

# Education and Industry Are Key Partners in India's IT Success

By LAURINDA KEYS LONG

One lesson from Dinesh C. Sharma's well-written and meticulously researched history of India's IT industry is the caution against presuming one can find a moment when this phenomenon is static long enough to examine, categorize, guide or predict it. This leads to the question: Was the book not obsolete by the time it rolled off the printing press?

The answer in this case is no. And not only because of Sharma's skill as a story-teller who, even with a subject some might consider dry, writes with humor, a sense of adventure, painting portraits of flawed heroes, the best intentions gone awry through human hubris and just plain fallibility. For Sharma's story, just as a classic Greek drama, has a moral, more than one. His tale reminds us of the adage that those who fail to learn from history are doomed to repeat it.

With the natural fit between Indians and information technology that is so clear today, it's clearly tragic that the development of the industry here had to be, as Sharma calls it, a "long revolution." Indeed, in his journalistically well-reasoned work, Sharma uses, as I recall, only one exclamation point, and it's reserved for the activities of the "license raj" that delayed development of an industry that the government itself was trying to build in the national interest. He makes the interesting observation that those who gained power over imports, licenses, etc. did not view computers as office equipment, but as tools of power, and power had to be controlled. As we know, there are governments today that know the Internet means power, for the individual, and are desperately trying to control it.

Sharma's book is of interest not only to historians and IT professionals, but psychologists, statisticians, and students of social and political science. His writing is also forward-looking, with a careful examination of India's higher education system and how it can be developed to produce the graduates the country needs, not only for institutional research and national development, but to lead the businesses and private industries that will create jobs for the growing population.

Sharma thoughtfully analyzes how the noblest purposes behind the development of India's IITs—to build them on a par with the world's best, like the Massachusetts Institute of Technology—doomed them, in one way, to creating MIT-type graduates. Sounds great, but he explains that these bright, accomplished, successful young men and women had few choices for careers in a system which cut off avenues for them to contribute to their nation. So they went where most MIT graduates went, to the United States. The brain drain. It's a depressing chapter until Sharma develops it, showing that, without any five-year or other master plan, circumstances beyond any one entity's control formed a new phenomenon. It's true that loosening controls on

technology imports and investment regulations played a part. But other factors—not the least the longing of India's IIT elites to come home, with their successful business plans and entrepreneurial spirit nurtured in America's more open economy—brought about what Sharma describes as "brain circulation." It sounds much healthier.

Ironically—and oh how many instances of irony does Sharma relate—this brain circulation, characterized by cross-disciplinary and cross-border networks, informal and formal, is not only what impels the growth of India's IT industry now. It is the key to how it all began.

"A constant exchange of information, knowledge and experience took place between Indian scientists and leading Western groups through education, training, lectures and employment," Sharma says. The giants of India's early computer usage and IT development, Homi Jehangir Bhabha and Prasanta Chandra Mahalanobis—engaged in an epic struggle over which institute would become the "National Computer Centre"—were both educated in the West. They had contact in 1947 and 1955, respectively, with the father of modern computing, John von Neumann at Princeton University in New Jersey. They "maintained their links with top scientists and scholars," Sharma says, "created and nurtured networks with their Western counterparts while building teams of scientists at home. This networking helped a great deal in their endeavors in the emerging field of computer technology as well." One example of this is Samarendra Kumar Mitra, who was "not an engineer, but a graduate in chemistry" when he was chosen by Mahalanobis to head an electronic computer lab in 1950. Kumar had spent the previous year in the United States, visiting laboratories that were using computers. American scientists and engineers involved in the new field of computing were also visiting India as early as 1950, some through an agreement signed that year between U.S. Ambassador Chester Bowles and Prime Minister Jawaharlal Nehru. American academics, such as those at the University of Illinois, simply mailed control logic schemes and programming manuals when their Indian colleagues asked.

The University of Illinois' Digital Computer Laboratory also played a role in the selection and acquisition of India's first large-scale digital computing system. Bhabha appointed a committee of four of his staff, who were working at the Illinois lab and other U.S. institutes, to make a recommendation. They visited manufacturing and research facilities across America and settled on the CDC 3600, made by Control Data Corporation of Minneapolis, Minnesota.



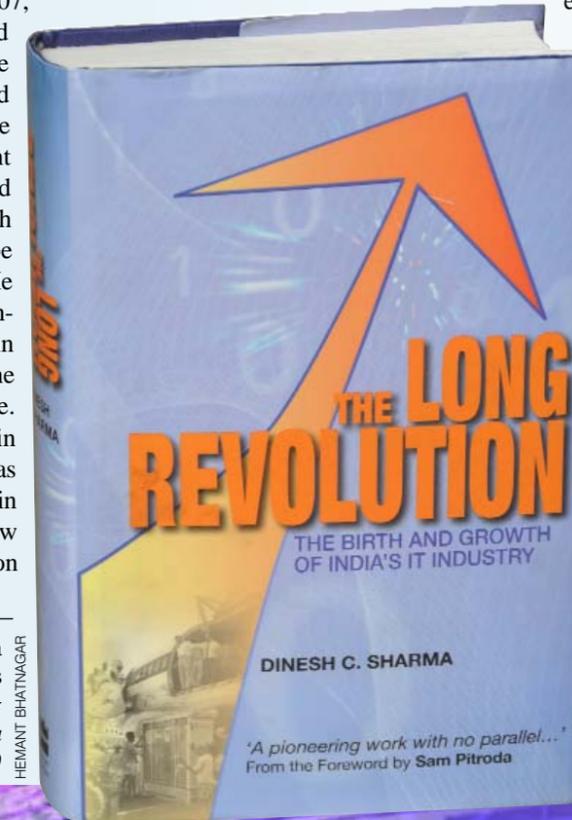
Courtesy Dinesh C. Sharma

"The large computer arrived in Bombay on the morning of 11 May 1964, on a chartered Boeing PanAm," Sharma says. Control Data had given a \$1 million discount and the U.S. Agency for International Development granted another \$1.5 million to defray the cost.

Serendipity is also part of India's IT history. Although there are unconfirmed reports of Nehru's visit to an IBM plant in 1956, Sharma reveals that the first apparent high-level contact between IBM and a key Indian policy maker occurred in June 1959, when Bhabha chatted with IBM's research director, E.R. Piore, on a flight from Paris to Zurich. Sharma has been granted amazing access to historical documents from institutions, the government and individuals and has done a lot of digging for gems. The reader is the beneficiary.

Sharma gives a complete, balanced and educational review of IBM's history in India, elucidating the clash between the American company's desire to maximize profits and the Indian government's desire to build up its own computer industry and preserve foreign currency reserves. He explodes many myths regarding these interactions and shows that there was a chance for compromise, which would have allowed the industry giant to remain in India while giving the government some of what it felt was needed in the nation's best interest. Not for nothing is Sharma an award-winning journalist. In 2007, he was given the National Award for Science Writing in print by the National Council for Science and Technology Communication. He depicts fascinatingly how different world views, personalities and expectations seemed to compel each party to take actions that can only be fully understood in hindsight. He gives a balanced analysis of the benefits that IBM's first 25 years in India brought to the nation and the boons incurred by its departure. Interestingly, Sharma tells us, within two years of that exit, IBM was sending feelers to do business in India again and the company is now fully back, working with Indians on every level of the IT industry.

**The Long Revolution**  
The Birth and Growth of India's  
IT Industry  
By Dinesh C. Sharma  
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Nehru is rightly given much credit for nurturing the development of computers, and Sharma tells how the prime minister charmingly handed out certificates to graduates of the first IBM training class and continued doing this until just a few months before his death. But the germ of the idea for Indian institutes of technology began before India's independence, Sharma relates. During World War II, Sir Ardeshir Dalal, an Indian Civil Service officer, tried to get capital goods and experts to build up India's scientific research and development sector. Realizing that Britain could not spare the manpower or equipment, Dalal turned to America. He led an industrial delegation looking for machinery and skilled personnel and studied "the working of government projects such as the Tennessee Valley Authority and setting up institutions like the Massachusetts Institute of Technology."

This germ came to fruition under Nehru's prime ministership. Different nations were asked to sponsor individual IIT campuses in India. With funding from the Ford Foundation, MIT led a consortium of nine American engineering and technology institutes in 1961 who sent "highly experienced and specialized faculty to Kanpur." Also sent was a \$7.5 million IBM computer that was used to train thousands of people, not only IIT students. By the way, Sharma refutes the folklore that this computer arrived at the campus on a bullock cart. When the American consortium project ended in 1972, Sharma says, 122 U.S.

faculty members had served 200 man-years at Kanpur while 50 Indian faculty had been trained in the United States. The institute had an enrollment of 2,000 and a faculty of 260, more than half recruited from abroad.

"The IITs have played a pioneering role in the development of computer science education. The trigger for this" was at Kanpur with the installation of the IBM 1620 computer in 1963 and an IBM 7044 in 1966, Sharma says. These "formed the core of the Computer Centre at the institute, which became the training ground for the first generation of Indian computer programmers and computer science graduates. The center benefitted not just undergraduates, graduates and the faculty of the institute, but scores of people from research, academia and industry all over the country."

