

IV. RECOMMENDATIONS

197. The following paragraphs include recommendations and suggestions contained in the contributions received from participants in the ESCWA Expert Group Meeting and enriched by the results of the discussions that took place. They are classified in categories referring to the parties that should be most actively involved and would be taking the lead in implementation. However, many of the recommendations will need to be addressed through collaborative action, hence the need for the national policy/strategy initiatives included in the recommendations to Governments. Issues raised by participants in the discussion and panel sessions were also taken into account in drafting the Meeting's recommendations. In particular, attention was drawn to the fact that the recommendations include the endorsement of an ESCWA initiative aimed at promoting technology parks, incubators and high-technology clusters in the member countries. This initiative should lead to the development of technology-based institutional forms that have proven effective in enhancing S and T capacity-building (see recommendation F below).

A. GOVERNMENTS

198. Devising and implementing national S and T policy and innovation strategy initiatives targeting priority national socio-economic development issues were viewed as a necessary first step to be taken by Governments in S and T capacity-building.

199. Specific policies and strategies for developing priority sectors through innovation promotion schemes based on new technologies also needed to be formulated by Governments, while securing effective involvement by professional and business associations, as well as by chambers of commerce, industry and agriculture, in the formulation of those policies and strategies.

200. Experts attending the Meeting emphasized the key importance of Government policies in creating a favourable environment for the development of innovative capabilities and for facilitating the creation and success of S and T capacity-building initiatives based on new technology. Thus, Governments in ESCWA member countries were called upon to undertake the following:

(a) Encourage the transformation towards a digital knowledge-based economy through special initiatives aimed at technology capacity-building;

(b) Take the lead in developing S and T capacity-building initiatives (technology parks/incubators and high-technology industry clusters) that would increase productivity and competitiveness at the local or national level, promulgate the legislation and regulatory instruments conducive to their establishment, and share the risks involved in launching and running such initiatives with other concerned stakeholders;

(c) Direct particular attention towards launching and providing special support for initiatives aimed at the introduction and dissemination of e-government. In this respect, it was considered that there was need for Governments to devote greater attention to devising coherent policy directives to coordinate efforts made by different ministries and stakeholders for dealing with the host of economic, business and social issues critical to the implementation of e-government initiatives. In particular, it was stressed that such initiatives could catalyze other S and T initiatives, as well as cut red tape and offer more convenient services to citizens, thus allowing widespread use of more effective technologies and more satisfactory management practices in general;

(d) Increase core spending on R and D, especially in strategic research;

(e) Provide financial backing for S and T initiatives, particularly in human resource development, and actively seek support from private enterprise, NGOs and multinational and international firms, as well as from international agencies and donor groups, regarding such support as an investment and not as expenditure;

(f) Promote and encourage:

(i) Partnerships and foreign technology-based investment;

(ii) Venture capital investments in start-ups and incubation schemes, which would entail the formulation and implementation of legislation to encourage the setup of local, regional and international financial institutions;

(iii) The creation of financial mechanisms, including the creation of financial markets on which stocks of technology-based enterprises may be floated, to provide additional financial resources;

(g) Establish prerequisites for the private sector to play an active role in producing a continuous stream of innovative inputs for socio-economic development;

(h) Promulgate laws and enact enforcement measures to ensure strict implementation of intellectual property rights regimes to promote innovation;

(i) Substantially update and radically revise codes of commercial practices;

(j) Modernize national tax systems and associated incentive schemes to fit current needs;

(k) Devote special attention to upgrading basic technical infrastructures, particularly the telecommunications infrastructure, and create better links to knowledge sources and international networks;

(l) Launch free-zone initiatives for information technology and media-related enterprises;

(m) Establish systems of awards and prizes at the national level to encourage innovation and excellence in S and T;

(n) Introduce regulatory interventions in key technology sectors, particularly in the IT sector.

201. Governments need to improve legislation and introduce incentives to allow wider participation by women in technology capacity-building initiatives.

202. Governments should also take the lead in promoting national knowledge equity, targeting the creation of knowledge and skills, and letting NGOs and the private sector follow.

B. CIVIL SOCIETY INSTITUTIONS

203. Civil society institutions, including professional associations, business federations and chambers of agriculture, industry and trade, can and should play a more active role in the formulation of S and T policies, as well as participate in a variety of national and local S and T capacity-building initiatives, including the establishment of special technology promotion and dissemination bodies, networks and extension and bridging institutions. Committees dedicated to the development of the IT sector should be formed and, through lobbying, work to create a more appropriate legislative and regulatory environment for the development and dissemination of IT.

204. Reform is also required at the business firm level. Thus, concerned civil society institutions should provide support to private firms in introducing essential reforms. Motivating employees, creating loyalty and reducing up-front costs would need to be dealt with as priority issues.

205. Business associations and chambers of commerce and industry should seek to become investors and partners in technology initiatives, in order to promote such initiatives and play a major role in their development.

206. A guide to best practices for defining and enhancing core business functions, taking into account changes introduced by new technologies, is sorely needed. Such a guide, classifying SMEs and listing their

most important core business functions, would help improve the performance of SMEs and ought to be developed by chambers of commerce and industry.

207. Initiatives designed to promote the contributions of women to technological capacity-building should seek to empower women by developing their awareness of the potential they have for responsible and active participation in this field. Legislative changes will be needed in order to enable them to fully realize that potential.

C. PRIVATE SECTOR INSTITUTIONS

208. Private firms should:

(a) Enter into collaborative ventures with universities and research centres in new technology initiatives and invest in start-up enterprises. They should narrow, to the greatest degree possible, the gap imposed by differing value systems on both sides of the technology divide. In particular, businesses should host especially designed training schemes and applied research programmes for students;

(b) Collaborate with local universities and focus on vocational training and the continuing education of decision makers and technical managers in areas of crucial concern for building knowledge-based societies for the twenty-first century, as well as on research and technological development;

(c) Enter into strategic alliances and partnerships with internationally renowned companies in order to enhance access to the global market;

(d) Take an active part in the establishment and activities of advisory boards designed to supervise the operations of incubators and other capacity-building initiatives, thus providing a suitable mechanism for continuous monitoring and guidance, as well as for revising future orientations.

209. Linkages between investors, incubators and start-up enterprises are necessary for the survival of emerging enterprises. These enterprises have to maintain close contact with potential investors and capital venture institutions in order to obtain the financing necessary to launch their projects and also see them through the following years until “critical mass” is reached and they are able to cover their financial needs.

210. Private sector stakeholders in S and T capacity-building initiatives would need to form, at the outset, a common long-term vision and as clear a view as possible of future directions in order to avoid friction between different actors and be able to assess progress. There is also a strong need to adopt clear-cut objectives and dynamic methods in the management of technology initiatives, as demonstrated again and again by the experience of others.

211. “Intelligent manufacturing systems” constitute a new form of research/manufacturing initiative aimed at focusing on the collaborative efforts of a number of organizations from industry, academia, research centres and Government. Projects considered within such initiatives have often addressed international concerns arising from the continuing trend towards globalization. Concerned private sector enterprises should:

(a) Support and adapt collaborative research approaches;

(b) Establish alliances and consortia in order to implement cooperative projects essential for sustainable development in the Arab countries;

(c) Ensure that the scope of such projects is always defined within a global context, in order to facilitate integration with global initiatives and enhance the probability of success.

D. UNIVERSITIES AND RESEARCH CENTRES

212. Education and skill formation play a crucial role in the success of capacity-building initiatives. Attention must be paid to all stages and facets of the educational system. This may entail:

- (a) A drastic revision of educational systems;
- (b) Active participation of universities and research centres in supplying expertise and highly skilled manpower to S and T capacity-building initiatives;
- (c) Formulation of university/research centre/industry partnerships that emphasize the needs of particular client groups, which has been proven to be an important ingredient for success;
- (d) Collaboration with the private sector on vocational training and the continuing education of decision makers and technical managers in areas of crucial concern for building knowledge-based societies for the twenty-first century, as well as on research and technological development;
- (e) Active involvement by business associations in the definition of profiles for future scientists, engineers, technologists and researchers in order to meet the need for skilled manpower.

213. Initiatives aimed at human resource development (those focusing on distance education) are a key to disseminating and assimilating new technological knowledge and also provide a source of opportunity for new SMEs. Such initiatives should be granted priority status in plans for S and T capacity-building in Arab countries, especially by the universities in the region.

E. UNITED NATIONS ORGANIZATIONS AND INTERNATIONAL AND REGIONAL AGENCIES

214. United Nations organizations and concerned regional organizations could act as a clearing house to provide specialized services and advice in launching S and T capacity-building initiatives, taking into account the welfare of humankind, regardless of race, creed or sex.

215. They should assist various countries in the formulation and implementation of workable frameworks for revising and reforming legal and regulatory instruments to bring them in line with ongoing global changes, taking into consideration the degree of liberalization of national economies, in order for S and T capacity-building initiatives to flourish.

216. A new commitment has been made by concerned specialized agencies and organizations of the United Nations system,⁴ particularly those with mandates that focus on general economic and social development and specifically target industrial, agricultural, trade, human resource development, S and T capacity-building and environmental amelioration. Within the scope of this new commitment, these agencies and organizations are required to coordinate and cooperate more effectively with national and regional entities and agencies, including NGOs, involved in technology transfer and knowledge dissemination, on the one hand, and with enterprise development, on the other hand. Targets for improved coordination and cooperation should include:

- (a) Developing frameworks for the launching and management of S and T capacity-building initiatives;
- (b) Pooling of expertise and resources;
- (c) Improving public perceptions of the role of S and T for sustainable development;
- (d) Encouraging women's participation in design, research, development and engineering activities.

⁴ Timely affirmation of a new commitment by the United Nations system has been announced by the Secretary-General for the development of ICTs and putting those technologies at the service of development, through the formation of an ICT Task Force and Trust Fund (see resolution E/2000/L27 by the Economic and Social Council).

217. United Nations agencies and other international organizations need to assist Governments in producing well-considered feasibility studies and project proposals for capacity-building initiatives.

218. Systems of awards and prizes to promote technological innovation in the ESCWA and Arab region should be initiated by concerned regional organizations.

219. There is also need to work on S and T awareness at several levels. The role of the media in this area is unquestionably crucial. It is essential, therefore, for the S and T community to provide the media with special support by holding regular news briefings of clear and practical content. To help in this endeavour, a task force should be formed at the recently established Arab Science and Technology Foundation, which is based in Sharjah.

220. ESCWA, in cooperation with other United Nations organizations and specialized agencies, on the one hand, and with concerned regional and national institutions, on the other hand, should play an important role in launching S and T capacity-building initiatives. A first step might be to study alternative modalities for launching and managing such initiatives to achieve optimal performance.

F. AN ESCWA INITIATIVE FOR TECHNOLOGY PARKS, INCUBATORS AND HIGH-TECHNOLOGY CLUSTERS

221. The initiative outlined in the box below was endorsed by the experts present at the Meeting. Its aim is to identify and implement schemes adaptable to ESCWA member countries, incorporating the necessary studies, training and technology transfer, as well as creating the appropriate institutions for capacity-building and networking them.

222. There is an urgent need for the diversification of ESCWA economies and for rendering them more productive, competitive and environmentally friendly. While technology and research parks, technology incubators and high-technology clusters are not the only options, they do constitute effective means for achieving many worthwhile objectives in all three directions.

223. This is demonstrated by the experience of both developed and developing economies, where greater capabilities have created new employment opportunities for the continually growing populations and are also helping them meet the multifaceted challenges of global, as well as regional, change. Similar results could be attained within the ESCWA member countries, bearing in mind that such initiatives should not be viewed as an end in themselves but as a link between industry and R and D institutions.

224. ESCWA is called upon to cooperate and coordinate efforts with other United Nations organizations, as well as with concerned international and regional organizations, to formulate and assist in the implementation of relevant initiatives, taking into account the special needs and priorities of ESCWA member countries.

225. These initiatives should target the creation of technology parks, incubators and high-technology clusters through:

- (a) Raising awareness of the possibilities offered by these new institutional forms;
- (b) Providing assistance in building experienced national teams of motivated individuals;
- (c) Contributing substantively to the formulation of governmental and business-sector technology policies and strategies;
- (d) Providing advice in the creation of infrastructure capabilities and legislative instruments that would render the ESCWA member countries and their business communities attractive to high-tech entrepreneurs and international technology-based partnerships.

226. The notes on technology park initiatives included in the following box were reviewed by participants at the Meeting and were considered appropriate as a basis for the formulation of detailed project

proposals for fund-raising, in addition to serving as a starting point for future regional and international cooperation and coordination.

Box. ESCWA initiative for the creation of technology parks in the member countries

Several resolutions of the United Nations Economic and Social Council and the General Assembly in the 1980s and 1990s have called for focused effort in the dissemination of new technologies, the facilitation of technology transfer and the building of scientific and technological capacity in the developing countries, with emphasis on their requirements in achieving sustainable development and enhancing the competitiveness and productivity of their economies.

The fact that past ESCWA work programmes have focused on targeting the above objectives in studies and in organizing expert meetings was justified by the need to create awareness in and build consensus on the essential strategic and policy issues considered lacking, or at least underdeveloped, in many institutions in the ESCWA member countries.

Having adequately addressed these issues in the past, there is now clear need—evident both in the field and in the recommendations of a number of expert group meetings—for ESCWA to undertake operational initiatives aimed at fostering technology research and development, along with demonstration and networking activities, aimed at linking production and services capacities to enhanced technology inputs. Thus, participants in at least three of the past expert group meetings of the Technology Section came out in strong support of a more active role by ESCWA in the networking of technology capacity-building. The meetings of eminent persons organized by ESCWA to deliberate on the priority areas in its work programmes during the past few years have also emphasized these points.

Technology parks can, and have in the past, played an important part in technological capacity-building through bringing together in the same physical location such facilities as R and D, manufacturing, high-level training, technology and business incubation, financing institutions, standardization and calibration laboratories, testing and analytical facilities and industrial services and facilities.

ESCWA—through its Technology and Industry Sections, as well as its Regional Advisers—has already been approached to provide inputs on the design of technology parks and technology/business incubators from concerned institutions in Jordan, Kuwait, Lebanon, Palestine, the Syrian Arab Republic, among others.

The fact that institutions in a number of ESCWA member countries (Bahrain, Egypt, Oman and the United Arab Emirates) are in the process of setting up park facilities, contemplating their establishment or seeking advice on such measures, is further evidence of the need for ESCWA to play a well-defined role on this front.

It is within this context that an ESCWA initiative aimed at fostering the creation of technology parks, essentially as instruments for networking at the disciplinary, sectoral and functional levels, would constitute a logical and necessary step at the present time. The role that ESCWA would need to play could focus on the following tasks:

- (a) The preparation of documents on the role played by technology parks and other capacity-building schemes, including their constitution, organizational structures and resource requirements, with case studies from developed and developing countries, as well as nascent examples from some ESCWA member countries;
- (b) Elaborating frameworks for the establishment of technology parks and other capacity-building schemes with at least three models in mind, in order to cater to variations in the nature and diversity of prevailing economic conditions and the degree of sophistication of national S and T and innovation systems;
- (c) Monitoring activities aimed at the creation of technology parks and their subsequent operations in the ESCWA member countries, with the aim of facilitating exchange of know-how and expertise;
- (d) Playing the part of the hub for a network of technology parks and other capacity-building schemes in the ESCWA member countries.

227. In both areas, it was considered highly desirable by the participants for ESCWA to:

- (a) Consider the wealth of knowledge inherent in the experiences shared at the Meeting, as well as that found in the literature, in formulating optimal modalities, methodologies and criteria for the selection

and implementation of suitable forms of technological capacity-building initiatives of particular relevance for the ESCWA region and other Arab countries;

(b) Play the part of a catalyst and a coordinator of efforts within and among its member countries, with a view to formulating and implementing initiatives in the above-mentioned domains and publicizing them as soon as possible, using the means provided by new information and communications technologies. The participants, on their part, offered assistance in providing relevant information and possible support.

228. Taking into account the variety of economic systems and technology management and monitoring arrangements in force in ESCWA member countries, experts taking part in the Meeting recommended that ESCWA undertake the study and formulation of models for use in the creation, monitoring and management of technology parks and incubators, taking into consideration the variety of economic systems currently in force in ESCWA member countries and the need for an effective blending of the relevant legislative, regulatory and managerial arrangements with prevailing conditions.

229. It was further recommended, in this respect, that the formulation of the above-mentioned frameworks be undertaken as part of the integrated initiative that ESCWA was requested to launch at the earliest opportunity, taking advantage of its regional status and its extensive knowledge and information on the various aspects of socio-economic development in its member countries.

230. Considering the need for disseminating effective frameworks for the establishment of similar initiatives in other Arab countries, ESCWA was also requested to seek existing and potential avenues of cooperation and coordination with other concerned United Nations agencies, as well as with international and regional organizations, in efforts to disseminate and customize these models for optimal application in the Arab region.

231. Considering the need for adapting frameworks for technology initiatives more precisely geared to the socio-economic conditions in each member country, it was recommended that ESCWA identify national institutions with which it may cooperate in customizing frameworks to fill specific national needs and aspirations.

232. It was further recommended that ESCWA work in collaboration with concerned national and regional bodies with a view to elaborating models for initiatives especially aimed at the promotion of SMEs and the role of women in technology development. Feedback on priorities, however, should be actively sought through a market survey. The choice between general versus specialized technology parks/incubators should be made with a view to the characteristics of the area under consideration and the special attributes it might impart to the park/incubation scheme.

233. Experts taking part in the Meeting expressed the hope that such efforts will result in the creation of a network of institutions engaged in the establishment, performance monitoring and management of initiatives leading to the establishment of technology parks and incubators in the ESCWA member countries.