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RESEARCH AND DEVELOPMENT INSTITUTES AND INDUSTRY THE EGYPTIAN EXPERIENCE

by

Nabil A.M. Saleh, Emeritus Professor

National Research Centre
Egypt

00-0532

1. Introduction

Egypt has an old history in the field of natural sciences, which goes back to ancient Egyptians who mastered mathematics, astronomy, medicine, and agriculture among others. This was followed in the 9th-12th centuries by the advancement in the Arab World; Egypt included, in the fields of chemistry, mathematics, astronomy and medicine. Later, and during the reign of Mohamed Ali (1769-1849), two areas were profoundly developed in Egypt. The first was the area of agriculture, through the importation of a number of new crops, building barrages along the Nile and the regulation of irrigation systems. These had a positive effect on developing agriculture in Egypt. The second area was the development of an industrial infrastructure through sending a number of missions and training of technologists in the West. This had an effect on the development of a number of industries e.g. metallurgical industries, shipbuilding and military equipment.

2. Present Status

2.1 R&D Institutes

During the 20th century, Fuad First's Egyptian University was established in 1908. This was the first university in social and natural sciences, other than Al-Azhar University that was the oldest Islamic theological university at the time in the region (at present it has changed to include several natural and social sciences). This was followed in 1939 by the establishment of Fuad First's Research Council, with the aim of serving as a link between research and industry. This council was developed over the years and which resulted in the establishment of the National Research Centre in 1956. This was followed in 1957 by the establishment of the Atomic Energy Authority. Both represented the earliest R&D establishments in Egypt. Ever since, 13 governmental and 3 private universities presently exist, as well as 53 research institutes working in the field of natural sciences and affiliated to several ministries.

The staff members in the 13 public universities amount to 33,176, in the field of natural sciences (Table 1)[1]. Furthermore, staff members active in R&D related to industry would be much less after excluding staff working in the fields of medicine and agriculture (excluding food technologies). The three private universities have only been established during the last 4-5 years, and have at present no staff active in R&D. Unlike the universities, staff members affiliated to the research institutes are not burdened with teaching responsibilities. They are full time researchers dedicated to R&D in different related areas. The Ministry of Scientific Research is responsible for 11 specialized research institutes, which have a total staff number of 4764 (Table 2). Of the six other ministries with research institutes, only three are related to industry: Ministry of Industry (3 institutes), Ministry of Electricity and Energy (2 institutes) and Ministry of Housing, Utilities and Urban Communities (Table 3) [1].

2.2 Industry

In Egypt, the responsibility for different industries is divided over a number of ministries. These are as follows:
Ministry of Industry. Responsible for formulating policies, strategies and plans toward the industrial development of Egypt. These activities are carried out through the offices of the minister of industry and the General Organization for Industrialization. The General Organization for Standardization and Quality Control is responsible for monitoring and follow-up of standards and quality control, for both the private and public sectors [2].
Ministry of Public Enterprise Sector. Responsible for the public sector industries. Industries of a kind are grouped under Holding Companies, which set priorities, policies and follow-up of each sector in accordance with the general policies set by the ministry of industry. The Ministry of Public Enterprise Sector is at present in the process of a privatization plan for the public industry. Furthermore, a plan for the modernization of older industries is also under way.
Ministry of Electricity and Energy. Responsible for the electrical power and renewable energies (solar and wind).

Ministry of Military Production. Responsible for the military, as well as a number of civilian industries (e.g. manufacturing equipment for solid waste, electronic industries and several household hardware).
Ministry of Petroleum. Overall supervision of public and private sectors in the petroleum production.

Table 1. Staff Members of the 13 Egyptian Governmental Universities

Universities	Natural Sciences					Social Sciences				
	No. of colleges	Ph.D.	M.Sc.	B.	Total	No. of colleges	Ph.D.	M.Sc.	B.	Total
Cairo	17	4621	1393	893	6907	20	1234	516	468	2218
Alexandria	12	2976	691	307	3974	11	924	200	304	1428
Ain-Shams	10	2734	921	490	4145	6	1267	467	393	2127
Assiut	7	1275	442	256	1973	7	243	96	106	445
Tanta	10	1167	493	319	1979	6	502	213	195	910
Mansoura	9	1466	447	263	2176	7	353	133	138	624
Zagazig	13	2670	845	282	3797	12	785	255	97	1137
Hilwan	5	393	140	134	667	13	1181	561	637	2379
Minia	4	658	275	100	1033	5	336	131	127	597
Minoufia	6	842	304	122	1268	7	245	173	102	520
Suez-Canal	9	628	274	167	1069	8	246	146	122	514
South Valley	6	341	165	128	634	7	297	138	147	582
Al-Azhar	16	2428	561	565	3554	40	2219	468	1074	3761
Total	**124**	**22199**	**6951**	**4026**	**33176**	**149**	**9832**	**3497**	**3910**	**17239**

Table 2. Staff Members of Research Institutes Affiliated to the Ministry of Scientific Research

Research Institutes	No. of divisions	Ph.D.	M.Sc.	B.	Total
National Research Centre	11	1277	810	576	2663
Central Metallurgical Research and Development Institute	4	52	33	66	151
Theodore Belharz Research Institute	21	146	126	68	340
Petroleum Research Institute	7	134	73	88	295
National Authority for Remote Sensing and Space Sciences	7	11	7	11	29
National Institute of Astronomy and Geophysics	4	53	48	91	192
National Institute of Standards	4	63	34	59	156
National Institute of Oceanography and Fisheries	4	116	179	56	351
Electronics Research Institute	7	36	37	77	150
Ophthalmology Research Institute	13	85	162	60	307
Mubarak City for Scientific Research	3	26	94	10	130
Total	**85**	**1999**	**1573**	**1162**	**4764**

Table 3. Staff Members of Research Institutes Affiliated to other Ministries

Ministries	No. of Research Institutes	Ph.D.	M.Sc.	B.	Total
Ministry of Industry	3	37	72	527	636
Ministry of Electricity and Energy	2	551	284	922	1757
Ministry of Agriculture	18	2641	1423	2196	6260
Ministry of General Works & Water Resources	9	52	86	101	239
Ministry of Health	11	247	422	690	1359
Ministry of Housing, Utilities & Urban Communities	1	68	75	98	241
Total	**44**	**3596**	**2362**	**4534**	**10492**

Although Egypt has always been known to be an agricultural country, yet over the years this has changed in favor of industry. Thus in 1999 agricultural production represented 17.4% of the National Income, while industrial production represented 19.5% of the National Income. Furthermore, industrial exports have increased over the years as shown by the figures in table 4:

Table 4. Value of Egyptian industrial exports (1977-1999)

Year	Industrial exports (MEGP)
1977	273,7
1984	596,0
1997	6,000,1
1999	7,000,3

Source: Ministry of industry

2.3 Linkages

Linkages between the R&D institutes and industry at large exist at three levels: a) Inter-ministerial; b) Inter-institutional; and c) Private sector.

2.3.1 Inter-ministerial

The highest level of linkages exist in the form of a committee, headed by the Prime Minister and members are those involved in R&D as well as industry, agriculture and health. A technical group is affiliated to the committee and is headed by the president of the Academy of Scientific Research and Technology (ASRT). Little, if nothing, has come out of this committee, as it only met once over the last three years.

On a second level, ad hoc groups, combined symposia and conferences on ministerial levels usually lead to inter-institutional agreements. This might form the strongest level of inter-ministerial forms, but does not really form a systematic relationship, but rather reflects urgent problems that need immediate attention. The third and most stable level of interaction is in the form of the Specialized Research Councils under the auspices of the Academy of Scientific Research and Technology (ASRT). The structure of these councils is made up of specialists from R&D institutes representing universities and research centres, technologists from different fields (industry, agriculture, health...etc.) and representatives of a number of ministries in each given area. (see Table 5 for list of research councils). It is the job of these research councils to set priorities based on the national economic and social development plan as well as the needs of each sector presented to the councils through members of corresponding ministries. These priorities are translated into a number of priorities and research projects, which are advertised nationally, and the best projects selected. These councils have been active ever since the establishment of the ASRT in 1972. The results of the final reports from each council are presented to an annual meeting attended by all ministries involved.

Table 5. Specialized Research Councils Affiliated to the Egyptian Academy of Scientific Research and Technology

Specialized Research Councils
Food, Agriculture and Irrigation Research Council
Animal Wealth and Fishery Research Council
Industry Research Council
Petroleum Research Council
Mineral Wealth Research Council
Electricity and Energy Research Council
Medical Research Council
Environment and Development Research Council
Transport and Communication Research Council
Housing, Utilities and Urban Communities Research Council
Administrative Sciences Research Councils
Economic Sciences Research Council
Social Sciences and Population Research Council
Basic Sciences Research Council
Space Technology and Sciences Research Council

2.3.2 Inter-institutional

The inter-institutional linkage is usually formed via two routes. The first route is through a request from an end user (e.g. industry) for technical assistance to solve a given problem. This is usually formulated into an agreement between the end-user and the R&D institute. The second route is initiated on the R&D side through the marketing of R&D capabilities (e.g. marketing office), or on a personal basis through researchers offering their “know how” to the industry. This second route also results in the signing of an agreement between both parties. Funding of these activities usually takes two forms: The first is that industry will pay the total cost to the R&D institute, or in a few cases an application is forwarded to the ASRT and financed through the Specialized Councils. Intellectual properties are usually included in the agreements to protect the rights of each side. The majority of contracts lead to improving production, or optimizing production lines, and only in very rare cases will this type of agreement lead to patents being filed and registered.

2.3.3 Private Sector

The private sector is playing an increasingly important role in forming links between industry and the R&D community. This takes place through a number of private sector consultant offices. These offices act as local consultants for the industry, and acquire funding from foreign grants to Egypt. Major donating countries are USA, Canada, Germany, Denmark, UK and Japan. The World Bank and EC also fund several projects giving preference to developmental projects. Funds are usually in the form of small grants or soft loans, and in some cases include cost sharing. Local consultant offices normally have their own specialized staff, however in many cases they also contract specialists from R&D institutes. Foreign consultants and equipment form an important component of any contract, thus insuring the transfer of knowledge and in many cases new technologies. A large proportion of these grants and loans go towards funding environmental projects (combating air and water pollution, solid waste and industrial waste management).

A number of programs also exist, which finance activities in the private sector. Examples are the PSDP (Private Sector Development Program) financed by USAID, DANIDA and EU. The aim of the program is to help SMEs in developing management systems, as well as offering technical assistance with quality management or production optimization, to ensure good and compatible quality. A five-year program called Industrial Modernization Program (IMP) is planned to start this year. It will be the first phase of the Government of Egypt's long-term industrial development strategy. Funding will be shared through the EU and Government of Egypt. The overall objective is to promote GDP growth and competitiveness of the private enterprise sector, with special emphasis on small and medium enterprises, in the context of an economic liberalization. The specific objectives of IMP are:

a) to assist private enterprises in their development;
b) to strengthen business associations, support institutions and services;
c) to strengthen the Ministry of Industry; and
d) to improve the sector policy framework.

3. Future Outlook

3.1 Challenges

A number of challenges presently exist and more are to come in the field of industrialization and globalization. The first challenge is to establish a strong local industry capable of producing high and compatible quality of products. The second challenge is finding a niche in the local, regional and international markets. The third challenge is being prepared for the application of the GATT and TRIPS agreements.

A further challenge exists in the form of the multi-nationals and giant companies that are a threat to many up-coming industries in developing countries at large.

3.2 Transfer of Technology or Innovation?

After the Second World War, most of the innovative technologies based on military superiority led the West to develop its civilian industries. This had a profound impact on raising the quality and performance of auto-industry, aviation industry, shipbuilding, communications, etc. This in turn led to the raising in the quality of living in the West, with better quality and increasingly better services. In the midst of all these evolving technologies, those who were quick enough to pick up all of the new ideas began to use "reverse technology" to undo, imitate and develop the evolving new products. For example Japan purchased about 42,000 contracts for transfer of technology during the period of 1951-1984 from the advanced industrial countries [3]. In the developing countries and over the years, the term "transfer of technology" was at times replaced by "appropriate technology" and "affordable technology". Today, and after the application of the GATT agreement, "permissible technology" is the more likely prevailing method of transfer of technology to developed countries. Thus under the GATT agreement, as well as the Intellectual Properties Laws, it is becoming more difficult to use reverse technology, and only new products with new properties and functions are acceptable. This has and will undoubtedly affect the marketing capabilities of developing countries, pushing them towards developing new products rather than copying existing ones. A capability most developing countries cannot acquire or develop that easily.

In a report on patents in Egypt, it was reported that since the year 1951 only 20459 patents were granted [4]. This means an annual average of only 410. Of these 43 were by Egyptians and 367 by foreigners. If one considers patents as an indicator of innovative R&D activities, then the low numbers can only reflect the poor yield from both R&D institutes and industry. And it therefore becomes clear that something is amiss in the relationship between R&D institutes and industry. The wealth in the scientific community is not being directed or exploited in the correct or fruitful manner it should be. In order to overcome this, innovation should be considered. In its white paper published by Japan in 1991, it was stressed that in order for the transformation towards innovation to take place, stress must be placed on directing researchers towards basic sciences. With this in mind, we should learn the lesson that basic sciences form the basis for innovation and the production of new ideas. Although Egypt has a good foundation for basic sciences, yet more responsibilities are placed on R&D institutes to develop and strengthen their capabilities to meet the challenge of becoming the leading strength behind industry. It also places a responsibility on industry to come up with new ideas, requirements and needs for development and to share in the cost of R&D expenditures.

3.3 Requirements

3.3.1 R&D Management

R&D Management (RDM) is a vital component both in R&D institutes as well as industry itself. Within R&D institutes, the idea of RDM does not exist except on a rudimentary level. The idea of training scientists and technologists in RDM has no priority and in many cases is non-existent. The importance of RDM lies in being the tool that links both R&D institutes and industry on a management level. One can understand the importance of RDM, once its components are defined and put into application. Examples of RDM components are: Institution and project management (including planning, monitoring, funding, marketing, human resources); marketing in the broader sense and which includes feasibility studies and market studies; human resources development; funding and negotiations; international relations and information technology which will serve as an important component to all the above-mentioned areas.

A second aspect of RDM is that existing in industry. Any industry that is competing for markets should have its own R&D capabilities. This unfortunately only exists in large and giant industries abroad, which are capable of funding such an activity. In the West, industry (in the broader sense) contributes to 50-80% of funds spent on S&T on a national level. In Egypt, this is non-existent in industry. Only a few of the larger industries have R&D units, but which in fact act only as control and optimizing production lines. This is reflected (along with R&D institutes) in the lack of patents as pointed out under 3.2. Industry (both large and medium) should be encouraged to establish R&D units within their factories. These units could start off by establishing information and background material on products produced, training and upgrading human resources, contacting R&D institutes, with the aim of forming a developmental plan for the industry. With time, these units could gradually develop their capabilities and establish small labs, separately or collectively with similar industries. Ultimately, links with R&D institutes could be established and developed.

3.3.2 Methods of Transfer of Technology

3.3.2.1 Introduction

A number of forms for the transfer of technology are known. These could be summarized as follows:
a) **Patent Agreement**. Patents gave the owner legal protection for a new process of a new product for a period of ten years. However, after the TRIPS agreement, the protection was also extended to the product, and the time limit was extended to twenty years.
b) **Know How Agreement**. The licensor has technological know how (not included in a patent) that is considered as secret and privileged information. This information is sold to the licensee to be used for the production and marketing of new products.
c) **Technical Assistance Agreement**. The first party offers information and technical assistance acquired over the years to the second party. This is not classified as industrial secrets under patents or know how agreements.
d) **Other forms**:
i) Engineering services.
ii) Trademark agreement.
iii) Franchise agreement.
iv) Administrative and supervisory services.
v) Training.

In Egypt, the most common method used for the transfer of technology are those under (c) and (d). In a survey [2] made by the ministry of industry for public sector industries, difficulties encountered when purchasing new technologies were identified as follows:

- Conditions to use only raw materials supplied by manufacturer.
- Conditions to use only equipment and spare parts supplied by manufacturer.
- Restrictions on transfer of technologies to others.
- Restrictions on development of technologies.
- Restrictions of dissemination of information.
- Restrictions on exporting goods except to pre-defined markets.

3.3.2.2 Technology Incubators

Technology incubators are considered to be one of the methods used to introduce new technologies to new and young entrepreneurs in the SME community. The West and leading industrial countries have applied this method successfully. Similar successes have been reported in South East Asia. In Egypt, and over the last few years, the idea of applying technology incubators has been considered. However, nothing concrete has been established as yet. The idea started with a number of lectures and meetings between experts from the UK, R&D institutes and SMEs. This was spearheaded by the Social Development Fund, several R&D institutes and a number of businessmen [5]. Three locations were chosen reflecting quite distinctive local context. The first was the 6th October City, a broadly based industrial economy with diverse size distribution of local enterprises. The second was based at Tebbin, close to two research institutes and focusing on metallic materials and environmental protection. The third was proposed to be developed within the Mansoura University campus and to focus on several university areas of strength. The aim of these incubators was:

- Promoting growth of new jobs.
- Encouraging growth and development of SMEs.
- Encouraging introduction of new technologies in the development of products and processes.
- Generating commercially viable technology based enterprises.
- Upgrading skills in the workforce through training in new technology based subjects and methods.

Managerial logistics have prevented this program from taking off, and it is only a matter of time when the idea is implemented and starts a chain of reactions in this area.

3.3.2.3 Technology Parks

Three types of technological communities are known to exist. The first is known as "Science Park" or "Technology Park". These are usually in the vicinity of a university or research centre on areas of 30-100 acres. The second type is known as "Technology Valley" and the smallest is of a minimum area of 1000 acres, and can reach 16,000-20,000 acres. The third type is known as "Technology City" and reaches sizes of 100,000-200,000 acres. The activities of most of these technological communities are encouraged through their governments, through a number of tax exemptions or providing other facilities. Thus, some countries offer tax exemptions for a grace period and others for life (e.g. Malaysia and S. Korea). Others offer soft loans for constructions, or share in the capital costs (Israeli government offers to share up to 60% for some projects) [6].

The main strategic plan for establishing technology parks in Egypt is to transform Egypt into a technology producing, exporting and utilizing advanced locally developed technologies. This in turn will also help with the economic and social development plan for Egypt. In 1995, four technology valleys were planned for Sinai, City of 6th October, Nag Hamady and Sohag. This was later downsized to two, Sinai and Qena.

The Egyptian government has undertaken the responsibility of establishing the infrastructure for the first Technology Park to be located in Sinai. It shall be situated in the North West of Sinai, East of the Ismailia [6]. The total area is about 17,000 acres ($72km^2$). The infrastructure for the first stage ($24km^2$) is already under way, and plans for this stage are being prepared through a S. Korean company. Areas expected to be housed in the first stage are:

- Information technology
- Microelectronics
- Communication industries
- Biotechnology
- New materials
- Fine tools
- Renewable energy.

A second Technology Park is being planned for Qena Governorate in Upper Egypt, on an area of 500 acres. Universities and R&D institutes are involved in plans for both parks, which should form a strong link between the R&D institutes and the planned industrial community in both parks.

On September 17, 2000, a protocol for the establishment of the "Pyramid Smart Village" was signed at the Ministry for Communication and Information. This represents the second initiative for the establishment of Technology Valleys in Egypt (the first being the Sinai Technology Valley, mentioned above). The "Pyramid Smart Village" is planned to encompass technological activities in the fields of communication and information. The area housing this project is expected to be 136,000 square meters, and with a capital of 80 MEGP. The management of the village will be through a management and development company to be shortly established. The Government of Egypt will contribute 20% of the capital in the form of the land allocated for the project, and the private sector is expected to contribute to the remaining 80%.

3.3.3. Industry and Environment

Environment is taking top priority all over the world. The over-exploitation of natural resources and its effect on our forests and seas is resulting in a negative impact on our biodiversity. Industry is one of the major sources of air and water pollution; not to mention the hazardous effects it has on human health at large. In Egypt, air and water pollution caused by industry, among other sources, is above the normal levels. This has lead the government to establish first, the Egyptian Environmental Affairs Agency (EEAA), and later the Ministry for Environment. As a result of establishing EEAA and the Ministry of Environment, law no.4 for the year 94 was issued which identified pollution sources and set regulations and standards for combating them. The levels of pollution set by law no.4 are presently under revision to improve its efficiency. The enforcement of the law in industry is also gaining momentum. This has also lead a number of R&D institutes to undertake studies towards combating pollution. By law, every industrial establishment has to carry out an "Environmental Impact Assessment" (EIA). The EIA is carried out by a number of R&D institutes as well as private consultant offices. In some cases, foreign consultants are also involved. Although the government and industry fund the EIA studies, yet a number of foreign agencies also offer grants to fund such studies, as well as funding corrective measurements to combat pollution. It is envisaged that the role of environmental studies shall increase over the years. This will place more responsibilities on both the R&D institutes and industry to carry out detailed studies. Furthermore, as most of the larger industries are over 40 years old, development and replacement by environmentally friendly technologies will take increasing priority. Finally, new industrial establishments will undergo more rigorous inspections in the future before being approved.

4. Conclusions and Remarks

It is clear that Egypt has a solid infrastructure of scientists and specialists in the field of natural sciences. With 33,176 staff members in the universities, 4,764 research staff in research centres affiliated to the Ministry of Scientific Research and 2634 research staff in research centres affiliated to other ministries. These figures exclude researchers in the Ministries of Agriculture and Health.

The university staff is burdened with their teaching responsibilities on one hand, and research is mainly in basic sciences with little developmental research. Similarly, in the research centres affiliated to the Ministry of Scientific Research and other ministries, the majority of publications can be classified under basic sciences. The fact that the number of patents produced is scarce does not mean that the R&D community does not interact with industry (or for that matter, areas like agriculture and health). The interaction is mainly in the form of one-to-one consultations or contractual consultancies in the form of projects, programs or contracts. Over 95% of the interactions between R&D institutes and industry are in the form of product improvement, quality control or process development. This no doubt has a positive impact on the industry, however it does not produce new technologies. The remaining 5% led to new products or processes and the know-how has been paid for in lump sums, and only registered as a new trademark. This is being corrected at present in the production of software for Information Technology, however no data was available at the time of the preparation of this manuscript.

The industry in Egypt started out through the public sector, and the transfer of technology was carried out in one form or the other as discussed previously. During the last two decades, and with the open market policies adopted, several small and medium private industries have been established. Most of these new enterprises were turnkeys and hence needed little help (if non) from the local R&D community. With the implementation of the GATT and TRIPS agreements, pressure is mounting on large, medium and small industries to develop processes and quality management as well as producing products capable of competing on an international level. Furthermore, environmental laws are also placing pressure on the industry to produce environmentally friendly processes and products, clean industrial wastewater and clean air.

The challenges that R&D institutes and industry will have to face can be summarized as follows:

- There is a strong need for the establishment of a National Science and Technology Policy and Strategy. This should be built upon the National Economic and Social Development Plan. Furthermore, it should involve all ministries and public and private sectors. In order to fulfill such a task, a program similar to the "Foresight Programme" adopted in the UK must be applied* (see Box 1). This could only be

* The term "Foresight" is used nowadays to describe and identify present S&T priorities in the light of hypothetical projections of future economic and social developments. National foresight exercises are being used today in several developed countries. It relies mainly on the Delphi techniques alone or a combination of methods including Delphi, scenarios and brainstorming [7,8].

achieved through an organization affiliated to the Prime Minister's office, to guarantee its effectiveness and to ensure its implementation throughout all the ministries involved. It is also advisable to have a "S&T Policies Office" affiliated to the President's office. The job of this suggested office would be to keep the President updated with all international matters involved in S&T. This office can also act as a liaison office between the President's office and all policy-making decisions and follow-ups to be reported to the President.

- The role of the Ministry of Scientific Research would be instrumental in: a) playing the leading role in the "Foresight Programme", with the Minister of Scientific Research acting as chairperson to the program. b) playing an important role in the implementation of the policies, through the Academy of Scientific Research and Technology (ASRT), which will act as the national implementing agent.
- The role of the R&D institutes would be: a) taking part in setting priorities for the "Foresight Programme", b) implementation of the policies set by the program in collaboration with the end users, and c) building up capabilities in frontier sciences and establishing centres of excellence.
- Industry (and other areas) should be involved in setting priority needs for the "Foresight Programme", present and future. Industry should be encouraged to take part in funding R&D activities, and in return should be given tax exemptions.
- The private sector is expected to take an active role in financing new small and medium industries. This could be carried out through playing a leading role in the establishment of technology incubators and technology valleys, which would undoubtedly reflect on the prosperity of the private sector at large.
- The Government should play a leading role in fostering the science incubators and science parks that are still being studied and under consideration for over five years. This should be tied in with priority areas set down by the "Foresight Programme", thus feeding the industry with needed technologists, technicians and skilled labor for the production of badly needed new technologies.

Box 1. The UK "Foresight Programme"

The UK's Government-led Foresight Programme brings people, knowledge, and ideas together to look ahead and prepare for the future. The UK Foresight programme was launched in 1994 following a major review of Government science, engineering and technology policy. In 1995 the first set of visions and recommendations for action were published, followed by four years of development and implementation. A new round of Foresight began on 1 April 1999.

Business, the science base, Government, the voluntary sector and others work through thirteen Foresight panels to think about what might happen in the future and what we can do about it now to increase prosperity and enhance the quality of life for all.

Foresight can help get ready for the future by:
- Giving the chance to get involved in Foresight networks and contribute to the current Foresight consultations;
- Providing free access to a wide range of information about the future, including the current thinking of Foresight panels and others.
- Building bridges between business, science and government, bringing together the knowledge and expertise of many people across all areas and activities in order to increase national wealth and quality of life.

Source: Extracted from http://www.foresight.gov.uk [9]

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