

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*.

Ernest J. Wilson III, Michael L. Best

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

development in the same way it does for an athlete, who respects and follows a regime and practices daily, often doing calisthenics with colleagues.

By contrast, a creative society values and expects different social qualities, almost all of them in the service of imagination. Originality, resourcefulness, and inventiveness are central to the personality of creative people. They can be very contrarian. Expression and individualism are also high on the list. A creative culture welcomes and even encourages a healthy questioning of authority, especially when it is authority for authority's sake. Complexity and contradiction provide the rich soil for growing new ideas. Quality of life comes from design and invention, and the arts play a central role.

By contrast, all the behavioral characteristics needed to jump-start and accelerate economic development seem to be the opposite, and those lead to a very uncreative environment. This is often most manifest in primary education, where the typical emphasis on drill and practice makes kids fearful to ask questions, frightened to make mistakes, and afraid to be different. One solution is to accept such rote learning, raise standards of living, and then work with the next generation to stimulate fearlessness and "outside-the-box" thinking. I believe we can do better.

The place to make the change is in early education. Primary school need not follow a tradition of conformity or the discipline of recitation. It can be more inventive, more project-oriented, less driven by tests. It can encourage question-asking and risk-taking, at no added cost. More than anything, adults and teachers need to encourage multiple points of views and let children know that there is both an artist and an engineer inside each of them. Education can be more than mind calisthenics, even in a very poor nation.

Computers and the Internet are the tools of change for primary schools because they serve, among other things, as a window into multiple points of view. Furthermore, a child can play with ideas in a manner that feels more like sports than class. Although there is great importance to learning by being told (by teachers or books), there is an even greater and untapped value in self-learning. As poorer nations start to find the means to equip and connect students, the naturally tendency will be to put all these facilities in places of higher learning, affecting the older children because they are the

ones who will be contributing members of society soonest. Avoid that temptation. It is wiser to put as many of those connections as possible, maybe even most of them, into the primary education system, to influence how a child learns from the beginning. Otherwise, we spend all our time unlearning the bad habits of rote education.

All of us learn for the first 5 or 6 years of our lives by playing and interacting with the world. The next 12 or more years are dominated by being told. It is widely accepted that the computer and the Internet are breaking the distinction, making learning more playful and seamless. All good and well, but these are tools for the rich, when by one count less than half the primary schools in the world have even a phone line and the cost of a single computer can exceed the annual salary of the teacher.

But this state of affairs is rapidly changing. We are headed toward \$25 laptops and wireless broadband so inexpensive that schools could and should get it for free. Both are as certain as gravity. So the intervening period, where possible, should use whatever means of subsidy and leverage possible to accelerate the process. One of those may well be using the kids to build rural networks in unlicensed spectrum (also another story).

I believe that children are naturally creative. What we call school and good behavior stifle and, in most cases, eliminate this natural element, forcing the most determined and creative children to be misfits. For this to change does not require dismantling all rigor in education. More than anything, it takes a mind change in adults, parents, and educators. The modern educational movement is away from the idea of a uniform curriculum, itself an industrial age artifact, kept primarily for the ease of testing. This needs to be replaced with more individualized and playful learning, which is starting to happen in the world's richest countries. If developing nations do not take notice and act sooner rather than later, a generation or two will just have to be skipped before a nation addresses being a creative society. That should not be.

Nicholas Negroponte