**Organizational Innovation and Research & Development**

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## Abstract

*Today, such countries can enter international competition that is always seeking to use new technologies and this can be possible only with research and development center (R & D) in accordance with the criteria for active and new world. These centers According to the aim of creation, Have different policies. In this paper, after reviewing the literature, will investigate and explain the success factors of research and development, Position of research and development in advanced countries and Iran. Then compare them. At the end solutions for improving researches are provided.*

**Key words:** research and development, basic research, Applied Research, innovation

### *1. Introduction*

Change in external and internal environment of economic enterprise are so quick, multilateral and complex and also inclusive, that firms without proper planning and appropriate strategies and Forecasting cannot continue their life, grow, flourish and development. In the last two decades, due to the absence of special conditions of the market and competitive, large firms could have acceptable prosper in the domestic market, being the market competitive, and with global economic conditions governing, No other life cannot be developed and development may not appropriate response and answer them without consciously changing and dynamic environments. Responsive and conscious responses to complex developments put economic enterprise in the social status of open systems theory. Systems that change and development permanent, are naturally integral part of them. In the present age with the increasing expansion of knowledge and breadth of the range of its application in solving many problems, Research and study has the main role in the development of various industries.

### *2. Research and Development Concept*

Term research and development is a continuous and dynamic process of basic research, applied research and developed studies which scientific results of each stage are as a store of knowledge gathered over time and these reserves as an important input and valuable source of ideas and inventions that is a new stage of action. For example, in research and technology applications through combining the results of basic research and research resources in the application stage, technical knowledge is obtained in a process (Unesco, 1982).

Term research and development is creative work which regularly Save to increase scientific and technical knowledge and use this knowledge in new applications of the invention and design (Friman, 1974).

Research and development include identification of needs or talents, ideas creation, creation, design, production and dissemination of introducing a new product or technological system (Dean, b.v. 1980).

### *3. Types of Research*

Research has different categories; some of the methods of classification are:

Classification research based on process, classification based on duties, classification based on the budget resolution, based on classified research fields of science, classification based on areas of activity, classification research based on UNESCO categories (Alimohammadi, 2005). For research and development, usually three types are mentioned: basic research, applied research and developed research, and all three types of the research introduces elements of creativity process (Lowel, 1988).

#### 3.1 Basic Research

The research to increase human knowledge and understanding of the universe and don't have attention in business goals (Although it has the potential to be possible in future).

1- Favorable environment for such research is academic spaces such as university

2- In this study increscent of human excellence and human knowledge and discover facts about the universe is the aim.

3- Executives, of this study are academic scientists and researchers
4- Product of this research is scientific theories

**3.2 Applied Research**

Research conducted by using scientific research and knowledge gained with an emphasis on results of basic research with special business purposes, and are mainly related to product or processes and production methods.
1. Favorable environment for this research is academic environment, such as universities and common enterprise environments such as industrial plant
2. The purpose of this research is increasing the technical knowledge with the special aim of business
3. Executives Board are jointly business Researchers (industrial) and academic researchers (university)
4. The product of this study is production of specific product or process or special method

**3.3 Developed Research**

Research in industrial environments and in relation to increasing and improving productivity of production factors and take place with specific target of dispelling customer needs or wants.
1. Favorable environment for this research are enterprise environments such as industrial plant
2. The purpose of this study is particularly in relation to business and meets customer demands and expands the target market
3. The executive researchers are firm researchers
4. Product of this research is to increase productivity factors of production and ultimately, extend the target market and sales (Aliahmadi, 1998).

**4. Success factors in R & D**

International competition in innovation, has been Central nucleus of policy studies and market (Dodgson, 2000) And innovation have been introduced as the determining factor of economic performance of industrial firms and industries (Freeman, 1995) Also under innovation growing pressure, businesses must remain in the business environment (Furino, 1988) And since the task of research and development activities is management the process of creation and innovation technology, Factors affecting the success of innovation is significantly. Mr Twiss divided Effective factors in technology innovation in the seven categories as the following (Twiss, 1990).

1. Putting oriented market
2. Having a relationship with the company objectives
3. Having an efficient system of project evaluation and selection
4. Having an efficient system of project management
5. Having a creative resource for generating ideas
6. Innovation adoption by organizations
7. Commitment to activities performed by the one or more persons

Mr Twiss says on the part of the book "technology innovation":
The following activities are appropriate for systematic research and development:
1. Define Companies strategies and determine the area of activity that your organization intends to engage
2. Codification Research and development strategy to ensure that research and development activities in line with company strategy
3. Having an evaluation system for selecting projects that are in connection with financial and organizational objectives
4. Determine the components of research projects to measure their performance
5. Periodic evaluation of projects to measure achievement of objectives
6. having a system to control assigned resources are used clearly

## *5. Importance of research and development process in growth and development of countries*

Industrial developed countries accentuate the establishment of research and development institutions and capitalize on them as direct investment in industries, And know this as a major cause of industrialization and one of the important tools and mechanisms for creating an environment that technological development activities can be best operate, Indeed, the importance of investment on research and development in advanced industrial countries is clear and obvious as the fact, And today research and development will determine allocation budget and financial issues. Nowadays investment on R & D units is one the competitive advantage. Companies such as General Motors, IBM, Ford and Boeing in the United States invest more than two billion dollars annually in R & D section.

Another example of the leading companies involved in the research and development investment is LG that invests more than one billion dollars annually in research (Alirezaaliahmadi, 2003).

## *6. Research and Development Indicators*

One of the important criteria for comparing indicators of research in different societies that shall be considered is sensitive of research. Comprehensive research and development indicators in each country, is defined as research intensity. Research intensity is the research and development costs compared to GDP.

In 2008, developing countries were spent more than a thousand billion dollars on research and development. The amount is about 2 percent of the world gross income. Most costs in this regard belong to U.S. With 448.1 billion dollars And the highest percentage of the R & D share of GDP Related to Japan with 41 / 3 percent. Americas share is 40 percent that is more than the share of Asia continent (Table 1) (R&D Magazine,Dec. 2009).

As observed in Figure 3 the highest costs in the research and development related to the USA, China and Japan (R&D Magazine,Dec. 2009).

**Insert Table 1 Here**

**Insert Figure 1 Here**

## *7. Research and Development in Japan*

Japan's rapid and massive development, after Second World War, Encouraged many countries to have benefit from this move successful management model. It is acknowledged that this great success in reconstruction and development after the war, all are certain methods of debt management. Specific management methods in Japan influenced on strategy formulation and implementation of research. The most important characteristics of management in Japanese research and development are:

### 7.1 Long-term perspective

Macro-policy in research and development are carried by Japan Science and Technology Council which is the advisory arm of the Prime Minister. The council has started its work in 1959 and will determine long-term goals in the research and development and has a special budget for research on important issues of the country. In addition of this council, council of representatives of Japanese researchers (Japan Council of Science) that the government has no direct role in their selection but will financial support of theme.

### 7.2 Focus for human resource

Unlike Western research institutions, that equipment, financial resources are more important, in Japan they relies on human resources, and it is the main strategy that tried to use the maximum of their scientific and practical power.

### 7.3 Internal organization growth

In research institutions it is trying to create a permanent group of individuals with persistent on constraints. Thus the growth and changes is gradual, but increasing.

### 7.4 Accelerated innovation

Nature of valuable research system based on the rapid adoption and dissemination of new ideas may be providing growth in innovation. However, this trend is not only a brilliant idea but the process of creating a new product based on the ideas in the context of national needs and the importance of trade has the most importance (salehi, 1998). In Japan, 90% of research and development budget is provided by the private sector and 20% by the government. With a national strategy, Japan goes towards the goal that in terms of science and technology takes the first category in the world (R&D Magazine,Dec. 2009).

## *8. Research and Development in U.S.*

united stated of American has a Successful history in the production and transfer of technical knowledge and commercial researchers, so that Commercialization research results plays very major role in the country's economic growth and development. In the last decade the twentieth century, in the USA the highest rate of investments performed on R & D activities and innovation, particularly in applied research and development.

These activities based on basic research in universities, and were simultaneous with the rapid growth in capital investment; Of course, with the support of large industrial companies and using effective tools such as information technology is practical. Today the main focus of industrial research and development in America and many countries is in trade and economic growth.

This very complex system is based on closer and direct relationship between industry, State and the University. Also the most important factor is competition between different centers of products manufacturers. Important factors in making researches results in commercial type in united state of America are (Magnus Karlsson, 2004):

• Technical knowledge transfer budget
• Intellectual property laws
• Higher education and self entrepreneurial
• Laws and policies dealing with small companies
• Innovation and Special Programs of the state

### *9. Conclusion*

If we consider the Growth path of research activities and research in developed countries, it can be a useful guide for managers to decision-making in research and development sector. Based on the present status, key issues that are effective and can be as the main concern of managers for decision-making in research and development are:
• Activation of the Supreme Council for Research in the field of formulation an integrated policy for research needs
• develop strategic plans in study trustee companies
• Modified rules for active participation of private sector
• Integrating the specific organization and formation of parallel institutions to support the commercialization of research results

For out of the crises that threatens academic life – research, in the first stage each government should provide financial support and build facilities, Reducing bureaucracy involved in research, , increased facilities and conditions for providing activities and projects and innovations, assign special privileges such as; pay the cost for researchers to present in scientific seminars, increasing Scientific staff - technical universities and research organizations, and creating centers for exchange between inventors and researchers, to prevent discrimination in some agencies and scientific communities, create a safe space for them in society etc. In the second stage, Universities as a great source of science should be able to orient scientific approach as the main think and endeavor in order to making researches practical. This will be obtain with permanent and appropriate communication between research centers.

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Table 1 - costs and share of worldwide research and development in 2008 (R&D Magazine,Dec. 2009)

| Percentage of R & D expenditure of GDP | Percentage of R & D expenditures in the world | R & D costs (billion dollars) | Regions |
|---|---|---|---|
| 2.28 | 39.9 | 448.1 | Americas |
| 2.79 | 35.4 | 397.6 | U.S. |
| 1.91 | 32 | 359 | Asia |
| 1.28 | 9.1 | 102.3 | China |
| 3.41 | 13.2 | 147.8 | Japan |
| 0.8 | 2.4 | 26.7 | India |
| 1.69 | 24.9 | 278.8 | Europe |
| 1.21 | 3.2 | 35.9 | others |
| 1.94 | 100 | 1121.8 | world |

**Figure 1:** world status of R & D (R&D Magazine,Dec. 2009)