

# A Regional Science, Technology and Innovation Observatory (RSTIO)

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## INTRODUCTION

The ESCWA region occupies a strategic position between Europe, Africa and Asia and as such could be an important conduit of ideas, materials and manpower, particularly since the region borders major sea lanes in the Mediterranean, the Red Sea and the Indian Ocean including the Gulf. Furthermore, the region has considerable resources of energy, mineral wealth and more importantly a potential reservoir of a young population. It has to be remembered, however, that the region has unresolved political conflicts and shows a great variety in income levels, education levels, STI contributions to predominant sectors in the economy, and so on.

A major characteristic of the new knowledge-based century is the abundance and the availability of information. However, the assimilation and effective use of this information in socio-economic development remains the critical issue for countries to master. In this globalized and competitive world, the standing of the member countries of the Economic and Social Commission for Western Asia (ESCWA) are contingent on the acquisition of technologies in order to underpin their development- something which in turn depends to a great extent on the ability of these countries to monitor the landscape for indicators charting progress in converting knowledge into socio-economic output.

The onset of the 21<sup>st</sup> century heralded with it new challenges to which the Arab countries, with the ESCWA MCs being an integral part, might find hard to cope unless they undertake a shift in the mind set of decision makers in order to set the scene in place to be able to compete in a globalized economy manifesting itself in tandem with the technological evolution not seen in the post war years. Keeping the status quo or leaving it “as is” will continue to exasperate socio-economic development, keep labour migration and brain drain unchecked and limit the returns on national investments.

Therefore, a critical evaluation of the situation necessitates monitoring of the STI scene in order to raise awareness of the prevalent conditions and take timely remedial action nationally and regionally. Naturally therefore, the collection and monitoring of indicators in order to chart the state of science, technology and innovation (STI) in the ESCWA region becomes a major challenge for the ESCWA member countries. The promotion of what has come to be known as an STI Observatory (STIO) thus becomes an institutional imperative providing feed-back to policy-makers and for strategic analysis and resource allocation. Resolution 55/2 adopted by the UN General Assembly (2000) formulates an ambitious agenda in this respect and highlights a set of activities as the UN Millennium Development Goals in order to focus on relevant issues of good governance and calls for partnerships with the private sector especially in the fields of innovation and information technology.

**Science and Technology indicators are analytical tools traditionally defined as “a series of data designed to answer questions about science and technology systems, its internal structure, its relation with the economy and society, and the degree to which it is meeting the goals of those who manage it, work within it, or are otherwise affected by its impacts”.**

**(OECD, 1992. Technology and the economy: the Key relationships).**

In this respect the decision of ESCWA to establish a Regional Technology Centre (ESCWA TC) is both timely and highly relevant as part of the regional effort to equip the region with the modern tools needed to attain the knowledge society aspired by all and to help the member states to be equipped with international methodologies to build comparative S&T indicators. As part of the gamut of the activities of the ESCWA TC, the promotion of national science, technology and innovation policy formulation, the establishment of national STIOs and a regional STIO stand out.

## ESCWA INITIATIVES

### A. Portals

In order to promote ST and particularly innovation, ESCWA launched two major initiatives: The ESCWA Research and Development Portal (ERDP) and the Network of Technology Parks and Technology Incubators (NTPI) (ESCWA 2003)

The ERDP targets the scientific communities, particularly research and development centres in the member countries and promotes collaboration among institutions and individuals with the aim of information sharing and adaptation and development of new knowledge and environmentally sound technologies in fields such as manufacturing industry and information and communication technology.

NTPI on the other hand provides information on ESCWA initiatives in technology parks, incubator schemes and high technology manufacturing and service clusters that integrate a number of new concepts in technological capacity building. There is information on R&D, manufacturing training and capacity building, financing institutions, standardisation and calibration laboratories, testing analytical facilities industrial services etc.

The Tunis agenda for the Information Society has acknowledged the importance of partnership in measuring the ICT indicators. As a follow-up to its recommendations ESCWA had organized a number of activities to study the possibility of establishing a regional information society observatory by interlinking the national observatories of its members. This multi-tiered approach would have allowed member countries to determine what data needed to be collected in order to assist policy makers formulate strategies for ICT-driven socio-economic growth. The 4-year budget was estimated to be about 300 000.00 USD. Unfortunately, the project could not be implemented because of financial restrictions (Personal communication).

### B. ESCWA Technology Centre

The idea of establishing such a centre in the region goes back to 1978. Recently, in view of strengthening national capabilities in STI policy formulation and implementation, and in order to obtain greater benefits from current economic activities and from available human resources, ESCWA decided to establish a regional technology (ESCWA TC) centre with a mission to assist member countries and their private and public organizations to acquire the necessary capabilities to accelerate socio-economic development for attaining technological parity with other nations. Amongst the major issues to be addressed are (ESCWA 2006, 2007b):

- Making available the considerable technological capabilities currently sequestered in existing **national** industries;
- Proposing mechanisms for a more effective utilization of **national** infrastructures and the human capital available in the **region**;
- Facilitating access to information at low cost, an identifying disseminating best practice in the **region** ;
- Providing assistance to **member countries** in achieving the Millennium Development Goals.

ESCWA TC thus is expected to have considerable impact on the type, range and volume of financial services in the region and on inter-Arab trade and technological cooperation, and will be able to address outsourcing and competitiveness issues. Furthermore, ESCWA TC can play a very useful role in acting as a hub for a regional network of national 'observatories' (ESCWA 2007b). In this context, it is reasonable to assume that once national STIOs are in place, (thus far 3 countries have asked for ESCWA assistance in order to develop their STIOs) the establishment of a regional centre or a network of national STIOs will be its natural extension.

## EXAMPLES OF OBSERVATION NETWORKS

The section describes briefly some regional and international structures that could provide hindsight and serve as models for the regional STI Observatory. Information is mostly collated from the respective web sites. Some of the most relevant structures that could serve as examples are the following:

1. **Network on Science and Technology Indicators for Latin American Countries (RICYT)**. The RICYT provides a very good example of a successful regional collaboration. The network was established with the participation of Latin American countries together with Spain and Portugal to promote the development of

instruments for **measuring and analysing** science and technology in Ibero-America, in a framework of international cooperation, in order to achieve a better knowledge of them and their best utilization as instruments for the decision making process.

The full range of its specific objectives being as follows:

- To design indicators for the measurement of S&T and innovation in their region;
  - To provide the international comparability and interchange of information on STI, and the development of comparative studies;
  - To organize international and regional programmes for compiling information on STI;
  - To organize international workshops and meetings about the Network's main subjects;
  - To publish information, papers and analysis of indicators, and to develop information processes on S&T and innovation;
  - To provide the interface for the relation with public S&T statistics organisms;
  - To train experts on statistics and S&T indicators;
  - To promote the region's incorporation to the international system of S&T indicators by adapting the internationally accepted standards;
  - The generation of a Latin American standard adapted to the regional specificities: the institutional parameters according to the national organisms characteristics;
  - To generate the adequate input and output indicators for the region's S&T systems;
  - To generate the adequate innovation indicators for the productive activities profiles.
2. **UNESCO Observatory Portal** for monitoring the development of the information society trends in knowledge societies. This is partially based on the answers provided by countries to periodically sent questionnaires.
  3. **ARABSTATS which** is sponsored by the United Nations Development Agency is a repository of statistics on human development in the region. The user of the site could generate comparisons and charting of any **indicator** on knowledge economy in the Arab world.
  4. **EUROSTAT** whose mission is to supply the EU members with high quality statistical information. EUROSTAT does not collect information; these are collected by the respective statistical services of the member countries which are then send to EUROSTAT for **consolidation and harmonisation**.
  5. **The AFRICAN Network of Science and Technology and Innovation Observatory** has been established in the continent in order to raise the profile of science and be able to formulate a flexible template with **indicators** that countries may use to map their research and knowledge systems and identify national and regional **priorities** in a region which is diverse culturally, socially and economically.

There are numerous other examples of regional collaborative efforts that could provide additional insight and information. Amongst these:

6. **Science and Technology Awareness Network in Canada (STAN)**. STAN aims at enhancing the profile and influence of the science and technology education and public **awareness** sector. It is a member-driven organization comprising over 240 public and private sector institutions including governmental structures, schools, corporations, science sector operators etc. STAN promotes collaboration and networking among its members.
7. This parallels another structure in British Columbia which is the **British Columbia Regional Science and Technology Network (BERSTN)** that was established in order to aid the growth and development of innovative businesses in the region. BERSTN provides beneficial and complementary services throughout their region to the private sector, community agencies and post-secondary institutions. Furthermore, it engages in **networking**, identifies facilities and secures resources for shared projects and broadens the base of support for networks through advocacy. (BERSTN.COM)
8. **European Science and Technology Observatory (ESTO)** which is a **platform** to analyse and monitor technological developments and their interactions with society at large. Its main purpose is to detect at an early stage and analyse scientific and technological breakthroughs, trends and events, to develop knowledge and supply original information of potential EU importance.

9. **European Sociology of Science and Technology Network (SST Net)**

It explores the changing relations between science and development and promotes links to other academic and professional associations in the field of science and technology. It provides a **platform** for disseminating research results and aims at creating and maintaining data bases of members of the network.

10. **Union for Islamic Science and Technology Centres (UISTC)**

UISTC facilitates the scientific and technological collaboration among member states for development of knowledge based economies, and promotes the collecting and maintaining of high level technological **data bank** in order to disseminate suitable technologies for members.

UISTC has established the **Science and Technology Investment Initiative** for employment creation and poverty alleviation by **promoting linkages between industry and research**.

11. **United Nations Conference on Trade and Development (UNCTAD)** as part of the Commission on Science and Technology that falls under the umbrella of its Science and Technology for Development Network; has developed a **gateway** that provides access to information in areas of science and technology with the aim of building awareness of ST developments that are particularly important for socio-economic development.

The various economic and social commissions including ESCWA that fall under UNCTAD have developed their respective policies and action plans in order to meet the challenge of socio-economic development. The establishment of the ESCWA TC falls under these activities (see above).

The list is much longer; however those mentioned here differ in many ways as regards structure, mission and partners. Many of the ESCWA MCs are covered by some of these activities described above. More importantly, these structures all have experiences that should be looked into as they provide important pointers that could guide the decision makers embarked on the establishment of the future ESCWA STIO.

#### THE ENABLING ENVIRONMENT

For the students of regional science and technology activities it is apparent that there is paucity of publicly available information and that there is a strong reason for improving data gathering and harnessing activities region-wide. The lack of information is a strong reason for improving and extending the capabilities of regional organizations including those of **ESCWA Statistical Services**. It will be difficult for ESCWA member countries to work their way out of their developmental crisis unless they improve data on all relevant topics.

Most ESCWA TCs have STI related structures capable of serving as a nucleus for further development. One has to start building up national 'STI Observatories', beginning with a few persons but developing in a few years' time into an 'STI Observatory'. With the support of ESCWA and the UNESCO Institute of Statistics based in Canada (just to mention a few), these national efforts can become viable and sustainable, eventually forming the lynchpin of a **regional network of STI Observatories**.

There is some, though limited, experience in the region on conducting a centrally coordinated activity in relation to STI. The EU funded ESTIME Project was one such undertaking. Five out of the 8 participating countries were ESCWA member countries (Egypt, Jordan, Lebanon, Syria and Palestine Authorities). The results obtained, however, were not all symmetrical as they reflected different commitments by countries that were also at differing rungs of socio-economic development. Nevertheless it provided an insight into their STI capabilities. The reports produced give a bibliometric analysis at institutional level and macro level and present a review of science and technology policies of some of the countries. The project had a follow-up component specifically oriented toward creating an EU-Med countries observatory (EU ESTIME 2007a). The EU funded MEDIBTIKAR Project was another joint activity aimed at conducting innovation surveys in several Mediterranean countries (Syria, Lebanon, Jordan, Egypt).

If the ESTIME project did not live up to all of its expectations, according to certain quarters, it is because of the different perceptions and expectations of the countries and their willingness to provide all the relevant information and data to the coordinating organizations which was perceived by some as not being indigenous to the region.

## THE REGIONAL SCENE

The ESCWA region ( with its 14 member states ) is a very diverse region as regards socio-economic development, wealth, population and population density, literacy, tertiary education levels, development of STI institutions, level of institutional collaboration etc. There are, however, numerous other aspects to the region that unify them under the umbrella of a multitude of organizations and structures. UN ESCWA is one such structure supported by its members and to which they relate as being an independent structure dedicated to the socio-economic development of the region. This makes any collective action by or through ESCWA to be perceived as indigenous, regional and for the region.

Three countries of the region: Lebanon, Syria and Jordan have now taken active steps through assistance and support provided by ESCWA in order to set-up their respective national STIOs (ESCWA 2007c, 2008a, 2008b). The context, the structure, the hosting and financing arrangements of their respective action plans differ from one another. Specifically:

- The hosting structures vary in their current mandates;
- The countries differ in socio-economic considerations;
- There are very different, even non-existent, levels of cooperation with the productive private sector;
- Level of cooperation within public sector partners is not well developed;
- The formation of an independent management board in whom operations will be vested is perceived differently;
- As yet there are no firm and legally binding commitment by governmental authorities even though this is expected to be forthcoming;
- No one country has as yet effectively gauged the willingness of potential partners to collaborate;
- Legislation as regards dissemination of information is generally wanting.

In these 3 countries and in all the other ESCWA MCs it is fortunate to note the existence of a multitude of structures that have various types of ST data collected over the years. These however, by their own admissions, are not necessarily harvested in line with robust and internationally accepted methodologies; something that makes national, regional and even international comparisons impossible.

It is also fortunate that most of the ESCWA MCs have indigenous trained personnel in sciences who have accumulated considerable expertise through participation in regional activities, workshops and training programmes that focus on creating platforms for the collection and analysis of STI data. The UNESCO Observatory Portal reveals the following picture of national structures involved in various aspects of STI data collection or as providers of information:

<b>Country</b>	<b>No. of STI info providers</b>	<b>1995 KEI index*</b>	<b>2008 KEI index</b>
Bahrain	5	6.07	5.58*
Egypt	20	4.7	4.52*
Iraq	1	-	-
Jordan	3	4.87	5.23
Kuwait	1	5.51	5.87
Lebanon	7	5.05	4.82*
Oman	2	4.28	5.01
Palestine	1	-	-
Qatar	1	5.32	5.29*
Saudi Arabia	3	4.82	5.24
Sudan	0	-	-
Syria	2	3.1	2.93*
UAE	7	5.83	6.06
Yemen	2	2	1.9*

\* Knowledge Economy Index is rated between 1 -10.

The above table, we think, does not provide the full picture and does not do justice to the region. It does, however, go to the heart of the issue; namely that the national and regional mechanism of information harvesting and dissemination is far from being desirable. By way of auto criticism one should also accept the existence of a general

reluctance in providing such information when the prevailing culture and attitudes still toy with the notion that information should not be accessed readily by whomever and whenever; assuming of course that it is available nationally.

As regards the country-wide capability for acquiring and using knowledge effectively for growth, one notices a regression in 6 out of 11 countries for which information is available. Here again, one cannot help but feel a sense of unease about the reported figures assuming of course they represent the situation fairly.

### A NICHE FOR A REGIONAL NETWORK OF STI OBSERVATORIES

Throughout the process of providing models for the establishment of STIOs in Lebanon, Syria and Jordan, common needs have surfaced that need to be addressed chronologically once the process of establishing a regional STIO gets underway. One assumes here, and rightfully so, that the member countries all share the concerns expressed above that the modern challenges of the 21<sup>st</sup> century are pervasive and that the countries stand to lose from accruing benefits of the modern age unless a new approach is adopted. The elements of such an approach could be summarized in the following way:

- There has to be a national cooperative effort by all potential players: private and public sector institutions, universities, R&D firms, NGOs etc. and that information is to be shared in an open space;
- There are things the private sector will not do, there things the government can do better, and there are rules the government could set to prepare the environment for such collaborative action;
- Countries should develop a modern and forward looking science, technology and innovation policy through a process of consultation with all the stakeholders;
- The establishment of a national STI Observatory should follow in tandem as a tool; preceded by the formulation of a national STI Policy. The STIO could thus allow the national authorities to evaluate their efforts in R&D and to adapt their strategy;
- Capacity building and cooperation with similar regional and international organizations are important in furthering STI visibility of the region, for experience sharing, and for soliciting financial and technical assistance;
- Support from high government level is important so is good governance and transparency.

Having set the context, the following needs should be addressed by the prospective regional STIO network:

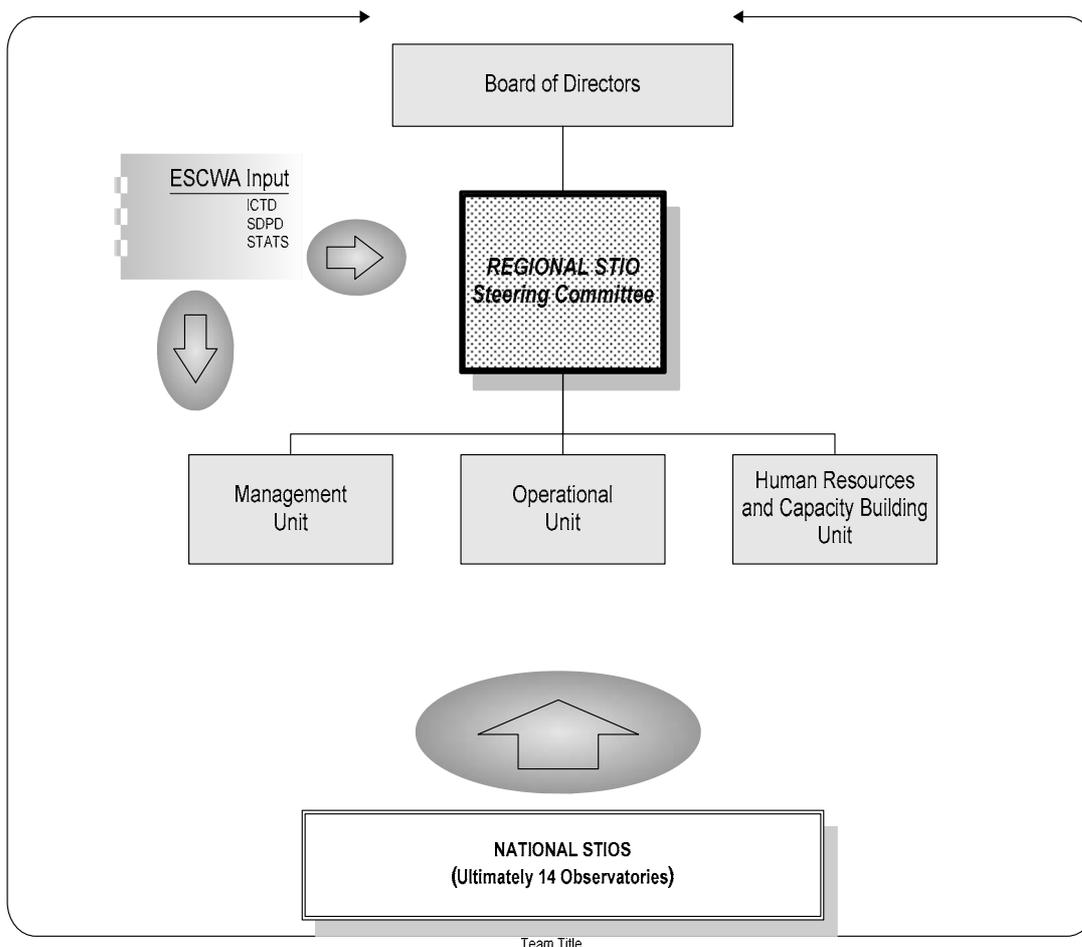
- To design indicators for the region in order to measure the STI effort;
- To analyze region-specific problems in order to introduce solutions to methodological issues like collecting data, building or acquiring databases (e.g. for bibliometrics), building relevant STI indicators;
- To evaluate the institutional capabilities of regional STI organizations in order to ensure their active and effective participation in STI statistics collection and dissemination;
- Promote methodological knowledge in the production of STI indicators and their use in forecasting trends and needs of the region;
- To organize training programmes and workshops in order to upgrade the professionalism of the operators for a better input and output of STI data;
- To integrate the ESCWA region in international systems by adopting common methodologies;
- Establish methods and mechanisms of disseminating STI related information in order to raise the profile of the region;
- Provide seed money and identify the resources for implementation.

By virtue of its existence and as a platform, the regional STIO can additionally engage in relevant complementary activities such as the promotion of university-industry linkages in order to bridge the gap and move technologies closer to the market; and can act as a platform in order to facilitate dialogue in view of creating awareness of science and technology and identifying the major providers of information

The developing and transitional countries face formidable challenges in their attempts to compete in a science driven economy because of structural shortcomings and financial restrictions which stand to be even scarcer under the financial crunch the world is experiencing. However, a start could be made preferably spearheaded by a regional organization such as UN- ESCWA. What is given above is a tall order and as such has to be phased out along a well established time line - the sine quonon condition for success being the presence of STIOs in most of the member countries. The regional STIO Network as part of the ESCWA TC will operate in harmony with them.

**A POSSIBLE STRUCTURE**

The proposed regional observatory presently could only be perceived as a regional network of existing national STIOs and national STI structures that could best fill in the vacuum until such time each country has in place a functioning STIO. Furthermore, it is advisable to harness the ESCWA experience, as some of the functions of the regional structure could provisionally be taken over by ESCWA as it has the mandate, and more to the point, it houses several divisions that can deal with the requirements of the process.



**Explanatory Remarks**

The ESCWA Technology Centre, which is expected to be established soon, has the mandate to have under its umbrella a structure similar to the one described above. In particular within its aims and operational mandate it is mentioned that (ESCWA 2007b):

- ESCWA TC should promote the establishment of a network of STI observatories thus making the ESCWA TC an information hub through which national and regional cooperation could be promoted and facilitated;
- ESCWA TC could (provisionally) operate as a regional observatory for science and technology statistics and indicators.

Incorporating such a unit within the ESCWA TC offers distinct advantages, as various ESCWA operational divisions could act as sources of expertise and experience. The Divisions of Information and Communication Technology (ICTD), Sustainable Development and Productivity (SDPD) and Statistics Divisions could be instrumental in setting the scene and providing the initial impetus for operations. It is therefore important to fine tune the operational, recruitment and administrative modalities and harmonise them with those of the UN system in general.

Ultimately of course the regional centre will work with and for the national STIOs and there will be the need for a **Steering Committee** composed of national focal points to oversee the planning and implementation of programmes. This committee should be able to monitor activities and evaluate them by adhering to the safeguards built within the ESCWA TC for such activities.

- There is, however, the need for a **Board of Directors** which should be a body independent from the national focal points whose main task should be to oversee the regional STIO and approve the programmes proposed by the Steering Committee. This body could be integrated within the future ESCWA Technology Centre. The Steering Committee will prepare the programme, propose a planning and eventually the requirements for funding. The Board of Directors will evaluate the execution of the programme, which could be supported by an external evaluation. Nominations to the board should be through a process of consultation between ESCWA and EMCs.
- The **Management Unit**, headed by a senior officer, will be in charge of programme coordination and organizational development, external relations and communications. It provides management support to the scientific units to implement their respective work plans.
- The **Operational Unit** which is in charge of methodologies will organize data collection, organization and harmonization.

As the regional STIO expands, operations could be developed around the following themes or programmes which in time could evolve into operational units:

1. **Knowledge for Growth Unit**, by focusing on the research-innovation-education triangle, should be in charge of collecting strategic techno-economic information to support policy mechanisms in developing knowledge based economies. This being an approach similar to the one adopted by the EU, will contribute to the acquisition of scientific and technological capabilities associated with industrial and development programmes in the region. Indicators will enable the region to use the multiplicative characteristics of scientific and technological knowledge more effectively. ESCWA TC will be developing a portal within its Information and Data Management Division that could in time, interface with this unit.
2. The **Technology Market Unit** as a separate entity because it is a crucial link in the revenue generating loop. The supply and demand interaction is assessed there so is the impact of renovation.

The scientific units are based on regional needs and respond to those outlined in the study on *Detailed Assessment of Regional Needs and Priorities and Identification of Implementation Mechanism* report commissioned in preparation to the establishment of the ESCWA TC. One major role of these scientific units will be to monitor the environment in order to find out what is available by way of resources and knowledge and try and provide procedures for providing missing capabilities to the region (ESCWA 2007b).

These units are not rigid boxes and there should be a great deal of transversal activities and inter-unit interactions as they are all geared to addressing the systemic issues of the region and building indicators. The ultimate shape of the structure will depend on the decisions made by ESCWA MCs in consultation with ESCWA. Ultimately, however, all of these units will aim at arriving at indicators to measure the STI scene and the complex nature of innovation in the areas they will focus on (ESCWA 2003):

- Framework and infrastructure conditions that determine range and opportunities for expansion;
- Science and technology capabilities for knowledge generation;
- Human resources;
- Social and cultural factors.

## THE WAY AHEAD

One of the challenges the ESCWA region faces is to upgrade its ability to convert knowledge and expertise into socio-economic benefits. Knowledge of the landscape through indicators are effective tools to do so; hence the necessity for national STI observatories and ultimately a network of these and a centralised hub for consolidation and dissemination of indicators for policy formulation.

The question of budget and personnel are not touched upon in here as it is pre-mature. One suffices to say that indigenous personal are available in most countries that could integrate into such a system under the initial guidance of a few international consultants, following a programme of specifically designed training workshops. One also does not need to recruit many operators as these could be initially seconded by the countries themselves. Ample provisions could be made for the regional STIO network while the process of establishing the ESCWA TC gets underway.

The challenges the region faces are formidable; however, a start should be made. The decision to establish a regional technology centre is the first cornerstone to be followed, hopefully, by consolidation of national and regional efforts in establishing a regional STIO network. The region can go a long way provided it has in place the qualified human resources, the financial support and the required mandate.

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- ESCWA. 2008b. Establishment of the Jordanian Science, Technology and Innovation Observatory. ESCWA Report.

## USEFUL WEBSITES

[www.arabstats.org](http://www.arabstats.org)  
[www.berstn.com](http://www.berstn.com)  
[www.europa.eu](http://www.europa.eu)  
[www.eurostat.eu](http://www.eurostat.eu)  
[www.iscte.pt](http://www.iscte.pt)  
[www.jrc.es](http://www.jrc.es)  
[www.ird.fr](http://www.ird.fr)  
[www.medibtikar.eu](http://www.medibtikar.eu)  
[www.oecd.org](http://www.oecd.org)  
[www.ricyt.org](http://www.ricyt.org)  
[www.scienceandtechnologynetwork.ca](http://www.scienceandtechnologynetwork.ca)  
[www.unctad.org](http://www.unctad.org)  
[www.sciencedev.net](http://www.sciencedev.net)  
[www.unesco-ci.org](http://www.unesco-ci.org)

## ACRONYMS

ESCWA	Economic and Social Commission for Western Asia
ESCWA MC	ESCWA Member Country
ESCWA TC	ESCWA Technology Centre
EU	European Community
OECD	Organization of Economic Cooperation and Development
R&D	Research and Development
STI	Science Technology and Innovation
STIO	STI Observatory