A Review of Application of Triz Methodology in Product Development

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Abstract: *To cope up with intensity of competition, the industries and organizations need to develop and reproduce products continuously. For this, TRIZ \methodology is one of the most efficient and effective method, used by industrial and organizational persons. It is a scientific and structured approach to solve problems faced in new product development. TRIZ method provides very useful, novel and practical solutions increasing speed and coordinated support of teammates in Product Development work. In this paper a review of application of Triz Methodology for effective product development is discussed.[1]*

Key Words: *TRIZ, Product development, problem solving.*

1. INTRODUCTION:

TRIZ is "Theoria Resheneyva Isobretatelskehuh Zadach" in Russian and as "Theory of inventive Problem Solving and used acronym" (TIPS) in English. This method is also described as "Creative Problem Solving Method". Altshuller found similar approaches, used in wide different areas, creating very effective solutions in the investigations. The benefit of TRIZ is that oppositions can be methodically solved with application of innovative solutions. There are three fundamental principles of TRIZ:

- The ideal design is main objective.
- Logical inconsistencies help to solve the problems.
- Innovation process can be arranged as efficient and systematic [1-3]

TRIZ includes analytical tools that are necessary for problem solving and also it is knowledge-based tools that are necessary for system transformation and their theoretical foundations. Using all the information about the problems of the products, the analytical tools of TRIZ can be used for transforming, modeling and analyzing problems. Also, ARIZ is a special analytical tool that gathers substance-field analysis, conflict analysis, required function analysis and other techniques. TRIZ uses algorithmic approaches for improving legacy systems or designing new systems. Therefore, it includes to evaluate the available data rather than estimation. The main goal of TRIZ method is to find the ideal solution or perfection. [1-5]

2. BASIC STRUCTURE OF TRIZ:

Basic TRIZ structure has tools, method and philosophy (Figure 1).Its philosophy displays excellence, resources, and contradictions. ARIZ is most important tool of TRIZ. It is a problem solving algorithm. The most used tool of TRIZ is Contradictions Matrix [1-2]

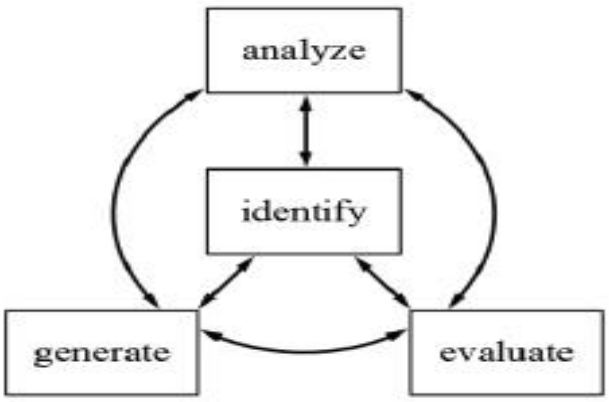

Fig.1.Problem solving in Product development [2]

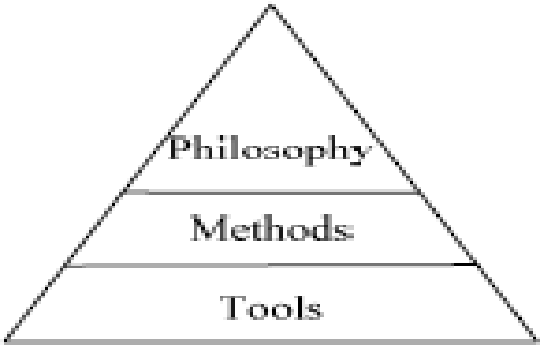

Fig.2.Basic Structure of TRIZ [1]

We can say that TRIZ is a problem solving toolkit based on logical analysis of data. It is beyond traditional and a theory or a set of principles. TRIZ is a knowledge-based systematic methodology of inventive problem solving. A methodology for the effective development of new (technical) systems in addition to being a set of principles that defines how technologies and systems evolve. It provides a systematic approach for finding solutions to technical problems and innovating technical systems [2-3]

3. TRIZ ALGORITHM-ARIZ:

ARIZ directs the step toward the most powerful solution which is available for the problem. ARIZ, isn't an equation is Combines different parts of TRIZ by asking a series of questions, ARIZ is a multi-step process to find an inventive solution. Also, ARIZ doesn't find any solution, it is only a process. It introduces biased solutions from expression of problems

ARIZ process has 9 stages based on three main groups as follows;

A. Restructuring the original problem.
- The system / problem analysis.
- Resources / problem analysis model.
- Describing the physical contradictions and the ideal final result.

B. Elimination of physical conflicts.
- Separation of the physical conflicts, mobilization and utilization of resources.
- Using information database: Impacts, standards and principles.
- Replacing or reformatting "micro-problem"

C. Analysis of the solution
- Re-examining the solution and analysis of method that abolishes physical contradiction.
- Improving maximum utilization of the solution
- Re-examining all the stages that conveys the solution in real-time practice. [2-4]

4. FEATURES OF TRIZ:

- Helps for concept development of new products, processes and business strategies.
- Helps for forecasting of technology evolution of systems, products and processes.
- Improves the process of inventive and technical problem solving.
- Supports for finding solutions and protection of company copyrights
- Supports the evaluation of the customer's needs
- Root cause analysis of failure and troubleshooting of new as well as existing products.
- Provides a structured problem solving approach.
- Helps to generate innovative ideas.
- Provides Innovation and new solutions for development.
- Speed up to identify the problems and solving them. [2-3].

5. CONCLUSION:

The goal of this paper is to study TRIZ methods for effective product development process. In order to achieve this goal TRIZ methods supports the idea generation process with properly structured approach. It leads people directly to new methods to solve their problem. TRIZ tools need a significant amount of training time and by experience TRIZ provides useful tools and means for efficient product development process. [2-6]

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