FORUM

China Versus India: Contrasting Strategies, What Consequences?

To capture best practices and useful lessons in this fast-changing world of international development and information and communications technologies (ICTs), what could be more interesting and instructive than to find two countries pursuing diametrically opposed strategies across the most salient dimensions of national ICT strategy? Where the governments not only clearly articulate contrasting strategies, but they actually allocate scarce and valuable resources such as capital investment, tax benefits, market protection, and political support to pursue those rhetorical strategies. Furthermore, imagine two cases in which their strategic realignments could have significant medium-term implications for the two countries, for their region, and indeed for the global ICT sector as a whole. Finding and comparing such a pair should attract the attention of practitioners and researchers alike in the field of international development and ICTs.

The People's Republic of China and India provide precisely such a comparison. And their contrasts are indeed stark. To put it bluntly, but accurately, China's leaders have concentrated their efforts on producing hardware, whereas India's leaders have concentrated on software; China focuses mainly on its own domestic market, whereas India looks to export markets.

These contrasts exist alongside important similarities. Both countries have huge land masses with very large populations and a history of state ownership and controls. Both countries have ambitious national elites, with great resources at their disposal, including tens of millions of educated people. The two are next-door neighbors, very active in their region, with tense but expanding bilateral relations. And both countries have designed explicit national strategies toward ICTs. Given these contrasts and similarities, many questions come to mind:

- What are the most salient differences in ICT performance between India and China?
- Why do these differences exist? What causes them?
- What are the implications of their current ICT strategies for other political, commercial, and strategic concerns?
- More speculatively, what would happen if the two countries' ICT strategies changed significantly, converging toward one another?

In December 2002 we traveled to Beijing to discuss these questions with a cross-section of practitioners and scholars active in the field of ICT. Our colleagues confirmed that the China-India comparisons were matters of real concern among Chinese decision makers. They described the many official and unofficial visits between the two countries and the active research now being conducted by companies, government units, and others on the contrasting national approaches to ICT. Moreover, in our extensive interactions in India we discovered parallel concerns with the "China problem" that holds across most sectors, though it is particularly present in ICT. Given the high degree of interest we concluded that the journal should contribute to the debate; fortunately, we had access to two excellent papers that treat critical aspects of the India-China differences carefully and seriously, and we selected them for this inaugural issue. They are nicely complementary in their approaches and subject matter, and they concentrate on two of the most high-profile ICT elements that most attract analytic attention—software production and the Internet.

Press and his colleagues apply their highly developed MOSAIC methodology to documenting, comparing, and evaluating different patterns of Internet diffusion in the two countries. They show that although India started earlier with the Internet, by the turn of the century it had fallen behind China along many important dimensions. By contrast, Li and Gao concentrate on the software industry. Their main subject is China, but they point to fascinating contrasts with India in terms of exports and domestic market sales. These two detailed, empirically based assessments describe today's complex realities. They also provoke additional questions, such as those mentioned earlier, that are necessarily more speculative. Although the authors do venture some explanations, they wisely stick mostly to what their

empirical studies show. We, however, will be less cautious and speculate briefly on the wider implications of these conditions.

Ultimately, the choices that China and India make individually will carry great consequences for their own internal domestic ICT conditions, for their bilateral relations, for regional ICT developments, and even for the global ICT industry as a whole.

Domestic Impacts

The advantage that China now enjoys in the diffusion of Internet and other telecommunications services suggests that the downstream contributions of modern ICT to Chinese society will be proportionately greater. Not only is the absolute diffusion greater (by factors of two and three) but according to Press et al., the sophistication of ICT use is also higher. Although it is naïve to assume an automatic one-to-one relationship between accelerated computer or Internet diffusion and gains in economic efficiency, administrative transparency, or wider political participation—because diffusion is always filtered through multiple institutional and societal prisms—it can be argued that factories, farms, and service providers will see their productivity rise at faster rates in China than in India where Internet penetration and information processing rates are lower. The cumulative effect of these efficiency gains could be quite significant as both countries try to make a transition from growth achieved mainly through extensive methods, bringing more land under cultivation, hiring more factory workers, and so on, to improvements brought through more qualitative means and increases in per capita productivity.

Indian political elites do indeed recognize the potential rewards of enhanced infrastructure as they try to shift their incentives toward greater domestic diffusion of their world-class ICT expertise, with more positive benefits for citizens and consumers. However, accelerating the diffusion of software in particular must be linked with other commercial and policy reforms to increase production, imports, and sales of affordable hardware, as well as continued expansion of general telecommunications infrastructures, especially in rural areas.

Conversely, although China has done a good job developing its hardware and telecommunications infrastructures, it has been looking to India's software sector with an eye toward duplicating some of its

high-value successes. China may excel in local PC assembly, but as a low-margin commodity enterprise it will contribute modestly to long-term value creation and innovation in a knowledge society. The rough-and-tumble Indian software market has moved slowly and steadily up the value chain and has been able to capitalize on entrepreneurial energies and innovations. China will not be able to legislate top-down competition and innovative thinking in the same way it has been able to mandate the build-out of its telecommunications infrastructure.

Bilateral Relations

As India and China pursue their national strategies, their choices will also affect the bilateral relations between the two neighbors. If their ICT sectors continue to evolve in ways that are complementary, that trajectory might contribute to positive relations between the two giants. If they pursue strategies of greater convergence, with Indian elites becoming more serious about producing for the local market (and perhaps for the neighboring market) as China rushes into software exports and higher value-added products, then one might anticipate potential conflicts. But as Li and Gao correctly point out, there are alternatives to status quo or convergent competition, and that is inspired collaboration, where each country can play to its strengths.

Whether China and India can work together cooperatively in these sectors (which could contribute to overall strengthening of bilateral relations) or engage in cut-throat competition (which might, conceivably, contribute to eroding bilateral relations generally) may well have as much to do with politics and culture as with technologies and business. One has to only turn to the Indian press coverage of Prime Minister Atal Bihari Vajpayee's recent trip to China to see that Indians are getting paranoid about China's attempts to strengthen its high-value software export industries. The results of this paranoia can be defensive posturing and business activities that may be more centered on national pride than market realities. All this diminishes the chance of bilateral collaborations in the sector. On China's part, an attitude that its software industry, given single-minded and strong central planning, can somehow gobble up India's innovation-centered businesses is equally damaging, and naïve.

Regional Impacts

Choices made by this pair will also affect others in the region, such as Malaysia, Singapore, Taiwan, and Vietnam, all of whom are trying to pursue their own ICT strategies. Vietnam, for instance, wants to expand its commodity-type production (including software), and Singapore and Malaysia are both trying to attract more corporate research and development (R&D) centers. Their successes will hinge in part on what paths China and India choose to follow, whether in high-volume, low-value-added lines in their own less-developed regions, as well as very high-end R&D clusters. The Asian Tigers, in particular, have made a good show as "fast followers" of ICT innovations emanating, in particular, from North America. However, that only has taken them so far. As India and China continue to chart their own paths, these other regional leaders will be challenged on many fronts.

Global Impacts

Beyond impacts on their immediate neighborhoods, their choices will also have significant demonstration effects on other developing regions of the world such as Latin America. Our interviews indicate that companies and government officials in Brazil are closely following developments in these two Asian giants as they design their own ICT strategies, both in pursuing low-cost computers for sale to poor communities and in considering future export markets for software and ICT services.

One should not underestimate the cumulative impacts of these two nations' ICT strategies on the future structure and dynamics of the global ICT industries. China already has more mobile telephones and land lines than any country in the world, and its imports of equipment and services are huge. Indeed, China recently overtook Japan and Mexico as the single largest exporter of electronic equipment into the world's largest national market, the United States. Moreover, India, as it continues its history of exporting people and innovations such as global hits like Hotmail, cannot be ignored as its ICT industry hones its craft and opens itself up to more competition.

Over the coming years ICT corporations around the world must start considering the possible impact not only of China's and India's domestic purchases on their own companies' bottom lines but also the aggregate impacts of China's and India's exports, R&D, and production and overseas investments on the structure and dynamics of the worldwide industry, including prices, innovation, and standard setting.

The breadth of the questions raised by comparing India and China can and should be applied to other pairs of nations (or regions or cities or firms) such as Mexico and Chile, or Senegal and Ghana. We believe these questions can usefully be addressed by interdisciplinary teams from economics, law, political science, engineering, and other disciplines drawing on their relative strengths. These are contributions that would be very welcome for future issues of *Information Technologies and International Development*.

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Can a Developing Nation Be Creative?

Or, does creativity only come after sufficient prosperity allows for the required inefficiencies, idiosyncrasies, and incongruities of innovation?

Singapore is the poster child of economic development. Twenty-five years ago it was one of the poorest countries; today it has the per capita income of Britain and private home ownership of Switzerland. As a city, it is hospital clean and more or less without crime. But something is missing, and the Singaporeans themselves know it. Current government-sponsored initiatives include a serious look at how to stimulate more creativity, less uniformity, with some breaking of the rules and maybe a little designer dirt added here and there.

Here's the paradox. Development takes discipline, team playing, and efficiencies that come from standardized, controlled, preplanned, and highly regulated environments. This is most evident if you compare China and India, who were at equal levels of poverty 15 years ago. Today, China has more than 10 times the foreign investment and double the per capita income. Its lead is accelerating and India will be left even further behind, in spite of being a democracy (or because of being a democracy—though that is another story). Discipline works for