What the Future Holds: Insights from Social Science

Edited by Richard N. Cooper and Richard Layard. 2002. Cambridge, MA and London, England: The MIT Press. Pp. 285. $29.95 hardcover.

The authors in this interesting book of essays repeatedly emphasize that forecasting is difficult, especially when the time horizon is a quarter century or more into the future. But, as the editors point out in an introductory chapter, most human decisions, whether by individuals, businesses, or governments, involve making judgments about the future. "The oracles of today are science, which generates the new technology, and social science, which evaluates its impact upon human society." Forecasts go wrong, but forecasting should not be abandoned; "systematic study of the future leads to clearer understanding."

The origin of this book was a conference held in Oxford in July 1999 to address how to think intelligently about the future. The editors are outstanding scholars. Richard N. Cooper is Maurits C. Boas Professor of International Economics at Harvard, and Richard Layard is Director of the Center for Economic Performance at the London School of Economics. The book is composed of a series of essays by specialists writing about specific areas in viewing the future: the use of scenarios, population, energy, climate, work, monetary policy, government, and cybernetics (the science of communication and control in animate and inanimate systems).

Because of the difficulties in predicting the future with any precision, the first section discusses the use of alternative futures, or scenarios. Scenarios must have their roots in the present or represent patterns that have been observed elsewhere. Demographic developments are considered next. Today's population and age profile tell much about the next two decades, yet a Twentieth Century Fund forecast made in the early 1950s that the world population in the year 2000 would be 3.6 billion was too low by an estimated 2.5 billion! Nevertheless, a forecast for the world population for 2050 places it between eight and twelve billion, with accompanying developments such as changing attitudes and the role of women, pressures for migration, and adaptation of agriculture and extension of aquaculture. Also, as the population ages, it increases at a decreasing rate and becomes more urban.

The section on energy cites past forecasts of total energy and oil consumption that were significantly wrong, both underestimating and overestimating the actual results. Most forecasts for the early twenty-first century indicate a world still dependent on fossil fuels, although some hope is held for creating incentives for alternatives through taxation and regulation. Climate change is considered because one of the undesirable effects of the heavy use of fossil fuels may be a significant change in the global climate. The discussion in this section is quite technical, as forecasting here is a complicated process using mathematical models of the earth's climate that reflect basic principles of physics and are fitted to historical data. These models are "shocked" with growing emissions of carbon dioxide in the atmosphere caused by use of fossil fuels. Then the next century of climate is simulated to discover what would happen to surface temperature, precipitation, wind velocity, and other variables. Translating these developments into public policy depends on assessment of the social impacts of climate change, as well as the costs and benefits of taking particular actions.

The section on work identifies several qualitative trends in the workplace. Those trends are: increased employment of women in higher paying jobs, the increase in average skill and age of workers, the shift in the world labor force to developing countries, the shift in manufacturing to these countries, the decline in manufacturing employment in rich countries, growth in employment in health care and personal services, and the widespread use of information technology at the workplace and in the market. The practical significance of these trends leaves room for continued debate.

New technology makes it easier and less costly to make payments electronically, with balances or lines of credit extended by many commercial institutions other than traditional banks. Such a development would undermine the ability of central banks to steer the economy by means of monetary policy, requiring possible alternative ways to influence the economy.

Government is discussed in terms of the way technological change impacts political life, as an increasing number of problems can be dealt with only by international cooperation (e.g., climate change, transboundary pollution, financial stability, trade policy, labor migration, and capital mobility). But "the logic of greater

economic interdependence may move us to a more diffuse structuring of political authority."

The final chapter considers placing future forecasts in their intellectual and historical context. In the 1960s and 1970s, three schools of thought emerged. The first school focused on technical achievements, that is, "the influence of new technologies on the change and continuity of social and economic structures in the highly industrial countries (above all, the United States), predicting the post-industrial society as a kind of information or knowledge society primarily based on the innovative potential of pure scientific knowledge as well as on the new information technologies." The second school applied the cybernetic approach to global politics and global interactions, predicting the emergence of (or the hope for) a kind of planetary society. The third school focused primarily on the role of values and social norms as crucial factors of change, predicting (or hoping for) the emergence of a *trans-industrial society*, which would bring the dominance of a new collective consciousness of social integrity based on a (spiritual) unity between man and nature.

All three schools of thought assumed that technology drives change, not just in changing methods of production, but also institutional arrangements, social norms, and cultural values. All three schools of thought produced reasonably accurate forecasts of technological change but exaggerated the malleability of social institutions and cultural values. These observations may provide helpful guidelines in projecting the future.

For a business economist whose concentration is not just near-term forecasting, this book will provide stimulating and different viewpoints on assessing the future. A current popular buzz phrase is, "Think outside the box," and this book clearly encourages thinking beyond the daily chores of predicting the next month or year. It will not tell you what the future will hold, nor do the writers claim they can do so. But the book contains provocative ideas, overlooked relationships, and challenging hypotheses that will broaden horizons and stimulate the reader's own thinking about the future.

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Managing New Industry Creation.

By Thomas P. Murtha, Stefanie A. Lenway, and Jeffrey A. Hart. 2001. Stanford, CA: Stanford University Press. Pp. 268. $34.95 hardcover.

This book presents the results of original research, and its contents are illustrated well by its two subtitles: one carried above and one below the title: "The Race to Commercialize Flat Panel Displays" and "Global Knowledge Formation and Entrepreneurship in High Technology." This dual theme runs throughout the 199 pages of text. (The other 69 pages are devoted to copious footnotes, appendices, and an index). The three authors—two professors of management, and one of political science—endeavor to give us details on one specific sector as well as insights that can be transplanted onto other industries. For the most part, they are successful in this quest. On balance, this book is worth reading by those economists who have an interest in high-tech industries and in the birth of new industries in general.

The content is organized into nine chapters, with catchy titles to arouse our interest, such as "What's Wrong with This Picture?" and "Surviving the Killer App." Four of the nine chapters carry the word "knowledge" in their headings; however, while this central concept is often cited, it is not fully explained. There are four useful tables, with three of them comparing knowledge-driven organizations with those that are product-driven. In the former, speed is the value proposition, while in the latter it is either cost leadership or product differentiation. In contrast to the four tables, the five figures are weak to the point of being meaningless: most of them have a single line rising at forty-five degrees with the axes carrying weak labels and no unit measures.

The authors have done a yeoman task of talking to participants in the flat panel display industry in the late 1990s. A total of 160 high-level, high-tech individuals from three key nations—the United States, Japan, and South Korea—were asked to discuss their views of the sector, over time and across corporate and national boundaries. This is highly commendable and seldom found in other industry descriptions. The text attempts to integrate their insights with published data from governments, private sector sources, and the authors' own views. We see the heroic efforts in the R&D labs as well as the race to commercialization. These integrated descriptions ring true many times, but in several places they are belabored and repetitive.

Three major findings emerge from this study of the flat panel display sector—which itself is diverse and complex, with the displays being small and large, embedded in both

consumer and industrial goods—that can be transplanted to other industries. First, while product development is important, the underlying development process is equally crucial. The process consists of many steps: the interaction of scientists and engineers in the laboratories, testing and pilot plants, assembly operations, and moving into the marketplace. The excitement of innovation and collegiality coupled with managerial decisions is conveyed quite well.

Second, while competition is the traditional mode of business, cooperation can be—and often is—highly useful to both individuals and corporations. The book demonstrates the old adage of never burning one's bridges: the rival of today may well be the partner of tomorrow. All kinds of formal and informal strategic partnerships, alliances, and joint ventures spring up. There are also insights and some analysis on pioneers vs. followers in the flat panel industry (yes, some pioneers do have arrows in their back).

Third, there is the notion of knowledge creation, with the authors emphasizing the trinity of learning, continuity, and speed. Two of these are elaborated on, for example, explicit vs. implicit learning and the need for speed, but the notion of continuity is never clearly enunciated. Also, there should be more material here on individual vs. organizational learning. Furthermore, the important topic of scaling, that is, moving from small-scale bench production to vast factory output, is not tackled in the depth that it deserves.

At the end of the text, the authors marshal several appendices that contribute to the chapters, including a detailed chronology over the twentieth century; a list of the 160 interviewees; and tables showing price trends, market leaders, and sales (though offering only limited data on market shares). The last appendix is a list of abbreviations. However, it is incomplete (e.g., "CVD-chemical vapor deposit" is omitted) and should have been put up front.

In addition to the specific problems identified above, the book has some general shortcomings. First, it would have been better if the authors had cast their nets a bit wider. There is no reference to C. Christensen's recent in-depth studies of innovation and strategic management (both text and cases); Peter Senge's and others' work on organizational learning; Sahal's in-depth study on technical change and the crucial role of scaling; and, Pelz and Andrews' pioneering work on the sociology of scientists, wherein they demonstrate how such professionals become more productive by doing subprofessional work. Taking this body of research into account would have helped place the book in a broader context. Second, a major disappointment in the book is that readers often do not get, despite the 160 interviews, the specific role that leading scientists played in technical advances and how top managers speeded the race to commercialization. Perhaps in future research with this unique data, the authors can focus on this question. Third, a sharp editorial pencil would have helped readers see the forest through the individual trees. The text, full of acronyms, dates, names and numbers, has a tendency to run dry.

These shortcomings should not obscure *Managing New Industry Creation's* commendable features. It is a useful, thoroughly documented contribution to business economists' understanding of the process of creating and being successful (and sometimes failing) in a new industry.

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