

ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA

**REPORT OF THE
EXPERT PANEL ON INFORMATION TECHNOLOGY
AND DEVELOPMENT PRIORITIES: COMPETING IN
A KNOWLEDGE-BASED GLOBAL ECONOMY
Beirut, 15-16 May 2000**



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INTRODUCTION

1. The changes that overtook the world during the last decade of the twentieth century have contributed to a climate of enhanced competition, coupled with vanishing trade barriers, more stringent intellectual property regimes and much greater concern for the environment. These same changes are gradually contributing to transformations in the role of Governments and to calls for non-governmental organizations (NGOs) and business institutions to play a more prominent part in socio-economic development. These developments will undoubtedly pose serious challenges for socio-economic efforts in the ESCWA member countries.

2. Within this context, the contribution of technological capacity to socio-economic development has become increasingly clear and important. In particular, information technology (IT), coupled with recent developments in telecommunications, offers immense opportunities for catalysing and accelerating socio-economic development in the developing and least developed countries. Capabilities in a number of areas, including distance learning, e-commerce and modern networking and management, will directly affect national competitiveness and productivity as well as integration into the global marketplace. In addition, new medical care systems and modern methods for monitoring natural resources and the environment will increasingly affect living standards and resource conservation. Finally, well-distributed and properly managed IT and telecommunications capabilities will significantly further a participatory approach to governance.

3. With the above in mind, the Panel's deliberations placed special emphasis upon the following themes:

- (a) IT and the knowledge-based global economy;
- (b) The status of information and communications technologies in selected ESCWA member countries;
- (c) Capacity-building in priority areas of information and communications technologies;
- (d) Emerging issues in information and communications technologies and their applications.

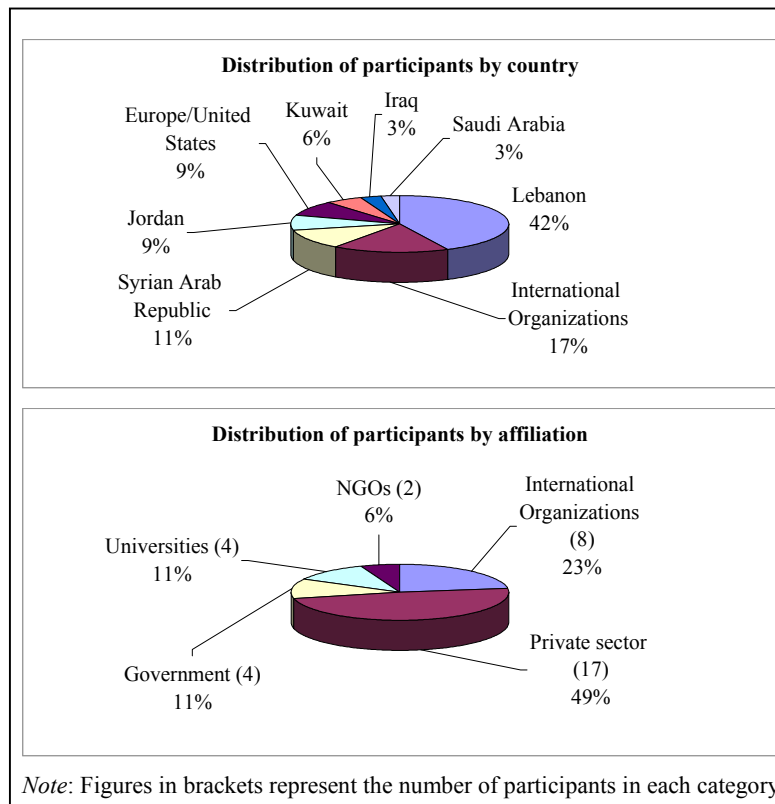
4. The Panel's recommendations also served to provide input for the high-level segment of the 2000 session of the Economic and Social Council, which had adopted the theme of "Development and international cooperation in the twenty-first century: the role of information technology in the context of a knowledge-based global economy".

I. ORGANIZATION OF THE PANEL

5. The Expert Panel on Information Technology and Development Priorities: Competing in a Knowledge-based Global Economy was held on 15 and 16 May at the headquarters of the Economic and Social Commission for Western Asia (ESCWA) in Beirut. The agenda/programme of work of the Panel is contained in annex II to the present report.

6. Thirty-five experts took part in the Panel (see the list of participants in annex I). The participants included experts from six ESCWA members, as well as independent consultants from France and the United States of America. ICT specialists from government departments, NGOs and business enterprises, as well as representatives of a number of United Nations organizations and specialized agencies, took part in the Panel. All participants attended in their capacity as ICT specialists. Figure I below shows the geographic distribution and the affiliation of the participants.

Figure I. Distribution of participants in the Panel



II. PRESENTATION OF PAPERS

7. Twenty-one presentations were submitted to the Panel during the four sessions held on the above-mentioned four themes. The presentations are summarized below.

A. INFORMATION AND COMMUNICATIONS TECHNOLOGIES AND THE KNOWLEDGE-BASED ECONOMY

1. *E-economy, new growth regime and public policies*

8. The presentation on the paper “E-economy, new growth regime and public policies” was made by Mr. Eric Brousseau of the University of Paris 1 (Panthéon-Sorbonne), who began by pointing out relevant features of knowledge-based economies in their functional breakdown. The information production segment of new economies had been stronger over the long run than that of productive activities. Within the information sector, the vast majority of its workforce was engaged in coordination activities, with a minority that could be considered involved in the actual production of knowledge. ICTs were originally used to support internal coordination, while the growing importance of coordination had been directed at the market. That explained why the development of new methods of coordination in the market (exchanges between firms and transactions) represented significantly higher productivity gains than internal coordination.

9. Since services and innovation were two key drivers of growth, knowledge-based economies were by their very nature growth-oriented. In addition, the Internet was boosting that growth at three levels: it allowed the transfer and duplication of codified knowledge at negligible cost; it was a medium that was more sophisticated and flexible than previous media and was itself a major factor of innovation in opening up technological and business opportunities.

10. The modularization and decentralization of the new economies had led to an increased demand for diversification and customization, while innovation was leading to competition. Because the Internet was

both a distribution and a communication network, it posed new problems in that distribution networks usually required centralization while communication networks required decentralization. While the Internet was based upon interconnected and interoperable heterogeneous networks, coordination was still necessary between operators that were both complementary and competitive. The situation generated certain problems in that it created new transactions for which new types of optimal vertical agreements with a competitive component had to be invented. That could be achieved through coordination policies that relied on building efficient institutional frameworks, a redesign of antitrust policies, and the development of specialized regulatory authorities operating at a regional level.

11. ICTs were expected to lead to several kinds of productivity gains. Among them were more efficient managing of resources due to a decrease in distribution costs; eliminating inefficient suppliers and intermediaries due to a more transparent market and a resulting downward push on prices; and enabling customers and suppliers to contact each other directly, thereby bypassing commercial intermediaries.

12. However, that might not be the case. First of all, e-commerce was still a very small segment of the economy as a whole, and one that was underperforming in terms of profit generation. Furthermore, commercial intermediation was still in evidence within e-commerce. Finally, e-commerce was not a frictionless market, given the discrimination between consumers and the non-negligible search costs.

13. There were still technical and strategic barriers to the transformation of transactions into electronic form. There would always be the need for certain transactions and operations to be performed off-line. Moreover, vendors did not always have an interest in making markets more transparent. Most items for sale on the Internet were still standardized items. More specifically, the only products that could be said to operate in a truly virtual market were airline tickets and securities, both of which were products that had a very limited number of dimensions. As dimensions (and hence complexity) increased, the barriers to online transactions increased. Furthermore, market electronization tended to favour price differentiation over quality differentiation, which in turn could lead to a standardization of quality.

14. Commercial intermediaries would continue to play a role in financing, insurance and logistics management. An environment in which customers and producers could coordinate their plans through information was hampered by asymmetries at several levels, and by incompatibilities of various types. Moreover, intermediaries were doing more than just managing information. They were responsible for information management (economies of scale and scope), logistics management (economies of scale and scope), making transactions secure from online intrusions, insurance (commercial risk), and liquidity (market clearance). Intermediaries also had assets—namely their ability to extract and utilize private information as well as their efficiency in handling information—which could not be replaced by electronic networks.

15. The relation between free and fee-based services was another topic raised by the presentation. It was noted that Internet economics relied on positive externalities. Although non-commercial web sites attracted the majority of users, for-profit businesses financed overall development, and although e-commerce generated profits, there were essential free services that could complete the transactions. In sum, those interdependencies were leading to new links between the supply side and the demand side.

2. The emerging knowledge-based global economy

16. A presentation was made on the paper “The emerging knowledge-based global economy,” prepared by Mr. Cristiano Antonelli of the University of Turin for the meeting. It was stated that the current technological innovations were viewed as the result of complex alliances and compromises based upon the valorization of weak knowledge indivisibilities and local externalities. The situation could lead to complementarities with regard to technological knowledge and innovations among heterogeneous groups of agents acting in a state of disequilibrium.

17. The convergence of the efforts of a variety of innovators, each with a specific and yet complementary technological base, could lead to the successful generation of a new technology. With such an approach, the distinction between innovation and diffusion was blurred. Furthermore, the adoption of a new technology

was viewed as the result of a complementary effort that made that technology useful and specifically reliable and increased its scope of application. Those who adopted the technology were no longer viewed as passive and reluctant prospective users, but rather as participants in the evaluation and diffusion processes.

18. Profitability of adoption was the result of a process rather than a set of given facts. As appropriate coalitions of heterogeneous firms were formed, new ideas could be implemented and would grow incrementally, eventually becoming profitable. Knowledge generation was thus a collective process by virtue of the coming together of various pieces of knowledge owned by different agents.

19. The conditions and features of communication processes explained the clustering of innovations in well-defined regional spaces. Furthermore, localization favoured access to external knowledge, currently viewed as an essential intermediary input in the generation of technological knowledge, and encouraged the introduction of localized technological changes. That in turn led to self-reinforcing mechanisms based upon localized increasing returns.

20. In general, the shift to knowledge-based economies was an essential part of globalization, and that could be seen in the trend to concentrate innovation in developed countries and to expand manufacturing and commercial activities, providing further proof of the concentration of “knowledge-power” in developed countries. Such a trend raised questions about equity and income distribution, in that there might be serious imbalances with regard to which components of knowledge-based economies were being globalized and which were not.

B. STATUS AND FUTURE PROSPECTS OF INFORMATION AND COMMUNICATIONS TECHNOLOGIES IN THE ESCWA MEMBER COUNTRIES

1. Prospects for future development in telecommunications: a global view with special focus on the ESCWA member countries

21. The presentation on the paper “Prospects for future development in telecommunications” was made by Mr. Roberto Blois Montes de Souza of the International Telecommunication Union (ITU). The presentation provided a comprehensive overview of recent developments and the current state of telecommunications. It was pointed out that the share of developing countries in general, and of the ESCWA member countries in particular, in the overall global infrastructure had been improving in recent years, albeit at a very slow pace. This was particularly the case for the growth of the Internet and the Internet Protocol backbone in the ESCWA members, which lagged behind other emerging markets such as Latin America. Rapid developments in the cellular marketplace, especially in the high-income Gulf countries, were noteworthy.

22. Governments and business leaders in the developing countries were aware of the current importance of ICTs and were embracing several sectoral reforms. Privatization of national carriers, increased competition of the Internet and cellular services, and price adjustments of telephone lines were some of the strategies adopted.

23. The presentation reviewed policies and regulatory measures necessary to promote ICTs in the region. It was stressed that the presence of a sound, efficient, effective and transparent regulatory framework was essential to gain investor confidence. In addition, regulatory institutions had to enforce and monitor the implementation of competitive principles.

24. The presentation concluded with a description of the role of the ITU in assisting developing countries in the following ways :

- (a) Disseminating policy and regulatory information;
- (b) Organizing workshops and seminars and offering training programmes to regulators;
- (c) Offering direct advisory services to developing countries in their ICT reform process.

2. Science and technology in the ESCWA member countries, with special reference to ICT capacity-building and technology transfer

25. The paper on “Science and technology in the ESCWA member countries,” prepared by the Chief of the ESCWA Technology Section, defined in its introduction the functions and constituents of national systems of science and technology, pointing out the deficiency of those systems in the ESCWA member countries.

26. The first part of the paper described the research and development (R and D) systems in the ESCWA member countries. It was stressed that the limited contribution of R and D activities to socio-economic development was due to the following:

- (a) Few and weak R and D institutions, especially in areas of advanced technologies;
- (b) Dearth of human resources devoted to R and D;
- (c) Low expenditures on R and D;
- (d) Limited use of opportunities presented by cooperative international research projects, such as special European Union programmes.

27. All the above factors had led to diminished R and D output. The paper provided more detailed information on the diminished R and D output, which was reflected in the low level of patenting in the ESCWA member countries.

28. The second part of the paper examined the status of ICTs in the ESCWA member countries. It was stated that the ICT infrastructures were still largely inadequate in most of the ESCWA region. Indications of that inadequacy could be assessed through several ICT indicators, such as the number of personal computers (PCs) and the number of top-level domain names. The average number of PCs in the ESCWA member countries fell below that for the developing countries as a whole in 1995, and amounted to around one seventh of the world average. The average did, however, increase more than twofold, from around 6 to 15 PCs per 1,000 inhabitants in 1997. With regard to more conventional ICT infrastructures such as telephones, the figures for the ESCWA member countries still lagged behind those in developed countries, although the Gulf Cooperation Council (GCC) countries had higher indicators than the other ESCWA members. The average number of telephone lines in the ESCWA member countries in 1997 was approximately half the world average of around 135 lines per 1,000 inhabitants.

29. The final part of the paper described aspects of technology transfer activities taking place in the ESCWA member countries, with emphasis on the ICT sector, through a review of contracts concluded in those countries and published in the *Middle East Economic Digest (MEED)*. An analysis of those contracts during the period 1992-1999 revealed low expenditure on ICT contracts in general and the prominence of some GCC countries in comparison with the rest of the region.

30. The paper concluded that ESCWA member countries would need to focus on building endogenous science and technology (S and T) capacity, especially in ICTs, in order to meet the challenges of a globalized knowledge-based economy. Such efforts would necessitate coordination at the national, regional and international levels.

3. Information and communications infrastructures of the ESCWA region

31. The paper on “Information and communications infrastructures of the ESCWA region” was prepared by the ESCWA Regional Advisor for Telecommunications. In the first section of the paper, it was noted that telecommunications was one of the most important supporting sectors for trade efficiency. The field of teledensity was reviewed in the paper; however, teledensity alone was no longer sufficient in any assessment of new services, which increasingly required a variety of tools (PCs, mobile phones, the Internet). A comparison of the telecommunications profile of the ESCWA region with the world profile clearly showed that the ESCWA region was below the world average with respect to many services. However, positive steps were being taken in most of the region to privatize and deregulate basic services as well as to provide new

services such as mobile telephony and the Internet. It was noted that the telecommunications sector of the ESCWA region needed to be restructured to provide global, affordable and unrestricted access to the public and the business community.

32. With regard to information technology, the paper stated that the ESCWA region had not received the attention it merited from Governments, although a few recent projects had been announced to promote the sector. Specific projects mentioned in the paper included those in Egypt, Jordan, and Dubai in the United Arab Emirates. As to information content, the utilization of information for research, development and decision-making was still considered to be low. Furthermore, citizens in the ESCWA region were still denied the right to access information.

33. A number of guidelines including the following subjects were proposed as part of a regional plan of action: (a) developing ICT indicators; (b) developing ways and means of harnessing the software industry; (c) copyright; (d) the pervasiveness of the Internet; (e) the right to access information; and (f) the need to develop applications with a multiplier effect.

4. Notes on sectoral issues in ICT promotion and development

34. The presentation “Notes on sectoral issues in ICT promotion and development” was made by Mr. Mansour Farah, IT consultant, who began with an overview of the status of ICT infrastructure in the ESCWA region. That was followed by a review of sectoral needs and priorities starting with agriculture, in which it was stated that that vital sector was fragmented and deficient in skills and resources. However, a number of technologies could support the agricultural sector, such as multipurpose community telecentres, integrated farm systems, greenhouse software systems, and irrigation and wastewater control systems. In traditional industrial segments, product quality was generally low and protectionist measures prevented competitive forces from pushing for change, although there were some examples from the ESCWA member countries of use of IT to improve product quality and of markets being regained. Other examples of embryonic attempts include electronic data exchange for textile manufacturing companies in ESCWA member countries. A number of technologies could enhance productivity, including computer-aided design, computer-aided manufacturing and computerized numerical control, while demonstration centres and regulations encouraging venture capital would play an important part in disseminating ICT.

35. ICT industries had been started up in the ESCWA member countries. Those industries were concentrated on software development, but also included PC assembly, manufacturing of communication cables, electronics equipment and telephone switches; little had been done in terms of microelectronics. The software development itself was still fragmented, local, and rarely exported, with extremely few instances of a regional presence. The transport and tourism sector in the region had not yet been significantly exposed to ICTs, except for classical applications such as reservation systems. There were numerous areas for improvement, including resource management, administrative and financial transactions based on electronic data interchange, and even virtual transport enterprises.

36. Financial and commercial institutions in the developed countries had experienced tremendous growth in ICT usage, which was not yet the case in the ESCWA region. The need to further develop information and communications infrastructures was still hindering the provision of services such as credit cards and e-banking. At another level, the banking sector in ESCWA member countries needed to be restructured by introducing the retail banking concept, greater branch office autonomy, and smooth integration of new applications with existing legacy systems. Public administration in the region was characterized by complexity and bureaucracy; ICTs should be introduced into that administration in order to achieve higher efficiency, higher productivity and e-governance. The introduction of management information systems had brought about improvements, but most of the public administrations in the region were still not computerized or networked. ICTs in public administrations would also require improvements in the business processes themselves, and that could be facilitated by work flow management software, geographic information systems, and locally produced software to accommodate local laws and regulations.

C. COUNTRY PRESENTATIONS

1. Information technology and development priorities in the Kingdom of Saudi Arabia

37. The presentation on the “IT and development priorities in the Kingdom of Saudi Arabia” was given by Mr. Badr Al-Badr of the Al-Alamiah Internet and Communications Company. It was stated in the presentation that although Saudi Arabia might be facing certain development challenges, including high population growth, a large territory, an oil-centred economy, and a gender divide, Saudi Arabia was one of the first countries in the region to adopt computerization for banking debit cards, electronic government services and national records.

38. The telecommunications infrastructure in Saudi Arabia had been growing rapidly, and teledensity had reached 11 per 100 inhabitants. Saudi Arabia had been connected to both regional and international wide area networks, and more recently to the Internet. The growth of the latter during the past year had been very strong and was expected to continue at the same pace for some years to come.

39. The paper concluded by noting that private training institutes were proliferating in Saudi Arabia and served to complement the five computer science colleges in the country, although demand still exceeded supply. A number of initiatives had been undertaken by the Government to encourage ICTs, including the use of computers in schools.

2. ICT and its impact in accelerating socio-economic development: the case of Egypt

40. The presentation on “ICT and its impact in accelerating socio-economic development: the case of Egypt” was made by Mr. Raafat Radwan, Chairman of the Information and Decision Support Centre (IDSC). In its first part, the paper summarized the current state of ICT in Egypt, and stressed that the telecommunications infrastructure had been undergoing significant change. During the past decade, teledensity had increased tenfold; the current rate of increase was at an overall national average of 10 per 100, with an average of 15 per 100 for Cairo and Alexandria, the two principal cities in Egypt. The infrastructure components themselves had been expanded and modernized, with digitalization currently at almost 100 per cent. Although the telecommunications sector was still a public sector monopoly, the mobile phone market was a privatized subsector currently open to two firms and had experienced a very healthy growth rate. The overall telecommunications market in Egypt was estimated in 1998 to have exceeded US\$ 1 billion.

41. Since 1985, the IDSC had supported the information infrastructure in Egypt through numerous projects, which were included in a number of programmes including:

- (a) Supporting the decision-making process for successful socio-economic development;
- (b) Building the IT infrastructure;
- (c) Building a national IT;
- (d) Technology development;
- (e) Human resources development;
- (f) Promoting international cooperation.

42. Since 1993, when the Internet was first introduced in Egypt, many advances had been made, with the most noteworthy being an initial free public Internet access provided by IDSC and later the total privatization of that market. The development of the market, coupled with the establishment of several private Internet service providers (ISPs), had led to the introduction of a broad spectrum of Internet services. In that context, the Government of Egypt had launched an Electronic Commerce Initiative.

3. Resources for information technology and telecommunications development: current situation in Lebanon and prospects for the future within a regional framework

43. The presentation on “Resources for IT and telecommunications development: current situation in Lebanon and prospects for the future within a regional framework” was made by Mr. Raymond Khoury, Technical Cooperation Unit Director of the Office of the Minister of State for Administrative Reform. With

regard to the current situation in Lebanon, it was stated in the presentation that the hard infrastructure had improved, with state-of-the-art connectivity having been made available in the country's major cities. In addition, two mobile phone licences had been granted and a telecommunications privatization bill had recently been passed. Two private sector technology zones were being developed. At the policy level, a draft document had been prepared, and a national ICT committee structure had been approved. At the legislative level, the Government had recently passed the intellectual property rights law, with other laws covering free zones, digital signatures and privacy protection still in the process of development. The Government had also embarked on a number of reform measures, which should eventually promote e-government, while financial measures, such as loans to small and medium-sized enterprises (SMEs) and the provision of venture capital funds, were being taken. With regard to soft infrastructure, human resources were considered to be in relatively good supply, and training and education were receiving considerable attention, including cooperative and internship programmes with local industries.

44. To meet the future requirements in the telecommunications field, there were plans to expand modern networks to all parts of Lebanon. The diversification of services and reassessment of pricing policies would be another priority. The Government was expected to increase its efforts in policy-making, including partnerships with the private sector and academia. As for legislation, more action was needed, including deregulating telecommunications and relaxing import duties. In terms of soft infrastructure, greater efforts would be needed to diversify human resource skills and to diversify the national ICT expertise.

45. One of the specific proposals called for was the development of a regional framework to link the countries in the ESCWA region by establishing "Communities of Practice". Such communities could lead to common understandings on subject areas and to agreements that in turn would eventually lead to a regional framework. Participants in such an initiative could include regional organizations, universities, United Nations agencies, policy centres, and government-supported institutions.

4. Developing the Lebanese software industry

46. The presentation on "Developing the Lebanese software industry" was made by Mr. Nashat Mansour of the Lebanese American University, who stated that software production was a promising industry in Lebanon and had the potential to expand the country's job market and increase the national income. That industry had strengths and opportunities, such as the presence of export-oriented software companies in Beirut and the availability of qualified software engineers thanks to the country's education system. However, the software industry also suffered from weaknesses and threats, such as the prevalence of small companies and the lack of interest shown by local and international investors. The paper proposed policies and suggestions for developing the Lebanese software industry. Those policies were based on a partnership between the Government, industry, and institutions of higher education, and covered the areas of finance, investment, export, marketing, legislation, human resources, software engineering practices and infrastructure.

5. ICT capacity building in the Syrian Arab Republic

47. The presentation on "ICT capacity building in the Syrian Arab Republic" was made by Mr. Mohammad Munajed of the University of Damascus, who began the presentation by stating that while during the 1980s there had been a relatively slow evolution of ICT activities in the Syrian Arab Republic, the past decade had witnessed a significant prioritization of the sector. Specific decisions and activities to build ICT capability had been undertaken.

48. One of the most crucial activities was a multiphase project for the renovation and modernization of the phone and data communication networks, which could dramatically reduce the "queuing" delay for customers seeking to obtain a telephone from many years to a few weeks. As for data communication networks, a packet switching network was in place linking a number of cities. The Internet was a relatively new introduction to the Syrian Arab Republic, with the current modest capacity undergoing expansion under the umbrella of a single Government monopoly provider.

49. With regard to soft infrastructure, two independent nationwide computer awareness programmes had been launched and a significant number of participants had already attended the programmes. Computer training courses had also been provided, both for trainers and students, from primary to higher-level education level. A number of government ministries and departments had begun computerization in the public sector, with the banking sector being among the most active.

6. Information technology and telecommunication capacity-building in Jordan

50. The presentation on “IT and telecommunication capacity-building in Jordan” was made by Mr. Yousef Nusseir, President of the National Information Centre in Jordan. The paper began with an extensive overview of the lengthy process which had led to the formulation of a national information system strategy and which had involved 1,000 institutions in the public and private sectors. This was followed by the establishment of sectoral strategies. Implementation of several sectoral strategies had already begun, notably for labour, economy, industry, agriculture, and S and T. The National Information Centre had been crucial in those efforts.

51. With regard to information technology, the Jordanian Computer Society had led the efforts to develop a national strategy for IT that would promote private sector leadership and partnership with the Government.

52. Although the telecommunications service provider had recently been commercialized, it still had a monopoly on basic telephone services, leaving other services completely open to the private sector, all under the stewardship of a regulatory commission. The teledensity in the country, currently at around 12 per 100, was expected to reach 20 within three years, and the digitalization of the networks was under way. Mobile phone systems, paging services and public payphones were currently provided by the private sector.

53. Since its introduction in Jordan in 1995, the Internet had affected all sectors. There were currently seven service providers (only one from the public sector), with the 100,000 users representing 2 per cent of Jordan’s total population. The same percentage applied to mobile phones.

54. Like other banking and finance sectors in the region, Jordan’s banking and finance sector had been transformed by the use of information technology. This applied to other areas as well: 92 per cent of government organizations had introduced IT in their operations. In the field of education, IT had been introduced in Jordanian schools in 1975, and was currently used in all secondary schools. With an annual growth rate of 25 per cent in the IT sector, it was not surprising that Jordan was considered amply supplied with IT personnel, given the 17 universities, 15 colleges, and 20 training centres in the country that provided IT-related degrees and training.

7. State of ICTs in Kuwait

55. The presentation on the “State of information technology and telecommunication in Kuwait” was made by Mr. Abdulla Mubarak Al Sabej, Chairman of Arab Telecom. The paper noted that while in the 1980s mainframe computers had handled critical operations for a limited number of organizations, there were currently more than 200,000 computers in Kuwait in all sectors, with an expected 15 per cent annual growth of the IT market.

56. Usage of the Internet had increased since 1993 when it was offered by one service provider, although continued growth could not reach its full potential without clearly defined policies.

57. Kuwait, like the rest of the region, had experienced a telecommunications boom. The first point to multi-point broadband wireless data network in the region was to be introduced in Kuwait in the year 2000.

58. Although banks were providing secure payment systems for e-commerce, digital signatures were not yet recognized. An intellectual property law had been passed and was being strictly enforced.

8. Development of the information technology sector in Iraq

59. The presentation on the “Development of the IT sector in Iraq” was made by Mr. Hussain Kubba of the United Nations Development Programme (UNDP). The paper noted the financially promising openings for private investment in the IT sector in Iraq, in particular in the software and hardware market, which had developed spontaneously in the late 1980s. Micro computing had helped to end the hitherto de facto State monopoly of the IT sector. The communications sector, however, remained exclusively State-controlled, with no private sector involvement or privatization initiatives. Government planning and strategy formulation for IT-related matters had been entrusted to the now defunct National Computer Centre.

60. During the past decade however, there had been serious limitations on the development of the whole IT sector, and the private sector in particular. The drastic fall in gross national product (GNP) had led to the erosion of local market opportunities, which had particularly affected software. A lack of export opportunities, due to the sanctions among other reasons, was preventing any growth. The destruction of the national telecommunication system had helped to further increase the isolation of the IT community in Iraq from technological developments worldwide. There was no comprehensive policy to encourage the private sector. Property rights legislation, tax breaks, subsidies, and easier access to finance were all lacking. State initiatives to provide much needed “knowledge-based factors of production” were still very limited. The critical economic and social conditions in Iraq were also contributing to a significant brain drain, while the lack of Internet services for the public at large remained a severe limitation on access to information and knowledge.

61. Discussions were currently under way to legislate the establishment of a national commission for computers and informatics. The commission would address the promotion of the IT industry in Iraq through the establishment of specialized centres.

D. INFORMATION AND COMMUNICATIONS TECHNOLOGIES IN SELECTED PRIORITY AREAS

1. Distance learning for the ESCWA/UNESCO member countries

62. The presentation on “IT and telecommunications technologies in selected priority areas: distance education for the ESCWA/UNESCO member countries” was made by Mr. Tarek Shawki, Regional Informatics Advisor of the UNESCO Cairo Office. The paper reviewed the emergence of a global higher education economy and the strategies and views of UNESCO on a global knowledge society. Those strategies revolved mainly around the digital divide, economic globalization, and access to knowledge content.

63. The presentation then provided a comprehensive review of UNESCO projects and initiatives in IT and learning, including creating learning networks, the International Institute for Information Technologies in Education (IITE), open source software, CDS/ISIS, IDAMS, Trans-European Tele-Education Network (TEN), and EdWorld.

64. Paradigmatic issues were also reviewed, in particular the factors that affected how learning environments would evolve in order to adapt ICTs, such as culture and techniques. The presentation focused on moving towards a new learning model, based on the classical models and the means and methods to shift to ICT-based models of learning. In that context, a specific UNESCO effort was reviewed, namely the International Grid for Learning (IGL). The IGL components were reviewed, covering the Web resource server, primer workshops, training kits, and regional nodes. The presentation concluded with a thorough review of the general subject of distance education, including mechanisms for delivery, success factors and effectiveness, appropriate technologies and key players.

2. Health informatics and telematics for ESCWA member countries

65. The presentation on “Health informatics and telematics for ESCWA member countries” was made by Mr. Najeeb Al-Shorbaji of the World Health Organization (WHO) Regional Office for the Eastern Mediterranean. The presentation began with a review of the factors that were expected to lead to growth of

health information systems. The six types of health information were reviewed, covering management, clinical, epidemiology, literature, knowledge, and personal and community information.

66. Various definitions of telemedicine were provided; the most specific was the use of telematics and informatics to deliver health care services to patients regardless of their location. The components of telemedicine, namely teleconsultation, telemonitoring and teleinformation, were reviewed, along with examples of the requisites and benefits. The presentation reviewed other factors to consider in implementing telemedicine, such as costs, goals, objectives, cost-benefit analysis, systems integration and cooperation. Other points stressed were the need to adhere to technology standards and raising of human resource skills.

67. The presentation also included a comprehensive review of the state of health informatics and telemedicine in the ESCWA member countries, along with different mechanisms of support provided to those countries by WHO. Those support mechanisms included consulting services, conferences, training, software development, and access to the relevant literature. The presentation concluded with a review of international roles, including issues such as the information society, software evaluation, health cards, standards and legislation, as well as the parties involved such as the ITU, collaborating centres, NGOs, and liaison with industry.

E. SPECIAL ISSUES IN THE PROMOTION AND DISSEMINATION OF INFORMATION AND COMMUNICATIONS TECHNOLOGIES

1. *Internet services and their growing dissemination: legal issues*

68. The presentation on “Internet services and their growing dissemination: legal issues” was made by Mr. Toni Issa, President of the Association pour le Développement du Droit et de l’Informatique au Liban. The presentation reviewed the current state of the Internet and the justifications for international demands to elaborate legal and technical rules that would guarantee the security of exchanges for persons using the Internet.

69. With regard to the attribution of domain names, the presentation covered a number of issues, including the definition of a domain name and its practical function, entities in charge of attributing domain names, principles applied internationally in attributing domain names, the contradiction between domain names and international trademark and label laws, and litigation and lawsuits originating from the “first come, first served” rule. The presentation also reviewed Internet services, ranging from the legal status of Internet service providers to the contractual framework of those providers and their responsibilities. The presentation stated that irresponsibility in that respect had become a prevailing trend worldwide.

70. E-mail services were also covered in the presentation, specifically with regard to the mixed nature of services (private and public mail), the lack of total technical reliability, secrecy laws, probative value and possible legal problems. The presentation concluded with a review of Web services and hyper links based on several viewpoints, including the legal nature of Internet Web sites and Web pages, problems resulting from the temporary saving of Web sites in memories and servers, and the establishment of links between different sites.

2. *The public voice in the development of information technology*

71. The presentation on “The public voice in the development of information technology” was made by Mr. Marc Rotenberg of the Electronic Privacy Information Center. It was noted in the presentation that there were many new opportunities for economic development created by IT. There were social concerns involved, such as the impact on privacy and freedom of expression, as well as linguistics and cultural identity. IT increasingly determined public policy through decisions involving technical standards, such as whether to require user identification for the Internet.

72. The presentation reviewed the increasingly important role that Internet-based NGOs were playing by serving as advocates for the public interest and by providing a “public voice” in the emerging policy debates. The importance of the “.org” sector to the future of civil society and IT decision-making was

reviewed. Although the public voice organizations were often small and informal, they were having a significant impact in the policy world, reflecting perhaps growing public awareness of the issues. That impact had been evident in a number of examples, ranging from United States-based politics to the attempt by the Organization for Economic Cooperation and Development (OECD) to introduce cryptography guidelines, to actions aimed at specific enterprises such as Intel and Doubleclick.

73. The presentation concluded with a summary of the future role and challenges for Internet NGOs, including access to the Internet as a fundamental right, encouraging privacy-enhancing technologies, expanding the issues to developing countries, and consumer protection.

3. Information technology and public policy issues: from global development networks to community participation

74. The presentation on “IT and public policy issues: from global development networks to community participation” was made by Mr. Steven Clift of Publicus.Net. He stated in his presentation that, while the pace of change was accelerating for IT usage, the transformation of democracy through the Internet had only just begun. Citizens could gain new opportunities through electronic free assembly, association and participation in governance. However, online voting was just one part of democracy online; it was hoped that the representative aspect of online democracy would become the more central issue.

75. Government was a significant user of the Internet in many respects, but it was important to distinguish between e-governance and e-government services. And thus the crucial area for development of online democracy involved representative and decision-making bodies; that required adapting online tools to official democratic processes so as to involve citizens. Many examples of leading government online support for democracy were given, ranging from decision-making to government consultations, parliamentary consultations and “wired” officials.

76. The media had made the largest investment in the efforts to make material available on the Internet, and were thus at the receiving end of citizens’ requests for news and information about government processes. Other factors were also crucial in shaping the role of the media: time (and hence commerce), consolidation efforts, alternative content, and discussion boards.

77. Although the early uses of the Internet by political forces mainly involved what were essentially online brochures, it was becoming more of a campaign communication and organizational tool, allowing candidates and parties to bypass the media. Increasingly, attention would be focused not just on candidates and elections, but rather on those candidates who won and became elected officials. That in itself might eventually raise legal and ethical issues relating to the use by elected officials of government-funded information infrastructures.

78. Online advocacy had originally been tied to personal or small-scale efforts, and in recent years that had developed into large advocacy organizations with a strategic or integrated approach. Other changes had involved a shift from Internet-related advocacy to general advocacy on a myriad of issues. However, there were expectations that the success stories would come from high-energy, short-term opposition efforts or events. It could be argued that advocacy would be more successful at the local and global levels than at national levels, given that in the latter case there might already be mature forms of advocacy. The ICT tools for online democracy were being developed mostly by the private sector, including academic research institutions. Some examples of those tools were free e-mail lists, open sources for applications and tools, and open standards.

79. In conclusion, the adapting of existing institutions—public, private or non-profit—would not suffice. What was needed was the creation of “public Internet” partnerships that allowed the advantages of online competition to enter the public world in the form of collaboration. One such approach might be through a Public Internet Consortium that would promote efforts to apply existing Internet standards and influence emerging open standards in the public interest.

F. PROMOTING INFORMATION AND COMMUNICATIONS TECHNOLOGIES IN THE ARAB COUNTRIES

1. *Knowledge-based economy: Arabization of information technology*

80. The paper on “Knowledge-based economy: Arabization of information technology” was written by the ESCWA Regional Advisor for Science and Technology. It was stated in the paper that there were clear indications of the transformation of economies around the world and that economists were establishing ways to factor knowledge into theories and models. The Arab world was at an important crossroads and must play out its role in, and take its share of, the knowledge-based economy.

81. The paper classified four types of knowledge for review. It analysed how those types of knowledge had become commodities or economic agents. The types of knowledge were: the know-what, the know-why, the know-how, and the know-who.

82. Enterprises and organizations depended increasingly on their information networking in order to improve their knowledge collection, utilization, production and innovation. There were many examples of those information networks, and they had come to play an important role in innovation as well as in the promotion of national innovation systems.

83. Knowledge-based economies required significant efforts for human resource development. IT illiteracy was a definite obstacle to that development; better literacy levels were required. However, the pace of technological change required ongoing lifelong training, and most of the existing IT educational resources were not yet available in Arabic. The shift required in the transition from low-skilled to high-skilled labour required a corresponding shift in policies, including wages, labour and education.

84. Working and handling knowledge involved languages. To ensure the highest level of productive work, the language used should be the mother tongue of the workers. As the generation, dissemination, publishing, and utilization of information was mostly conducted in English, Arabization was obviously necessary in the region. The publishing and utilization of work in Arabic was considered more essential than its generation and dissemination. Specific efforts for Arabization should be geared to a number of areas, including creation and unification of terminology, standardization, Arabic database creation and publishing (especially on the Internet), scientific translation, using the Arabic language in higher education, and support of funding for IT research using the Arabic language.

85. In conclusion, a number of specific measures were recommended, including promoting R and D (knowledge generation), increasing networking (knowledge dissemination), supporting documentation and awareness programmes (knowledge publishing), and providing enabling mechanisms such as technology incubators and copyright and patent laws (knowledge utilization).

2. *The case for an Arab knowledge-based economy initiative*

86. The presentation on “The case for an Arab knowledge-based economy initiative” was made by Mr. Talal Abu-Ghazaleh, President of the Arab Management Society. The presentation stated that the challenge facing the various countries of the world, particularly those in the ESCWA region, was to transform their economies to take advantage of the explosion in information technology. One proposal to meet such challenges was to launch an Arab Knowledge-Based Economy Initiative through the joint efforts of a number of United Nations bodies and agencies, other international organizations and NGOs.

87. Such an initiative could strive to benefit from potential opportunities by allowing stakeholders to access and benefit from technological information resources, by providing decision makers with adequate information support systems, and by enabling businesses and the public at large to enjoy the use of information and knowledge in making rational choices.

88. A number of objectives could be realized through that initiative: (a) ensuring the continuous flow of information and communication; (b) creating an inter-Arab information and communication network with low costs and reliable communication; (c) achieving maximum utilization of information by encouraging the

development of systems that allowed for wide dissemination; (d) increasing networking and promoting exchanges; (e) fostering a new generation of Arabs trained to use information and communication technologies; and (f) allowing the inflow of new technologies and the export of intellectual products.

89. The presentation reviewed in detail the activities necessary to achieve those objectives in four major areas: human resources; information resources; institutional and management systems; and technological resources. The roles to be played in forming an Arab knowledge-based society were varied and included Governments (with regard to removing impediments, liberalization, intellectual property rights, and leading by example); the private sector (assuming investment risk and being involved in entrepreneurship); the media (information dissemination and creating and disseminating awareness); and other organizations (support and monitoring).

III. RECOMMENDATIONS

90. An extensive review of the material contributed to the Panel was conducted during three discussion sessions. In addition to the issues raised by the papers submitted to the Panel, a number of additional issues presented by the Panel's secretariat were debated.

91. A number of recommendations and suggestions were put forward by the experts with a view to providing advice to all concerned parties regarding future action aimed at ICT capacity-building in the ESCWA member countries. Owing to the economic, social, cultural and linguistic similarities between the ESCWA member countries and other Arab countries, it was felt that many of the recommendations and suggestions made by the experts applied with equal validity to the Arab countries as a whole.

92. The experts reaffirmed the need for concerted action by all concerned parties if worthwhile objectives in ICT capacity-building were to be achieved. Since implementing the suggestions made by the experts was more often than not the responsibility of many parties rather than a single entity, such as a single government department, an NGO, or a specific enterprise, the results of the deliberations of the Expert Panel, summarized in the following paragraphs, were grouped under headings that corresponded to the issues discussed.

A. POLICIES, STRATEGIES AND ACTION PLANS

93. Ministries of State, high level governmental and non-governmental bodies, and national information centres have recently been established by ESCWA member countries to promote certain aspects of ICT development. There is therefore an urgent need to devote far more attention and resources to the formulation of coherent policies, strategies and plans of action aimed at ICT capacity-building and sustained development of existing capabilities. The principal goals of such policies, strategies and action plans should be to provide ESCWA members with improved competitiveness in the knowledge-based global economy and to support their own moves towards creating knowledge-based societies.

94. Efforts aimed at the formulation of cross-cutting national ICT policies that address overall socio-economic development goals should take into account both the targets set by explicit sectoral development policies and the relevant S and T policies, owing to the close bonds that link overall technological capacity-building to ICT capacity-building. ICT policies, strategies and action plans will also need to cater for supra- and intersectoral development objectives. In numerous instances, sectoral ICT policies will need to be closely integrated within the sectoral development policies.

95. National ICT policies, and related strategies and action plans, must address objectives within at least two time frames, involving, in the longer term, goals such as instituting changes in attitudes and revolutionizing educational systems. In order to cope with accelerating technological and global economic development, goals targeted in the shorter term would include the adoption of interim ICT capacity-building measures, including specialized institution-building, urgent human resource development programmes and the achievement of specific ICT capabilities in selected priority sectors/segments.

96. The need to set national and sectoral ICT policy objectives based on actual demand considerations and established needs rather than supply- or technology-push considerations must be emphasized. In particular, policy makers and regulators concerned with telecommunications in countries where market forces are still dormant should aim to monitor, and when necessary intervene, to promote and facilitate expansion of ICT services.

97. In order to attain their objectives, overall ICT policies and implementation strategies should address the following:

- (a) ICT infrastructure-building in its various forms and orientations;
- (b) Human resources development goals in the diversity of ICT disciplines and their areas of application;
- (c) Financial resources required for sustainable ICT development and the role of the private sector in securing resources;
- (d) Fundamental issues in content creation and management from the economic, social, cultural and linguistic aspects;
- (e) R and D requirements for ICT capacity-building, including research in the social sciences with a view to designing optimal intervention strategies and linking R and D activities in ICTs with industry;
- (f) Regulatory and legal aspects in the context of ICT capacity-building and knowledge-based societies, with special emphasis on:
 - (i) Intellectual property rights;
 - (ii) Establishing the foundation for e-governance and public access to information;
 - (iii) Security, privacy and human rights;
 - (iv) Criteria for setting up taxation and tariff systems in relation to the use of ICTs and their secure application in e-commerce and e-banking.

98. Issues on which sectoral ICT policies and strategies will need to focus include:

- (a) Sector and segment ICT priorities, special needs and resource allocations;
- (b) ICT alliances and cooperative ventures with operators inside and outside the ESCWA member countries;
- (c) Human resources development issues specific to the sector/segment in question;
- (d) Promoting “public domain information” facilities and ensuring that they provide information and applications to improve education, health, environment and government functions.

B. LEGISLATION AND REGULATORY INSTRUMENTS

99. Legislation conducive to ICT capacity-building is urgently needed in the ESCWA member countries. In particular, attention is drawn to the need for accelerating deregulation of the telecommunications sector in the ESCWA member countries with a view to promoting competition and providing a wider range of services at lower cost. Suggestions that may be singled out for priority attention concern the formulation of the following:

- (a) National privacy acts based on the Universal Declaration of Human Rights and related norms, such as article 12 of the Declaration, in a manner that maintains balance between the privacy, necessary secrecy of commercial transactions and unimpeded flow of information for the public good;
- (b) Intellectual property rights laws and corresponding regulations for their enforcement;
- (c) Laws to regulate transactions over the Internet, including commercial exchange, with particular attention to consumer protection and fraud prevention;

- (d) Legislation that provides ICT industries with incentives on a par with other industrial sectors;
- (e) Laws and relevant regulations in the field of communications, allowing firms ready and affordable access to the Internet and to international telecommunication carriers with emphasis on promoting e-commerce.

C. FUNDING OF CAPACITY-BUILDING IN INFORMATION AND COMMUNICATIONS TECHNOLOGIES

100. The securing of an adequate and sustained flow of financial resources for ICT capacity-building must be a priority for Governments, national, regional and international investment institutions, and donor organizations. This will be especially important in the initial stages before the ICT enterprises and their specific applications have matured. The following modalities for achieving sustained funding of ICT development are emphasized:

- (a) Creating conditions supportive of bids by national, regional and international capital markets to provide venture capital and investment funds for launching ICT companies;
- (b) Providing incentives and regulatory schemes that support and enhance efforts by the private sector in human resource development as well as infrastructure- and institution-building;
- (c) Increasing government spending on R and D and higher education aimed at mastering and adapting priority ICTs;
- (d) Encouraging innovation and entrepreneurship through national and regional competitions with financial recognition;
- (e) Introducing measures that enhance regulatory transparency and confidence in relevant institutions with a view to gaining long-term investor commitment.

D. HUMAN RESOURCE DEVELOPMENT

101. The importance of human resource development, both within ICT disciplines and in specific ICT application areas such as distance education and telemedicine, cannot be overemphasized. An overarching goal of human resource development efforts in the ESCWA member countries is to produce a more creative and innovative human resource base. Clearly, achieving this objective would require sustained long-term efforts on several fronts. In the medium and long terms, educational curricula must be modernized and new modalities must be introduced in human resources development, based on the most recent ICT advances such as distance education and computer-aided instruction. An objective to be targeted within shorter time horizons is the provision of specific professional development and training courses in cooperation with end-user enterprises, focusing on various sectors in which individual ESCWA member countries can compete, such as health care, transport and tourism industries, trade and government services.

102. All three objectives merit focused attention and enhanced resource allocations. Several tasks will need to be undertaken to achieve these objectives, including:

- (a) Introducing new computer education curricula at all levels of school education, beginning at the earliest possible age;
- (b) Offering faculty and students incentives to adopt ICT tools;
- (c) Upgrading the quality of technical and vocational ICT education, widening the extent of subjects they encompass, and ensuring their geographical dissemination in urban and rural areas;
- (d) Introducing ICT into curricula intended to enhance communication skills, entrepreneurship, research and self-learning capabilities;
- (e) Securing special training for ICT students and new graduates, including internships and cooperative programmes;
- (f) Regulating ICT in line with other professions.

E. DISTANCE EDUCATION

103. Applications of ICTs in education, with particular reference to university education and technical/vocational training, include:

- (a) Computer-aided instruction (CAI);
- (b) Internet-based distance education;
- (c) General and administrative management applications.

104. Only the third above-listed application is thought to have gained some ground in the ESCWA member countries. Nevertheless, both CAI and Internet-based distance education hold enormous promise for disseminating high quality higher education as well as technical and vocational training in these countries. Two important considerations will limit their dissemination, however. The first is the need to develop vast amounts of course material within relatively short periods, for such systems to “take off” with any measure of success. The second is the fact that Internet access is still limited for large student-age populations both in terms of physical facilities and cost.

105. Addressing the above two constraints will necessitate new modes of cooperation between universities in and outside the region. The role of United Nations organizations and specialized agencies, acting in cooperation with regional and national educational authorities, will be instrumental in planning for pilot activities, which must be followed up by wide-ranging initiatives aimed at extending the reach of educational and training institutions beyond campus boundaries.

F. TELEMEDICINE

106. There are areas in which ICTs should help to advance health services, in terms of quality and extent of dissemination. One example would be the computerization of health care management at the national and institutional levels, including national health information systems and health insurance schemes. There are numerous similarities between ICT applications in such areas and other ICT applications in a variety of service sectors. All such applications therefore constitute areas of priority for ICT development throughout the ESCWA member countries.

107. Telemedicine is unique in that it will often require significant restructuring and integration of national policies and management practices. Furthermore, in building national and regional telemedicine capabilities, it is advisable to adopt a heuristic and gradual approach with well-defined targets and close monitoring arrangements. Pilot projects, preferably with a regional and international as well as national character, may be conducted in selected priority areas, with help from United Nations and other international organizations, such as the World Health Organization (WHO), the United Nations Children’s Fund (UNICEF) and ITU. Such projects should facilitate the accumulation of useful experience in telemedicine applications.

108. In selecting pilot projects in telemedicine, it will be important to assess the value it would have in imparting skills for the design and implementation of national and regional telemedicine initiatives. It would also be essential to ensure that such projects possess well-defined objectives and respond to established public needs.

G. E-GOVERNANCE AND ONLINE DEMOCRACY

109. With the exception of their cost, which makes them inaccessible to large cross sections of developing country populations, ICTs are inherently democratic and enabling. Two factors will determine or hinder the level of penetration achieved by ICT-based systems in the running of community affairs at any level: the national and local policies that permit their utilization, and the schemes that make them more accessible to the general population. In the ESCWA member countries, the latter factor is not merely cost-related. Language difficulties and basic skills are considerations that need to be taken into account in the attempts to introduce e-governance schemes and disseminate online democracy. While cost issues may be amenable to short-term solutions, language and skills issues would require sustained efforts for much longer periods.

110. For the above reasons, a gradual, multifaceted approach may be more suitable in the dissemination of e-governance in the ESCWA member countries. The fact that significant dissemination of e-governance schemes is contingent upon various developments in a variety of areas, such as machine translation and digital literacy, lends further support to the argument for broad-based national and regional ICT initiatives.

111. The following issues constitute points for consideration in the design of such initiatives:

- (a) Promoting specialized forums for peer-to-peer exchange with a view to creating “online seed communities;”
- (b) Extending national information networks to all areas in the ESCWA member countries;
- (c) Providing mechanisms that allow for gradual public participation in information retrieval and exchange with trusted collaboration hosts;
- (d) Using regulation/mediation to monitor the contents of forums in order to preserve the values and traditions of regional societies;
- (e) Providing support for R and D efforts aimed at enhancing digital literacy as well as reducing language and cost barriers to the dissemination of e-governance schemes;
- (f) Adopting technologies for protecting privacy and personal information.

112. Achieving meaningful results in the application of ICTs to streamline governance and enhance democratic values is a task that should not be left to a single party, whether government, NGO or civil society institution. Adopting participatory approaches at the outset is essential for the success of these goals. Participatory approaches should therefore be part of the core strategies in the design of national and regional ICT initiatives.

H. COMMUNICATION AND INFORMATION INFRASTRUCTURE

113. The construction of modern information and communications infrastructures is a crucial component of ICT capacity-building. Unlike similar activities undertaken in the past, the building of modern ICT infrastructures will have to be firmly based on a participatory approach. Alliances will be needed between a variety of institutional forms, including government departments, local and international enterprises, technology holders and research organizations, and even NGOs concerned with ICT infrastructure-building. The following issues and needs should be taken into account:

- (a) Bringing information infrastructures within reach of the general population through a variety of means, including the provision of access systems in public places;
- (b) Prioritizing communications infrastructure-building activities in accordance with the requirements of specific application areas, such as e-commerce, e-governance and telemedicine;
- (c) Providing low-cost dissemination of information in areas with inadequate telecommunication infrastructure;
- (d) Introducing, adapting and disseminating new technologies such as terrestrial wireless and satellite communication systems in order to ensure reliable access to global information infrastructures;
- (e) Adopting unmetered telephone dial-up fees with the same local or metropolitan area code;
- (f) Ensuring broadband services in their various forms and providing bandwidth-on-demand facilities for low-cost multimedia applications;

I. STANDARDS

114. The adoption of national and regional standards that conform to international norms and that allow for easy upgrading to accommodate future technological change is essential to ICT capacity-building. Thus, the adoption of standard international procedures for encryption and digital signatures will also facilitate and ensure the security of Web-based transactions.

115. In particular, the adoption, publication and effective enforcement of quality standards for ICT devices, software products and related services and maintenance practices is a task of immense importance for ensuring competitive ICT capabilities.

116. With regard to a related issue, the standards and criteria adopted for the evaluation of national ICT capacity-building projects should be in line with international best practices. The following will have to be considered in the selection and formulation of ICT standards:

- (a) Clear sets of standards and criteria by which to evaluate any national information and communication initiative project, all to be in line with international best practices or trends;
- (b) Publication and enforcement of product and process quality standards and practices for ICT devices and software, including interfaces;
- (c) Adoption of encryption and digital signatures as tools to facilitate and ensure the security of Web-based transactions.

117. There is a need for concerted action by all parties concerned: Governments, NGOs, enterprises and media organizations, as well as international and regional organizations concerned with promoting sustainable socio-economic development. The following specific suggestions are addressed to Governments and enterprises in particular.

J. ROLES FOR GOVERNMENTS

118. In ICT capacity-building, the need for concerted action by Governments, NGOs, enterprises and media organizations, as well as international and regional organizations concerned with promoting sustainable socio-economic development, is attested by the experiences of several developing and developed countries. Nevertheless, many tasks aimed at ICT capacity-building, such as promulgating the relevant legislation, creating incentives for private enterprise, introducing and enforcing standards, and promoting specific applications, such as telemedicine, distance learning and e-governance, require active support by, and the direct participation of, national Governments. Modalities for active ICT capacity-building meriting attention by national Governments include:

- (a) Providing support for ICT capacity-building, with emphasis on maintaining modern international and domestic communication systems as a primary objective in national socio-economic planning;
- (b) Formulating national and sectoral ICT policies and strategies;
- (c) Adopting measures to facilitate and encourage national, regional and international investment in building ICT infrastructures and running ICT production and service facilities as well as investing in creating knowledge societies;
- (d) Ensuring national, regional and international interconnectivity and interoperability of telecommunication networks and protocols through initiating and taking part in relevant coordinating bodies and corresponding activities;
- (e) Introducing reforms to provide tax breaks and incentives for start-up ICT enterprises and encouraging their participation in national and international bids;
- (f) Reducing the cost of telecommunication services, levels of taxation, and import duties on ICT products and services;
- (g) Developing and implementing national plans for health informatics and telematics as well as distance learning, and integrating these plans within national health systems;
- (h) Introducing ICTs in public administration and encouraging the participation of national enterprises in building e-governance infrastructures;
- (i) Introducing measures and enforcing regulations to secure safe e-banking services;

- (j) Initiating measures to subscribe to a Unified Commercial Code;
- (k) Expanding the jurisdiction of established commercial authorities to include commercial exchanges carried out using electronic means, such as e-commerce and Internet transactions;
- (l) Adopting international best practices in resolving disputes relating to online transaction trade and taking part in the continual evolution of such practices;
- (m) Enforcing international rules in the area of registration of patents and trademarks.

K. ROLES FOR PRIVATE ENTERPRISE

119. ICT capacity-building provides enterprises in the ESCWA member countries with opportunities as well as challenges. The development of software and hardware systems for education, telemedicine and e-governance should provide an impetus for new entrepreneurial ventures. The following suggested measures are aimed at bolstering the chances of the private sector to meet the challenges and reap the opportunities offered by national, regional and international ICT capacity-building:

- (a) Participating in the preparation of e-commerce related rules, regulations, measurements and procedures;
- (b) Developing advanced computer software systems that facilitate knowledge creation and management using the Arabic language;
- (c) Promoting the establishment of partnerships between ICT industries and universities and research institutions in the development of niche applications;
- (d) Establishing an association of ICT industrialists that will represent their interests and follow up their concerns;
- (e) Establishing an institute for software R and D and advanced training of software researchers and developers at the national and regional levels;
- (f) Enhancing cooperation among concerned entities in the ESCWA member countries, and the Arab countries, in ICT capacity-building in general and the software industry in particular;
- (g) Partnering with the public sector and NGOs in the ESCWA member countries, as well as regional and international organizations, in specific activities aimed at ICT development and the dissemination of ICT applications aimed at furthering socio-economic development objectives.

L. PUBLIC/PRIVATE SECTOR COOPERATION

120. The nature of ICT development processes and the role played by the private sector worldwide in ICT development necessitate concerted efforts by the public and private sectors in ICT capacity-building. The public and private sectors will increasingly need to enter into partnerships created through the establishment of joint national and regional ICT entities. Such entities would be aimed at accelerating the dissemination of ICTs and their applications, as well as rendering their continued development and adaptation less costly and even profitable. The following suggestions could constitute bases for fostering and advancing the outcome of such efforts:

- (a) Initiating and accelerating the establishment of integrated national information systems linking centres engaged in collecting information in the public and private sectors;
- (b) Encouraging and nurturing the establishment of “technology incubators” and “technology free zones” with emphasis on selected priority areas, including the development of software in response to the myriad applications expected to come into existence over the coming few years;
- (c) Creating joint public/private sector bodies to conduct ICT policy and strategy research, as well as research regarding the international market’s needs, together with marketing entities to assist national private sector firms in marketing their ICT products and services;

- (d) Surveying the expertise of ICT expatriates working in the developed countries with a view to eliciting their support in building national ICT industries;
- (e) Acting as guarantors for small and medium-sized technology firms seeking loans from national or regional banks and financial institutions;
- (f) Participating in long-term R and D aimed at ambitious ICT development, such as language interfaces and translators to overcome language-based barriers. This will play a crucial part in providing content well-oriented to the needs of the ESCWA member countries and the Arab countries in general;
- (g) Promoting joint public/private sector projects such as the establishment of multipurpose community telecentres in rural and remote areas.

M. INTERNATIONAL AND REGIONAL COOPERATION

121. The capability for effectively utilizing modern ICTs increasingly hinges on their adaptation rather than the mere importation of hardware and software items. Carrying out such adaptation, particularly in relation to Arabizing software systems and interfaces with the exceedingly limited resources allocated to development in the ESCWA member countries, is one such challenge. This is an area that lends itself to fruitful cooperation and coordination between the ESCWA member countries and the Arab countries in general.

122. On a more general note, cooperation between the developing countries, and with international sources of technology, will contribute immensely to ICT capacity-building in the region. The following propositions provide suitable bases for such cooperation:

- (a) Exchanging experiences in developing information policies and strategies, among the Arab countries, and on an international level;
- (b) Encouraging strategic alliances involving public and private firms with reputable international firms in key technological sectors, including advanced software development, telecommunications services and products, voice-over IP licences, and modern TV and PC manufacturing ventures;
- (c) Creating well-funded international and regional partnerships to promote the dissemination of existing applications of ICT and Internet standards and influence emerging open standards in the public interest;
- (d) Strengthening intraregional networks as a priority in the agenda of regional institutions concerned with ICT capacity-building;
- (e) Developing high capacity regional backbones to connect each country within a multi-hub global network in which no single entity dominates connectivity;
- (f) Establishing regional “communities of practice” to share best practices among peers in priority areas and to conduct outreach programmes to tap the expertise of nationals living abroad and assist end-users at the national and regional levels.

N. ROLES FOR UNITED NATIONS ORGANIZATIONS

123. The United Nations organizations and specialized agencies are expected to play an important part in coordination, policy-making, and in specific areas of application such as distance education, telemedicine and e-governance. Focus should be maintained on the following:

- (a) Promoting interagency cooperation and coordination with a view to national and regional ICT capacity-building in the ESCWA region;
- (b) Initiating cooperative activity between United Nations agencies and the private sector in support of ICT capacity-building in the public sector;

(c) Establishing regional networks to enhance collaboration in ICT capacity-building through bilateral or multilateral links between all United Nations agencies and between those agencies and the public and private sectors;

(d) Launching collaborative efforts aimed at setting up pilot projects to accelerate dissemination of ICTs in priority sectors;

(e) Encouraging public debate on the structure and content, as well as privacy issues, of ICT services, especially in the light of the economies of scale and the externalities that are associated with the ICT revolution, leading to a monopolistic and global market dynamic;

(f) Implementing special activities, including studies and expert panels to discuss ICT development issues in priority sectors.

124. In view of the importance of the information on ICT developments in formulating relevant policies and launching ICT capacity-building initiatives, there is a need for producing up-to-date information on regional and national ICT indicators such as ICT penetration, infrastructure, industry, services, content, opportunities and obstacles.

O. NEW INSTITUTIONAL FORMS AND SPECIAL INITIATIVES

125. Many members of the Panel stated that there was a need for new institutional forms, as well as fresh national and regional initiatives. It was strongly felt that, in implementing such initiatives, the essential requirements for joining the knowledge-based global economy should be taken into account.

126. Novel approaches were needed in the design of the above initiatives, with national and international enterprises encouraged to join forces with government departments, NGOs, United Nations organizations and donor agencies active in the region. The dynamism generated by enterprises amalgamating with the development expertise and credibility of government departments, NGOs, United Nations organizations and donor agencies should contribute effectively to bridging the ever-widening digital divide for the benefit of all.

127. The Panel proposed that such initiatives would need to capitalize on modern ICT developments in order to create virtual institutional forms and networks whose primary tasks would be to improve the competitiveness of national economies within the context of the global knowledge-based economy.

128. A proposition was put before the Panel by Mr. Talal Abu Ghazaleh (President, Arab Knowledge Management Society) regarding the launching of a regional initiative. That initiative was designated the "Arab Knowledge Society Initiative" (AKSI). The initiative would be overseen by an "Arab Knowledge Society Council" (AKSC). The mission of the initiative is to "promote the creation of knowledge-based Arab economic infrastructures and foster innovation for enhanced productivity and competitiveness in the knowledge-based global economy."

129. It was stressed that this initiative should not be regarded as a substitute for any other existing initiative or related entity. Rather, it was to be considered a means of furthering the capabilities of such initiatives and entities, as well as similar initiatives and entities in the making.

130. It was proposed by the Panel that the ESCWA secretariat should undertake, in cooperation with other United Nations organizations as well as concerned international and regional bodies and NGOs, to identify the modalities, networking arrangements and funding resources needed to launch this initiative in 2001.

IV. ASSESSMENT OF THE PANEL

131. An assessment form was distributed to the participants on the last day of the meeting in order to assess the Panel in both organizational and substantive terms. The results of the questionnaire (22 completed forms) are presented in figures II and III.

Figure II. Results of the assessment forms

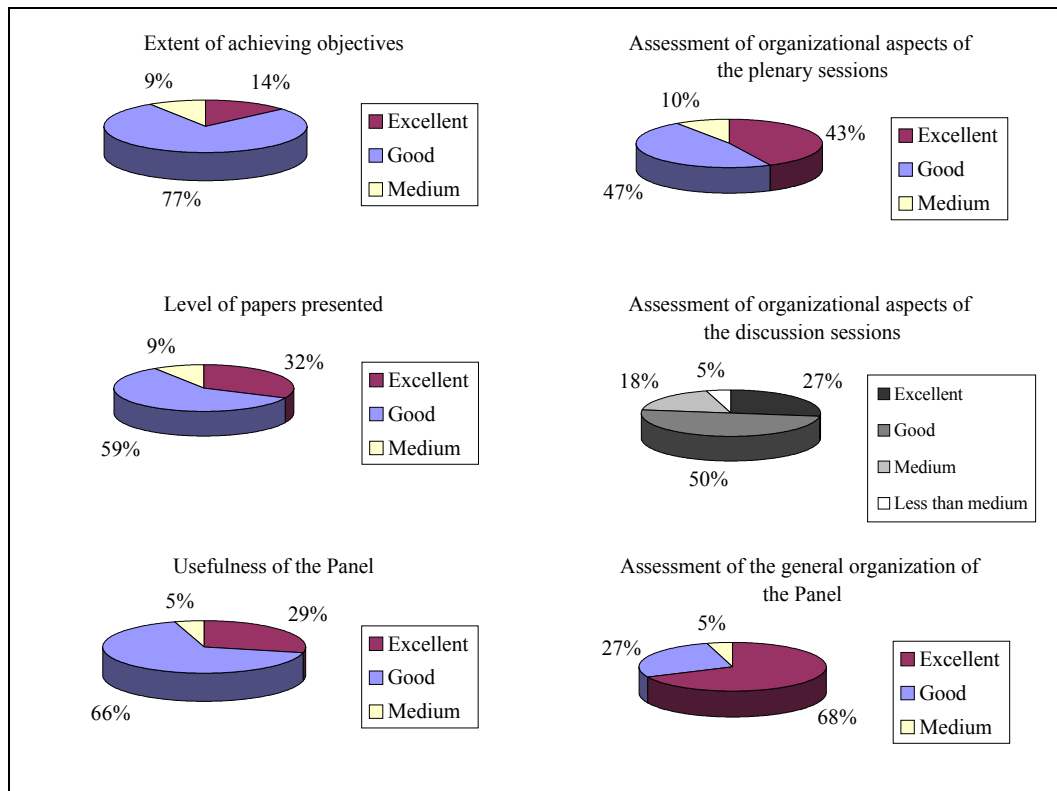
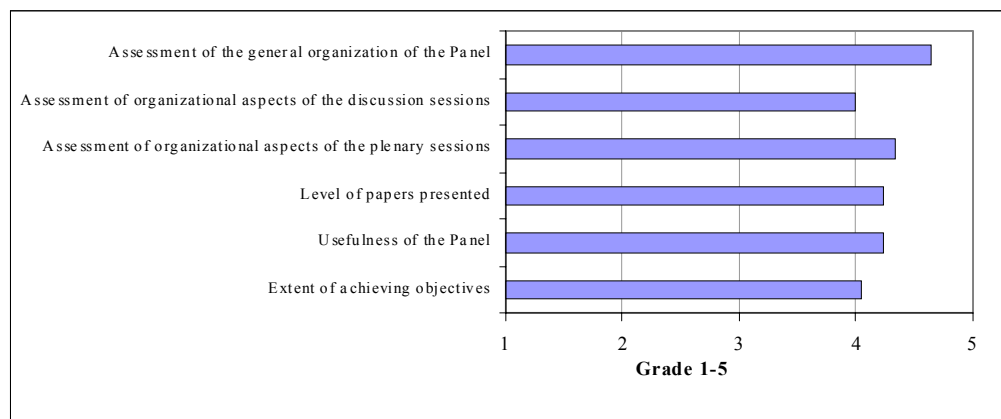


Figure III. Average score given to different aspects of the meeting



Note: The scoring system allowed participants to rate six aspects of the Panel on a scale from 1 to 5, with 5 representing the best grade.

Annex I

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Annex II

AGENDA/PROGRAMME OF WORK¹

Day 1: 15 May 2000

8.15 – 8.45 a.m.	Registration
8.45 – 9.30 a.m.	Opening statements The Chief, Sectoral Issues and Policies Division, ESCWA T. Abu Ghazaleh, President, Arab Management Society R. Blois Montes de Souza, Deputy Secretary-General, ITU The Executive Secretary of ESCWA
9.30 – 9.40 a.m.	Break
9.40 a.m. – 12.15 p.m.	Session I Introductory presentations <i>Chairperson: A. Farahat; Secretary of the Panel: O. Bizri</i>
9.40 – 10.10 a.m.	E-economy, new growth regime and public policies <i>E. Brousseau, University of the Sorbonne, France</i>
10.10 – 10.40 a.m.	The case for an Arab knowledge-based economy initiative <i>T. Abu Ghazaleh, TAGI, Egypt</i>
10.40 – 11.10 a.m.	Prospects for future development in telecommunications; a global view with special focus on the ESCWA member countries; <i>R. Blois Montes de Souza, ITU</i>
11.10 – 11.30 a.m.	Break
11.30 a.m. – 12.15 p.m.	Panel discussion <i>Chairperson: R. Blois Montes de Souza; Co-chairperson: A. Farahat; Secretary of the Panel: O. Bizri</i> <i>Panelists: T. Abu Ghazaleh, TAGI, . R. Blois Montes de Souza, ITU; E. Brousseau, University of the Sorbonne, France; M. Al-Sharekh, Al-Alamiah, Kuwait;</i> <i>Issues for discussion</i> Implications of the evolving knowledge-based global economy: global perspectives and ESCWA issues
12.15 – 5.30 p.m.	Session II Country presentations <i>Chairperson: T. G. Shawki; Co-chairperson: N. Al-Shorbaji; Secretary of the Panel: O. Bizri</i>

¹ Three ESCWA presentations (by the Regional Advisor for Science and Technology, the Regional Advisor for Telecommunications, and the Chief of the ESCWA Technology Section), which had been scheduled for presentation to the Panel, were given to the participants in written form, in order to allow more time for consideration and discussion of outside presentations.

Day 1: 15 May 2000 (*continued*)

12.15 – 12.35 p.m.	IT and development priorities in the Kingdom of Saudi Arabia <i>B. Al-Badr, Al-Alamiah, Saudi Arabia</i>
12.35 – 12.55 p.m.	ICT and its impact in accelerating socio-economic development: the case of Egypt <i>R. Radwan, IDSC, Egypt</i>
12.55 – 1.15 p.m.	Developing the Lebanese software industry <i>N. Mansour, LAU, Lebanon</i>
1.15 – 1.35 p.m.	ICT capacity-building in the Syrian Arab Republic <i>B. Munajed, Soft & CAD, Syrian Arab Republic</i>
1.35 – 3 p.m.	Lunch
3 – 3.20 p.m.	IT and telecommunication capacity-building in Jordan <i>Y. Nusseir, NIC, Jordan</i>
3.20 – 3.40 p.m.	State of IT and telecommunication in Kuwait <i>A.M. Al-Sabej, Arab Telecom, Kuwait</i>
3.40 – 4 p.m.	Development of the IT sector in Iraq <i>H. Kubba, UNDP, Iraq;</i>
4 – 4.30 p.m.	Break
4.30 – 5.30 p.m.	Panel discussion <i>Chairperson: M. Mrayati; Co-chairperson: A. Dewachi; Secretary of the Panel: O. Bizri;</i> <i>Panelists: A. M. Al-Sabej, Al-Alamiah, Kuwait, B. Al-Badr, Al-Alamiah, Saudi Arabia;</i> <i>H. Kubba, UNDP, Iraq; N. Mansour, LAU, Lebanon; B. Munajed, Soft & CAD, Syrian Arab Republic; Y. Nusseir, NIC, Jordan; R. Radwan, IDSC, Egypt</i> <i>Issues for discussion</i> Evaluation of initiatives aimed at technology acquisition, infrastructure and technological capacity-building in information and communications technologies and their applications with reference to sustainable development in ESCWA member countries

Day 2: 16 May 2000

9 – 11.30 a.m.	Session III Capacity-building in priority areas of information and communications technologies <i>Chairperson: Y. Nusseir; Secretary of the Panel: O. Bizri</i>
9 – 9.30 a.m.	Information and communications technologies in selected priority areas: distance learning for the ESCWA/UNESCO member countries <i>T. G. Shawki, UNESCO Cairo Office</i>

9.30 – 10 a.m.	Health informatics and telematics for ESCWA member countries <i>Dr. N. Al-Shorbaji, WHO Regional Office for the Eastern Mediterranean</i>
Day 2: 16 May 2000 (continued)	
10 – 10.30 a.m.	Notes on sectoral issues in ICT promotion and development <i>M. Farah, consultant, F. Sayegh, consultant and O. Bizri, ESCWA secretariat</i>
10.30 – 11 a.m.	Resources for information and communications technology development: current situation in Lebanon and prospects for the future within a regional framework <i>R. N. Khoury, OMSAR, Lebanon</i>
11– 11.30 a.m.	Internet services and their growing dissemination: legal issues <i>T. Issa, ADIL, Lebanon</i>
11.30 – 11.45 a.m.	Break
11.45 a.m. – 12.45 p.m.	Session IV Emerging issues in information and communication technologies and their applications <i>Chairperson: A. Dewachi; Co-chairperson: N. Mansour; Secretary of the Panel: O. Bizri</i>
11.45a.m.–12.15 p.m.	The public voice in the development of information technology <i>M. Rotenberg, EPIC, USA</i>
12.15–12.30 p.m.	Job creation <i>R. MacGregor, INDEVCO Foundation, Lebanon</i>
12.30–1 p.m.	IT and public policy issues: from global development networks to community participation <i>S. Clift, Publicus. Net, USA</i>
1– 2.30 p.m.	General discussion, recommendations and conclusions of the Expert Panel <i>Chairperson: H. El-Beblawi; Co-chairperson: T. Abu Ghazaleh; Secretary of the Panel: O. Bizri</i> <i>Panelists: B. Al-Badr, Al-Alamiah, Saudi Arabia; E. Brousseau, University of the Sorbonne, France; R. Khoury, OMSAR, Lebanon; R. Radwan, IDSC, Egypt; T. G. Shawki, UNESCO Cairo Office</i> <i>Issues for discussion</i> Frameworks for new policies and strategic initiatives from the perspectives of governmental and non-governmental organizations; Resource availability and allocation for enabling knowledge-based economies; New roles for international and regional organizations in promoting capacity-building in information and communications technologies and their applications, including distance learning and telemedicine; Future innovative approaches by concerned organizations in government, enterprise federations, and civil society partners as well as in the United Nations system, acting in partnership to ensure equitable shares in the benefits of the knowledge-based economy.