Achie ving International Competitiveness through establishment of TRIZ workstation in R & D units of Iranian Industries

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Abstract:

The brainwave power as a result of technological human ware endeavor and the knowledge management are the greatest factors of international competitiveness of Industrial firms.

Nowadays, Innovative Knowledge Management (IKM) is the key factor and has the highest effect on products, and services and technological innovation.

This Paper with the awareness of the important role of creativity and innovation in technological inventions and its relevance to R&D units of developing countries, proposes establishment of TRIZ workstation in R&D units which have the closest common tasks and with the structure of cross functional teams.

Finally, the role of the TRIZ creative problem solving workstation in R&D, its establishment process and development is investigated and shows that the cost and time duration of R&D activities can be reduced.

Introduction:

In the paradigm of Innovative Knowledge Management, the critical success factors are the knowledge and technology creation and their application in product and service innovations with the objective of knowledge base competitive economic development.

The most critical function among the whole value chain which is called Total Value Management (TVM), is R&D and its role in innovation of other sub – processes in different dimensions, which creates value by innovating the whole process and in any of the sub processes, even in R&D methods and strategies.

[Fig 1]

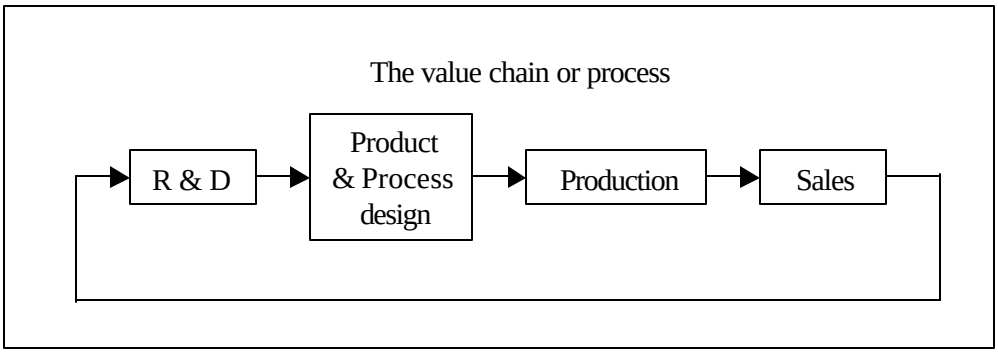


Fig (1), The value process

The scope of innovation in value creation processes can be namely and briefly described as:

1- Innovation in R&D methods and strategies;

2- Innovation in Product Planning and product design;

3- Innovation in process design;

4- Innovation in production and control systems;

5- Innovation in sales method and strategies.

As we know, the engine of innovation in each of the above mentioned functions is the creativity of the R&D teams which should innovate the process to reduce the cost, increase quality and speed activities (or reduce the cycle time).

The Innovation Knowledge Management tries to innovate the task groups (in R&D units) to bear this innovation.

Investment in Knowledge Management, and establishment of creative problem solving groups in R&D units in developing countries and increasing their problem solving skills are the key factors of knowledge base economic development, this is the reason the of developed countries in this decade are mostly emphasizing on skills of creative problem solving techniques.

Innovation:

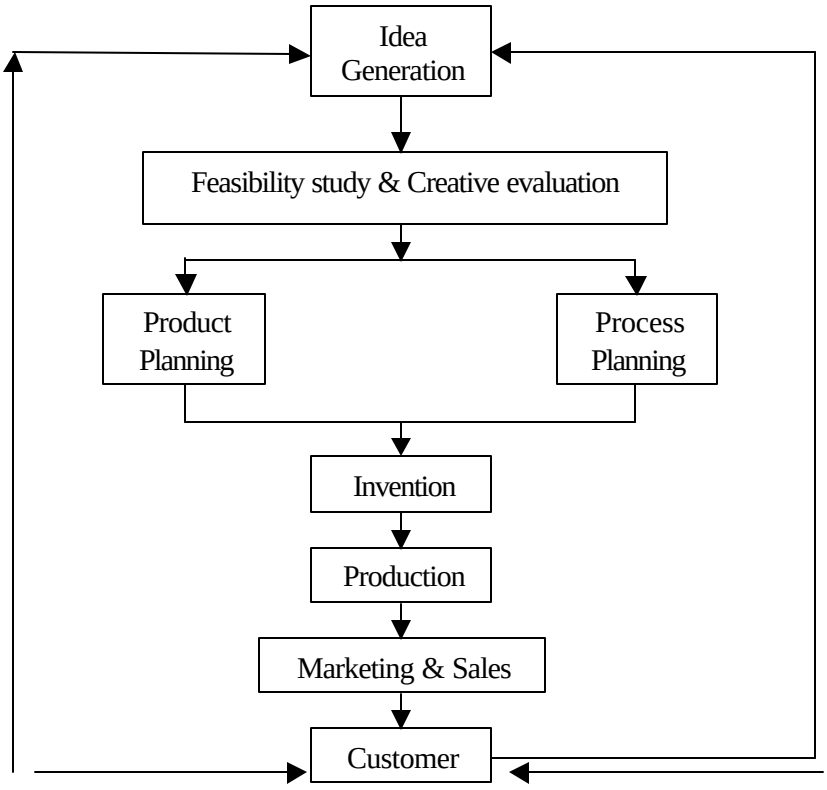
Innovation is the process of generating new ideas and its creative evaluation, customization and implementation to produce an economic product or service.

Technological Innovation:

Technological Innovations are classified as:

- Radical innovation;
- Incremental innovation.

The creative problem solving groups, considering the circumstances and the situations of problem, can adopt each of the above innovative methods for product, process, design or combination of these cases. To create higher values, human skills and the creative methods namely TRIZ can play a very crucial role. In fig (2) the process of idea generation up to producing and sales of a customized product or service is show n.



Technological Innovation Process:

This process is a sophisticated set of activities which converts the scientific knowledge and new ideas into a physical and practical phenomenon's. In this process the TRIZ activities involve with R&D functions have a significant role in empowerment of innovating ability of the process.

Innovation in Research and Development Functions

R&D functions are fundamental and the very structural base of innovation in every organization which in the areas like innovation in creation of new product with higher quality, creation of a new production process, creation a new market, innovation in providing new resources and creation of new industrial organizational structure.

Innovation by R&D units of developing countries and Iran: **Titr**

Reducing the technological gap between advanced technological countries and less–developed nations can not only be filled by traditional R&D duties, but also the new technologies transfer should be considered as one of the effective functions of R&D in developing countries like Iran.

The most critical issue in technology transfer, is the technical knowledge which is based on creativity of R&D members to activate reverse engineering or value engineering to substitute new ideas to reach the objectives of the project. In short-term technology transfer and in the long term entering to other steps of research and idea generation and technology development are inevitable. So the tasks of R&D in Iranian industries could be:

- Evaluation , selection and feasibility study of new technologies;
- Transfer of selected technologies through the acquisition of technical know ledge;
- Adaptation and customization of technology;
- Development of the transferred technologies considering new products and processes.

The Productivity of these R&D units is greatly depends on their creativity potential for innovation.

Adopting TRIZ methodology for creative problem solving in R&D units in Iranian industries could accelerate technology transfer cycle as well as technology development period.

TRIZ methodology could help to:

- Enhance the analyzing potential and creative evaluation of ideas;
- Enhance the creative thinking ability of R&D human ware;
- Enhance the ability to forecast the future of technology and assess it;
- Equip the company with tools to transfer the technological knowledge;
- Equip the company with the tools to innovate the products and the processes;
- Equip the company with tools for technology development related to the technology strategies of the company.

Creative problem solving station:

The plan of creative problem solving station for the first time developed by Iran Institute of Innovation and Technology studies in Iran and is running through an educational approach. in industrial companies. This approach began with the training of managers. and engineers to create the cultural background for creative thinking, idea generation and creative problem solving techniques and tools. In this plan the design R&D and production engineers should pass the two level workshops to learn and concentrate on TRIZ techniques and tools to do the task of idea generation, idea development up to new product development and the creative problem solving.

How to develop TRIZ Station:

- Information gathering and analysis about the areas, that the station should concentrate on;
- Information gathering and analysis about the station mechanism concerned to the organizational situations;
- Educating and training top level and middle managers and middle and engineers.
- Special Courses:
    - Elementary courses for all the station members;
    - Evaluation and selection of main station members;
    - Especial course for main members;

- Cross functional teams and relations between the main station member and the organization personals.
- Station commissioning;
- Mechanism planning of the station;
- Establishment of the station secretariat;
- Organize problem solving groups;
- Technological facilities provision (Software and Hard ware).

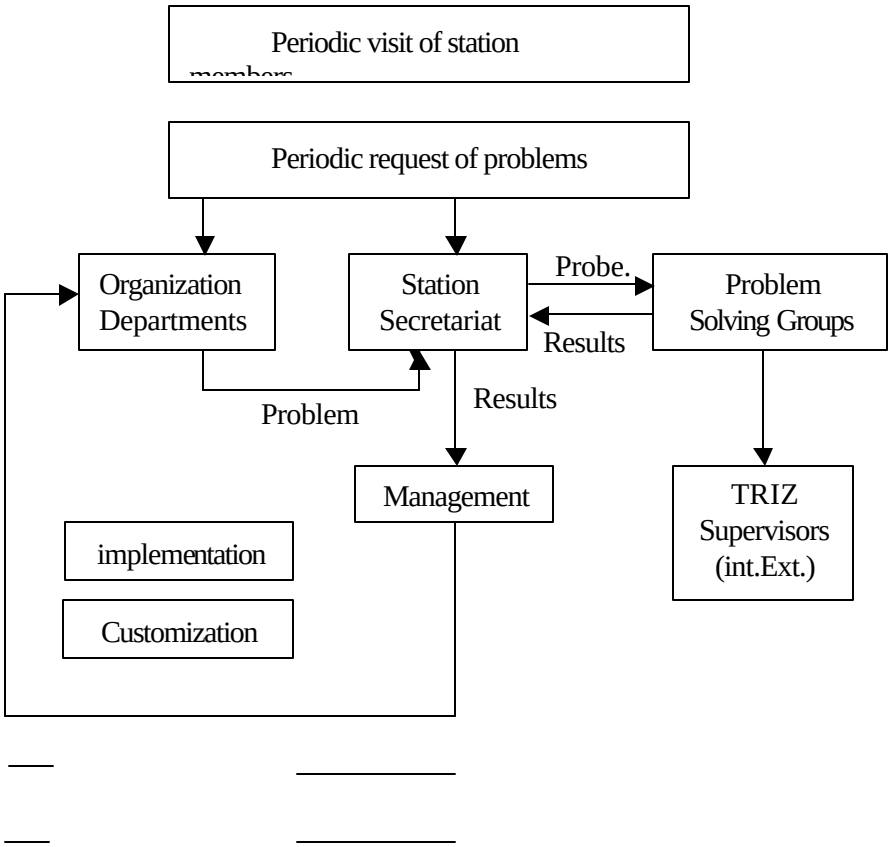


Fig (3). Station Problem Solving Flow

TRIZ Station Development

- OOrganizing periodical meeting;
    - Interchanging ideas about research problems to extract problems for the station;
    - Develop across-functional teams to departmental problems for the station;
- Periodic meetings in the organization with the main station members;
    - Enhancement of creative problem solving culture (with describing the results of the problems);
    - Motivate the organization to challenge the problems.
    - Dissemination of the station conclusions;
- DDocumentation of station Information;
    - The reports needed for the organization;
    - Papers and books;
- UUpgrading the main station members knowledge in relation to international TRIZ centers.
    - Develop especial TRIZ databases .
    - Participation in international RT12 conferences and workshops.