

SCIENTIFIC AND TECHNOLOGICAL INNOVATION

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Rezumat. *Astăzi, știința și, în consecință, cercetarea științifică este larg recunoscută ca fiind principala forță motrice a producției și sursă de inovare și transfer tehnologic. Există multe definiții în acest sens, care caută să definească conceptul de cercetare științifică, dezvoltare experimentală (inginerie) și progres tehnic. Practic, în țările dezvoltate fenomenul de inovare este analizat în raport cu conceptul de transfer de tehnologie, pe baza experienței și a cunoștințelor în domeniul științei și tehnologiei. Inovarea trebuie să fie abordat în mod sistematic, iar acest lucru implică: știința, tehnologia, principii financiare și economice, management.*

Abstract. *Today, science and, accordingly, scientific research is widely recognized as the main driving force of production and source of innovation and technology transfer. There are many definitions in this regard that seek to express the concept of scientific research, experimental development (engineering) and technical progress. Practically in the developed countries the phenomenon of innovation is being analyzed in relation to the concept of technology transfer, based on the experience and knowledge in science and technology. Innovation has to be addressed systematically, it involving: science, technology, financial and economic principles, management.*

Keywords: *Scientific research, technological development, innovation, technology transfer.*

Introduction

Scientific research has the overall objective of investigation of areas or issues that are not addressed, in pursuit of discoveries and inventions, or by investigating addressed ones for obtaining of new, superior results or improving existing knowledge and activities.

In this way we inevitably come to define the technological development, technological engineering and introduction of technical progress.

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Technological development is the activity taking place on the basis of applied scientific research and empirical knowledge to achieve a product, a machine, or equipment.

There are three categories of research activities:

- Basic Research;
- Applied Research;
- Development.

1. THE INNOVATION CONCEPT

Practically speaking, in developed countries the phenomenon of innovation in relation to the concept of technology transfer is being analyzed based on accumulated experience and knowledge in science and technology. Innovation must be addressed systematically and it involves: science, technology, financial and economic principles, leadership and management.

Innovation defines at the same time a process and as a result of the process (product innovation). Innovation is a complex, diverse activity, involving more behaviors and interactions and, depending on the context, may have different understandings. Innovation includes all opportunities, measures of scientific, technical, commercial and financial resources necessary to achieve the success of the development and marketing of new and improved materials and products, new and improved processes, or to introduce or implement a new social service (Figure 1.1.). In other words, innovation includes all activity domains, including those that define the business functions, in other words, it includes both technical and non technical activities.

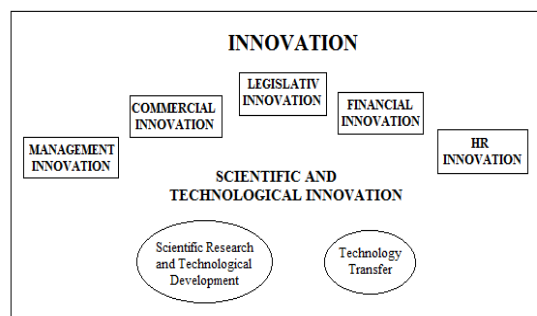


Fig. 1.1. Innovation and its components

Any strategy must necessarily have amongst its fundamental elements scientific and technological innovation for the manufacturing of known or new products.

Scientific and technological innovation process has a specific structure related to several internal and external parameters: the sales, the profile level achieved in relation to the expected one, enlarging or reducing the area of markets, regional or global technological level state, financial development possibilities, competitive system in the field, global or local trade, etc.

Scientific research and technological development activity is a component of the innovation process, either as a source of innovative ideas or to solve problems that may occur at any stage of the process. In other words, the innovation process highlights the work that includes research, design, production and distribution, as steps that lead to innovation. The main sources of innovation are the science and fundamental and applied scientific research, whose results are transferred in the production of material goods and services through technological development, technological engineering and introduction of technological progress. Those working in science and research, represent 90% of all researchers and scientists that worked in that field from the beginning of mankind until now.

Innovation covers mainly constructive and functional improvement of machinery, machinery equipment, process improvement, technological processes and automation in every industry including services.

2. CREATIVITY AND INNOVATION

Creativity is representing the relationship of interdependence between science, technology and society, by which science and technology are mutually stimulated while generating social comfort. Finally, the two activities stimulate economic development in conditions of globalization. Science and technology can be considered systems, amongst which different processes take place.

Applying the technology is important in supporting the competitiveness of products and services, and the pace of implementation depends on:

- The development of scientific knowledge and technology;
- Organizations and centers specialized in technology transfer centers;
- Financial incentives necessary to determine the technical people to interact;
- Lack of services that enhance the capacity of interaction of the entities involved in the technology transfer.

These services may be technical in nature but may include non-technical activities such as funding, training, evaluation, management, negotiation, legislation.

Because the technology transfer is a subprocess of innovation, the training of experts in technological development project and technology itself evaluation is

mandatory. These technological innovation programs could include: technical and economic assessment, technology management, innovation best practices. To promote innovation and technology (internal and/or international) transfer, measures in the short, medium and long term are necessary.

3. R & D INSTITUTIONAL SYSTEM

Strategies for innovation and technology transfer usually represent state priorities for both industrialized countries and those undergoing transition. Science and technology have a very important role in developing these strategies by creating, promoting and disseminating the cultural, technical, scientific and intellectual values.

Restructuring and renewal of socio-economic aggregate requires an inter-relational dynamic framework, based on the exploitation of scientific research results, particularly transfer of information, knowledge and technology. Achieving such a framework requires a innovation policy that would represent an interaction of the opportunities, capacities, strategies and real scientific, technological and market processes. The innovation policy should be seen as a coordinated multitude of national level factors, experts, politicians, business people, governmental organizations and NGOs, to ensure transfer of ownership forms and renewal of society. Innovation is an effective response to economic problems and the difficulties of transition and should be seen as a concept aimed at unity (institution), organization, strategy, technology and human resources.

This response in its entirety, involves the existence of specific innovation and technology transfer entities for:

- National strategic foundation of the concept of innovation and technology transfer with activities: organizing, drafting legislation, advertising and information;
- Foundation of economic policy the principle of continuous innovation;
- Creating innovative projects suitable mechanisms of technology transfer and the absorption of new technologies, products and services;
- Authorizing the establishment of local centers of innovation, implementation and technology transfer, with activities in several areas: identifying problems and opportunities for applying existing achievements, adaptation technologies, marketing services;
- Assessment (audit);
- International representation and relations with the programs and networks of innovation and technology transfer;

- Organization of services and technology marketing offices of the technologies with responsibilities in: trade agreements and licenses, development of technology for the interests of both economy and a large number of institutes, technology marketing, establishments of regional alliances beneficial in supporting small and medium enterprises.

4. TECHNOLOGY TRANSFER – INNOVATION SUBPROCESS

The main sources of innovation are science and scientific research, which represent a manufacturing sector of invention development by which application technical progress is obtained. Due to the extremely diverse economic conditions and an economic environment in constant motion, basic scientific research is increasingly integrated with applied scientific research.

Viewed in this interdependency, basic research and applied scientific research can be addressed as a single activity which is carried out systematically to develop new methods whose application result in stimulating economic and social progress. These two scientific research activities are aimed at developing technologies allowing science to the extent that is focused on technology, to become a productive force.

Conclusions

The transition from a planned economy to a market economy cannot be done without a certain „shock” and that passage has precarious employment as „a mandatory consequence”. This is actually the most difficult problem imposed by this transition (Figure 5.1.).

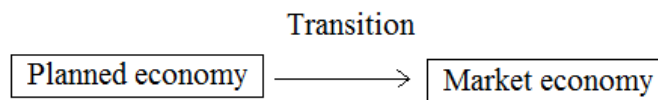


Fig. 5.1. The transition from a centralized economy system to a flexible economic system
Following these changes, to succeed, an enterprise needs to mobilize all resources and technological resources first, which will allow them to reduce costs, improve performance and quality of products or services, to create and occupy new markets.

In the case of technological innovationve project, the economical agent applies the following:

- Manufacturing, control, functional improvement, documentation, licensing technologies;
- Technical documentation, approval documentation, know-how, technical standards, verification bulletins, information databases;

- Technology adopting existing solutions to international regulations (GMP);
- Draft standards and business products, product certification production through approved laboratories;
- Models, prototypes, tools, devices, materials, systems, standards;
- Plant varieties, animal breeds and related software technologies (CAD, CAM);
- Studies, scientific reports, diagnoses, prognoses. The use of this amount must be clearly highlighted in the feasibility study / business plan for innovative projects.

R E F E R E N C E S

- [1] OCDE, Manuel D'Oslo, (Paris, Franta, 1992), p.31;
- [2] OCDE, Definition et conventions de base pour la mesure de la recherché et du development experimental. Resume du manuel de Frascati, (1993, Paris, Franta, 1994), p.8;
- [3] PECULEA, M., Interface between science and technology,(Tehnica, Bucharest, Romania, 1994);
- [4] ALBU, D., AL., Internation economic cooperation, (Expert, Bucharest, Romania, 1995), p.132;
- [5] ANDRE, M., Recherche and Technological Development Policy, (European Documentation, Luxemburg, Luxemburg, 1998);
- [6] BELOUS, V., Creation in the construction machinery equipment, (Junimea, Iasi, Romania, 1986) ;
- [7] BONCIU, J., F., International cooperation in high technologies, (PhD, ASE, Bucharest, Romania, 1994);
- [8] CONSTANTIN, I., Intellectual property and business success, (Rentrop & Straton, Bucharest, Romania, 1996) .