

BOOKS & ARTS

Future tigers of innovation

Manufacturing in China and India has seen huge expansion, but California's Silicon Valley can breathe easy — the countries are still some way from becoming world innovation leaders, explains **Ming-Wei Wang**.

**The Venturesome Economy:
How Innovation Sustains Prosperity in a
More Connected World**

by Amar Bhidé

Princeton University Press: 2008. 520 pp.
\$35, £19.95

Written during these times of economic instability and job insecurity, *The Venturesome Economy* by Amar Bhidé examines innovation and its market in an era of rapid globalization. Bhidé, a professor of business at Columbia University, New York, provides an analysis of the nature and mechanism of innovation.

He examines the relationships between know-how and products to stress that innovation can materialize only when there is a benefit to the public. Ownership of intellectual-property rights and practical use of innovation dictate the economic return to inventors and to those who financed or participated in its development, regardless of where the innovation originated.

Innovation is divided into three layers: ground-, mid- and high-level. Bhidé clearly lays out the importance of mid-level innovation: the capability to develop products. It bridges high-level creativity and ground-level production, allowing the formation of novel products or services. Outsourcing research and manufacturing activities to poorer countries does not affect this capability, as innovation proves to be a dynamic ecosystem that involves many participants and aspects of society. "The different forms of innovation interact in complicated ways, and it is these interconnected, multilevel advances that create economic value," he says.

Using many interviews with business executives and reliable statistics, Bhidé points out how venture-capital participation is crucial in pushing innovation into the market. Many discoveries that are later developed to benefit the public are supported in their infancy by venture-capital funds. This mechanism is a key vehicle among Western nations for transforming creative ideas into commercially viable products or services.

The Venturesome Economy also explains that cutting-edge research performed overseas can ultimately help production and consumption for domestic users. Sending research and development (R&D) activities offshore to China and India, for example, is good for the United States and Europe. In a persuasive analysis from historical and scholarly perspectives, Bhidé convinces us that this outward activity frees innovators in



China's manufacturing power turns innovations from other countries into consumer products.

the United States and Europe, allowing them to pursue more intellectual endeavours, as long as they retain ownership of the inventions and have a dominant role in sales and marketing — both crucial to realizing the value of innovations.

Bhidé recognizes concerns that outsourcing research activities will challenge the supremacy of the United States and other developed countries in terms of technological innovation, and hence their national interests. In reality, this is unlikely to happen at present. Although the United States is facing huge financial problems, its economy is the largest in the world, around four times larger than China's and almost twelve times that of India, according to World Bank data. The United States has a tradition and culture of innovation and has the largest consumer market, which is very receptive to new products and services. Although China is the largest producer of modern goods for the international market, its capacity for consumption has yet to catch up, providing no immediate competition to US consumers. In addition, lower tolerance to failure, a need for more cohesive teamwork, insufficient development experience — that is, mid-level innovation — and deficient venture-capital mechanisms continuously hinder China's attempts to become a major leader in the global innovation arena.

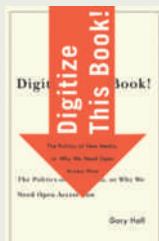
Bhidé agrees that concerns about China taking over US scientific supremacy are unsubstantiated, and "arise from a failure to appreciate the complex nature of the modern innovation system and its interactions with globalization". It took more than 50 years to develop California's

Silicon Valley, and one cannot expect it to be reproduced overnight in China or India, despite massive infrastructure expansion in both countries and booming outsourcing businesses. An essential spirit of Silicon Valley is respect for entrepreneurship — risk-taking and accepting failure have become part of the unique culture that continues to exalt innovations from generation to generation. It also attracts many immigrants from all over the world, forming a pool of talent that is indispensable to its success and fervour. Innovation is not only about science and technology, but extends to management, finance and culture.

A venturesome economy relies on what Bhidé calls 'venturesome consumption', without which the benefits of innovation cannot be realized: "the willingness and ability of intermediate producers and individual consumers to take a chance on and effectively use new know-how and products is at least as important as, if not more important than, its capacity to undertake high-level research," he writes. Becoming an innovative nation requires scientific and technological superiority, and mastery of the commercialization of innovation to benefit from it.

However, the current financial climate has caused significant difficulties in raising venture-capital funds. The economic gloom has resulted in dwindling resources for R&D as venturesome business has become less attractive to wary investors. There is also a lack of funding for early-stage research compared with the disproportionate amount being spent on late-stage product development. Without

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Gary Hall argues for the importance of free, worldwide and perpetual access to scientific research results in *Digitize this Book!* (Univ. Minnesota Press, 2008). He focuses on the benefits and problems of open

access for academic and research purposes, discusses the global effects of new media and asks to what extent increasing Internet use has changed political decision-making.

Two new books discuss the effects of technology on society. *Beyond: Business and Society in Transformation* (Palgrave Macmillan, 2008) looks at how it is



influencing areas such as science, religion, art and politics — and what we can expect in the future. Studying how technologies have altered education has led Mario Raich and Simon L. Dolan to predict the rise of a 'virtual culture' in business and society, in

which physically distant individuals are linked by shared purposes online.

William E. Halal's *Technology's Promise* (Palgrave Macmillan, 2008) uses data gathered by the TechCast Project at George Washington University in Washington DC to predict how current problems, such as food shortages or the energy crisis, could lead to future opportunities. Assessing developments in genetics, energy and space travel, Halal speculates on how greater access to global information will provide opportunities for developing nations.

Innovative India Rises (Medialand, 2008), edited by veteran science writer and political journalist L. K. Sharma, presents a broad view of India's innovation. Scientists, policy makers and businessmen, justifiably proud of what India has achieved, assess the problems it faces and the future it may attain. Authors discuss India's aspirations in space and the potential benefits of space technology on the ground. Energy, defence and biotechnology also get an in-depth look. The volume updates a previous version written a decade ago.

Jenny Meyer

such crucial resources, innovation faces obstacles in getting off the ground.

In *The Venturesome Economy*, Bhidé provides a thorough discussion of the relationship between venture-backed business and globalization. Asserting the global influence of the United States, he explores the complex synthesis of innovation in an increasingly open international market. He also emphasizes the importance of embracing the ever-changing market and not fearing the false alarms and paranoia that strike an unpredictable economy. Fortune can be invited only by discourse with other countries

and by encouraging their advancement and development. The venturesome economy will establish itself on such frankness to innovation in a constantly changing world. ■

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For more on innovation, see www.nature.com/nature/focus/innovation/index.html.

India's scientific legacy

**Technology at the Core:
Science and Technology with Indira Gandhi**
by Ashok Parthasarathi
Addison-Wesley Professional: 2008.
348 pp. \$29.99

The end of the Second World War saw the beginning of decolonization in many countries. Among the nations that became free, India is unique in having a firm science and technology base. This exists because the nation was led by a visionary prime minister, Jawaharlal Nehru, who strongly believed in directing science and technology for the development of the emerging nation. Nehru's dialogue with high-ranking scientists, such as Shanti Swarup Bhatnagar, Homi Bhabha and Daulat Singh Kothari, led to practical solutions for how to achieve it. Another fortunate circumstance was that Nehru had a long tenure of 17 years at the helm, during which India enjoyed political stability.

It is against this background that one should read *Technology at the Core*. The author's father, the late G. Parthasarathi, was a senior diplomat and close confidant of prime minister Indira Gandhi, Nehru's daughter. And author Ashok Parthasarathi worked for several years in her secretariat, making him eminently qualified to write an account of how she handled issues relating to science and technology. Indeed, in several places he cites instances showing the informality of her interaction with him.

Mrs Gandhi, as she was widely known, succeeded her father two years after his demise, and like him, she had a soft spot for science and technology. "It was Indira Gandhi who brought scientists, engineers and technocrats into policy-making and managerial positions," explains Parthasarathi. Nehru, by contrast, saw them more as laboratory workers and thinkers.

This book focuses on the years 1967 to 1977

and 1980 to 1984, when Mrs Gandhi was in power and when Parthasarathi was able to observe, report on and somewhat influence the events that were important enough for the prime minister's intervention. Since Nehru's time, major science and technology issues in India, such as space and atomic energy, have been handled by the prime minister. Parthasarathi was initially appointed special assistant to Vikram Sarabhai, the Chairman of the Atomic Energy Commission. In 1970 he was moved to the prime minister's secretariat, where his job was administrative in nature but required good scientific knowledge. His varied roles included briefing the prime minister, preparing drafts of her speeches, acquainting her with the progress of meetings — including complaints about bureaucratic delay — and reminding her of previous enabling decisions of the cabinet.

One might imagine that science-related decisions would be taken rationally. That image receives a knock if one reads the accounts in this book. One learns that Sarabhai gave an unrealistic future estimate of nuclear power generation without consulting his second-in-command at the Atomic Energy Commission, Homi Sethna, who had the engineering experience. The Department of Atomic Energy continued to have internal quarrels between engineers and scientists. The book also describes controversies from the Council of Scientific and Industrial Research, with one director-general reportedly victimizing the favoured staff of his predecessor.

There are hints of bigger controversies. When the Indian National Satellite System was being constructed, Mrs Gandhi insisted on finding out who was involved in the tendering procedure. She suspected that one of her senior ministerial colleagues was trying to influence the bids. Advance payments were reportedly sent to suppliers of defence equipment in the United States shortly before the US government was