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Book Review

[Book Review of] Handbuch
Technologiemanagement, Erich Zahn (ed.) :
Stuttgart, Schäffer-Poeschel, 1995

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and harmonization of fiscal policies in the context of monetary unions. But in view of constraints on the length of the volume, the choice of subjects to be covered can be justified.

Overall, therefore, the volume should be particularly useful for graduate and advanced undergraduate students who want to get clear and thorough overviews of the fields covered. In fact, I have already included some of the chapters in the reading list for my graduate course on international macroeconomics. Priced reasonably, I would not hesitate to propose to my graduate students that they acquire this volume.

Hans Genberg

Zahn, Erich (Ed.), *Handbuch Technologiemanagement*. Stuttgart 1995. Schäffer-Poeschel Verlag. XXIV, 1104 pp.

Political and academic discussions of international economic relations have come to be dominated by a widespread concern over technology: Which technologies hold the greatest promise of future payoff and economic growth? What does it take for a firm, a region, a country to compete successfully in the race to make these technologies available? And who will ultimately benefit, who stands to lose from new technologies? A consensus seems to be forming at least in so far that technology, instead of being a free good, rather is an asset which is productive only if looked after and managed with care.

Beyond this, the management of technology is uncertain terrain, a subject of research still in flux. Among the many questions yet to be settled is the old economic issue of the appropriate level for decision making: Should all management of technology be left to individual firms or should country-wide organisations, including central government, be involved? In other words, should countries adopt active technology policies, should governments be in the business of selecting promising technologies for promotion and subsidised development?

The Japanese Ministry of International Trade and Industry (MITI) is often regarded as a successful example of such anticipatory technology management at the national level. The US administration seems to have moved closer to the Japanese model under President Clinton, whose council of economic advisers is headed by Laura D'Andrea Tyson, an advocate of 'cautiously activist' technology policies aimed at market outcomes. In Europe, the triad's third pole, Germany is the biggest economy, yet German views on technology issues have hitherto been less vocal and, indeed, less clearly defined.

Handbuch Technologiemanagement brings together much of current German thinking on the management of technology and therefore deserves an international audience. The heavy volume contains contributions not only from a variety of academic disciplines, including engineering, business administration, the natural and the social sciences, but also from practitioners of both industry and politics. The book may be used as a guide by managers and politicians, and as a source of reference and information by economists seeking to understand the outlines of what Rosenberg (1994)¹ has called a road map of the science/technology landscape in advanced industrial economies.

The book divides the subject matter into eight parts, each of which comprises several chapters, by different authors, focusing on different sub-topics. Part I is meant to lay the *foundations* of technology management and includes a chapter by the editor (*Erich*

¹ Rosenberg, N. (1994). *Exploring the Black Box. Technology, Economics, and History*. Cambridge: Cambridge University Press.

Zahn, University of Stuttgart) on the definition and purpose of technology management, critical reflections on historical applications of basic scientific knowledge in industry (*Walter Kaiser*), an essay on the management of fundamental innovations (*Walter Kroy*) and brief studies on technological trends in five areas of special interest in the current policy debate: microelectronics, mechanical micro systems, biotechnology, environmental technologies and production process technology.

Part II, the book's centrepiece, provides detailed descriptions of specific *functional tasks* of technology management in the industrial firm. These tasks include the formulation of entrepreneurial strategy, the development, maintenance and exploitation of distinct technological competencies, and the management of interfaces between research and development (R&D) and marketing (*Klaus Brockhoff*), between supplier, producer and customer (*Stephan Schrader*) as well as between members of strategic technology alliances (*Alexander Gerybadze*).

Part III addresses *organisational* implications of technology management, emphasising the need for efficient communication (*Torsten J. Gerpott*) and ongoing organisational change (*Knut Bleicher*). – Part IV explains a variety of methods proposed for the management of technology. Six chapters introduce methods of managing creativity and knowledge (*Erich Zahn* and *Jürgen Greschner*), technology forecasting (*Horst Geschka*), technology assessments (*Meinolf Dierkes* and *Sophie Mützel*), the evaluation of technological alternatives (*Werner Pfeiffer* and *Enno Weiß*), development projects (*Bernd-J. Madauss*) and the controlling of R&D (*Péter Horváth*). – In Part V, *practitioners* from various industries give their own accounts of the central issues and characteristic difficulties in managing their respective technologies, namely information technology, pharmaceuticals, chemicals, machinery, automotive technology, aircraft, multimedia and services.

Part VI is devoted to an *international comparison* of current practice in the management of technology: *Frieder Meyer-Krahmer* and *Guido Reger* take a look at the machinery industry in Europe and assess government efforts to support the diffusion of new technical knowledge in this area; they argue that the classical instruments to promote technology transfer should be complemented by new institutional arrangements, by active policies to create specific new markets, and should be guided by long-term demand forecasts. *Ronald S. Jonash* reports recent developments in the United States, while *Kazuhito Kondo* discusses some of the current challenges to technology management by individual firms and by the government in Japan. In addition, *Ursula Weisenfeld-Schenk* compares the strategies of leading countries in biotechnology.

Part VII discusses *technology policies* and some endemic difficulties with technology transfer in Germany. *Heinz Riesenhuber*, a former Minister of Research and Technology, commends five features of current German technology policy as efficiency enhancing: (i) the creation of a strong technology infrastructure (including the Fraunhofer Gesellschaft for applied research) to promote technology transfer and counselling for small and medium-sized firms; (ii) R&D subsidies and tax credits targeted at technologies whose markets are in their infancy; (iii) support for Europe-wide R&D alliances (especially among small and medium-sized firms); (iv) fiscal demand for selected large-scale technologies (as in the case of European aerospace technology); and (v) regulatory measures to set quality or environmental targets for private R&D. Further goes *Lothar Späth*, a former *Ministerpräsident* of Baden-Württemberg and now an influential industrialist in Eastern Germany. He calls for an 'entrepreneurial technology policy', by which he means public investment programmes targeted at high technologies deemed 'strategic' by recognised experts from industry, government and academia alike.

Part VIII rounds off the volume with two essays on the complex interrelationship between *technology and society*. *Günter Endruweit* explores current thinking on the

feedback relationship between technology and culture. In similar vein, *Reinhard Löser* criticises conventional technology assessment practice for ignoring feedback and for pretending a one-way causality from technology to society (and the environment). But, Löser argues, the indisputable impact of society on the strategic development of technology actually creates a responsibility for government to help form a consensus on national technology strategies which would provide '*Leitbilder*' for decentralised political, academic, and economic decision making by public and private agents alike.

The need for a consensus about technological goals and values, at a level above as well as within the individual firm, is a recurrent theme in many of the contributions to *Handbuch Technologiemanagement*. Indeed, there are repeated references to 'synergies' which allegedly can be exploited efficiently only by managing the respective complex system as one integrated entity. It is in this spirit that several chapters praise the system of technology management at Daimler-Benz, the well-known car and lorry manufacturer recently transformed into a widely diversified high-technology conglomerate with large stakes in aircraft, defense, electronics and financial services. However, by the time the *Handbuch* was published, Daimler was still in the depths of a prolonged structural crisis at least partly caused by its preceding take-over binge. This is a fact not mentioned in the book. It is a pity that *Handbuch Technologiemanagement* lacks rigorous *economic* analysis and thorough *empirical* studies to critically examine the sometimes highly controversial claims made by individual authors.

Michael Stolpe