CORPORATE STRATEGY AND PRODUCT INNOVATION

Second Edition

Edited by

Robert R. Rothberg

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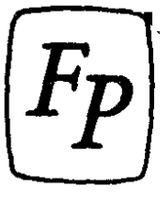

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Preface to the Second Edition

THIS SECOND EDITION CONTAINS a number of changes. They reflect new realities in the socio-economic and technological environment as well as the availability of significant new material. While a good deal of the content differs from the first edition, the basic organizing principles remain the same.

One change in the second edition is the new emphasis given to the role of law and government as a stimulus and barrier to innovation. Hollomon *et al.* catalog and discuss the various forms and points of impact, while Bennigson addresses the more specialized topic of product liability. A second change in this edition is the far greater emphasis given to product-planning matrices. Conley's classic paper, linking experience curves to the matrix, is now accompanied by papers by Day and Robinson *et al.*, which deepen and extend our understanding of this approach. Day questions the assumptions underlying this technique, while Robinson *et al.* show how a nine-cell version can be used in new ways in a highly competitive industrial setting.

The third major change in this edition is a series of seven new papers on concept generation and evaluation. If these papers can be said to have a common theme, it is that new problems also present new opportunities. Brown, Leaf, Keegan, and von Hippel all deal with opportunity identification—Brown, for instance, in terms of life-cycle costing, and Leaf in terms of analyzing competitor strategy and tactics. Green and Wind, Herbert and Bisio, and Souder, on the other hand, focus on newer or clearer approaches to concept evaluation. Souder, for example, compares eight different methods for screening new product proposals.

The fourth and final change of emphasis in this edition has to do with the internal dynamics of the innovation process within the firm. Abernathy and Utterback relate the nature of the innovation pursued to product/market maturity. Roberts examines the innovation process from the standpoint of the kinds of people required to make it function both efficiently and effectively. Vanderwicken looks at the process as practiced by Procter & Gamble, long regarded as one of the best-managed consumer goods companies in the country. In different ways, all three of these papers note that while it may be possible to institutionalize change, those in charge cannot afford to abdicate their responsibility for overall direction and control.

In the preparation of this edition I have once again relied upon the valuable assistance rendered by others. I would especially like to thank

Ben Barak of Rutgers University College, Merle Crawford of Michigan, David Furse of Vanderbilt, David Hopkins of The Conference Board, Burton Marcus of USC, and Mike Pessemier of Purdue for their advice and suggestions. A considerable debt is also owed to Barbara Amodeo, Natalie Henderson, Russ Nascondiglio, Dorothy Stalma and Willa Troutman for their assistance in collecting, copying, and preparing the source materials. Above all, I would like to thank my wife and daughter for their support and encouragement.

R. R. R.
Hillside, New Jersey

Preface to the First Edition

THIS VOLUME IS A PRODUCT of more than three years of course development work at Rutgers Graduate School of Business Administration. It was undertaken in response to a long-felt need for a book that could integrate strategic planning with new product development and, more importantly, could analyze both from an interdisciplinary perspective.

Product innovation has long been considered to be an important component of corporate strategy for survival or growth. Today it is vital. The squeeze on profits from current products, the need for higher profit margins, and the unceasing search for growth have turned corporated planners single-mindedly towards the objective of successful development and commercialization of new products. Corporate strategy is now inextricably bound up with the planning, structuring, and execution of new product programs.

The approach taken here recognizes that the process of strategic planning and new product development is inherently interdisciplinary in character. Successful management of this process requires the close cooperation of many specialists from diverse fields. These specialists, however, function under a severe handicap which can and does repeatedly undermine their efforts. This handicap is the almost total lack of understanding of any discipline other than their own. This book integrates diverse methodologies while extending reader comprehension and skills in dealing with issues of strategic planning and new product development. The discussion embraces consumer and industrial product-markets and is carried forward at a level appropriate to the thoughtful business student, be he a tyro or experienced executive.

The book itself is organized in four parts. Part I is entitled *The Importance of Innovation*. As its title implies, it is intended to convey the significance of new products to corporate survival and growth. Part II, *Strategy and Planning*, deals with the formulation of strategy and policy at corporate and marketing levels and with the organization of the new product function. Strategic planning provides the direction and discipline necessary for the efficient management of the process. Part III, *Concept Generation and Evaluation*, is concerned with the identification of promising new product ideas and their assessment from a development standpoint. Two points are stressed: first, that the quality of new product proposals is a function of both the number of ideas generated and the diversity of their points of origin, and second, that probabilistic concepts should be employed more frequently to help decide which projects should

be put into development. Part IV, *Development, Testing, and Commercialization* refers to those activities that take place after a decision has been made to translate the concept into a tangible market offering. Special emphasis is given to techniques that managers might find useful for decision-making and to concepts that may help them appreciate how potential buyers might respond to their new product initiatives.

"New" is not necessarily "better" in books as well as other product offerings. Classic articles are included in this collection regardless of their date of original publication.

No preface would be complete without acknowledging the valuable assistance rendered by others. I would like to thank David Aaker of Berkeley, David Luck of Southern Illinois, Stanley Shapiro of McGill, and David Wilemon of Syracuse for their helpful comments and advice. A debt of gratitude is also owed to Florence Adams, Michael Bucci, Stuart Gelbord, Howard Schwartz, Willa Troutman, and Arleen Troy for their considerable help in collecting, copying, and preparing the source materials. Above all, I would like to thank my wife for her personal and professional encouragement in the preparation of this book.

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Contents

I

THE IMPORTANCE OF INNOVATION

MOST COMPANIES now recognize that the key to their future survival and growth rests in a continuous flow of new and improved products. The five articles in this section provide important insights into some of the more dynamic elements of the innovation process.

Rothberg defines product innovation and explains how it has come to be an integral part of corporate strategy and planning. Marquis uses the findings of his classic National Science Foundation study on innovation to illustrate how a firm should go about identifying and taking advantage of its new product opportunities in an effective manner. Clifford outlines the product life cycle concept and shows how the diagnosis of incipient product line weaknesses can also be used to help set research priorities.

The last two papers in this section provide some insights as to why Murphy's Law* is so often thought to prevail in matters pertaining to new product development. Schon investigates the fear that innovation efforts frequently encounter within the firm. He notes that because fear is a function more of uncertainty than of risk, resistance to change can be expected to diminish as the project moves forward. Hollomon *et al.* conclude this section with an examination of the role of government in the innovation process. They also look at the experience of several other industrialized countries and propose a number of legislative and regulatory initiatives to stimulate technological innovation in the United States.

* Murphy's Law: If anything can go wrong, it will—and at the worst possible time!

1. Product Innovation in Perspective

Robert R. Rothberg

OVER THE PAST several decades business has come increasingly to the realization that new and improved products may hold the key to their future survival and growth. A host of environmental forces, including changes in consumer and competitor behavior, technology, and government policy have combined to make product innovation a vital element in the formulation of corporate strategy and planning.

The development of new products, however, remains an exceedingly difficult and challenging undertaking. It is difficult because the process of innovation is inherently complex, requiring the close coordination and control of a multitude of vastly different tasks. It is challenging because important decisions, often involving the very survival of the enterprise, must be made on the basis of very limited information.

This introduction has three purposes. First, it will define product innovation. Second, it will show how external forces have caused product innovation to become an increasingly important part of corporate strategy and planning. Third, and most important, it will outline a number of ways in which new products might be developed more efficiently and effectively.

Product Innovation Defined

"Product innovation," like "product" can be defined in several different ways. A product can refer to a physical entity or a cluster of anticipated customer benefits depending on whether the perspective adopted is that of the business or that of the market.

From a business perspective, therefore, a product innovation can be said to represent a change in, or an addition to, the physical entities that comprise its product line. From a market perspective, however, the term

refers to a new or revised set of customer perceptions concerning a particular benefits cluster.

That which is considered a product innovation by a business enterprise may not be recognized as such by its customers. Thus, the soap companies frequently change the chemical formulation of their detergents without publicizing the fact. The change may not be consciously recognized by the user. Conversely, a product innovation in the eyes of prospective customers may not be regarded as such by the business. An otherwise unchanged product, for example, may be repositioned in the minds of prospective customers through major changes in advertising, distribution, and pricing designed to attract new users and stimulate new uses. If, after repositioning, a majority of customers perceives this product to be a new benefits cluster, it is, by definition, a product innovation, or new product, from their point of view.

A business perspective is adopted here. Except where otherwise specified, a product innovation shall be defined as a change in, or addition to, the physical entities that comprise the firm's product line.[1]

Environmental Forces Affecting Product Innovation

The importance of new products to a company can be assessed in various ways. Their contribution to growth, for example, might be measured in terms of the proportion of increased company sales or profits that can be attributed to them over a given period of time. Consider Hewlett-Packard's successful line of pocket calculators. These accounted for roughly half of the average increase in H-P sales and roughly two-thirds of the average increase in H-P pretax earnings in the first three years following their original introduction.[2] While they no longer contribute nearly as much to corporate coffers, the funds they did generate have fueled the development and commercialization of a wide range of other H-P offerings. Moreover, their contribution to H-P's reputation for high-quality, technologically advanced products has also opened new avenues of market opportunity to the firm that otherwise would have remained foreclosed.

To assess the contribution of new products to business survival one must speculate on what would have happened if these offerings had not been introduced. The business landscape is littered with the wreckage of once-successful companies that neglected to develop new products while they still had the capacity to do so.

[1] A company develops new products for one of two reasons: a) to replace or supplement its existing offerings in their present markets; b) to serve new markets defined in terms of customer benefits or geography. It can develop new markets without new products by making appropriate adjustments in the pricing, promotion and/or distribution policies associated with an existing offering.

[2] Hewlett-Packard Company, 1974 Annual Report, p. 5.

Product innovation has become a vital element in corporate strategy and planning for a number of reasons outside the control of any single company. These include changes in consumer and competitor behavior, technology, and government policy.[3]

Consumer and Competitor Behavior

Two trends in the marketplace have been of major importance in stimulating product innovation: the increasing instability of consumer preferences and the growing intensity and sophistication of competition.

Consumer purchasing patterns have become increasingly less predictable over time as the result of rising discretionary incomes and expanding assortments of purchase alternatives. Rising incomes, of course, have contributed mightily to the absolute growth of virtually all markets over the past several decades. Growing markets not only attract new entrants with their own new offerings but force established firms in these markets to adjust or broaden their product lines in an effort to maintain or expand their sales.

Rising discretionary incomes also stimulate the development of new products in a second way, by encouraging prospective buyers to modify the weights they attach to various purchase criteria. Historically, low price has dominated the purchase decision. Rising incomes, however, allow consumers the luxury of spending more to buy products that more precisely fit their needs. This, in turn, stimulates the development of new products to meet the special requirements of particular market segments or product applications. New products stimulate other innovations. As the focus of competition shifts from price to product design, buying patterns become increasingly less stable or predictable, forcing business to continuously seek out new product and new market opportunities to further the realization of their own objectives.

Product innovation is also stimulated by the growing aggressiveness and sophistication of competition. This is a function not only of changing marketing and technological opportunities, but of the influx of professionally trained managers and the institutionalization of growth as a corporate objective.

Professionally trained managers are equipped to look at business problems and opportunities more objectively than managers whose perspective is limited by their experience in one particular field of endeavor. The professional is less likely to be influenced by emotion and precedent and more likely to try new ideas based upon a dispassionate appraisal of their merits.

[3] The forces discussed here represent trends in the business environment of relatively long duration. Speculations concerning the effects of more recent economic developments are deferred to *A Final Comment.*

Growth, measured in financial terms, has also become an end in itself over the past several decades, for reasons that range from the presence of attractive opportunities to the needs of a healthy organizational climate. Professional managers frequently see superior growth opportunities in the development of new products and new markets compared to more intensive efforts to improve financial returns within established product-markets. Competitors affected by these new initiatives are forced to respond in kind if they are to maintain any degree of control over their own destinies.

Changes in Technology

Changes in consumer and competitor behavior are not the only external forces affecting product innovation. Technological advances can have an equally profound effect, often leading to radical changes in the size and character of established product-markets.

Consider the development of large-scale integrated circuits (LSIs) and their use in pocket calculators. This has not only created a major new market for personal computational devices but has dealt a body blow to the market for conventional calculators based upon older electromechanical principles among industrial and institutional users. Rapidly growing calculator sales have also stimulated important improvements in the production of LSIs which in turn have led to dramatic price reductions and still further expansion of the pocket calculator market.

Improvements in product and process technology are often introduced to a wide variety of product-markets simultaneously. LSIs, for example, are used extensively in areas as diverse as computers and television sets, cash registers and automatic sensing devices. They offer a broad range of benefits to prospective users, including increased reliability and lower power requirements as well as smaller size and an expanded range of new performance capabilities.

This is the kind of competition that counts. Schumpeter referred to it as "the gale of creative destruction." [4] A common technological base sets limits to the intensity of interfirm competition within a given product-market, and when this commonality is broken the very survival of the disadvantaged firms may be threatened. The latter have no choice but to respond in kind if they are to maintain or regain their former marketplace position.

NCR, for example, has all but abandoned its traditional approach to cash register design and production in favor of electronics. Zenith, after trumpeting the merits of a hand-wired color television chassis for many

[4] Joseph Schumpeter, *Capitalism, Socialism, and Democracy,* 3rd Ed. (New York: Harper & Row, 1950), pp. 83–84.