

Chapter 7

Total–System Innovation Management: Concepts and Applications

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ABSTRACT

Innovation has been the driving force of economic growth and social progress. Today, innovation is viewed more than ever as one of the most important ways to resolve economic and social difficulties and sustain global development. Nevertheless, there is no widely adopted definition and unified framework for the innovation process and its management. This chapter develops a simple yet universal definition of innovation and uses a total-system approach to identify and examine the common key elements of many different types of innovation and to establish from which a unified framework for the development and management of an innovation process. This total-system approach is further applied to a particular key element, creative idea generation, to develop a number of practical techniques for its implementation.

INTRODUCTION

Human history has been the culmination of all types of innovations, from new technologies starting with fire and wheels to advances in agriculture, manufacturing, services, and weaponries; to

improved management concepts and practices; as well as to breakthroughs in theoretical knowledge and ideological principles. Today, in a globalized world with intense competition, increasing diversity, and expanding knowledge, innovation is viewed more than ever by international organizations, government agencies, and major corporations [e.g., OECD and World Bank (2008), United Nations (2010), White House (2010), and

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IBM (2013)] as one of the most important ways to resolve economic and social difficulties and sustain global development.

Even with such universal interest and attention, there is no widely-adopted definition and unified framework for the innovation process and its management. As pointed out by Roth (2009), most studies of innovation process have strong technology and economic emphases. Yet innovations are prevalent and equally, if not more, important in non-technological and non-economic areas, such as management concepts and practices, theoretical knowledge, and ideological principles.

This chapter proposes a simple yet universal definition of innovation and uses a total-system approach to systematically identify and examine the key elements and their interactions in an innovation process to establish a unified framework for innovation development and management, along with a particular application of the approach to a particular key element of the innovation process, creative idea generation.

BACKGROUND

There exists a large body of literature on developing a conceptual framework of the innovation process and its management, and a well-organized summary of the evolution of various generations of major frameworks of innovation process has been provided by du Preez, Louw, and Essmann (2008). However, these frameworks are diverse, lack of unity, and often incomplete or with special emphases.

This lack of unity may partly stem from a lack of agreement among definitions. Since a popular authority of English language, the Merriam-Webster Collegiate Dictionary (2013), has defined “innovation” as “1. The introduction of something new; 2. A new idea, method, or

device”, it is not unusual for many researchers to viewed “innovation” as synonymous to “new idea” or “invention”. Thus, as pointed out by Rothwell (1994), many early frameworks tend to focus on creativity, internal idea generation through technology push or demand pull, and external idea search and selection. Subsequent generations of frameworks [Trott (2005), Galanakis (2006), and Tidd and Bessant (2009)] have extended the innovation process to idea implementation, but still often neglected important key elements such as “seeking and providing initial support” for these new ideas. Moreover, practically no framework has included “societal and ethical considerations” in the innovation process and its management.

On the other hand, leading scholars and researchers have long concentrated on the tangible economic, market, technology, product, process, and method aspects of innovation. For example, Schumpeter (1934), revered for his groundbreaking theory on innovation, has focused the *economic benefits* of innovation; and even the innovation measurement experts at the Organization of Economic Cooperation and Development (OECD 2005) has formally defined: “An *innovation* is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organisation or external relations.” As a result, the major frameworks for innovation process generally have a strong focus on economic benefits and market returns as well as a predominant emphasis on technologies and products.

It is against this background of diverse frameworks, which are often incomplete or with special emphases and focuses that this chapter strives to develop a simple definition of innovation and use a total-system approach to establish a unified framework of the innovation process and its management.

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