

**"The Economics of Information Technology: An Introduction"
by Hal R. Varian, Joseph Farrell, Carl Shapiro, Cambridge
University Press, Cambridge, 2004, pages 102, Price Rs. 795**

This book provides probably an ideal introduction on economic factors affecting information technology industries. It is concise and is organised into two main sections. The first section of the book outlines the economics of Information Technology (IT) industries. This section asserts that better information for existing industries in the IT sector and demand and supply-side economies of scale lead to concentration in the high-technology industries. The second section is very relevant for countries like India where the IT sector is rapidly developing. This section analyses the role of Intellectual Property Rights (IPR) in information technology industries. It discusses whether the existing IPR regime function is intended to stimulate innovation and thus promote long-run competition or whether the system is out of balance, granting excessive IPR rights and could be improved so as to avoid retarding of innovation. The study briefly mentions about some of the important economic factors affecting IT industries like high fixed costs and low marginal costs of production, large switching costs for users and strong network effects. Considering the revolution which the development of IT brought in the world of communication and commerce, it is not wrong if one points out, internet as one of the greatest inventions in recent times and there is a need for new economics to understand how this revolution will change economic laws.

The introduction of the book correctly assesses that during the 1990s there were three events that stimulated IT: *viz.*, (i) telecommunications deregulation in 1996, (ii) the 'year 2000 problem' (Y2K problem) in 1998-99 and (iii) the 'dot com' boom in 1999-2000. In this context it may be mentioned that, the 'Y2K problem' is the "single phenomenon" that launched India as a serious player in the international software scenario. The huge demand for software engineers and programmers from India to fix the Y2K glitches gave a good starting point for the IT sector in India and marked the beginning of the outsourcing era in India.

The authors connote internet boom as a "combinatorial innovation". This means that innovation can be combined and recombined to create new products. They point out that the lack of physical constraints has facilitated the rapid progress in internet revolution. The internet revolution may not be a major invention compared to the technological developments of the past but the uniqueness of this revolution lay in the fact that it involved immaterial components like programmes and there were no delays in manufacturing or shipping. Innovators everywhere could combine and recombine this software to create a host of new applications.

The study point out that price discrimination is important in high-tech industries for two reasons: First, the high-fixed-cost and low-marginal-cost technologies observed in these industries often lead to significant market power. Second, IT enables for fine observation and analysis of consumer behavior allowing various marketing strategies that were earlier difficult to carry out.

The book under review discusses privacy issues and points out that these issues are of trust, *i.e.*, consumers want to control how information about them is used. Seller of IT goods can offer prices and goods that are differentiated by individual behavior or characteristics. Under first-degree price discrimination, firms will charge the highest price they can to each consumer, thereby capturing all the consumer surplus. Second-degree price discrimination refers to a situation where everyone faces the same menu of prices for a set of related products. It is also known as "product line pricing", "market segmentation" or "versioning" and is widely seen in the market. For example, newspapers are available online and in physical form. Similarly, movies are available in theatres, on tape, on DVD, and on TV. In short, information goods can be sold in different versions. Versioning is good in that it allows markets to be served that would otherwise not be served. This is the standard output-enhancing effect of price discrimination.

Third-degree price discrimination is selling at different prices to different groups. Armstrong and Vickers (2001) observe that when consumers have the same tastes and there is a fixed cost of servicing

each consumer, then competitive third-degree price discrimination will make consumers better off. The reason is that competition forces firms to maximise consumer utility. Another form of price discrimination in high-tech markets is price discrimination based on purchase history. Fudenberg and Tirole (1998) investigate models where a monopolist can discriminate between old and new customers by offering upgrades, enhancements and the like.

The study discusses, bundling, which is, the practice of selling two or more distinct goods together (Adams and Yellen, 1976). This is particularly attractive for information goods since the marginal cost of adding an extra good to a bundle is negligible. In this case according to the book, there are two distinct economic effects: reduced dispersion of willingness to pay, which is a form of price discrimination, and increased barriers to entry. Bakos and Brynjolfsson (1999, 2000, 2001) have shown that bundling significantly enhances firm profit and overall efficiency, but at the cost of a reduction in consumer surplus.

The book rightly points out that the welfare theorem assumes that competition benefits consumers, if the variables for the firms are prices, innovation and quality choice. However, firms may also compete on other dimensions that may reduce welfare such as political lobbying, *etc.* This book indicates that the choice of dimensions in which to compete has not received sufficient attention in existing literature and this is an area for future research.

The study describe three forms of competition in standard setting, *viz.*, (i) standards war (in which tactics such as penetration pricing to build an early lead, etc are adopted), (ii) standards negotiations (here each prefers its own standard to the other's) and (iii) standards leader (in which a leading firm wants to maintain a standard but a group of small firms wants to interconnect with the standard). Standardisation reduces the cost due to economies of scale in manufacture and reduces the risk associated with supplying idiosyncratic parts.

Part two of the book complements its first part by focusing on IPR. IPR play a major role in creating competitive advantage in the

information economy than what it did in the agriculture and industry. This section provides an overview of the IPR regime in the USA. The study mentions that currently the debate is active on whether copyright law must change. On the one hand, certain copyright holders express concern that modern IT is permitting piracy to become rampant, and the internet is serving as "one giant copying machine". On the other hand, critics of copyrights assert that copyrights confer too much power, either to control how works are used or to keep works out of the public domain for many years.

The book discusses two schools of thought on incentives for innovation which is very interesting, *i.e.*, the 'incentive school' and 'openness school'. The incentive school focuses on whether an innovator can capture a large portion of the benefit of his or her creation. This school thinks of innovation that is "1% inspiration, 99% perspiration". Perspiration will be more forthcoming if it is well paid. The openness school, by contrast, feels that there are incentives for innovation—often stronger than intellectual property like social recognition, career advancement, *etc.*

Patents, a reward for successful innovation, confer exclusive rights leading to monopoly. Since the costs are substantial, the policy of granting patents only makes economic sense in cases where it is sufficiently likely that chances of innovation would be substantially reduced or delayed in the absence of a patent. This insight is reflected in the legal requirements that the invention be "novel" and "non-obvious". Despite many studies on this topic there are no quick answers to this question of incentives to inventors. In this context, it is very interesting to note that, IBM pledged 500 of its existing software patents to the open-source community, to be placed into a patent "commons" that allows open-source software developers to use the innovations and build upon them without risk of infringement. One of the reasons for this unusual step is the fear that they risk undermining innovation. The patent commons is meant to help restore the balance. Many companies such as Nokia have taken similar initiatives (*The Economist*, October 22, 2005). The book under review, however, does not mention much about this very novel and important trend of 'open-source'.

The patent holders can issue licenses permitting others to use their inventions. Patent holders can earn more profits by licensing their patents than by withholding it. From the welfare angle, licensing allows diffusion of new technologies. The book point out a pertinent point that unlike stronger patent protection, which at best can promote innovation at the expense of diffusion, licensing can simultaneously promote both innovation and diffusion. Cross licenses are used for utilising patents of each others' invention.

The study mentions about the distinction between trade secrets and patents. Trade secrets are information that individuals or companies possess but do not share. However, unlike copyrights and patents, trade secrets lose protection once they are out in public domain. Trade secret protection is weak in that the owner of the trade secret cannot prevent others from using the same know-how if they discover it independently. Therefore, the decision for keeping the new technology secret or file for a patent is very critical. The *quid pro quo* for obtaining a patent is the disclosure of the invention to the public, making it more likely that other firms will attempt to use the patented invention or even build on it to obtain their own patents. However, the patent is hard to enforce and will last for only 20 years. On the other hand, trade secrets can be kept indefinitely. The study points out that many experts are calling for reform to the US patent system. The major problem identified is that of patent quality: too many "questionable" patents are issued by the Patent and Trademark Office (PTO). One reason cited for this is that the existing means of challenging issued or prospective patents are inadequate.

The study conclude that intellectual property- copyrights, patents and trade secrets-will play an important role in the 21st century and IT will comprise a greater proportion of economic activity. The authors make a very valid observation that copyright law and patent law are under pressure to evolve as IT advances very rapidly. The fight between those who benefit from the current system, with its careless standards for the issuance of patents and those who bear the costs of those patents, also is increasing. The book predict that in the near future the US patent system will be reformed to reduce the number of "questionable" patents.

The book is very relevant in this age of IT and inventions. It is very focused and informative. The authors cite many other important works in this area which enable the readers to get a wider picture and diversified view of this topic. It may be recalled that, many economists have pointed out that nowadays disparities in the productivity and growth of different countries have far less to do with their abundance (or lack) of natural resources than with the capacity to improve the quality of human capital (knowledge). The information and communication technology revolution is crucial as it involves technologies meant for the production and dissemination of knowledge. Ideas are to the information age what the physical environment was to the industrial one. Just as pollution or an irresponsible use of property rights threatens land and climate, so also a too tight intellectual-property inhibits invention. IPR greatly influence the switching costs. This study correctly points out that finding the right balance will test the industry, policymakers and the public in coming years. It is also true that as the developing countries like China, and India increase the patents in their name; the developed countries may start to see the present IPR system from a different perspective. The book under review is very topical and relevant for India in the context of its rising IT sector. Developing countries should take all precautions to make its patent rules and IT laws well balanced and compatible to the overall development of these countries. The numerous examples on the unique characteristics of the IT industries add the merit of this study. In short, this book will be an asset for all those who are interested in a study of IT, IPR and related area.

Brijesh Pazhayathodi*

* Shri Brijesh Pazhayathodi is Research officer in the Department of Economic Analysis and Policy of the Bank