoros	56	40	48	0.71	79	68	73	0.86
Djibouti	45	18	31	0.40	..	..	65	..
Egypt	54	25	40	0.46	83	59	71	0.71
Iraq	55	25	40	0.45	84*	64*	74*	0.76
Jordan	82	54	69	0.66	95	87	91	0.92
Kuwait	73	59	68	0.81	95	93	94	0.98
Lebanon	91	82	86	0.90	..	..	86	..
Libya	73	31	54	0.42	94	77	86	0.82
Mauritania	41	19	30	0.46	63	47	55	0.75
Morocco	42	16	29	0.38	67	41	54	0.61
Occupied Palestinian Territories	..	..	..	..	97	87	92	0.90
Oman	..	..	..	..	88	75	83	0.85
Qatar	72	65	70	0.90	89	89	89	1.00
Saudi Arabia	60	32	48	0.53	88	77	84	0.88
Somalia	..	..	..	..	..	..	..	..
Sudan	43	17	30	0.40	71*	52*	61*	0.73
Syria	72	34	54	0.47	89	75	82	0.84
Tunisia	61	32	46	0.52	85	67	76	0.79
UAE	72	64	70	0.89	90	88	89	0.98
Yemen	..	..	..	..	75	37	56	0.49
Arab Countries	55	25	40	0.45	82	62	73	0.76

** Ratio of women to men.

* 2000 Data

Source: Database of the UNESCO Institute for Statistics

Table 10: Gross enrolment ratio in secondary education in the Arab states by gender, 1980 and 2006

Country	1980 (or closest three years)				2006 (or closest three years)			
	Male (%)	Female (%)	Total (%)	Gender parity index	Male (%)	Female (%)	Total (%)	Gender parity index
Algeria	40	26	33	0.65	80	86	83	1.08
Bahrain	70	58	64	0.83	100	104	102	1.04
Comoros	..	..	22	..	40	30	35	0.75
Djibouti	15	9	12	0.60	27	18	22	0.67
Egypt	61	39	51	0.64	91	85	88	0.93
Iraq	76	38	57	0.50	54	36	45	0.67
Jordan	62	56	59	0.90	88	90	89	1.02
Kuwait	84	80	28	0.95	87	91	89	1.05
Lebanon	61	57	59	0.93	77	86	81	1.12
Libya	89	63	76	0.71	86	101	94	1.17
Mauritania	..	..	11	..	27	23	25	0.85
Morocco	32	20	26	0.63	53	45	56	0.85
Occupied Palestinian Territories	..	..	..	..	90	95	92	1.06
Oman	17	6	12	0.35	91	88	90	0.97
Qatar	65	68	66	1.05	105	102	103	0.97
Saudi Arabia	36	23	30	0.64	..	..	94	..
Somalia	13	5	9	0.38	..	..	..	..
Sudan	..	..	16	..	35	32	33	0.91
Syria	57	35	46	0.61	73	71	72	0.97
Tunisia	34	20	27	0.59	81	89	85	1.10
UAE	55	49	52	0.89	91	94	92	1.03
Yemen	..	..	..	..	61	30	46	0.49
Arab Countries	57	38	..	0.67	70	65	68	0.93

Source: Database of the UNESCO Institute for Statistics.

Table 11: Gross enrolment ratios in tertiary education in the Arab states by gender, 1980 and 2005

Country	1980 (or closest three years)				2005 (or closest three years)			
	Male (%)	Female (%)	Total (%)	Gender parity index	Male (%)	Female (%)	Total (%)	Gender parity index
Algeria	9	3	6	0.33	19	24	21	1.26
Bahrain	5	5	5	1.00	20	48	33	2.40
Comoros	< 1	< 1	< 1	..	3	2	2	0.67
Djibouti	< 1	< 1	< 1	..	2	2	2	1.00
Egypt	21	11	16	0.52	..	..	35	..
Iraq	12	6	9	0.50	20	12	16	0.60
Jordan	14	13	13	0.93	39	41	40	1.05
Kuwait	9	15	11	1.67	10	29	19	2.90
Lebanon	41	21	30	0.51	44	49	46	1.11
Libya	11	4	8	0.36	53	58	56	1.09
Mauritania	4	2	3	0.50	5	2	3	0.40
Morocco	9	3	6	0.33	13	10	11	0.77
Occupied Palestinian Territories	..	..	..	..	40	42	41	1.05
Oman	< 1	< 1	< 1	..	18	19	18	1.06
Qatar	6	17	10	2.83	10	33	19	3.30
Saudi Arabia	9	5	7	0.56	24	35	29	1.46
Somalia	1	<1	1	..	..	..	..	..
Sudan	3	1	2	0.33	6	6	6	1.00
Syria	23	10	17	0.43	..	..	15	..
Tunisia	7	3	5	0.43	25	35	30	1.40
UAE	2	5	3	2.50	13	37	23	2.85
Yemen	..	..	..	..	14	5	9	0.36

Source: Database of the UNESCO Institute for Statistics.

Table 12: World Bank Education and Human Resources Index* (KAM) (most recent compared to 1995)

Country or region	Most recent period	1995	Change
Arab countries			
Algeria	3.64	3.50	0.14
Bahrain	5.82	6.32	-0.50
Djibouti	0.49	0.78	-0.29
Egypt	4.35	4.31	0.04
Jordan	5.49	4.50	0.99
Kuwait	4.87	4.61	0.26
Lebanon	4.76	5.84	-1.08
Mauritania	0.94	1.11	-0.17
Morocco	2.00	2.44	-0.44
Oman	4.30	3.13	1.17
Qatar	5.29	5.55	-0.26
Saudi Arabia	4.87	3.86	1.01
Sudan	..	1.59	..
Syria	2.91	3.31	-0.40
Tunisia	4.10	3.50	0.60
UAE	4.78	4.27	0.51
Yemen	1.83	1.54	0.29
Neighbouring and comparison countries			
Iran	3.89	4.44	-0.55
Turkey	4.38	4.42	-0.04
Israel	6.72	7.39	-0.67
Cyprus	6.45	6.09	0.36
Malaysia	4.14	4.16	-0.02
India	2.26	2.56	-0.30
China	4.11	3.62	0.49
Top-ranking countries			
Denmark	9.80	9.61	0.19
Sweden	9.40	9.59	-0.19
Finland	9.78	9.74	0.04
Holland	9.26	9.69	-0.43
Canada	9.26	9.69	-0.43
US	8.77	9.42	-0.65
UK	8.54	9.69	-1.15
Geographic regions of the world			
Middle East and North Africa	3.69	3.97	-0.28
Africa	1.46	1.68	-0.22
Europe and Central Asia	6.74	6.65	0.09
G7	8.73	9.09	-0.36
Latin America	4.39	4.64	-0.25
South Asia	1.89	2.14	-0.25
Western Europe	8.16	8.61	-0.45
Income Level			
High income states	7.60	7.81	-0.21
Upper middle income states	5.89	5.76	0.13
Lower middle income states	3.61	4.02	-0.41
Low income states	1.71	1.87	-0.16
World	**4.16**	**4.82**	**-0.66**

Source: World Bank database (Knowledge Assessment Methodology), http://info.worldbank.org/etools/kam2/KAM_page6.asp on 13 February 2009.

* The index value falls on a scale of 0-10 and is calculated from three key indicators: adult literacy rate, secondary enrolment, and tertiary enrolment. The top 10 per cent of states score in the range 9-10, the next highest 10 per cent of states score in the range 8-9 and so on.

Table 13: Adult illiterate population and children (of primary school age) out of school in the Arab countries by gender 2007 (or closest two years)

	Number of illiterates				Number of children out of school			
	Male (000s)	Female (000s)	Total (000s)	Gender parity index	Male (000s)	Female (000s)	Total (000s)	Gender parity index
Algeria	1918	4057	5974	2.12	61	88	149	1.44
Bahrain	32	31	63	0.97	0.283	0.137	0.420	0.48
Comoros	48	74	122	1.54	..	..	..	..
Djibouti	..	..	..	..	27	29	56	1.07
Egypt	6256	10567	16824	1.69	10	222	232	22.20
Iraq	..	..	..	..	109	398	508	3.65
Jordan	87	219	305	2.52	34	26	60	0.76
Kuwait	66	56	122	0.85	5	7	13	1.40
Lebanon	94	215	309	2.29	37	37	74	1.00
Libya	124	445	569	3.59	..	..	..	..
Mauritania	346	486	832	1.40	51	38	89	0.75
Morocco	3349	6467	9816	1.93	157	237	395	1.51
Occupied Palestinian Territories	31	104	136	3.35	56	52	108	0.93
Oman	108	166	274	1.54	46	41	87	0.89
Qatar	29	18	47	0.62	0.700	0.454	1	0.65
Saudi Arabia	1032	1441	2473	1.40	245	252	497	1.03
Somalia	..	..	..	..	..	..	..	..
Sudan	..	..	..	..	..	..	..	..
Syria	663	1505	2168	2.27	..	..	..	..
Tunisia	529	1205	1733	2.28	21	14	35	0.67
UAE	249	78	328	0.31	2	3	5	1.50
Yemen	1414	3667	5081	2.59	275	632	906	2.30

Source: Database of the UNESCO Institute for Statistics, http://stats.uis.unesco.org/ on 1 June 2009.

Table 14: Regional literacy rates and gross enrolment in primary and the upper stage of basic education 2007 (or the closest two years) in the Arab region and the other regions of the world

Region	Literacy rate (%)			Gross enrolment ratio in primary education (%)			Gross enrolment ratio in the upper stage of basic education (%)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
North America and Western Europe	99	99	99	101	101	101	104	103	103
Central and Eastern Europe	99	96	98	98	96	97	90	89	89
Latin America and the Caribbean	92	91	91	120	116	118	100	104	102
Central Asia	99	98	99	101	99	100	96	93	95
East Asia and the Pacific	96	91	93	110	108	109	92	92	92
Arab countries	**82**	**62**	**73**	**102**	**92**	**97**	**85**	**77**	**81**
South and West Asia	75	54	64	111	105	108	70	62	66
Sub-Saharan Africa	71	54	62	101	89	95	43	34	38

Source: Database of the UNESCO Institute for Statistics, http://stats.uis.unesco.org/ on 25 February 2009.

Table 15: Ratios of gross enrolment in upper secondary and tertiary education and average school life expectancy in the Arab countries and the other regions of the world 2006 (or the closest two years)

Region	Gross enrolment ratio in upper secondary education (%)			Gross enrolment ratio in tertiary education (%)			School life expectancy (years)
	Male	Female	Total	Male	Female	Total	
North America and Western Europe	98	98	98	60	80	70	15.8
Central and Eastern Europe	88	83	85	53	66	60	12.8
Latin America and the Caribbean	70	79	74	29	34	31	13.1
Central Asia	87	81	84	24	26	25	11.1
East Asia and the Pacific	58	59	58	25	24	25	11.0
Arab countries	**55**	**53**	**54**	**22**	**22**	**22**	**10.1**
South and West Asia	43	35	39	12	9	11	8.3
Sub-Saharan Africa	27	21	24	6	4	5	7.3

Source: Database of the UNESCO Institute for Statistics, http://stats.uis.unesco.org/ on 25 February 2009.

Table 16: Net and gross enrolment in primary education and proportion of over-age pupils for this stage 2006

Country	Net enrolment rate (%)			Gross enrolment ratio (%)			Over-age enrolment ratio (%)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Algeria	96	94	95	114	106	110	17	11	14
Bahrain	98	98	98	120	119	120	8	6	7
Comoros	..	..	..	91	80	85	..	..	..
Djibouti	42	34	38	49	39	44	7	5	6
Egypt	96	92	94	107	100	103	10	8	9
Iraq	95	82	89	109	90	99	14	8	11
Jordan	89	90	90	96	98	97	2	2	2
Kuwait	84	83	83	97	96	96	8	7	7
Lebanon	82	82	82	96	93	94	10	8	9
Libya	..	..	..	113	108	110	..	..	..
Mauritania	78	82	79	99	104	102	20	21	21
Morocco	91	85	88	112	100	106	21	14	18
Occupied Palestinian Territories	76	76	76	82	83	83	2	2	2
Oman	73	75	74	82	83	82	5	4	5
Qatar	93	94	94	105	104	105	4	3	4
Saudi Arabia	77	79	78	91	91	91	..	..	..
Somalia	..	..	..	..	..	..	..	..	..
Sudan	..	..	..	71	61	66	..	..	..
Syria	97	92	95	129	123	126	7	6	7
Tunisia	96	97	96	110	107	108	13	9	11
UAE	88	88	88	104	103	104	4	3	4
Yemen	85	65	75	100	74	87	14	9	12

Source: Database of the UNESCO Institute for Statistics.

Table 17: Gross enrolment ratios in upper stage of basic education by gender, average school life expectancy, and number of years of compulsory education around the year 2005

Country	Gross enrolment in the upper stage of basic education (%)			Years of compulsory education[1]	Average school life expectancy (years)
	Male	Female	Total		
Algeria	111	105	108	9	12.0
Bahrain	104	104	104	9	14.4
Comoros	47	35	41	8	7.9
Djibouti	32	22	27	10	3.5
Egypt	102	95	98	9	11.9
Iraq	70	45	58	6	8.9
Jordan	94	95	94	10	13.0
Kuwait	91	92	91	9	12.4
Lebanon	85	92	88	6	12.6
Libya	117	115	116	9	16.5
Mauritania	29	26	27	9	7.1
Morocco	70	58	69	9	9.3
Occupied Palestinian Territories	98	102	100	..	12.8
Oman	96	92	94	(10)[2]	11.6
Qatar	103	100	101	12	12.1
Saudi Arabia	..	..	63	6	..
Somalia	..	..	..	..	..
Sudan	49	45	47	8	4.6
Syria	95	89	92	9	..
Tunisia	107	106	107	11	13.3
UAE	97	96	97	9	11.2
Yemen	67	34	51	9	7.9

Source: Database of the UNESCO Institute for Statistics.

[1] International Bureau of Education (2006), International database on education, Geneva, UNESCO-International Bureau of Education

[2] Oman does not have compulsory education, but the new education law envisages a ten-year basic education stage.

Table 18: Lessons in basic education devoted to each subject as a proportion of all lessons (per cent)

Country	Islamic education	Arabic language	Foreign languages	Mathematics	Science	Social studies	Arts	Physical education
Algeria	5	30	14	19	10	7	9	6
Bahrain	8	26	13	18	11	9	7	8
Comoros	..	..	..	..	..	..	..	..
Djibouti	..	..	..	..	..	..	..	..
Egypt	9	38	9	17	8	7	8	6
Iraq	11	26	8	16	13	11	7	7
Jordan	10	27	10	16	15	9	7	6
Kuwait	12	25	16	14	12	5	10	8
Lebanon	0	20	22	16	15	11	10	6
Libya	12	23	4	20	13	9	10	9
Mauritania	10	24	18	18	4	11	11	3
Morocco	10	25	19	18	10	5	9	5
Occupied Palestinian Territories	..	..	..	..	..	..	..	..
Oman	17	26	9	17	11	7	7	6
Qatar	15	25	17	15	10	6	5	6
Saudi Arabia	28	26	4	14	9	9	4	6
Somalia	..	..	..	..	..	..	..	..
Sudan	18	28	9	17	9	4	9	4
Syria	8	29	8	16	10	10	10	8
Tunisia	5	28	24	14	9	8	5	6
UAE	13	24	16	17	11	7	7	6
Yemen	20	26	5	17	9	9	5	5
Average	**11.7**	**26.4**	**12.5**	**16.6**	**10.5**	**8.0**	**7.8**	**6.2**
Standard deviation	**6.4**	**3.7**	**6.1**	**1.7**	**2.6**	**2.1**	**2.1**	**1.5**

Source: Compiled by Ramzi Salamah, member of the Report's core team, on the basis of data from the International Database on Education, publications of UNESCO's International Bureau of Education, Geneva, 2006.

Table 19: Time devoted to education in the two stages of basic education in the Arab states

Country	Number of school weeks per year	Primary education		Intermediate education	
		Average number of periods per week	Average annual hours of education	Average number of periods per week	Average annual hours of education
Algeria	30	27	810	32	955
Bahrain	31	28	789	30	850
Comoros	..	..	..	..	..
Djibouti	..	..	..	..	..
Egypt	34	37	944	39	995
Iraq	36	33	891	33	891
Jordan	37	30	819	36	999
Kuwait	34	32	808	31	791
Lebanon	34	30	810	35	1050
Libya	30	28	651	36	837
Mauritania	36	30	1080	30	1080
Morocco	33	28	924	32	1056
Occupied Palestinian Territories	..	..	..	..	..
Oman	32	30	640	30	640
Qatar	30	33	660	36	792
Saudi Arabia	30	30	664	34	765
Somalia	..	..	..	..	..
Sudan	42	29	812	39	1106
Syria	32	32	768	35	925
Tunisia	30	28	825	30	900
UAE	30	34	680	35	788
Yemen	36	32	864	36	972
Average	**33**	**31**	**802**	**34**	**911**

Source: Compiled by Ramzi Salamah, member of the Report's core team, on the basis of data from the International Database on Education, publications of UNESCO's International Bureau of Education, Geneva, 2006.

Table 20: Literacy rates among young people (15-24 years of age) and gross enrolment in upper secondary education by gender 2005

Country	Literacy rates				Gross enrolment in upper secondary education			
	Male (%)	Female (%)	Total (%)	Gender Parity Index	Male (%)	Female (%)	Total (%)	Gender Parity Index
Algeria	94	90	92	0.95	50	67	58	1.34
Bahrain	100	100	100	1.00	93	103	98	1.11
Comoros	91	86	89	0.95	30	24	27	0.80
Djibouti	..	..	..	..	19	12	16	0.63
Egypt	90	80	85	0.89	79	75	77	0.95
Iraq	..	..	..	..	38	26	32	0.68
Jordan	99	99	99	1.00	74	77	76	1.04
Kuwait	99	98	99	0.99	91	107	99	1.18
Lebanon	..	..	..	..	68	76	72	1.12
Libya	100	98	99	0.98	78	111	94	1.42
Mauritania	70	62	66	0.89	21	19	20	0.90
Morocco	83	64	74	0.77	37	32	34	0.86
Occupied Palestinian Territories	99	99	99	1.00	66	74	70	1.12
Oman	99	98	98	0.99	79	79	79	1.00
Qatar	96	98	97	1.02	93	99	96	1.06
Saudi Arabia	98	96	97	0.98	..	..	..	..
Somalia	..	..	..	..	..	..	..	..
Sudan	..	..	..	..	25	25	25	1.00
Syria	95	91	93	0.96	32	32	32	1.00
Tunisia	97	94	95	0.97	61	75	68	1.23
UAE	98	96	97	0.98	75	81	78	1.08
Yemen	93	64	79	0.69	54	25	40	0.46

Source: Database of UNESCO Institute for Statistics.

Table 21: Time devoted to secondary education in the Arab states

Country	Humanities Track		Science Track	
	Average number of periods per week	Average annual hours of education	Average number of periods per week	Average annual hours of education
Algeria	30	895	31	930
Bahrain	26	663	26	672
Comoros	..	..	..	..
Djibouti	..	..	..	..
Egypt	41	944	39	995
Iraq	33	882	33	900
Jordan	31	870	32	879
Kuwait	31	791	31	791
Lebanon	35	1050	35	1050
Libya	38	863	39	870
Mauritania	30	1092	32	1152
Morocco	29	946	31	1012
Occupied Palestinian Territories	..	..	..	..
Oman	35	747	35	747
Qatar	36	660	36	792
Saudi Arabia	34	773	36	803
Somalia	..	..	..	..
Sudan	38	812	39	1106
Syria	33	889	34	907
Tunisia	39	889	39	885
UAE	35	788	35	788
Yemen	36	872	36	972
Average	**34**	**857**	**34**	**903**

Source: Compiled by Ramzi Salamah, member of the Report's core team, on the basis of data from the International Database on Education, publications of UNESCO's International Bureau of Education, Geneva, 2006.

Table 22: Evolution of enrolment rates in vocational and technical secondary education in the Arab states from 1970 till 2005 (per cent)

Country	1970	1975	1980	1985	1990	1995	2000	2005
Algeria	19.7	2.5	..	3.7	7.1	5.8	..	21.3
Bahrain	6.8	..	10.6	20.4	..	13.0	37.7	48.2
Comoros	..	..	..	..	..	..	..	..
Djibouti	44.0	28.1	..	26.7	..	14.7	29.2	18.7
Egypt	19.0	17.4	21.6	..	18.6	..	..	..
Iraq	3.1	..	5.5	10.5	..	8.6	19.6	23.4
Jordan	3.0	3.9	5.3	9.2	24.8	23.2	25.1	17.5
Kuwait	2.9	1.2	0.2	0.4	..	1.0	3.6	9.0
Lebanon	1.6	..	10.9	..	..	..	26.7	26.3
Mauritania	..	..	..	..	..	..	..	..
Morocco	2.3	..	1.3	2.2	1.4	6.9	14.5	12.0
Occupied Palestinian Territories	..	..	6.0	..	2.4	0.9	..	..
Oman	..	..	..	..	..	..	..	..
Qatar	5.1	3.7	2.8	3.1	2.9	1.7	3.2	2.0
Saudi Arabia	1.9	..	1.5	2.0	2.8	1.7	..	..
Somalia	3.1	5.7	17.6	..	..	..	..	..
Sudan	..	..	..	..	..	..	..	..
Syria	3.2	4.5	4.3	6.4	7.3	..	39.8	28.2
Tunisia	11.1	..	27.3	19.0	..	..	..	6.4
UAE	9.9	..	..	1.0	..	1.3	1.9	1.3
Yemen	..	..	..	..	..	..	..	..

Source: Database of the UNESCO Institute for Statistics.

Table 23: Enrolment in tertiary education by level of study around 2005 (per cent)

Country	Technical Education		Bachelor's Degree		Postgraduate	
	Common rate	Ratio of females	Common rate	Ratio of females	Common rate	Ratio of females
Algeria	19	30	77	64	4	44
Bahrain	8	52	92	69	0	30
Comoros	..	..	..	..	..	..
Djibouti	31	48	69	39	0	..
Egypt	4	..	95	..	1	..
Iraq	17	22	78	39	5	35
Jordan	11	61	88	49	1	28
Kuwait	0	0	98	71	2	37
Lebanon	15	47	84	54	1	35
Libya	26	50	72	52	2	38
Mauritania	4	13	96	25	0	..
Morocco	17	45	77	46	5	32
Occupied Palestinian Territories	10	49	90	50	0	..
Oman	20	41	79	54	1	22
Qatar	3	87	97	68	1	39
Saudi Arabia	14	21	84	65	2	40
Somalia	..	..	..	..	..	..
Sudan	..	..	..	..	..	..
Syria	12	47	83	..	5	..
Tunisia	23	26	70	68	7	55
UAE	..	..	..	..	..	..
Yemen	15	13	85	22	0	31

Source: Database of the UNESCO Institute for Statistics.

Table 24: Student enrolment rates in tertiary education by field of specialisation 2005 (per cent)

Country	Education	Medicine and health sciences	Engineering	Mathematics and pure and applied sciences	Social sciences, law, and business administration	Agriculture	Literature and arts	Other / not specified
Algeria	1	..	9	8	36	..	14	32
Bahrain	3	8	8	9	53	..	9	11
Comoros	..	..	..	..	..	..	..	..
Djibouti	..	..	2	9	31	..	5	55
Egypt	..	..	..	..	..	..	..	100
Iraq	19	..	18	5	21	..	14	23
Jordan	20	11	12	11	26	2	16	4
Kuwait	..	..	..	..	..	..	..	100
Lebanon	3	9	12	12	42	1	18	3
Libya	12	..	20	10	18	..	18	22
Mauritania	4	..	..	6	20	..	13	57
Morocco	2	4	5	17	51	1	20	1
Occupied Palestinian Territories	27	..	7	11	32	..	14	9
Oman	30	3	9	11	20	..	8	18
Qatar	12	..	4	14	46	..	6	18
Saudi Arabia	24	5	3	14	15	..	32	6
Somalia	..	..	..	..	..	..	..	..
Sudan	..	..	..	..	..	..	..	..
Syria	..	..	..	..	..	..	..	..
Tunisia	1	..	8	18	22	..	18	33
UAE	..	..	..	..	..	..	..	..
Yemen	..	..	..	..	..	..	..	..

Source: Database of the UNESCO Institute for Statistics.

Table 25: Number of specialists in the health fields in the Arab states 2005 (per thousand people)

Country	Physicians	Nurses	Registered Midwives	Dentists	Pharmacists	Laboratory Technicians	Health Administration	General Health
Algeria	1.13	1.99	0.24	0.31	0.20	0.28	1.93	0.29
Bahrain	1.09	4.04	0.76	0.46	0.62	0.65	2.30	2.13
Comoros	0.15	0.61	0.14	0.04	0.05	0.08	0.34	0.08
Djibouti	0.18	0.26	0.16	0.01	0.03	0.12	0.33	0.25
Egypt	0.54	1.98	0.02	0.14	0.10	0.27	0.07	0.18
Iraq	0.66	1.25	0.07	0.44	0.53	0.47	1.33	0.97
Jordan	2.03	2.94	0.30	1.29	3.14	1.00	3.15	1.60
Kuwait	1.53	3.91	..	0.29	0.31	..	..	..
Lebanon	3.25	1.18	..	1.21	0.95	..	..	..
Libya	1.29	3.60	..	0.14	0.25	..	..	..
Mauritania	0.11	0.56	0.08	0.02	0.03	0.04	0.35	0.16
Morocco	0.51	0.72	0.07	0.10	0.24	0.05	0.20	0.06
Occupied Palestinian Territories	..	..	..	..	..	..	..	..
Oman	1.32	3.50	0.01	0.19	0.53	0.36	1.33	0.49
Qatar	2.22	4.94	..	0.37	0.90	..	..	..
Saudi Arabia	1.37	2.97	..	0.17	0.22	..	..	1.57
Somalia	0.04	0.19	..	0.00	0.00	..	..	..
Sudan	0.22	0.51	0.40	0.03	0.10	0.09	1.03	0.50
Syria	1.40	1.94	..	0.72	0.52	..	..	..
Tunisia	1.34	2.58	0.29	0.25	0.29	0.40	1.61	1.18
UAE	2.02	4.18	..	0.33	0.38	..	..	..
Yemen	0.33	0.64	0.02	0.04	0.13	0.23	0.53	0.55
World	1.23	2.56	..	0.29	..	..	..	..
Europe	3.20	7.43	..	0.52	..	..	..	..

Source: Statistics of the World Health Organisation, 2007, http://www.who.int/whosis/whostat2007/en/index.html on 14 March 2009.

Table 26: Distribution of graduates of tertiary education by field of specialisation around 2005

Country	Education (%)	Medicine and health sciences (%)	Engineering (%)	Maths and pure and applied sciences (%)	Social sciences, law, and business administration (%)	Agriculture (%)	Literature and arts (%)	Other / not specified (%)	Number of graduates
Bahrain	8	10	10	10	40	..	9	14	3184
Djibouti	0	0	0	0	14	..	8	..	280
Egypt	..	..	..	..	..	..	..	100	342902
Iraq	16	10	26	4	20	3	10	10	87849
Jordan	16	11	9	19	28	2	10	4	42294
Lebanon	5	11	13	8	44	0	16	3	25700
Mauritania	0	0	0	5	17	0	12	66	2602
Morocco	12	5	6	9	31	1	18	18	48162
Occupied Palestinian Territories	23	7	9	12	32	0	17	0	12567
Oman	..	..	..	..	..	..	..	..	8280
Qatar	32	4	5	11	38	0	10	0	1386
Saudi Arabia	28	5	3	16	13	0	30	5	82659
Tunisia	..	..	..	..	..	..	..	100	56559

Source: Database of the UNESCO Institute for Statistics.

Table 27: School life expectancy in the Arab states from 1970 to 1990 (in years)

Country	1970			1975			1980			1985			1990		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Algeria	7.7	4.5	6.2	8	5	7	9.8	6.8	8.3	10.9	8.3	9.6	11	9	10
Bahrain	10.5	7.6	9.1	9.1	8.2	8.7	11.2	9.7	10.5	13.1	13.7	13.5	13	14	14
Comoros	3	1	2	..	..	..	..	..	..	..	..	..	..	..	..
Djibouti	3	1	2	..	..	..	..	..	..	..	..	..	..	..	..
Egypt	7.7	4.5	6.2	8	5	7	9	6	8	10	7	9	11	8	10
Iraq	8.4	3.5	6.0	11.0	5.5	8.4	12.2	9.1	10.8	12.0	8.7	10.4	11	8	10
Jordan	8	6	7	9.2	7.6	8.4	9.4	9.0	9.2	10	10	10	12	13	12
Kuwait	10.4	8.3	9.4	10.6	9.5	10.1	..	..	..	..	..	..	..	..	..
Lebanon	8	6	7	9.2	7.6	8.4	9.4	9.0	9.2	10	10	10	12	12	12
Libya	10.8	5.6	8.4	13.0	10.1	11.6	13.4	11.1	12.3	..	..	..	13	12	13
Mauritania	3	1	2	..	..	..	..	..	..	..	..	..	5	3	4
Morocco	5	3	4	5.8	3.2	4.5	8.1	4.8	6.4	8	5	6	8	5	6
Occupied Palestinian Territories	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Oman	..	..	..	..	..	..	..	..	..	..	..	..	9	8	8
Qatar	9.0	10.3	9.7	9.7	11.6	10.3	10.6	11.4	10.9	11.8	13.2	12.6	12	13	12
Saudi Arabia	5.2	2.1	3.7	6.6	3.8	5.3	7.2	4.8	6.0	8.2	6.2	7.2	8	7	8
Somalia	3	1	2	..	..	..	..	..	..	..	..	..	..	..	..
Sudan	3	1	2	..	..	..	..	..	..	..	..	..	5	4	4
Syria	10.1	5.1	7.7	10.8	6.7	9.0	11.4	8.0	9.7	11.9	9.3	10.7	11	9	10
Tunisia	7.7	4.5	6.2	8	5	7	9.8	6.8	8.4	12.0	9.6	10.9	11	10	10
UAE	8	9.5	9	9.0	10.3	9.7	9.7	11.6	10.3	10.6	11.4	10.9	11	12	11
Yemen	3	1	2	..	..	..	..	..	..	..	..	..	8	3	5

Source: Database of the UNESCO Institute for Statistics with extrapolations (Ramzi Salamah).

Table 28: Estimated educational level of people aged 25-50 in the Arab states 2005

Country	Aged 25	Aged 30	Aged 35	Aged 40	Aged 45	Aged 50	Weighted Average	Rank
Algeria	3.9	3.5	3.3	2.8	2.6	2.1	3.13	10
Bahrain	4.6	4.4	4.0	4.4	3.2	2.8	4.00	2
Comoros	..	..	..	..	..	..	..	..
Djibouti	1.6	1.6	1.6	1.6	1.5	1.4	1.56	16
Egypt	4.2	4.0	3.7	3.2	2.9	2.8	3.55	6
Iraq	2.7	2.9	3.1	3.3	3.2	2.4	2.94	12
Jordan	4.7	3.4	3.0	3.1	3.2	2.7	3.43	7
Kuwait	4.5	3.5	3.1	4.2	3.9	3.1	3.76	5
Lebanon	4.4	4.3	3.8	3.8	3.3	2.9	3.83	3
Libya	5.1	4.9	4.3	3.5	3.6	3.1	4.20	1
Mauritania	..	..	..	..	..	..	..	..
Morocco	2.3	2.5	2.5	2.5	2.2	1.8	2.33	15
Occupied Palestinian Territories	..	..	..	..	..	..	..	..
Oman	3.8	3.3	2.7	2.0	1.5	1.1	2.56	14
Qatar	4.0	3.9	4.1	4.0	3.5	3.1	3.81	4
Saudi Arabia	3.5	3.2	2.7	2.5	2.2	1.9	2.76	13
Somalia			1.3	1.4	1.3	1.4	1.37	17
Sudan	..	..	..	..	..	..	..	..
Syria	3.1	3.2	3.4	3.4	3.1	2.9	3.20	9
Tunisia	4.1	3.5	3.1	2.8	2.3	2.3	3.12	11
UAE	3.7	3.9	3.4	3.0	2.9	2.5	3.31	8
Yemen	..	..	..	..	..	..	..	..

Source: These indicators were calculated on the basis of data available in the database of the UNESCO Institute for Statistics with extrapolations. The figures are to be interpreted as follows: 1 = literacy; 2 = completion of primary education; 3 = completion of the upper stage of basic education; 4 = completion of the upper stage of secondary education; 5 = completion of a bachelor's degree (see the body of the text for further explanation.)

Table 29: Government expenditure on education in the Arab countries in the five years 2002-2006

Country	Expenditure as a proportion of GDP (%)	Expenditure as a proportion of total government expenditure (%)
Algeria	..	..
Bahrain	..	..
Comoros	..	24.1
Djibouti	8.7	22.4
Egypt	4.7	15.1
Iraq	..	..
Jordan	..	..
Kuwait	5.4	13.5
Lebanon	2.6	12.0
Libya	..	..
Mauritania	3.1	9.2
Morocco	6.5	27.1
Occupied Palestinian Territories	..	..
Oman	4.0	24.7
Qatar	2.7	19.6
Saudi Arabia	7.2	27.6
Somalia	..	..
Sudan	..	..
Syria	..	..
Tunisia	7.1	20.8
UAE	1.7	25.4
Yemen	..	..

Source: Based on data from the database of the UNESCO Institute for Statistics.

Table 30: Enrolment rates in non-government schools at pre-university educational stages in the Arab countries 2005 (per cent)

Country	Pre-primary education	Primary education	Upper stage of basic education	General secondary education	Technical secondary education
Algeria	..	..	0.0	0.0	0.0
Bahrain	99.4	23.7	17.9	26.0	0.0
Comoros	62.2	10.0	37.5	49.4	0.0
Djibouti	83.5	14.7	21.5	33.9	2.2
Egypt	30.1	7.3	..	..	..
Iraq	0.0	0.0	0.0	0.0	0.0
Jordan	..	30.4	..	10.8	2.3
Kuwait	37.4	33.0	28.0	..	..
Lebanon	77.3	65.8	56.5	46.7	57.5
Libya	..	..	..	..	..
Mauritania	77.8	8.0	10.9	16.3	0.0
Morocco	..	6.6	3.9	5.4	16.0
Occupied Palestinian Territories	99.8	8.7	4.4	3.5	7.3
Oman	..	4.6	1.3	..	..
Qatar	94.2	45.3	33.6	31.2	0.0
Saudi Arabia	..	..	..	..	..
Somalia	..	..	..	..	..
Sudan	71.0	5.3	6.2	15.8	0.0
Syria	74.3	4.4	4.0	6.5	0.0
Tunisia	..	1.1	3.3	7.8	0.0
UAE	75.4	61.1	45.4	37.8	0.0
Yemen	49.0	2.3	2.3	2.0	0.0

Source: Based on data available in the database of UNESCO Institute for Statistics on 25 February 2009.

Table 31: Number of students from some Arab countries in the US before and after the events of September 2001

Country	2000-2001	2006-2007	Change (%)
Algeria	220	145	-34
Bahrain	562	392	-30
Comoros	38	39	3
Djibouti	8	14	75
Egypt	2255	1664	-26
Iraq	155	262	69
Jordan	2187	1726	-21
Kuwait	3045	1633	-46
Lebanon	2005	1852	-8
Libya	39	93	138
Mauritania	73	64	-12
Morocco	1917	1202	-37
Occupied Palestinian Territories	237	361	52
Oman	702	254	-64
Saudi Arabia	5273	7886	50
Somalia	96	78	-19
Sudan	366	321	-12
Syria	713	462	-35
Tunisia	385	274	-29
UAE	2659	885	-67
Yemen	411	248	-40
Arab countries	**23346**	**19855**	**-15**

Source: Institute of International Education, 2007. http://opendoors.iienetwork.org/page/113118/ on 1 June 2009.

Table 32: Number of patents granted in the US in 2007 and spending on research and development

Country	Number of patents granted to citizens of the state in 2007	Research and development expenditure as a proportion of GDP (%)
Algeria	..	..
Bahrain	0	..
Djibouti	..	0.34
Egypt	11	0.19
Iraq	0	..
Jordan	1	..
Kuwait	10	0.20
Lebanon	..	..
Libya	..	..
Mauritania	..	..
Morocco	..	0.62
Occupied Palestinian Territories	..	..
Oman	1	..
Qatar	..	..
Saudi Arabia	37	..
Somalia	..	..
Sudan	..	0.33
Syria	3	..
Tunisia	..	0.63
UAE	11	..
Yemen	..	..
Korea	**7264**	**2.64**
Chile	**27**	**0.61**

Source: US Patent and Trademark Office, 2007. http://www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_all.htm. Statistics of the Human Development Report, UNDP, 2008. http://hdr.undp.org/en/statistics/ on 25 February 2009.

Table 33: World Bank Innovation System Index* (most recent compared to 1995)

Country or region	Most recent period	1995	Change
Arab countries			
Algeria	3.48	3.33	0.15
Bahrain	4.20	6.74	-2.54
Djibouti	1.29	2.47	-1.18
Egypt	4.55	5.02	-0.47
Jordan	5.66	6.09	-0.43
Kuwait	5.05	5.44	-0.39
Lebanon	4.69	4.19	0.50
Mauritania	1.75	1.87	-0.12
Morocco	3.67	4.78	-1.11
Oman	4.95	5.38	-0.43
Qatar	5.77	4.70	1.07
Saudi Arabia	4.04	4.96	-0.92
Sudan	1.97	2.23	-0.26
Syria	3.44	2.97	0.47
Tunisia	4.58	4.20	0.38
UAE	6.74	6.49	0.25
Neighbouring and comparison countries			
Iran	3.02	2.83	0.19
Israel	9.34	9.20	0.14
Cyprus	7.65	7.50	0.15
Malaysia	6.83	6.20	0.63
India	3.97	3.65	0.32
China	5.12	4.06	1.06
Top-ranking countries			
Denmark	9.57	9.53	0.04
Sweden	9.79	9.75	0.04
Finland	9.66	9.31	0.35
Holland	9.48	9.53	-0.05
Canada	9.43	9.32	0.11
US	9.45	9.56	-0.11
UK	9.18	9.36	-0.18
Geographic regions of the world			
Middle East and North Africa	4.31	4.64	-0.33
Africa	8.44	8.87	-0.43
East Asia and the Pacific	6.88	6.82	0.06
Europe and Central Asia	9.19	9.29	-0.10
G7	5.94	6.05	-0.11
Latin America	7.22	7.43	-0.21
South Asia	3.34	3.01	0.33
Western Europe	9.23	9.19	0.04
Income levels			
High- income states	9.05	9.22	-0.17
Upper middle-income states	6.76	6.69	0.07
Lower middle-income states	4.95	5.11	-0.16
Low-income states	2.63	2.90	-0.27
World	**8.01**	**8.18**	**-0.17**

Source: World Bank database (Knowledge Assessment Methodology), http://info.worldbank.org/etools/kam2/KAM_page6.asp on 14 February 2009.

* The index value falls on a scale of 0-10 and is calculated from three key indicators: Total royalty payments and receipts in US$ per person, number of patent applications granted by the US Patent and Trademark Office per million people, and the number of scientific and technical journal articles published per million people. The top 10 per cent of states score in the range 9-10, the next highest 10 per cent of states score in the range 8-9 and so on.

Table 34: Indicators on research and development activity and innovation in the Arab countries and other country groups

The Arab countries[1] and other country groups	Number of researchers working in the fields of research and development (per million of population)	Expenditure on research and development as a proportion of GDP (%)	Royalty and license fees payments and receipts (US$ per person)	Patents applications granted to residents (per million people)
	1990-2005	2000-2005	2005	2000-2005
Kuwait	..	0.2	0.0	..
Qatar	..	..	..	..
UAE	..	..	..	..
Bahrain	..	..	..	..
Libya	361	..	0.0	..
Oman	..	..	..	..
Saudi Arabia	..	..	0.0	..
Jordan	1927	..	..	..
Lebanon	..	..	0.0	..
Tunisia	1013	0.6	1.4	..
Algeria	..	..	..	1
Occupied Palestinian Territories	..	..	..	..
Syria	29	..	..	2
Egypt	493	0.2	1.9	1
Morocco	..	0.6	0.4	1
Comoros	..	..	..	..
Mauritania	..	..	..	..
Sudan	..	0.3	0.0	..
Djibouti	..	..	..	..
Yemen	..	..	..	..
Developing countries	..	1.0	..	..
Least developed countries	..	..	0.2	..
East Asia and the Pacific	722	1.6	1.7	..
Latin America and the Caribbean	256	0.6	1.1	..
South Asia	119	0.7	..	..
Sub-Saharan Africa	..	..	0.3	..
OECD states	3096	2.4	104.2	239
High HDI states	3035	2.4	75.8	189
Medium HDI states	..	0.8	0.3	..
Low HDI states	..	..	0.2	..
High income states	3781	2.4	125.3	286
Medium income states	725	0.8	1.0	..
Low income states	..	0.7	..	..
World	..	2.3	21.6	22*
Arab Countries	**..**	**..**	**0.9**	**..**

* World Bank database of the Knowledge Assessment Methodology (KAM) on 17 February 2009.

[1] Within this table, the Arab countries are given in order of their Human Development Index as given in the UNDP's Human Development Report for 2007-2008.

Source: Statistics of the Human Development Report 2007-2008

Table 35: World Bank indicators for the Innovation System Index

Foreign Direct Investment Outflows as % of GDP
Foreign Direct Investment Inflows as % of GDP
Royalty and License Fees Payments (US$ millions)
Royalty and License Fees Payments (US$ per person)
Royalty and License Fees Receipts (US$ millions)
Royalty and License Fees Receipts (US$ per person)
Total Royalty Payments and Receipts (US$ millions)
Total Royalty Payments and Receipts (US$ per person)
Science and Engineering Enrolment Ratio (%)
Science Enrolment Ratio (%)
Researchers in R&D
Researchers in R&D per million people
Total Expenditure for R&D as a percentage of GDP
Manufacturing Trade as a percentage of GDP
University-Company Research Collaboration (1-7)*
Scientific and Technical Journal Articles
Scientific and Technical Journal Articles per million people
Availability of Venture Capital (1-7)
Patents Granted by US Patent and Trademark Office
Patents Granted by US Patent and Trademark Office per million people
High-Tech Exports as a percentage of Manufacturing Exports
Private Sector Spending on R&D (1-7)
Firm-Level Technology Absorption (1-7)
Value Chain Presence (1-7)

Source: Website of the World Bank (KAM), www. worldbank.org/kam.

* This is based on the statistical score on a 1-7 scale of a large sample group in a particular country responding to one of the questions connected with the indicator to be measured.

INFORMATION AND COMMUNICATION TECHNOLOGY

(a) The Information and Communication Technology Index

Table a-1: World Bank ICT Index (most recent compared with 1995)

Country or region	Most recent period	1995	Change
Arab countries			
UAE	8.18	6.99	1.19
Qatar	7.56	7.24	0.32
Bahrain	7.22	7.30	-0.08
Kuwait	7.13	7.16	-0.03
Saudi Arabia	6.29	5.26	1.03
Lebanon	5.27	5.56	-0.29
Jordan	5.21	4.25	0.96
Tunisia	5.00	4.27	0.73
Oman	4.90	3.85	1.05
Morocco	4.32	2.96	1.36
Sudan	3.84	1.22	2.62
Syria	3.68	3.58	0.10
Egypt	3.66	3.75	-0.09
Algeria	3.37	2.91	0.46
Mauritania	2.80	2.50	0.30
Yemen	1.99	2.02	-0.03
Djibouti	1.63	3.36	-1.73
Neighbouring and comparison countries			
Iran	5.48	4.56	0.92
Turkey	5.38	5.87	-0.49
Israel	8.64	8.37	0.27
Cyprus	8.32	7.97	0.35
Malaysia	7.08	6.57	0.51
India	2.59	2.87	-0.28
China	4.16	2.74	1.42
Top-ranking countries			
Denmark	9.28	9.63	-0.35
Sweden	9.69	9.73	-0.04
Finland	8.56	9.75	-1.19
Holland	9.36	9.24	0.12
Canada	8.74	9.49	-0.75
US	8.93	9.83	-0.90
UK	9.38	9.10	0.28
Geographic regions of the world			
Middle East and North Africa	5.97	6.13	-0.16
Africa	2.65	3.58	-0.93
East Asia and the Pacific	6.94	7.83	-0.89
Europe and Central Asia	6.33	6.55	-0.22
G7	8.89	9.14	-0.25
Latin America	5.23	5.77	-0.54
South Asia	2.17	2.45	-0.28
Western Europe	8.80	9.22	-0.42
Income levels			
High-income states	8.58	8.72	-0.14
Upper middle-income states	6.41	6.40	0.01
Lower middle-income states	4.43	4.35	0.08
Low-income states	2.10	2.46	-0.36
World	**6.34**	**7.36**	**-1.02**

Remark: The table includes data from only seventeen Arab states.

* The index value falls on a scale of 0-10 and is calculated from three key indicators: number of telephone lines per thousand of the population, number of computers per thousand of the population, and number of internet users per thousand of the population. The top 10 per cent of states score in the range 9-10, the next highest 10 per cent of states score in the range 8-9 and so on.

Source: World Bank database (Knowledge Assessment Methodology), http://info.worldbank.org/etools/kam2/KAM_page6.asp on 13 February 2009.

(b) The growth of fixed and mobile telephone lines in the Arab states

Figure b-1 illustrates how the average total number of telephone lines (fixed and mobile) per thousand people grows in line with per capita GDP. It makes it clear that the population of most of the high-income Arab states possess fewer telephone lines than their counterparts in the other states of the world that enjoy similar per capita incomes, when measured as per the indicator itself (i.e., purchasing power parity). Despite telephone ownership rates in seven Arab states exceeding or approximating the world average, mobile telephone ownership rates in the remaining Arab states are less than the world average.

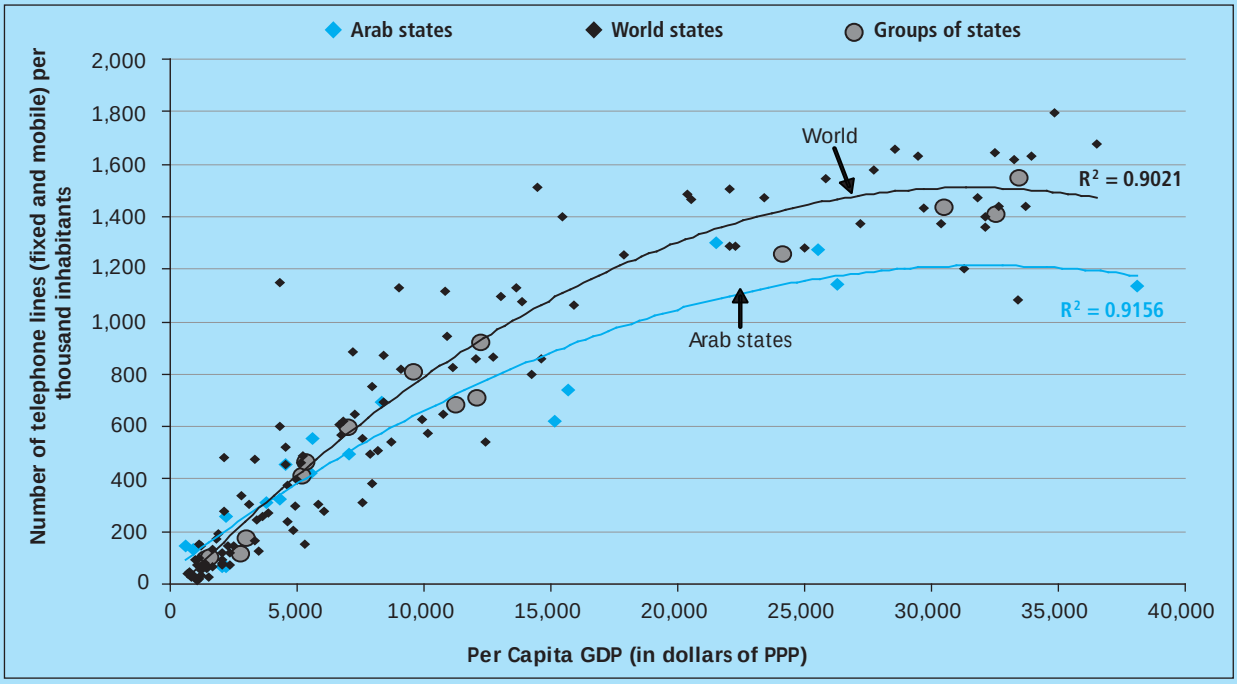
The spread of fixed telephone lines per thousand people has recorded marked growth in line with per capita income evaluated in purchasing power parity. Figure b-2 demonstrates that the relationship between the increased proliferation of fixed telephone lines and the increase in individual income is approximately linear. However, it is notable that the spread of these lines is increasing at a slower rate in the Arab states than worldwide. Hence, the number of fixed telephone lines per thousand people exceeds or approximates the world average in only six Arab states. This reflects negatively on the capacity of the remaining Arab states to access the internet, particularly given the expectation that in the near and medium term access to the internet will continue to rely on fixed telephone lines.

Figure b-3 gives a picture of the clear increase in mobile phone ownership as individual income increases. The figure reveals the direct relationship between increasing proliferation of mobile phones and increasing per capita income in the Arab states and globally. However the curve that depicts mobile phone growth against per capita income growth in all but seven of the Arab countries falls below the curve representing the other countries of the world. This means that personal income growth in the Arab countries has not been matched by growth in mobile phone proliferation similar to that in the rest of the world.

Nonetheless, it may be non-technical obstacles that prevent the wider proliferation of next-generation mobile phone services. In some Arab countries, many people will not be able to meet the rising costs.[1] Other factors are also expected to lead to some delay in the introduction of third-generation services to the Arab markets. These include,

FIGURE b-1

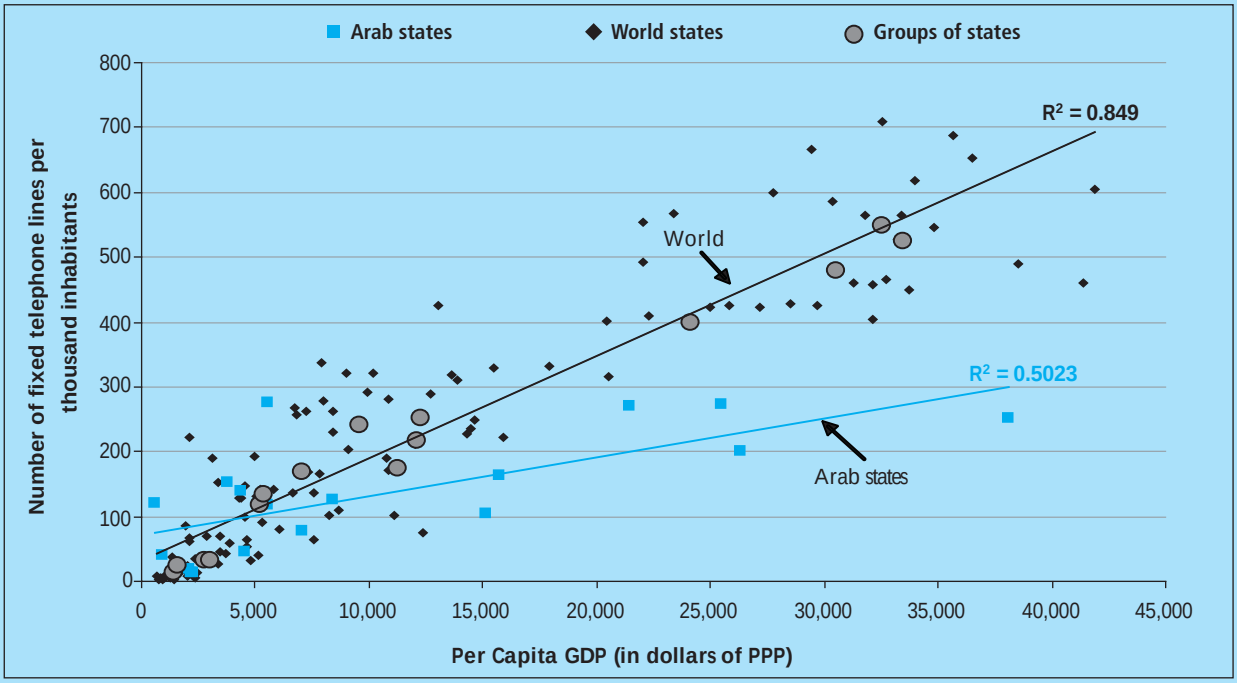
Growth in average total number of telephone lines (fixed and mobile) per thousand people plotted against per capita income for the world's states, some Arab states, and selected groups of states



Source: World Bank database (Knowledge Assessment Methodology)

FIGURE b-2

Growth in average number of fixed telephone lines per thousand people plotted against per capita income for the world's states, some Arab states, and selected groups of states



Source: World Bank database (Knowledge Assessment Methodology)

FIGURE b-3

Growth in average number of mobile phone lines per thousand of population plotted against per capita income for the world's states, some Arab states, and selected groups of states

Source: World Bank database (Knowledge Assessment Methodology)

for example, technological under-preparation that may open the door to futile practices and delay the widespread provision of services that conform to the tastes and behaviours of Arab societies. There is time enough, however, to avoid such pitfalls given that it is expected that onerous costs will remain a barrier until competition between the service companies leads to a marked drop in prices. Likewise, the rise in demand for 3G lines will depend as much on the removal of restrictions imposed by most Arab states on the use of certain services that form key incentives to migrate to third-generation (3G), such as the Global Positioning System, considered one of the main driving forces behind the spread of 3G networks around the world thanks to its ability to provide users with satellite-linked digital maps, as it will on the quality standards that are applied in the operation of these networks.[2]

(c) Classification of the Arab states according to selected indicators

It is no easy matter to classify the Arab states into groups according to the efforts they have expended and the results they have achieved in their attempt to obtain and utilise ICT in building the knowledge economy. The data necessary for undertaking a serious and objective evaluation are scarce and the methodologies of categorisation that have been devised are numerous. Many of these methodologies are based on simplistic assumptions and lead to conflicting results. The various elements that go to make up the design of a particular indicator are frequently handled as if they all have equal or similar effects when it comes to obtaining technology or spreading its use, which puts limits on the accuracy of the results of the evaluation. Many of the indicators are basically designed to measure the trend to purchase the goods and services linked to technology more than to measure how far it is utilised for the production and dissemination of knowledge. Most are largely quantitative and numerical rather than qualitative and descriptive and do not deal with how intensively and efficiently modes of technology are used to close the knowledge gap. To a great extent, they fail to measure knowledge content. Thus they do not permit an accurate diagnosis of the knowledge crisis in the Arab states or allow solutions to be drawn up.

Tables c-1 and c-2 present the "basic" indicators related to the proliferation of telephones and computers, use of the internet, bandwidth, and access costs in the Arab states for which data is available. They make it clear that the infrastructure provided and the material resources available do not necessarily correlate with usage. More meaningful methods of classification may be those that permit the evaluation of the Arab countries on the basis of the data available on the steps they have taken to formulate strategies and draw up plans aimed at developing their technological capabilities. According to such methodologies, states like the UAE, Bahrain, and Qatar lead the Arab countries, since they have abundant and integrated policies, strategies, plans, and projects for ICT which are implemented with some alacrity. This is undoubtedly helped by their low populations, the availability of the required resources, and the intensive follow-up at the highest decision-making levels to remove obstacles as they occur. The second group comprises states like Jordan, Egypt, and Saudi Arabia which have policies, strategies, plans, and programmes to sponsor and promote ICT, but whose implementation is slow because of obstacles of a largely bureaucratic nature or because of the lack of resources that can be allotted to the technology sector, as in Jordan and Egypt. States such as Kuwait, Oman, Syria, and Lebanon, which have succeeded in laying down ICT policies and strategies, but where the implementation plans and the programmes deriving from them remain incomplete, belong to the third group. The fourth group includes states such as Iraq, the Occupied Palestinian Territories, Yemen, and Djibouti that are suffering from difficult conditions represented by political crises, security disturbances, or severe lack of resources, which limit the role of governments in the implementation of ICT policies and strategies.

The Networked Readiness Index, which is monitored by the World Economic Forum, is connected to criteria linked to ICT policies and strategies. It expresses the extent of government commitment to develop this technology and to allocate the necessary support to it (see Table c-3). On the basis of this categorisation, the UAE comes first out of the Arab states and in twenty-seventh place out of 134 states of the world. It is followed by Qatar in twenty-ninth place, then by Bahrain, Tunisia, and Saudi Arabia in thirty-seventh, thirty-eighth, and fortieth place respectively. The bottom three places for the Arab states included in the report went to Libya, Algeria, and Mauritania in 101st, 108th, and 109th place respectively.

According to indicators of the World Economic Forum's report on ICT[3] , the UAE comes top of the Arab states covered by the report with respect to the first three indicators, although it fares less well on the encouragement of

competition between the internet service providers (ISPs). Egypt is ahead of the remaining Arab states covered by this report in terms of this fourth indicator. Qatar, Tunisia, and Bahrain also rank high among the world's states with respect to these indicators (see Table c-4).

The Global Competitiveness Report published by the World Economic Forum gives a similar picture of the performance of the Arab states with respect to a number of other indicators connected to technology and its use. As Table c-5 makes clear, Qatar, Saudi Arabia, and the UAE occupy high positions in the ranking of world states, and subsequently the top positions among the Arab states, on the basis of pillars including "Technological Readiness" and "Innovation." The other Arab states (for which the Report provides data) are ranked lower. Kuwait, Tunisia, Bahrain, and Oman, for example, occupy thirty-fifth, thirty-sixth, thirty-seventh, and thirty-eighth place respectively out of the 134 states covered by the report. These are followed by Jordan, Morocco, Syria, and Egypt in positions between forty-eighth (Jordan) and eighty-first (Egypt). The remaining Arab states covered by the Global Competitiveness Report – Libya, Algeria, and Mauritania – occupy lower positions in terms of technological readiness, with their positions falling between ninety-first (Libya) and 131st (Mauritania).

To sum up, investigation of the current state of ICT in the Arab countries shows them to be lagging behind the other countries of the world in some respects and keeping up with them in others. Available data also indicates the advance of some Gulf states over the rest of the Arab states, and over much of the rest of the world. However, the criteria used to measure both the lag and the progress have shortcomings.

Table c-1: Classification of the Arab countries according to some indicators of ICT infrastructure

Arab countries	Number of computers per thousand of population 2005	Mobile telephone lines per thousand of population 2006	Fixed telephone lines per thousand of population 2006
Algeria	10	630	90
Bahrain	180	1220	260
Djibouti	20	50	10
Egypt	40	240	150
Jordan	70	780	110
Kuwait	240	940	200
Lebanon	100	270	170
Mauritania	30	350	10
Morocco	20	520	40
Oman	50	710	110
Qatar	180	1120	280
Saudi Arabia	140	830	170
Sudan	110	120	20
Syria	40	240	170
Tunisia	60	720	130
UAE	260	1300	310
Yemen	20	90	50

Source: World Bank database (Knowledge Assessment Methodology/KAM) on 10 June 2009

Table c-2: Classification of the Arab countries according to internet use, access cost, and bandwidth

Arab countries	Number of internet users per thousand of population 2006	Price basket for internet (US$ per month) 2005	International internet bandwidth (bits per person) 2005
Algeria	70	9.41	4.98
Bahrain	210	30.23	579.43
Djibouti	10	41.11	56.74
Egypt	80	4.97	49.40
Jordan	140	11.14	57.94
Kuwait	310	22.22	347.87
Lebanon	230	10.00	81.08
Mauritania	30	54.25	14.66
Morocco	200	26.8	235.35
Oman	130	14.53	194.39
Qatar	350	16.48	953.44
Saudi Arabia	200	21.33	33.29
Sudan	90	65.51	5.58
Syria	80	13.97	0.90
Tunisia	130	12.38	74.78
UAE	400	13.07	923.20
Yemen	10	10.93	0.32

Source: World Bank database (Knowledge Assessment Methodology /KAM) on 10 June 2009

Table c-3: Ranking of some Arab countries according to Networked Readiness Index (2008/2009)

Arab countries	World ranking (among 134 countries)	Networked Readiness Index
UAE	27	4.76
Qatar	29	4.68
Bahrain	37	4.38
Tunisia	38	4.34
Saudi Arabia	40	4.29
Jordan	44	4.19
Oman	50	4.08
Kuwait	57	3.98
Egypt	76	3.76
Morocco	86	3.59
Syria	94	3.41
Libya	101	3.28
Algeria	108	3.14
Mauritania	109	3.12

Source: Website of the World Economic Forum, http://www.weforum.org/pdf/gitr/2009/rankings.pdf on 12 March 2009.

Table c-4: Ranking of a group of Arab countries according to some criteria related to ICT policy for 2008/2009

Importance of ICT to government's vision of the future			Laws dedicated to the guidance and regulation of ICT investment			Government prioritization of ICT			Quality of competition in the ISP sector		
UAE	1	5.86	UAE	1	5.13	UAE	1	6.05	Egypt	1	5.34
Qatar	2	5.66	Tunisia	2	4.87	Tunisia	2	5.80	Jordan	2	5.30
Tunisia	3	5.45	Qatar	3	4.82	Qatar	3	5.55	Saudi Arabia	3	4.86
Jordan	4	5.04	Bahrain	4	4.59	Jordan	4	5.52	Tunisia	4	4.84
Bahrain	5	5.03	Oman	5	4.34	Bahrain	5	5.42	Bahrain	5	4.37
Oman	6	4.97	Saudi Arabia	6	4.31	Egypt	6	5.18	Kuwait	6	4.27
Saudi Arabia	7	4.81	Jordan	7	4.05	Saudi Arabia	7	5.17	Morocco	7	4.09
Egypt	8	4.45	Egypt	8	3.86	Oman	8	5.02	UAE	8	3.85
Mauritania	9	4.16	Morocco	9	3.12	Mauritania	9	4.91	Oman	9	3.82
Syria	10	4.02	Kuwait	10	3.09	Syria	10	4.51	Algeria	10	3.59
Morocco	11	3.93	Mauritania	11	2.67	Libya	11	4.40	Libya	11	3.43
Algeria	12	3.68	Libya	12	2.39	Algeria	12	4.37	Qatar	12	3.41
Kuwait	13	3.61	Syria	13	2.37	Kuwait	13	4.28	Syria	13	3.38
Libya	14	3.32	Algeria	14	2.32	Morocco	14	4.14	Mauritania	14	3.17

Source: World Economic Forum, The Global Information Technology Report 2008-2009.

Table c-5: The Global Competitiveness Index and rank for some Arab states with respect to selected pillars, 2008/2009

Arab countries	Global competitiveness index		Pillar of technological readiness		Pillar of innovation		Pillar of infrastructure		Pillar of health and primary education	
	Rank[1]	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score
Qatar	26	4.8	37	4.3	29	3.8	35	4.5	18	6.2
Saudi Arabia	27	4.7	51	3.7	34	3.7	41	4.4	51	5.7
UAE	31	4.7	28	4.6	46	3.4	14	5.7	36	5.9
Kuwait	35	4.6	50	3.7	71	3.1	49	4.2	75	5.3
Tunisia	36	4.6	52	3.7	27	3.9	34	4.6	27	6.1
Bahrain	37	4.6	39	4.3	75	3.0	28	4.8	45	5.8
Oman	38	4.6	68	3.3	44	3.5	32	4.6	80	5.3
Jordan	48	4.4	57	3.6	51	3.4	44	4.3	56	5.7
Morocco	73	4.1	78	3.2	78	3.0	70	3.5	71	5.4
Syria	78	4.0	107	2.6	84	3.0	74	3.3	70	5.4
Egypt	81	4.0	84	3.0	67	3.2	60	3.7	88	5.2
Libya	91	3.9	98	2.8	100	2.8	112	2.5	103	4.6
Algeria	99	3.7	114	2.5	113	2.7	84	3.0	76	5.3
Mauritania	131	3.1	102	2.7	125	2.5	127	2.1	114	4.1

[1] With respect to the 134 countries of the world covered by the report.
Source: The Global Competitiveness Report 2008-2009.

End Notes

1 For example a news report, from Egypt, indicates that a proportion approaching 70 per cent of the people using the mobile phone services offered by the Mobinil company (which estimates its customer base at around 18 million, that is nearly 13 million Egyptian mobile users), will be unable to meet the costs of the full package of 3G services. It estimates that 20 per cent will be able to make partial use of these services and that only 10 per cent will be able to afford the whole package. Mobinil has offered some 3G services on its network and announced that it would launch the full package in September 2008. From "35 Millions Confront New Technologies ... 3G Mobiles ...", Al-Hayat newspaper, Cairo, 19 August 2008.

2 "Research and Studies of the 'ICTTA' in Damascus...", Al-Hayat newspaper, Damascus, 2 May 2008.

3 This includes four indicators to measure the government prioritisation of ICT, the laws devoted to guiding and regulating ICT use, the importance of ICT to government vision of the future, and quality of competition in the ISP sector.

مؤسسة محمد بن راشد آل مكتوم
Mohammed bin Rashid Al Maktoum Foundation

برنامج الأمم المتحدة الإنمائي
United Nations Development Programme

Jointly sponsored by the Mohammed bin Rashid Al Maktoum Foundation and the United Nations Development Programme / Regional Bureau for Arab States, this Report is the first in a series that address the state of knowledge in the Arab region with the view of knowledge as a primary avenue for renaissance and human development.

The Report uses the concept of "knowledge" to embrace all forms of a society's epistemological and cultural asset. It is viewed as a major organising principal of holistic human development, aiming to expand the choices and opportunities available to the individual Arab to enjoy freedom and an honorable life. Knowledge, in terms of its acquisition, production, indigenisation, and deployment, thus becomes a tool and goal that affects all levels of society equally and involves all fields, from the scientific, artistic, cultural, and traditional to accumulated societal experience.

From this perspective, the Report discusses the broad features and key components of the knowledge society and the knowledge economy, and reviews the gap that divides the region from the advanced world. The report highlights many deficits in the various areas of knowledge, while stressing the pressing need for freedom as an essential prerequisite for establishing the knowledge society.

Emphasising the triadic relationship among development, freedom, and knowledge, the Report views the upgrading of Arab knowledge performance as a gateway to the reform of the Arab development situation. Stressing the urgent need for action towards establishing the knowledge society, and out of a belief in the right to knowledge and a conviction that its dissemination is a societal responsibility, the Report also calls for better deployment of the Arab knowledge repertoire and for a productive intercommunication with the full range of global knowledge.

The Report concludes by putting forward a vision and a suggested action plan entailing a set of elements, practical mechanisms, and constructive action required to bridge the knowledge gap between the Arabs and the outside world on the one hand, and within the Arab countries on the other, to keep pace with the ever-growing knowledge society and knowledge economy. The Report does not claim that the proposed plans are either comprehensive or exhaustive, nor does it claim to hold a monopoly over the truth or all the right answers in this field. The suggested programme does, however, set down open horizons and motivating markers of the desired knowledge routes that lead towards renaissance and comprehensive human development.