

The Effective Management of Technology

A Challenge for Corporations

Sushil K. Bhalla

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For Michelle

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PREFACE

Most industrial corporations spend 40 to 70 percent of their pre-tax income on technology. This translates into the allocation of large capital expenditures and human resources towards maintaining, enhancing, and changing the direction of the businesses. Although technology plays such a major role in a corporation's performance, inadequate attention is paid to technological planning and management. Technology as defined here is products, processes, tools and devices, and their organization for use by people in fashioning goods and services. It includes research and development (R&D) but is not limited solely to R&D and encompasses all technical aspects of products and processes along with activities such as technology forecasting, technology licensing, and various support functions which are essential for the development and deployment of technology.

In the current state of planning, the major corporate emphasis is on marketing and financial issues, reflecting short-term financial results, micro-issues, and short-term resource allocation and funding. The position of marketing as a dominant function of business has evolved from the belief that a good marketing department can overcome all the business hurdles. This was the case after World War II, when there was an abundance of demand and fewer competitors. The marketing department was the key to full participation in this boom. Although the role of marketing is still important, the modern environment of vigorous competition, customer sophistication, and quickly advancing technologies emphasizes the need for additional talents in order to remain competitive in the market place. To market

a product it must be cost competitive, cost effective, and equal or better in quality and services than the competition can provide.

Today technological attributes, which play an important role in present and future costs and quality of the product, have become dominant criteria in product saleability. Heavy emphasis on marketing alone is not likely to keep a business successful. A combination of both technical and market factors controls the fate of a product line. Since these two functions form the heart of a business, their planning must be done in conjunction with each other, including inputs from both and resulting in an integrated technology/business plan.

Historically, there has been a time lag between the development of technology and its application in the market place. In today's environment, one of the biggest challenges facing corporations is reducing this lag. To do so technologists must understand key concepts of business management and business strategy. By the same token, business management must also understand key concepts of technology management and technology strategy. This will serve to achieve optimum results from technology to enhance the competitive position of businesses.

The essential ingredient for mutual understanding is a cohesive technology plan that is tightly integrated with the business plan. Such a plan addresses both market and technology forces ("Market Pull" and "Technology Push") which impact the competitive position and long term profit potential of a business, as well as factors that are important in the optimum utilization of technology. Some of the main reasons for the development of an integrated plan are to:

- Utilize technology-based resources to create an overall competitive business edge by addressing technology, business, and optimum human resource utilization
- Develop products ahead of the competition in areas of need identified by strategic business planning even though existing techniques fall short of fulfilling that need
- Visualize and respond to future needs and threats beyond the scope of a business plan
- Develop a portfolio of technologies to respond to business threats and opportunities
- Provide a realistic approach to the development of new products and technologies
- Coordinate technology and business philosophies
- Handle environmental, safety and product quality issues before they become a threat.

Today's industrial corporations face a critical challenge from three fronts: maturation/decline of conventional businesses; increased substitution from newly developed products; and heightened competition from developed and newly developing countries, both in domestic and international markets. These issues have become increasingly important in the fast changing environment of global competition. To maintain and enhance their competitive position, corporations have adopted a number of strategic planning techniques, most of which were developed by business consulting companies. The portfolio planning approaches are being used widely by diversified industrial corporations. The portfolio planning provides a mechanism for optimizing existing businesses, but does not address optimum management and utilization of technology and human resources.

This work was undertaken to review key strategic business planning concepts and their impact on business and technology and to bring out factors important in the effective management and utilization of technology and human resources. It does not provide a recipe for a quick fix, but rather, it gives material necessary for a rational process of managing technology in concert with business. Technology cannot be managed effectively unless one understands the strategic business planning process and basis of its development.

The book is divided into three distinct sections. The first section (Chapters 1-3) deals with the origin, concept, and rationale of strategic business planning; the development of various techniques used in evaluating businesses; and the impact of implementing strategic planning on businesses, technology, and human resources. The second section (Chapters 4-6) deals with the management of technology, how it has changed over the decades, its existing status, and future challenges. It also details salient features in the management of technology and the role of top management in the effective utilization of technology. The third section (Chapters 7-10) deals with the role of technology in new business development, either by internal development or acquisition, and the impact of corporate culture on innovation and motivation. It also details the methodology of integrating technology and business planning process and a means of implementing it within a corporation.

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