Chapter 1
An Introduction to Soft Systems Methodology

ABSTRACT

Soft systems methodology (SSM) is the outcome of a real-world action research program that uses the idea of systems to improve poorly defined, so-called soft problem areas. Theory and practice of SSM arouse interest and encourage discussions from various backgrounds by academics and practitioners. In order to introduce SSM for use in the real world, this chapter begins with different definitions and methodologies of systems thinking. Then, SSM defines the seven technical analysis steps, including the soft systems thinking and the necessary techniques such as rich picture, CATWOE analysis, root definition, and conceptual modeling. SSM has organizational analysis and practical applications in the industry sector that are reviewed and classified.

INTRODUCTION

We have recognized that as human understanding of reality is developed, this reality can be seen as an integrated system network. This network involves the hierarchy of systems, subsystems, and elements ranging from the universe to the components, so that we can grasp the reality as an integrated system of separate components. Although we have found out that the physical world can be defined in terms of systems, it can also be of the cognitive world. In this sense, it can be seen that the cognitive world has more effects on human behavior than the physical world. For example, in a business environment,

human behavior assumes a complexity level that is currently impossible to predict precisely.

Using a set of skills called systems thinking, we can expect to further identify the deep roots of the complex behavior in the world to better predict the behavior and eventually, correct its consequences (Arnold and Wade, 2015). There are various ways to rationally interfere with human affairs according to systems thinking: to grasp the complexity of real world through the ideas of systems. Systems thinking addressed the ways of thinking about the problems and solutions via the "whole system" viewpoints (Behl and Ferreira, 2014).

Mathematics presents a general language that is commonly applied to the so-called "hard" problems. The elements of the unstructured or "soft" problems may be conflicting goals, ambiguous or complex information flows, people with different attitudes and perceptions, and so on. When such factors are involved, it is difficult to assess the suitability of a mathematical language. This chapter examines the development of systems thinking and emphasizes the soft systems methodology (SSM) as one of the systems approaches. SSM was designed by Checkland (1981) and developed by Checkland and Scholes (1990) as a tool to explore the unstructured problems.

This chapter starts with the systems thinking definitions mainly obtained from the literature review. Throughout the history of systems thinking, there are many different systems thinking methodologies. It is argued that the soft systems thinking is more relevant in the completely poorly defined conditions where human beings and cultural considerations are involved. In addition, SSM is described along with its techniques.

SYSTEMS THINKING DEFINITIONS

Jay Forrester (1994) mentioned that there is no clear definition or use of systems thinking. Systems thinking is sometimes used interchangeably with system dynamics (SD). Systems thinking means much less than thinking and talking about systems, and recognizing the importance of systems. Rather, the relatively superficial general awareness of systems is considered in systems thinking. In Table 1, the systems thinking definitions are compared.

Systems thinking revolves around trying to understand how the things are related to each other. Formal thinking, which includes the most scientific thought and actually the most academic effort, mainly aims to gain understanding about something by making it separate. Focusing on the relationship reveals the way something works and how it impacts its surroundings. According

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