



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

**INTERNATIONAL MATERIALS ASSESSMENT
AND
APPLICATION CENTRE (IMAAC)**

AIDE-MEMOIRE

**Expert Group Meeting
On
Technology Roadmapping**

15 – 16 December 2002, Cairo, Egypt

2002

I. Background

Today, companies face many challenges in today's global markets. Products are becoming more complex and, at the same time, more customized. Time-to-market for a new product is shrinking and product life is shortening. A short-term focus is reducing investment funding. R&D is expensive, and reduced budgets are making it impossible for individual companies, especially for SMEs, to independently develop all the technologies they might need to meet future market imperatives. Competition is global and fierce, especially from countries that are technologically advanced. Therefore, better technology planning can help deal with this increasingly competitive environment.

Innovation — based on new technology — plays an enormous role in any company's success. Innovative companies enjoy greater sales, profitability and global market share. Today, many countries, particularly the developing ones, have weak innovation performance and therefore there a strong rationale for seeking new ways to boost the innovation. If the pace of innovation is to be stepped up, it is essential that there be greater collaboration between partners sharing common innovation goals.

In this context, companies must use effective tools to plan their future and better position themselves and their products. One of these tools, technology roadmapping, is a way to identify product or service needs, map them onto technology alternatives, and develop plans to ensure the required technologies will be available when needed. Here are some of the indications that an industry needs to produce a roadmap:

- Demands made by the markets the industry serves are changing dramatically.
- The industry has reached a strategic juncture with regard to entering new markets, seeking out new technologies or acquiring new skills.
- Companies within the industry are losing market share, failing to increase market share as new markets open, or facing a competitive threat.
- Companies within the industry have a vision of their place in future markets but no strategy for making that vision tomorrow's reality.
- Companies, or the industry, are facing uncertainty about what technologies and applications future markets will demand, and when new technologies will be needed.
- There is no consensus among companies, or within the industry, as to the best technology option from among the choices for future development.
- Each company within the industry is conducting separate R&D efforts devoted to technology problems, that all have in common.
- Individual companies within an industry sector lack the resources and skills needed to boost innovation, and would benefit from joint efforts in R&D, sourcing, or supply-chain arrangements.

Technology roadmapping brings players together to collaborate in a far-reaching planning process and opens the door to collaborative research and development (R&D).

It can play a key role in enhancing innovation. A technology roadmap does not predict future breakthroughs in science or technology; rather, it forecasts and articulates the elements required to address future technological needs. A roadmap describes a given future, based on the shared vision of the people developing the roadmap, and provides a framework for making that future happen technologically. It can help industry strive for increased innovation, competitiveness and market share.

A technology roadmap document presents the industry's consensus on a number of topics: a vision of the industry at a set time in the future; what new types of products (or services) markets will require; the enabling technologies to create those products; the feasibility of creating the needed technologies; the technological alternatives for achieving the needed technologies; and how to address these technology needs through R&D. The roadmap document addresses the role of an industry's suppliers in creating the desired future, human resources needs, governmental and nongovernmental barriers, and other topics.

Technology roadmapping is driven by a need, not a solution. For example, if the need exists for an energy efficient vehicle that gets better miles per gallon, then lightweight composite materials is a possible solution. There may be other more appropriate solutions. Therefore, you must start with the need, not a pre-defined solution. It is a fundamentally different approach to start with a solution and look for needs. Technology roadmapping provides a way to identify, evaluate, and select technology alternatives that can be used to satisfy the need.

However, the roadmap is only a high-level strategy for developing these technologies. A more detailed plan is then needed to specify the actual projects and activities. This is simply traditional project management, not something unique to technology roadmapping. Unfortunately, all of these activities are sometimes combined under the label of technology roadmapping, which causes much confusion about what the unique characteristics and real benefits of technology roadmapping are.

At both the individual corporate and industry levels, technology roadmapping has several potential uses and resulting benefits. Firstly, technology roadmapping can help develop a consensus about a set of needs and the technologies required to satisfy those needs. Secondly, it provides a mechanism to help experts forecast technology developments in targeted areas. Thirdly, it can provide a framework to help plan and coordinate technology developments both within a company or an entire industry.

Some companies do technology roadmapping internally as one aspect of their technology planning (corporate technology roadmapping). However, at the industry level, technology roadmapping involves multiple companies, either as a consortium or an entire industry (industry technology roadmapping). By focusing on common needs, companies can more effectively address critical research and collaboratively develop the common technologies. This level of technology roadmap allows industry to collaboratively develop the key underlying technologies, rather than redundantly funding the same research and underfunding or missing other important technologies. This can

result in significant benefits because a certain technology may be too expensive for a single company to support or take too long to develop, given the resources that can be justified. However, combining the resources across companies may make developing the technology possible and consequently the industry more competitive.

The International Materials Assessment and Application Centre (IMAAC) is being established by UNIDO with support from the Government of Brazil and located in Rio de Janeiro. Its mission is to provide an international forum to serve the materials community for more effective management of the techno-economic aspects of utilization of traditional and new materials and to assist the developing economies to absorb and apply rapidly emerging knowledge of materials to enable them to cope with the demands of competitive global markets as well as meet quality and environmental standards.

The main objective of IMAAC is to address the issues of materials technology having a major trans-sectoral impact on economic growth and competitiveness, and foster sustainable development of materials sector of industry that would lead to major qualitative changes in the production cycle – from processing of raw materials to obtaining of finished products.

In this context, IMAAC and other UNIDO International Technology Centres (ITCs) are well equipped and placed to play an important role in supporting this process at a country level, assisting in technology sourcing and assessing, bringing best international practices and experience, thus contributing to the process of sustainable development. Their main mission is to bridge technology divide faced by the developing countries through establishing an international framework and mechanisms for technology roadmapping. They will have to play the role as a cornerstone of the innovation systems and a bridge between the macro and micro levels. They have also to be active agents of innovation and technology transfer (North-South, South-South) with networking arrangements and strategic alliances between public and private sectors, research community and industry.

II. Objectives

- To discuss the basic principles of technology roadmapping.
- To review the experience of selected developing countries in applying these principles in the development of industrial sectors and formulation and implementation of technology policy.
- To outline UNIDO/IMAAC technology roadmapping programme and discuss the areas and modality of its implementation.
- To identify possible sources of funding and define the funds mobilization strategy.
- To work out the recommendations and measures to further promote and implement this programme in the materials sectors of industry.

III. Preliminary Programme

The Expert Group Meeting will be held on 15-16 December 2002. The provisional programme will consist of the following main elements:

- **15 December (Sunday)**
 - Introduction of the participants, approval of the agenda and chairperson.
 - Presentation of basic principles of technology roadmapping and discussion on these issues.
 - Presentations of the participants about the experience of their countries in technology roadmapping applied in specific industrial sectors.
 - Review of experience of selected countries and discussion on the issues.
- **16 December (Monday)**
 - Introduction of UNIDO/IMAAC technology roadmapping programme and discussion on the areas and modality of its implementation in specific materials sectors.
 - Identification of possible sources of funding and discussion on the funds mobilization strategy.
 - Working out the recommendations and measures to further promote and implement this programme in the materials sectors of industry.
 - Summing up and closing session.

IV. Participation

Participants will be the specialists in materials science and engineering, technology and industrial policy from government organizations, academia and UNIDO who have the knowledge and experience in industrial development and technology policy formulation. In particular, they will be from Brazil, Egypt, India, and the People's Republic of China, South Africa and Venezuela.

V. Documentation

The main documentation will consist of presentations on basic and specific elements of technology roadmapping and experience of the participating countries in this area, including sectoral programme development and formulation and implementation of relevant technology and industrial policy. The presentations will be distributed among the participants of the EGM and included in the final report of the meeting.

VI. Language

The Meeting will be conducted in English.

VII. Location

The Expert Group Meeting will be held in Cairo, Egypt. The venue of the meeting is either the Nasr city (EAEA), which is midway between the airport and downtown of Cairo, or TIBBIN (CMRDI), which is located in Helwan about 30 km south of downtown of Cairo. The participants will be informed about the exact premises later on.

VIII. Financial and Administrative Arrangements

The UNIDO/IMAAC will cover the travel cost via the most direct and economic route and will pay DSA (daily subsistence allowances) and small honorarium for invited experts.

The participants will be responsible for travel and all other expenses incurred in the home country incidental to travel abroad, passports, visas, the required medical examinations, inoculations and other such miscellaneous items, as well as internal travel to and from the airport of departure in the home country.

IX. UNIDO and the host country will not assume any responsibility for the following expenditures, which may be incurred by participants:

- (a) Compensation for salary and any related allowance during the period of meeting.
- (b) Travel and any other costs incurred by dependents.
- (c) Costs incurred in respect of travel and accident insurance, as well as medical and hospitalization bills in connection with attendance at the meeting.
- (d) Compensation in the event of death, disability or illness.
- (e) Loss or damage to personal property while attending the meeting.
- (f) Purchase of personal belongings and compensation in the event of damage caused to them by climatic or other conditions.
- (g) Other unforeseen.

X. Contact Persons

All communications regarding the Expert Group Meeting should be addressed to:

Mr. V. Kozharnovich

Programme Manager

Industrial Promotion and Technology Branch

Programme Coordination and Technical Cooperation Division

UNIDO

P.O. Box 300

A-1400 Vienna, Austria

Phone: (+43-1) 26026-3720/3702

Fax: (+43-1) 26026-6870

E-mail: V.Kozharnovich@unido.org.

Prof. F. H. Hammad

Chairman

National Committee on Advanced Materials

Academy of Scientific Research

Cairo, Egypt

E-mail: watanoma@internetegypt.com
fhammad20002002@yahoo.com