Chapter 87
Composite Indices in Technology Management: A Critical Approach

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ABSTRACT

This chapter focuses on composite indices used in Technology Management (TM). It provides a critical comparative analysis of 5 indices, summarizes their structure, weighting process and emphasizes technology related components of indices as well as their advantages and disadvantages. The second part of the chapter examines the ranks of OECD and BRICS countries for Global Competitiveness Index (GCI), Global Innovativeness Index (GII) and Global Entrepreneurship Index (GEI), and further, we analyzed the correlations of GCI and GII pillars and clusters with the final ranks of countries. The research proved the presence and the importance of TM in the construction of the selected indices, but also identified that there is a lack of composite indicators used exclusively for TM performance which are measured globally by official institutions.

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INTRODUCTION

Today's global environment characterizes continuous and exponential technological growth and development. Thus, it is very important to manage technology and follow the trends of technological changes. This chapter argues that technology and innovation management is indispensable for achieving sustainable competitiveness at different levels in the economy. The chapter provides a clear overview of the selected composite indicators, criticises their methodological approaches and clarifies the role of technology and innovation management performance indicators in the construction of global indices.

The concept of technology management (TM) is evolving and now encompasses multiple dimensions and components. The interest of scholars in research of TM performance characteristics is rising. This results in a growing number of dimensions, relationships and aspects continuously being added and discovered, also resulting in multiple indicators, indices, models which show a rising complexity of TM. In the conceptual sense, this chapter approaches TM from the perspective of comparative analysis of the chosen development indices used for ranking countries with a dual objective:

1. To present the components of TM developed in different models for measuring competitive, innovative, technological, economic, development, etc., performance in order to establish TM performance indicators leading towards the creation of comprehensive and integral index and
2. To identify the position of TM, measured by its contribution and in relation to the chosen overall global, competitive, innovative, development indices.

The integral TM approach and concept involves many aspects and dimensions some of which are represented by the multiple indicators presented in the analysis.

Technology Management (TM) is alternatively referred to as Technology and Innovation Management (TIM) in both the literature and this chapter (Levi Jaksic et al, 2014a). The complexity of TM is reflected by the multiple definitions coming as a result of approaching TM from different angles, with the overall agreement of its central role in shaping the economic and social reality of firms, regions, countries, and the global world. Some authors list information management, innovation management, entrepreneurship, new product development, Research and Development (R&D) management, intellectual property, as the crucial components of TM that are "increasingly recognized as essential for continued corporate and societal well-being" (Atkinson & Correa, 2007). There is an ample evidence of a steep rise in the development of the scientific field of TM (Cunningham & Kwakkel, 2011) that corresponds to the practical need of "managing technology as the fundamental source of competitive advantage of firms and economies" (Eskandari et al., 2007). In this century, the technological innovations in areas such as materials, electronics, aerospace, computers, telecommunications, and biotechnology have influenced the rise of dominant forces in the world economy (Levi Jaksic et al., 2014a). Yet there are serious concerns about "our effectiveness in generating and exploiting technology" (Mallick & Chaudhury, 2000). The MIT Commission on Industrial Productivity cites weak technology management practice as a primary cause for the decline of competitiveness in many key US industries (Mallick & Chaudhury, 2000).

The perspectives of micro and macro-management of technology and innovation are becoming more closely related to an integral approach. Open and sustainable innovation with entrepreneurial action results in new business ventures transforming the economy and society towards sustainability (Levi Jaksic et al, 2014b). Also, Samara et al. (2012) emphasize that TM performance is an integral part of national innovation systems (NIS). NIS can be described as the set of institutions, which jointly and