

## Chapter 6

# Soft Systems Methodology in Technology Management Practices

### ABSTRACT

*Technology management (TM) is a series of management disciplines designed to manage the technological fundamentals of the organizations for creation of competitive benefits. A successful technological development and commercialization can be rarely accomplished through diffused and undirected efforts. In such a complex situation, modeling can play a decisive role in the analysis of complexities and management of the dynamics of technology-based companies. In this context, the chapter describes five processes of TM, namely identification, selection, acquisition, protection, and exploitation. Soft systems methodology (SSM) is one of the soft operations research (OR) tools and techniques that can be implemented in TM phases as a hard OR. Furthermore, two case studies that addressed the use of SSM in policymaking to commercialize the new technologies and technology scenario planning in a research and development (R&D) organization will be also reviewed.*

### INTRODUCTION

Technology refers to the ways of doing something. In this context, it implies the means of accomplishing our objectives. Technology includes all the knowledge, tools, products, processes, methods, systems, and procedures used

DOI: 10.4018/978-1-7998-4504-1.ch006

to achieve the desired goals. In another way, technology can be defined as the implementation of knowledge for creating products and services in response to human needs and ambitions. In this definition, technology can include various areas: hardware, software, brain-ware, and know-how (Khalil, 2000). Technology management (TM) deals with planning, design, optimization, operation, and control of the technology-based products. Technology management is intended to maximize the cost-effectiveness of investment; which can further contribute to enhancing the organization value. TM refers to a series of management disciplines designed to manage the technological fundamentals of the organizations for creation of competitive benefits. The major reason for focusing on the technological part is wealth creation. In this content, TM requires in-depth comprehension of the technology, product, process, and technology life cycles (LCs). TM can be regarded as an R&D catalyzer (Namdeo et al., 2016).

TM has been considered as both a problem structuring and management framework, which could be combined through soft systems methodology (SSM) for extra development of the multi-methodology. Subjective and social constructionist principles are now implemented and translated to the real world systems on the basis of the more objective reality. Based on Checkland and Holwell (2004), TM can be regarded as a hard operations research (OR) method in which: it is the positivistic, functionalist, talks of systems and solutions, that ontologically supposes the functional and data models as a part of the real world, assuming that the system can be efficiently engineered to become goal seeking-orientated.

TM was defined as a multifunctional and multidisciplinary field by Phaal et al. (2004a); in their opinion, TM requires both commercial and technical functions combined with the academic perspectives (e.g. engineering, economics, business studies, social science, and psychology). Although not many practical methods were developed to undertake TM, they continued by a few TM-supporting conceptual models.

Chanaron and Jolly (1999) defined the task force on TM, which was also supported by the National Research Council as: “the management of technology links engineering, science and management disciplines to plan, develop and implement technological capabilities to shape and accomplish the strategic and operational objectives of the organization”. They justified the TM as a means to link the organizations’ technology profile to their objectives and goals.

In this chapter, TM process model will be explained; the SSM will be also reviewed as a Soft OR tool which can be incorporated in each phase. 2 case

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