

# **Technology Management System in Iran: Organization, Programs, Challenges**

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## **ABSTRACT**

Technology and innovation management systems of developing countries differ from those of industrial ones. Need for technology in these countries is not endogenous, but rather arising from new commodities imported from industrial countries. Technological development also does not result from internal knowledge and research, but consequent upon the technology transferring from abroad.

In such as environments, technology management by traditional method is hardly effective. These are problems confronting Islamic Republic of Iran nowadays and as a result organisations administrating the technology management suffer from nonconformity, then technological development does not follow a proper trend.

Absence of unique management, ambiguity of technological priorities, confusion of policy-making roles and interorganization execution and supervision, extreme government intervention in all fields and shortage of expert manpower are among the essential problems of the issue.

Although the universities and government have introduced solutions for these problems, no particular result has been emerged so far.

This article attempts to demonstrate a sight of the technology management system of Iran as well as its problems and recommend some solutions.

**KEYWORDS:** Iran, Technology Management System, National Technology Level,

## **INTRODUCTION**

Development of technology and innovation is rarely derived from sole operation of an independent organ, in fact in most cases it emerges from efforts of manifold components and requires proper dealings among them. These components together with their relations facilitate the flow of knowledge from the early stage of idea formation to begetting a new product or service worthy to be offered. Even with sources of knowledge located outside the country, the way of transferring knowledge and technology from abroad must be fully paved. It requires various organs with appropriate relations and interactions among them.

The sort and manner of relations among these organs form a chain-work, in frame of which the ultimate objective of technology development can be assured. Hence function of an independent organ can hardly lead to a desirable result. From this standpoint the interactions grid, relations and complementing characteristic of these components and activities are of vital importance.

Any country (with its various organizations, relations among them and environment affecting on them) form a system, which must tract the direction of technology and innovation development to enjoy proper operation with desirable efficiency and compete-ability. A country's power of

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investment in technology development critically depends on this system and its characteristics. Hence different operation and compete-ability of countries arises from different structures of this system, which called “National Technology and Innovation System”.

The main components of the mentioned system are:

- 1) General policy-making
- 2) Supplying financial resources for facilitating research and innovation
- 3) Research and reverse engineering.
- 4) Promotion of technologic entrepreneurship
- 5) Development of human resources
- 6) Technology diffusion.
- 7) Production of goods and services.

To launch knowledge generating process in the country firstly all the links of the mentioned chain must exist and secondly their function must be properly set in the same direction of the system movement. For instance, innovating activities especially in high tech field accompanies with high risk and the original idea of such activities usually is initiate by entrepreneurs and experts who lack the required resources to fulfill their innovative ideas. So proper access to risk-able and subsidized financial resources is one of determining factors. On the other hand in the framework of facilitating research and innovation are affairs like supporting spiritual ownership, which ignoring that can nip most innovative motives in the bud. Also if innovative achievements of the system’s components do not spread through the system purposefully and systematically general function of the whole system will be never economic. Here policy-making is of exceptional importance. Especially in countries like Iran, where the government plays a central role in the economic realm of the society, perhaps the most essential factor for technology development is the very properly policy-making. Continuing this article we will study the national management of technology system in Iran and its policy-making in particular.

### **Introduction to management of technology system in Iran**

In Iran many organs involve in national technology management, some of them are active in national level and the other- in a sector. The most essential organs are:

- “*Ministry of Science, Research and Technology*” (*MSRT*), formerly named “Ministry of Science and High Education”, the administrator of the universities, which plans to undertake the leadership of research and technology policy-making in the country.
- “*Ministry of Industries and Mines*”, which trough its affiliated industrial and research centers directly involves in technology development affairs and supports domestic technologists by granting financial aids and technical assistance.

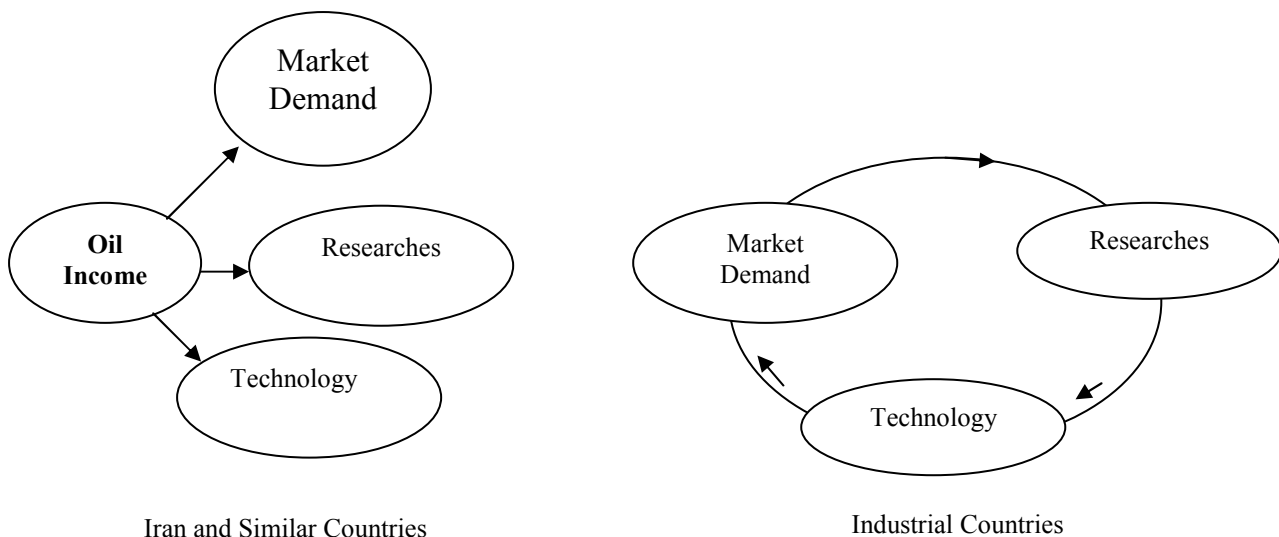
- “Ministry of Defense and Logistic”, which is active in military technologies and usually little information is published about its activities.
- *Technological Cooperation Office (TCO)*, which works under the Presidency organ and involves in developing vital technologies at national and super-sector levels.
- In addition to the mentioned organs, which involves in technological policy-making and the Parliament, which passes the relevant required regulations, there are some other sub-organs, like universities training required human resource for technology development; funds granting financial facilities to technologists; etc.

Yet, all knows, the chain-work of technology and innovation development in Iran is not fully completed and consequently the achievements are not proportionate to the capital invested.

### Difficulties and Challenges of Technology Management System in Iran

Although most existing problems of Iran’s management of technology system are common in other developing countries, especially oil rich ones, some of them are noted below:

- *Non-endogenous needs and resources of management of technology system.* In developed countries, to meet a market demand usually a new technology and innovation is introduced, which requires investment from research to production stages, the funding gains profit in return for selling the new products and this cycle is continuously repeated. In countries like Iran, a market demand is formed upon observing foreign products rather than on the basis of domestic technological power, as a result domestic technology can hardly meet the demand and importing foreign technology is inevitable. Since the imported technology in most cases is not placed on a proper seat, it imposes large extra costs and lacks compete-ability with foreign products. So investment in such technologies is not economical and the government has to earn the required capital from oil resources. In such situations, researching activities are just decorative and have no relation to the country real needs. The following diagram shows the difference:



In such an environment no technology growth can be expected.

- *state bureaucracy*. On one side due to its important role in economic and social relations government has a central place in national MOT system, on the other side because of bureaucracy and inefficiency, it is impotent to perform its duties properly.
- *Weakness of international relations*. Because of political changes in recent decades the country's international relations are weak, and some incitements intensify it. Hence Iran scientific and academic organs cannot effectively establish relations with their counterparts in other countries.
- *Interference of Policy-making Organs*. Due to political and administrative problems, the scientific and technological policy-making organs encounter overlapping of authorities and duties, they often make contradictory decisions or regulations.
- *Ambiguity in Technological Priorities*. Despite several policy-making organs, yet technological priorities of the country are not determined, each research and technology center chooses its subjects on its own and enjoys state supports and grants thereof.
- *Feebleness of Control and Evaluation*. No criterion has been assigned for evaluating and controlling specialists and technologists' works. Some research centers continue receiving state budget despite their significant failures in researching activities.
- *Brain Drain*. Despite few numbers of technologically specialists, the existing ones largely immigrate abroad. Universities are unable to substitute the required experts and as a result the lack of high-level experts is felt more and more every day.
- *Insufficient Research and Development Budget*. The ratio of R & D costs to Gross Domestic Production(GDP) in Iran is about 0/4%, which is quiet far from the 1%, threshold of development.

### **Future Plans of MOT system in Iran**

Regarding the mentioned problems, which have led to low level of national technology and critical decline in compete-ability of the country, the government and specialists have made solutions for future of Management of Technology System, some of which are as follow.

- *Taking New Foreign Exchange policy*. Various foreign exchange rates have led to cheaper imported products in comparison with the domestic ones. Unifying the foreign exchange rates, the government tries to make the production based on domestic technology economical. Yet main importers, most of whom are state organizations, seek to benefit from foreign products and services, and as a result, many domestic researches are ignored.
- *Reorganization of Management of Technology and Science System*. Regarding the present confusion," Ministry of Science,Research and Technology" has been organized to fulfill the duties of planning, supporting, evaluating and supervising policies made in these realms (i.e.

science, research and technology). Also a high council has been formed under the same name headed by the President, with Ministry as its secretariat and various organs and components. Yet the Ministry could not obtain the required means and structure to perform this role and it was established only following the example of newly developed countries especially southeast Asian.

- *Seeking to Determine the Technological Priorities.* Following President's approval, finally it has been decided to determine one or more technological priorities, in which Iran can play an initiative role (emphasizing on Cuban pattern in biotechnology). Studies are in progress on this issue in the country, but no conclusive solution has been reached yet.
- *Improving the Relation between Universities and Industries.* The government encourages industrial units and executing organizations to perform research and technology activities especially through universities. For instance if an organization undertakes to pay 40% cost of research activity, the rest will be provided by the government.
- *Supporting Information Communication Services.* At present attempts are made to offset the feebleness of international relation by benefiting from potentials of information technology and providing access to scientific resources and data banks for the researchers and technologists.

## **Conclusion**

It is certain that in countries like Iran, where the government has the central role in all economic, political and social realms, it undertakes the responsibilities of developing national technological level and market mechanisms cannot work effectively. Thus Iran government should try to lessen its share in economy and on the other hand support development of domestic technologies. Government's most vital duty here is studying the technology development system and chain-work and recognizing the missing links. Otherwise organs needed for completing the chain would not be formed and thus technological activities and researches would leave unfinished.

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