

# Management of Innovation and Process Systems Engineering

Jean-Marc Le Lann, Stephane Negny

*INPT-ENSIACET, LGC, UMR-CNRS 5503, PSE (Génie Industriel)  
118, Route de Narbonne 31077 – Toulouse Cedex 04, FRANCE  
Stephane.Negny@ensiacet.fr, JeanMarc.LeLann@ensiacet.fr*

## Abstract

In this paper, Innovation on technological point of view will be explored. Some tracks for helping for innovative aspects as well as the role of PSE and CAPE methodologies will be analyzed. Some new directions will be proposed as well as some examples of success will be enlightened.

**Keywords:** Innovation, TRIZ theory, Knowledge Based Management

In every field, researchers have to provide solutions, knowledge in order to propose evolution, to improve our surrounding world. One way to succeed is to innovate. Chemical Engineering domain does not escape to this (r) evolution.

Nowadays, Chemical Engineering has to face new contexts: for example, the gradually falling of hydrocarbon reserves after 2030 (2040), relocation (for European Countries). Moreover, new domains of applications emerge, like nano-micro technologies and biotechnologies, and others have a strong need of our knowledge: Energy for example. All these tendencies and demands increase the need to innovate in Chemical Engineering. Basing on current knowledge, it will have to innovate: technically, technologically, and perhaps in the way to theoretically approach problems for example in nano-micro technologies, but also to anticipate the future evolution in the field.

More generally, innovation may be viewed as resulting of an engineering product, materials, new proposed service associated with, a novel process, a new way for processing or manufacturing, or a novel method.

But Innovation is also something like a strange processing starting from the initial pioneering idea until its effective production to be delivered on the market corresponding to consumer needs or wishes, or more anticipating to a new generation societal demand.

In this contribution, after discussing some concepts about general innovation, it will be focused more precisely on technological based engineering innovation on new product, process, processing, methods, and related services.

Through this analysis, it will be attempts to see how Process Systems Engineering may contribute to the process of innovation, on what way it may help for enhance the innovative framework.

After this, we will try to see what kind of theories, tools or methods may be used for better innovation management such as Functional analysis, Value analysis, TRIZ theory as theory for solving innovative engineering problems as mentioned by some well known contributions (Z. Boris and al. (1999), M. Darell (2002)), concepts and tools coming from other fields such as Cased Based Reasoning (CBR) approach, Knowledge Based Management (KBM).

It will be presented how to use that connected with PSE methodologies in order to give some answers to the general problem of technological innovation. Some tracks about synergy between these different tools coming from PSE, TRIZ theory, Knowledge Based Management approach, Cased Based reasoning, Expert systems or Expertise will be explored in order to improve the whole process. It will be see how CAPE tools and PSE methods may be used for, how to incorporate them in the whole process in order to facilitate innovation with the view of an economic facilitator, to be more and more efficient and powerful.

These different main ideas will be largely enlightened by different examples taken in all domains of engineering as well as new methods and some “success stories” in the field of Chemistry, Materials, Chemical Engineering and Industrial Engineering.

Finally, it will involve some pioneering works in order to give more systematic way to help engineers for better innovation with the spirit of a novel approach to be innovative and to stimulate researcher’s creativity in order to be more competitive and in order to answer some accurate demands coming from societal point of view that will never been ignored by scientists and engineers.

## **References**

1. Zlotin Boris & Zusman Alla, 1999, “Managing Innovation Knowledge: The Ideation Approach to the Search, Development, and Utilization of Innovation Knowledge”, Ideation International.
2. Mann Darrell L; 2002 “Better technology forecasting using systematic innovation methods”, Elsevier Science Inc.