**Book reviews**

*Vikalpa* welcomes readers to contribute reviews of books of particular relevance to management issues in developing societies. Please send your contributions to Professor Rushikesh Maru.

*Industrial strategy and technological dynamism in machine tool manufacture: Comparative perspectives on India and Japan*
By Ron Mathews
Reviewed by Shekhar Chaudhuri

*Higher education and the new international order: A collection of papers*
By Bikas C. Sanyal (ed.)
Reviewed by Jandhyala B.G. Tilak

*Quantitative techniques for managerial decision making*
By U.K. Srivastava; G.V. Shenoy, and S.C. Sharma
Reviewed by B. Subba Rao

Increasing technological gap between the western world and developing countries is one of the significant causes of the widening economic disparity between them. The international arena in science and technology shows a predominance of the industrialized countries of the West. This is evident from the differences in R & D expenditure between the industrially developed and the less developed countries. There are a number of studies which have sought to unravel the reasons for the technological stagnation of Indian industry. The research under review is one such example. The author has attempted to understand why the Indian machine tool industry has not been dynamic. He has juxtaposed India's experience with that of Japan and the Soviet Union to arrive at some policy implications for the rejuvenation of the Indian machine tool industry. The report is organized into six sections with an introduction detailing the research methodology used for the study. Starting by emphasizing the significance of indigenous machine tool manufacture in the developing countries, the author examines two types of strategies for the machine tool industry: one, pursued by nations in the western world, termed as the traditional western paradigm and the other termed as the “Soviet Model.”

In the third section the author describes the strategies followed by India and Japan in developing their machine tool industries and evaluates their performance against four criteria: (i) growth of output; (ii) technological self-sufficiency; (iii) efficiency in production; and (iv) innovation (the last factor being dealt within the fourth section). In the penultimate section, the author attempts to analyse the various factors which might have been responsible for the divergence in the technological dynamism of the two countries' machine tool industries. The last section draws some implications for policy at the national level.

The work, no doubt, is extremely interesting and timely as the Indian government is now at a crossroads in terms of policy in a number of areas. Though there has been a general trend towards liberalization of various regulations relating to capacity increase, foreign collaboration, etc., many observers of Indian industry believe that the government has to liberalize the various regulations further to create an environment conducive to technological dynamism, cost competitiveness, and product innovation. This seems to be implied by the author of this report too when he says “… a crucial requisite for internal and external market improvement of the sector is the progressive introduction of efficiency inducing measures through the removal of structural and institutional barriers to competition…” (p. 56).

While I agree with this policy implication for developing the Indian machine tool industry, there are serious questions regarding the research methodology used for the study. The study is based totally on secondary data; that too, very sparse. In a number of sections the author arrives at certain conclusions without much evidence. The conclusions are mostly based on other articles and books or some unsystematically conducted interviews. The author has attempted to encompass a broad canvas in too little space. He has attempted to include historical, sociological, economic, and cultural factors which have contributed towards the uneven development paths of Indian and Japanese machine tool manufacture, without being able to do justice to all of them. A few specific points which I would like to highlight are the following:

1. A major issue arising from this research is regarding the basic methodology used by the author: can the performance of the Indian machine tool industry be really compared with that of Japan? Though the production of machine tools in numbers was almost the same for both India and Japan in 1946 it is not a good enough basis for a comparative study. If the study were to be placed in a historical perspective, as the
author claims to have attempted, it would be clear that though Japan's physical industrial infrastructure was partly destroyed, it had already a highly developed industrial culture which was not insignificant to the later resurgence of her industries. One fact of this could be gauged from the fact that during the 10 years preceding the end of the Second World War, on an average, Japan produced more than 41,500 machines per year.

It only shows the kind of skills, capabilities, resources, and the kind of orientation various segments of Japan's economy had to be able to produce and absorb such a massive output. Compared to this, India's output during the years 1942-45 was a paltry 1,956 machines per annum. For India it was only the beginning of political freedom attended by the traumatic experiences of the partition of the country. The country, torn between different ideologies had to struggle to find an identity before it could attend to the task of building industries. Development of the machine tool industry hinged on the simultaneous development of a large number of input supplying industries. Though Japan also had to pass through traumatic experiences after the war, the grounds for comparing her performance with that of India seem to be week. Also, one must remember that Japan received a very large amount of aid from the US for her rehabilitation.

In passing, the author has referred to the experiences of the Soviet Union in comparative perspective. That too must be qualified by the fact that by the time India achieved independence, the Soviet Union already had a rich experience of centralized planning for about a quarter century.

2. The traditional western paradigm of tool manufacture has been described as "one that emphasizes innovation and capital replacement as the motive forces operating between the machine tool users and machine makers in an economy. The primary conditioning elements for the effective functioning of this approach turn on such considerations as high market absorptive capacity for machine tools; a high demand for output; a high degree of competition; and reasonably high level of specialization being obtained ..." (p.12). One is not sure whether such a typical western paradigm exists. The West consists of a large number of countries and there are bound to be vast differences in the strategies adopted by say, the US, Belgium, UK, France, Sweden, Finland, Denmark, and the Netherlands depending on their distinctive skills, capabilities, and resource positions.

If one considers the data provided by the author, the US tool sector consisted of 505 establishments in 1958. According to the author, there was a high degree of market specialization as evidenced by the fact that in the same year three firms produced most of the milling machines; three firms made most of the gear manufacturing machines; two firms most of the internal grinders, which also goes to prove that there was very little competition in these product market segments. This contradicts the basic tenet of the traditional western paradigm of tool manufacture, that is, the existence of a high degree of competition.

Besides, some of the basic conditions of the traditional western paradigm also seem to be common to that of the Soviet Model: for instance, a high absorptive capacity for machine tools; a high demand for output; and high levels of specialization.

3. While evaluating the performance of the Indian machine tool industry, the author provides production data from 1941 to 1980. He mentions that though the output of the industry was increasing in value terms, it was fluctuating in physical terms. In fact, India was manufacturing less number of machines in 1980 than in 1964. The author only provides a speculative reason for this kind of industry behaviour. Instead of exploring the reasons for the same, he merely says that the reason could be the possibility of increasing sophistication and capital intensity of output.

4. An interesting similarity has been brought out by the author between the characteristics of the Japanese, the US, and the Soviet machine tool industries. In
Japan, the largest manufacturer of engine lathes in 1978 accounted for only 14 per cent of the market with the largest five firms accounting for 48 per cent; for horizontal boring machines the respective figures were 36 per cent and 58 per cent; for milling machines, 31 per cent and 86 per cent; for NC lathes, 19 per cent and 64 per cent, and for machining centres, 12 per cent and 52 per cent. In the US, as mentioned previously, three firms were dominant in gear manufacturing machinery; three in milling machines, and two in internal grinders. In the Soviet Union, out of 170 plants, 60 were specialized producers. Three firms made all gear manufacturing machinery, two made most of the milling machines, and one most of the radial drills. Though the similarity in market concentration is evident, the differences are not clear. It is clear that the Soviet Union’s industry had a high degree of plant specialization. Do the Japanese and US industries too have a high degree of plant specialization? This could be a major element of strategic difference.

5. The author concludes that "...operational efficiency increases in direct proportion to the degree of specialization ..." (p.47). As evidence he says that in Japan the group of companies which had workers between 50 and 99 had plant specialization ratio of 94.2 (machine tools' sales as a percentage of a firm’s total sales) and a labour productivity of Yen 23 million per worker as compared to Yen 14 million per worker for the group of companies having more than 5,000 employees and a plant specialization ratio of 1.1 per cent. Though apparently the logic seems to be correct, there are some pitfalls in this kind of reasoning. It is not clear whether the labour productivity factor calculated related only to the machine tool operation of the firms, because it is this ratio which should be compared. If finer distinctions were to be made, then the machine tool business of the multi-product companies need to be disaggregated further and a correlation between the size of the machine tool business and the index of product-market diversity of the machine tool business divisions could be developed. It is not clear why the machine tool division of a multi-business company cannot be as efficient as a company making only machine tools having a similar product range.

6. The author has touched upon the cultural factor as an important one influencing the technological dynamism of the Japanese machine tool industry. Though one cannot deny this, the subject could be the topic of a separate research. A large number of academicians have studied facets of what is known as “Japanese Style of Management” in recent years and the list of publications in this subject is growing larger day by day. In all fairness, therefore, the cultural factor would need separate treatment.

7. It is not clear from the report what is the difference between the terms “machine tool branch” and the “machinery building branch.” In a number of places these terms have been used; however, one is not sure whether they have been used interchangeably or they have different connotations.

8. Lastly, I would like to state that the report reviewed has achieved its purpose of evoking a debate on this important subject. It would have made a greater impact had the author attempted to describe the characteristics of the Indian machine tool industry in greater depth rather than providing only sketchy data on aggregate production and some facets of HMT. The Indian machine tool industry is quite complex. Side by side with the larger units there is a thriving so-called “unorganized” sector. Then there are giants like the TELCO, which manufacture highly complex and precision machinery for captive use. There are many other firms, largely Indian standards, which have captive machine tool manufacturing capacity. These aspects of the industry have been strongly influenced by the Indian government’s industrial policies from time to time. The author has rightly brought out the inadequacies of HMT in its machine tool business. However, this has to be seen in the light of the compulsions under which the government had almost no other option but to set up public sector units in a host of industries.

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The importance of education in socio-economic development has been recognized ever since the days of Adam Smith. However, education received a big push in late fifties and sixties of the present century with the famous Presidential Address of Theodore W. Schultz to the American Economic Association in 1960, which was later aptly described as “human investment revolution in economic thought.” But during the 1970s public opinion changed considerably against education, essentially because of the rapid growth of number of educated unemployed both in developed and developing countries. The academia as well as planners, administrators, and politicians quickly responded to the situation on both the occasions. The studies on screening hypothesis in the field of economics of education added fuel to the fire. I feel that the rejection of economic justification for investment in education in the 70s is not totally justified. Education, which is essentially a long range investment activity, would be able to produce the results good or bad, only in the long run. But without waiting for any more time, it was concluded that the “golden days of the economics of education are over.” Accordingly, neither the UN Declaration on the New International Economic Order, nor the Brandt Commission’s North-South referred to the role of education. Ever since, the educationists and notably the economists of education began wondering whether education has any role at all in the New International Economic Order (NIEO). Hence, since the late 70s we find increasing trend in the number of studies on “education and new international (economic) order.” UNESCO understandably played an important role in this. For instance, the UNESCO International Institute for Educational Planning (IIEP) organized a seminar on “Contribution of education to the new international order” (jointly with National Institute of Educational Planning and Administration) in Delhi in 1979. The UNESCO Institute for Education brought out a special issue on “Education and the new international economic order.” (International Review of Education, 28(4), 1982.)

The book under review reflects yet another extension of the concern of the UNESCO IIEP on the same theme. It contains 11 papers including a chapter on introductory overview by Bikas Sanyal. The contributors include two noble laureates in economics (Theodore Schultz and Jan Tinbergen), present and past practitioners at UNESCO and other UN organizations (Bikas Sanyal, Malcolm Adiseshiah, and Rafael Salas) and eminent social scientists like Samir Amin, Jean-Louis Reiffers, etc.

It is easy to start by mentioning two minor weaknesses of the volume. Being a collection of independently written papers by 12 individuals each having his/her own perspective on the problem, the volume lacks coherence as it contains generalized discussions by some and highly theoretical analyses by some others. Secondly and more importantly, the volume hardly helps us in better understanding of the nature of NIEO nor does it explain clearly the role of higher education in the NIEO. It is not to say that the papers in the volume are useless. There are highly valuable analyses of the higher educational systems in the world—some giving a global perspective (e.g., Malcolm Adiseshiah, Jan Tinbergen, etc.), some a third world perspective (e.g., Theodore Schultz, Samir Amin, Pablo Latapi, Fuenzalida, etc.) and some a developed world perspective, e.g., Suchodolski, Ahmed and El-Nashar, Reiffers, etc.), and each at the same time based on a country specific perspective.

Higher education the world over is being severely criticized. Further, it is widely felt that the higher education systems are “neither aware of nor seem concerned with the challenges of the NIEO.” Hence the reader opens a volume with a title of this kind with high expectations but sadly does not get totally satisfied, even though there are some excellent papers on the problem.
The volume presents two major viewpoints: higher education has a significant positive role to play in the country's development, and this in turn in the NIEO. On the other hand, according to the other viewpoint the traditional relationship between higher education and country's development and that between higher education and NIEO are highly questionable. Theodore Schultz holds the former viewpoint, while Samir Amin takes the latter position. Schultz attaches "price tag" to higher education and Amin argues for basic conditions to be fulfilled if education has to provide an effective answer to the problems of development. Schultz notes that higher education is involved in several achievements in developing countries and his sympathies go with higher education: "Higher education is always limited by the availability of resources" (p.57). On the other hand, Amin finds that "Education is becoming dysfunctional, a sort of useless luxury for an ever increasing majority of the population" (p. 154). Amin describes the role of education in social reproduction, transmission of ideology, transfer of technology, and in short the "crisis of modern world." He vehemently argues that unless: (a) education combines in itself theory and practice, (b) education concerns itself with all of the population (equality); and (c) critical assessment of the ideology and forms of education is made, it cannot be expected to make any positive contribution to NIEO. Schultz presents a sympathetic treatment of higher education. Higher education suffers severely due to certain limitations such as resources; but the expectations of higher education appear to be virtually unlimited.

The remaining papers in the volume fall into either of these two categories. Tinbergen assumes significant relationship between third level education and development and argues, however, for integration of education planning with socio-economic planning. Similar to Amin, Edmundo F. Fuenzalida discusses the problem of subordination of higher education to the policies of developed countries. Schultz's optimistic view is shared by Pablo Latapi and Mohamed Moursi Ahmed and Mohamed Hamdy El-Nashar. Latapi argues that universities in the developing countries are capable of aiding their countries in overcoming dependence and attaining self-reliance. While Latapi foresees decline in dependence on the part of the less developed countries of the world on the developed countries and improvement in the self-reliance of the former, Jean-Louis Reiffers argues that "the concept of integrated cooperation will inevitably come to the fore." In two separate papers, two specific issues are taken up—one on higher education and New Cultural Order by Bogdan Suchodolski and another on population education in NIEO by Rafael Salas.

Despite some of the drawbacks mentioned earlier, the volume is one of the best of its genre and should be widely read mainly because of stimulating analyses of the problem and the fascinating questions raised by several contributors.

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The motivation for writing this book has come, as the authors say in their preface, "from the lack of contextually relevant and a comprehensive book on quantitative techniques, which is sufficient to provide rather substantial course of study for two to three semesters." There is a felt need to meet the requirements of a good text book on quantitative methods in the Indian context. Many of the text books used for students of management have been written by American authors. The relevance to the Indian situation of such text books has always been questioned. Text books on operational research or statistics have been penned by Indian authors with different audiences in
view. To my knowledge the present book appears to be the first book aimed at students of management, combining both operations research and statistics.

The book is in two parts, Part-I dealing with various topics in statistics for managerial decision making and Part-II dealing with operations research topics for managerial decision making. There are 13 chapters in Part-I and 10 chapters in Part-II. In addition, there is a Part-III covering the basic mathematics required for a better understanding of the techniques used in the book. A listing of most commonly used statistical tables at the end is a useful addition.

Of the 13 chapters in Part-I, chapters 2, 3, and 4 are devoted to descriptive statistics and chapters 5 and 6 are on probability and random variables. The classical probability distributions are covered in chapter 7. Chapter 8 describes sampling and sampling distributions. Testing of hypotheses and confidence intervals are covered in chapter 9. Correlation, regression and multivariate analysis, time series analysis, and index numbers are covered in chapters 11, 12, and 13. Chapter 10 deals with decision making under uncertainty.

The coverage of topics under statistics is more than adequate for students of management. Some topics have been included to cater to the needs of students other than in management, as the authors have said in their foreword. Using this book for teaching the management students, I have found that the chapters on time series analysis and index numbers are not of much relevance. A somewhat greater detail in sampling distributions and statistical inference would have been welcome. Definitely a more detailed exposition of decision analysis to include utility theory, subjective probability approach, and one shot decision making would have added to this important area from the point of view of management students.

Coming to the operations research part of this book, there is a chapter on linear programming followed by the chapter on transportation problem. The network analysis used for project management is dealt in chapter 17 and simple queuing systems are considered in chapter 18. Chapters 19 and 20 deal with inventory control models and replacement decisions. Sequencing models, integer, dynamic and goal programming models, and simulation form the subjects of chapters 21, 22, and 23. Chapter 16 deals with theory of games.

The selection of topics for coverage under operations research is fairly exhaustive. In using this book for management students, I found that chapters on linear programming, transportation problems, waiting lines, and inventory control analysis were quite useful. In a single semester course on operations research, it will be difficult to cover all the topics. It would have been better if chapter 22 included a little bit of network flows and non-linear programming. From the point of view of relevance, the topics on theory of games and sequencing do not add much.

Overall, this book is a very good attempt at presenting under a single cover various quantitative techniques which can be covered in two to three semesters. The authors have taken great pains to provide a number of problem-sets at the end of each chapter. It is very gratifying to note that these problems and the examples are made relevant to the Indian managers in business context. A further highlight of the book is the summary of the important ideas presented at the end of each chapter under "At a Glance." One minor drawback of the book is the printing which could have been better.

If an instructor's manual and solutions to problems are provided, it would be of great help in using the book in courses.

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