

## Chapter 6.14

# Prioritizing Corporate R&D Capabilities: The Intellectual Capital Perspective

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### ABSTRACT

This chapter examines a comprehensive list of intellectual capital (IC)-related indicators for developing corporate R&D capabilities along the input-process-result (IPR) processes. Via factor analysis, 43 R&D related IC indicators were abstracted into 11 factors. Corporate R&D managers prioritized these IC factors by completing analytical hierarchy process (AHP) questionnaires. The results of AHP are as follows: (1) the

result phase is the pivotal of developing corporate R&D capabilities in three phases, (2) the top three weighting factors are the relational and process capitals (cost effectiveness to customers) in the result phase, followed by organizational capital (strategy fitness) in the input phase, and human capital (competency of R&D personnel) in the input phase; (3) strategy fitness in the input phase, project execution capability in the process phase; and cost effectiveness to customers in the result phase is the most crucial IC capabilities. Some discussions and conclusions were drawn.

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## INTRODUCTION

As Drucker (1993, p. 42) suggested, “The traditional factors of production—land, labor, and capital—have not disappeared. But they become secondary. Knowledge is becoming the only meaningful resource”. However, although the paradigm has shifted from manual work towards knowledge work, managerial awareness of the importance of “intangible assets” is quite low (Litschka et al., 2006). Guthrie (2000, p. 11) argued that “the limitation of the existing financial reports for capital markets and other stakeholders have led to a search for new ways to measure and report a company’s intellectual capital”, especially in the rising importance of the knowledge-based economy and information society. Intellectual capital is concerned with how better to manage and measure knowledge and other intangibles in the company (Mouritsen, 2002). Obviously, technological innovation has become the main source of competitive advantages for firms (Burgelman et al., 2004; Teece, 1987; Rothwell, 1992). It is well documented that R&D activities form the central element of technological innovation of firms (Cohen and Levinthal, 1990; Evangelista et al. 1997; Yam et al., 2004). However, the R&D processes are increasingly more expensive, costly and complex since the 1990s. How to manage corporate R&D capabilities in the intellectual capital view is a great challenge to many firms.

Previous research on IC proposed its structure and candidate indicators (Edvinsson, 1997; Stewart, 1997; Sullivan, 2000; Sveiby, 1997). Carlucci, Marr, and Schiuma (2004) showed that the management of IC directly impacts business performance. Furthermore, measuring intellectual capital can be used to help formulate business strategies and provide evaluation bases for venture capitalists (Liu, 2006). Yet, managers and researchers have experienced difficulties in conducting IC measurement model which includes measuring priority among candidate IC indicators (Mouritsen, Bukh, Larsen, & Johansen, 2002).

The chapter aims to measure R&D specific IC indicators to bridge this gap.

There are increasing studies to develop and evaluate weights of different dimensions and indicators of IC by AHP (analytical hierarchy process) in different firms, industries and nations (Bozbura et al., 2007; Chen, 2009; Han and Han 2004; Liu, 2009). Han and Han (2006) identified key IC dimensions and indicators that were better presented IC in the Korean mobile phone industry. Bozbura et al. (2007) identified the priority of human capital measurements by a group of IC academics and professionals in Turkey. Chen (2009) evaluated the weights of IC dimensions in the four Taiwanese high-tech firms. Finally, Liu (2009) mainly identified the importance of IC dimensions and indicators in the Taiwanese e-learning platform industry. However, few studies have empirically linked intangibles and corporate R&D capabilities. We argue that the weights of IC dimensions and indicators are R&D context-specific. This prioritizing of R&D capabilities provides a better compass to manage intangibles more effectively in the increasingly uncertain and complicated R&D activities.

The organization of this chapter is as follows. This Chapter reviews the definition and taxonomy of intellectual capital, categorizing R&D related IC indicators and proposing a R&D input-process-result framework. We explain the exercise of analytical hierarchy process. The results of AHP were shown. We compare the research results to previous literature. Finally, some managerial implications are drawn for R&D managers in firms and organizations.

## BACKGROUND

### Definition of Intellectual Capital

Teece (1986) argued that when established firms possessed some specific assets, they might prevent themselves from new entrants’ attack. He used the

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