

textbook will be most valuable to researchers who study decision making within the medical field. It may also be useful as a textbook for a course on medical decision making, if supplemented by additional background on medical risks.

Taking Technical Risks—How Innovators, Executives, And Investors Manage High-Tech Risks, by Lewis M. Branscomb and Philip E. Auerswald, 2001, Cambridge, MA: The MIT Press

Reviewer: Maurizio Pompella, University of Siena

The difficult life of technical innovators and the gaps which have to be covered in order to cross the “death valley” (where the majority of innovative projects fail) give a satisfactory idea of how tough is the way from scientific breakthroughs to market prototypes, or throughout the book—in other words—how difficult it is to control purely technical risks and market risks at the same time. The financial gap between funding of research and resources to be invested to put the projects in practice, the research gap between the initial idea and a market-suitable product, and also the trust gap—or the information asymmetry—between technologists and managers, may seriously affect the underwriting of high-tech risks. Technical breakthroughs no longer coincide with products themselves, as it was once; there is now a difference between an innovating concept and a product ready to be launched. This is the central subject of the book, and also a very typical insurance topic, as everybody can see and realize, although this is not emphasized throughout the work as it could have been. In fact, the risks necessarily related to all innovative projects are normally shared, and risky activities may be undertaken—under insurance mechanisms—which would not have been possible otherwise.

At the very heart, the problem originates from the fact that different, sometimes conflicting interests stand on the valley sides. On the one hand “inventors” and technologists are responsible for research and follow the reasons of science, often paying attention to feasibility more than to the impact of proposed innovations. On the other hand investors, and particularly managers, are responsible for decision-making processes and risk firm reputation and money, so that they follow the reasons of market.

The volume takes the form of a monograph that is divided in chapters, as usual; among the chapters a series of papers (“contributed essays”) can be found, however. These were mostly chosen from the commissioned contributions of a report on “Managing Technical Risks,” which was sponsored by the Advanced Technology Program of the NIST (National Institute for Standards and Technology) in the late nineties. Together with the academics, a series of practitioners were involved in the project, and two preliminary workshops were organized to approach the matter. Thus, most of the “added value” comes from the choice to combine continuous, often implicit, reference to theory—from Schumpeter on—with the point of view and the experience of professionals, whose opinions are quoted throughout the book.

The Introduction is devoted to elucidate the aims and structure of the book. On the other hand, the first chapter (*Between Invention and Innovation*)—having introduced the discussion and presented two case studies—offers a useful definition of *success* and *failure* in terms of objectives. Institutional, personal, and project objectives are discussed to evaluate technical uncertainties and failure risks. The corresponding

contributed essay (*Technical Risks, Product Specification, and Market Risk*, by George C. Hartman and Mark B. Myers) gives the subject a concrete form, by explaining how research, technology development, and product development activities are structured at the Xerox corporation, according to a model adopted to identify/quantify technology risks and market risks.

Risk and uncertainty are analyzed in the following chapter (*Defining Risks and Rewards*). However, this is not a purely analytical approach, for a “soft way” is chosen to treat the related statistical concepts: *the quantification of technical risk is as much an art as it is a science*. Some of the methodologies to assess the technical risks are mentioned here: (1) the two-part appraisal, evaluating the global risk as the product between the probability of technical and the probability of commercial successes; and (2) the mapping of the research, development, and commercialization process, in order to simulate a series of scenarios through which a model is to be obtained. Then the problem of the interdependence of technical and market uncertainties and the low predictability of changing “specifications” of products, as the development process goes on, are treated.

The second essay (*The Dual-Edged Role of the Business Model in Leveraging Corporate Technology Investments*, by Henry Chesbrough and Richard S. Rosenbloom) emphasizes—by the illustration of three cases—the relevance of the business model applied to bringing about the success of decided investments. In particular, it explains how an established business model may cause a twofold problem, either by masking the potential of a new technology or by exaggerating the reward expectations.

The institutional differences between firms in terms of corporate size and structure, as far as technical risk-taking is concerned, are the subject of the third chapter. Here the ways the innovations can be created—i.e., internal development, external acquisition, or collaboration—are discussed. Large, mid-size, and start-up companies are compared, in order to explore how they approach the matter and what are the advantages each of them may enjoy, by adopting a different mix of the three innovation strategies. Then the “external ways” to bridge the gap between research and market are considered in detail, and the role of universities (with the phenomenon of creation of new firms from university research), as well as the one of partnerships and consortia are explained.

The relevant evidence found by the authors here is that the relations with institutions outside the firm organization may provide a way to compensate differences between competitors, in terms of size and market experience. Some sort of summing-up closes the chapter, and describes the opportunities for large, specialized SMEs, and new firms, in terms of resources, management style, and expectations.

Raising Mice in the Elephants’ Cage is the meaningful title of the subsequent contributed essay, by James C. McGroddy. “There is more than ample evidence that mice are unlikely to survive and prosper when raised in the elephants’ cage.” The metaphor expresses the thesis supported by the author: the style of management of large, established enterprises is ill-adapted to the development of radical innovations and changing technology, as they normally develop plans having a high degree of certainty of execution. “Large companies [...] are organized to succeed in doing what they do well: managing and growing large businesses”; in so doing, they often fail

to capture new opportunities, and lose market share to the benefit of smaller, newly emerging players, which have no dominant position in their sector.

If applied to research-based innovation projects, portfolio strategies consider that a fairly large, diversified set of investments should allow a positive outcome, even if most projects were to fail. This happens because of high returns coming from a few successful projects, standing far above the average. Chapter Four (*More Ways to Fail Than to Succeed . . .*) addresses the question if—and in which cases—portfolio strategies represent a profitable choice, and reviews the alternatives available to manage the risk of both technical and market failure. The same two case studies introduced in the first chapter appear again to complement the section, and are analyzed in depth.

The essay that follows (*Technology Policy for a World of Skew-Distributed Outcomes*, by F. M. Scherer and Dietmar Harhoff) is strictly related to the latter chapter. It demonstrates how for a given sample—using a series of Monte Carlo simulations—returns from innovations are “skew-distributed” (mostly log-normal), and proves the limited value of a portfolio approach. Besides, it tries to address the difficult question if the mentioned skewness—at the aggregate level—could have any macroeconomic implication (at the level of a whole economy, *might the real business cycles [. . .] be attributable in part to randomness in draws from a skew-distributed universe of innovative opportunities?*). Maybe, but the answer cannot be univocal, and the authors—cautiously—suggest that the hypothesis is a good subject for future research.

Also a good question is the title of the last essay, the fifth: *Will Industry Fund the Science and Technology Base for the Twenty-First Century?* Well—as emphasized in the chapter that comes before the essay—this seems to be a matter of barriers to be overcome, and the government has a crucial role in boosting technology based innovations, by removing the institutional obstacles and by encouraging innovation. Most of the section, thus, is dedicated—apart from a review of the “institutional requirements” to face technical risks and to succeed—to state and federal programs to promote innovation.

The responsibilities of government are also underlined in the conclusions (*The Changing Landscape: Innovators, Firms, and Government*), where the relevant trends driving the U.S. innovation system and the *Institutional Requirements for an Effective System of Innovation* are dealt with. *Indeed, the environments that foster technological innovation—institutions, networks of relationships, culture, and traditions—are as exceptional as successful innovations themselves. [. . .] Helping to create and support such social capital is among the most important and difficult challenges for public policy in the coming century.*

Silent Spill: The Organization of an Industrial Crisis, by Thomas D. Beamish, 2002, Cambridge, MA: The MIT Press

Reviewer: Brian J. Glenn, Harvard University

There is a rich and well-established literature by those who employ issue definition and agenda setting analytical methods to examine environmental disasters. Anthony Downs, for example, described the rise and fall of issue attention cycles as they pertained to ecological disasters, explaining how solutions have to be found and implemented before the news reports move on to the next crisis. Studies of pollution by John Gaventa and problem definition by Barach and Baratz revealed that a problem is

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