



Pergamon

Journal of High Technology
Management Research 13 (2002) 143–156

THE JOURNAL
OF HIGH
TECHNOLOGY
MANAGEMENT
RESEARCH

Do competitive strategies drive R&D? An empirical investigation of Japanese high-technology corporations

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Abstract

This paper is an empirical study of the effects of competition strategy on research and development (R&D). Analysis of survey data from Japanese high-technology firms in consumer electronics, communications, precise machinery, and pharmaceuticals showed that the competitive strategies directed toward higher added-value and product differentiation exerted more impact on R&D than that aimed at cost leadership, and that strategies with broad market ambits were more important. We also found R&D to be fairly well integrated with strategic management. In sum, to enhance competitive advantage, Japanese high-technology companies tend to exploit R&D to create differentiated products with high added-value to supply a broad range of markets. © 2002 Elsevier Science Inc. All rights reserved.

Keywords: R&D; Competitive strategies; High technology; Technology-based firms; Strategic management; Japan

1. Introduction

The importance of research and development (R&D) in Japanese economic activity is well substantiated by the statistics. Corporate expenditure in R&D has been maintained at 2% of GDP since the late 1980s, which in turn accounted on average for 75% of the annual totals (Science and Technology Agency, 1999). Though spending moderated in the early 1990s due to the slowing economy, the numbers have reverted back to trend in the 3 years from 1995

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(Science and Technology Agency, 1999). Fundamentally, R&D in Japanese corporations tend to be devoted to commercializing technology, to enhance competitiveness, stimulate demand, expedite marketing, and to produce economies of scale and multiple market effects (Baba, Kikuchi, & Mori, 1995; Balachandra, 1990; Liao & Greenfield, 1998). In particular, an increasing number of companies subscribe to the belief that R&D can accelerate the introduction and application of technology to enhance and create demand, market value, and competitive advantage (Science and Technology Agency, 1995–1999).

R&D has emerged as a key factor in Japanese business. In recent years, many firms have attained strong domestic and international market positions in products created and developed by high-technology R&D (Hitachi, 1999; Matsushita, 1999; Science and Technology Agency, 1997–1999). The behavior of Japanese strategic management towards high-technology R&D has been explored in a number of studies (Herbert, 1990; Hull, Hage, & Azumi, 1985; Kuwahara, Okada, & Horikoshi, 1989; Liao & Greenfield, 1998; Ohmae, 1985; Science and Technology Agency, 1989–1999; Subramanian, 1990). Though important insights were obtained, empirical investigation into the relationships and links between these two core corporate activities has been limited. Following the approach of a previous work (Liao & Greenfield, 2000), we employ survey data to quantify and test the impact of the fundamental competitive strategies of cost leadership, product differentiation, and high value-added on the direction and scope of R&D in Japanese high-technology industry and manufacturing. In addition to the desideratum of enhancing value-added from new products, in such firms, R&D carries the expectation that technical breakthroughs would create values greater than that obtainable under trend conditions in the market. To extend the impact analysis beyond standard considerations of cost leadership and product differentiation, we propose hypotheses to test the importance of these two strategies relative to that aimed at higher added-value.

2. Competitive strategies and high-technology R&D

Seven hypotheses are presented regarding the effects of competitive strategies on R&D in Japanese industry and manufacturing, and of the possible integrative synergies between R&D and corporate strategic management. The hypotheses are then tested against survey data in the following section. In particular, we examine the problems comparatively across three industrial subsectors and four different-sized groups of companies. Given the relative newness of the field, it is hoped that in line with a time-honored approach (Friedman, 1956), our empirical results can contribute to an inductive foundation, which would then support efforts to model and analyze the relationships between corporate strategy and R&D.

Competitive strategies generically embody and implement the firm's desire to achieve cost leadership, product differentiation, and higher added-value (Bowman & Johnson, 1992; Porter, 1980, 1985; Schlie & Goldhar, 1995). Within this overall strategic orientation, the firm has the choice to develop products to satisfy a wide(r) range of commercial and industrial demands (relative to its competitors), or products which focus on specific market segments. Incorporating this consideration, corporate competitive strategies can therefore be classified as being orientated broadly or narrowly with respect to the market (Table 1).

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