January 1999

Impact of Technological Change on Developing Countries, The

Eric R. Biel

THE IMPACT OF TECHNOLOGICAL CHANGE ON DEVELOPING COUNTRIES

Eric R. Biel[*]

I am very pleased to be back in Cleveland. I turned down a couple of opportunities to speak in Cleveland in the early 1990s when I served as Trade Counsel at the Senate Finance Committee for Senator Lloyd Bentsen (D-TX). They wanted me to come here and make the case in support of NAFTA, but I respectfully declined – preferring to maintain my health and well-being. Then, Senator Pat Moynihan (D-NY) replaced Senator Bentsen as Finance Committee Chairman, and he opposed NAFTA, though more on political than economic grounds. By then, the invitations had dried up. In any event, I am pretty accomplished at being able to argue both sides of NAFTA.

Hopefully, today's topic will be provocative enough, but a bit less controversial. Even so, being a cautious government official, I do feel compelled to state the typical disclaimer at the outset: these are personal musings and observations, and they do not necessarily reflect the policy judgments or positions of the Department of Commerce or of others in the Federal Government.

I. OVERALL OBJECTIVES/FRAMEWORK

As I look over the conference agenda, it appears that my topic, "The Impact of Technological Change on Developing Countries," is a bit of an outlier in a program focused on the challenges of technology in the North American context. Having said that, I want to try to accomplish two things in these remarks. First, I want to provide a framework for thinking about the impact of technological change in developing countries, including how it affects traditional notions of how countries develop economically and what policies they should pursue to enhance the well-being of their people.

Second, I would like to touch briefly on how the United States, Canada, and other developed countries can help developing countries adjust to, and benefit from, technological change. In this regard, I intend to highlight examples of what U.S. government agencies are doing to help these countries

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establish the infrastructure needed to become part of today's emerging digital economy.

Let me add just one more qualifier up front. I will concentrate on the role of information technology in challenging some of the conventional wisdom concerning how developing countries are advised to transform themselves economically. I recognize this is just a subset of overall technological development. This subject could be approached from other perspectives as well, including by focusing on technology flows from one country to another. But I believe that concentrating on information technology provides the clearest illustration of the impact new technologies are having – and will continue to have – on the policies of governments and businesses and on the lives of ordinary people.

Let me begin by quickly reviewing some basic figures on the role of technology in economic growth. Last year, the Department of Commerce issued a report, *The Emerging Digital Economy*, that revealed that information technology alone was responsible for thirty-five percent of overall economic growth in the United States from 1995-97.[1] In dollar terms, that meant it was responsible for over one trillion dollars in additional national output in those three years. Moreover, if the measurement used included innovations stimulated by technology such as new business methods, new means of organizing work, and quality improvements, then "technological change" would account for over half of our total economic growth.[2]

So, the challenge we face in countries like the United States and Canada is to find ways to foster innovation through continued development of high-value products, services, and production processes. In practical terms, that means everything from education and skills training initiatives to increase the available "talent pool" to greater investment in so-called "frontier" research. And, just as importantly, it means trying to ensure that some segments of society are not left even further behind – a concern highlighted in another Commerce Department report from last year, which discussed the growing digital divide in this country.[3]

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[1] *See* U.S. DEP'T OF COMMERCE, THE EMERGING DIGITAL ECONOMY A1-5 (1998). The report is available on the Department of Commerce's "Electronic Commerce Policy" Web site (visited Aug. 3, 1999) <http://www.ecommerce.gov/emerging.htm>. A second report on this topic was issued by the Commerce Department in June 1999. *See generally* U.S. DEP'T OF COMMERCE, THE EMERGING DIGITAL ECONOMY II (1999).

[2] *See id.*

[3] *See generally* NAT'L TELECOMMUNICATIONS & INFORMATION ADMIN., U.S. DEP'T OF COMMERCE, FALLING THROUGH THE NET: DEFINING THE DIGITAL DIVIDE (1999).

II. IMPLICATIONS FOR DEVELOPING COUNTRIES

Obviously, though, this is not solely a U.S. and Canadian challenge – not when the Department of Commerce's National Telecommunications and Information Administration estimates that about six percent of *global* GDP today comes from high-tech industries.[4]

The challenges for developing countries, whether newly industrialized countries in Asia or still largely agrarian countries in sub-Saharan Africa, are obviously very different, and more substantial than those we face in North America. Often, government and business leaders in these countries are not even sure where to start – how to use technologies to advance policy goals. That creates the first major challenge for, to quote one of my favorite philosophers, Yogi Berra, and I paraphrase, if you don't know where you're going, when you get there you'll be lost!

Consider first some of the traditional conceptions of how countries develop economically. We often hear about the different "steps of industrialization." And, especially in the 1960s and 1970s, the thinking was that a country's economic development depended on its having certain indigenous manufacturing industries, such as steel, as well as some high-profile "showcase" projects, perhaps including new skyscrapers in the capital city, all of this while utilizing its chief comparative advantage – a generally abundant supply of low-cost labor. One often-cited example is South Korea, a country that in less than three decades transformed itself from a subsistence agrarian economy into one producing labor-intensive products like textiles and toys, then into a newly industrialized country with major production in steel, semiconductors, shipbuilding, autos, and other technology-intensive products, and finally into a more mature industrialized country that was admitted into the OECD and today is focusing on various "next generation products" despite the economic reversals of the past couple of years.[5] Notwithstanding its recent difficulties, South Korea remains one of the clearest success stories.

Let me be clear. I am not a developmental economist, and I do not intend to challenge this model. Developing countries need to put their growing populations to work – especially with huge numbers of new entrants into the job market each year. And it is certainly true that domestic manufacturing

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[4] *See* Larry Irving, *Connecting the Global Community*, Oct. 29, 1998 (visited July 8, 1999) <http://www.ntia.doc.gov/ntiahome/speeches/102998cfr.htm> (containing the prepared remarks of Larry Irving, Assistant Secretary for Communications and Information, National Telecommunications and Information Administration, U.S. Department of Commerce, at the Council of Foreign Relations).

[5] *See generally* U.S. Department of State, *Background Notes: South Korea*, Nov. 1997 (visited July 1, 1999) <http://www.state.gov/www/background_notes/south_korea_1197 _bgn.html>.

industries tend to convey a certain sense of "legitimacy," of being a "player" in the international economic system. Indeed, having visited sub-Saharan Africa four times in the past year, I have heard repeated discussions of what needs to be done to encourage more of the countries in that region to move from the first to the second of these stages of development, such as by building new textile and apparel production capacities.

But, one can acknowledge that approach to development while also recognizing that today, more than ever before, it is *information* that is critical to making people and companies more productive, including in the developing world. This in turn may mean that today, "sound development" and "economic progress" may depend less on large industrial projects and more on smaller, less visible, less-centralized initiatives. If that hypothesis is valid, it has tremendous implications for how governments set their priorities and allocate their often-scarce resources. So, with that in mind, let us consider briefly what technological change means for different parts of society in developing countries.

A. What Does Technological Change Mean for Government Leaders and Other Elites?

As I mentioned earlier, the technology and information revolution is promoting a more decentralized developmental approach, one less tied to the central government, connecting individuals more easily, providing new opportunities for personal expression and empowerment, and arguably reducing the opportunities for corruption and abuse of bureaucratic power. This has profound consequences which I can only begin to touch upon in this Article. Information technology is forcing a revamping of old ways of organizing responsibilities based on standardization, synchronization, and most relevant to this discussion, centralization. With technology comes a greater ability to have authority dispersed away from the center.

It is fair to say that different governments have responded to this in different ways. There is the well-known example of the ancient city of Bangalore, India, which today is a major information technology center thanks to the right mix of academic excellence (in that case, the Indian Institute of Science), abundant high-tech talent and skills, and government investment in infrastructure. Bangalore, you may recall, was featured in the November 9, 1998 issue of *Newsweek* on a list of the hottest high-tech cities, along with seven U.S. cities and one each in England and Israel.[6]

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[6] *See* Steven Levy, *The Hot New Tech Cities*, NEWSWEEK, Nov. 9, 1998, *available at* 1998 WL 17010696.

A more modest example is what South Africa is doing to encourage expansion of opportunity through access to new technologies. As part of the effort to empower parts of South African society ignored during apartheid, there are cooperative programs with foreign-owned firms like SABC Communications, which recently donated a communications tower in Khayelitsha Township outside Cape Town to provide residents of that impoverished community with a link to schools, libraries, and other information sources around the world.[7]

At the other end of the spectrum, we all have heard examples of how Chinese government authorities have tried to restrict access to the Internet and other cutting-edge communications technologies. At the same time, though, many Chinese officials do seem to appreciate the inevitably of change in China, with Internet subscriptions there doubling in the past year and projected to grow tenfold over the next five years. And there does appear to be something approaching a "social compact," through which government authorities are more tolerant of greater openness in key centers of commercial activity like Shanghai and Guongzhou, where economic growth has fostered rising expectations about the overall quality of life.

The bottom line is that some government leaders will never see promoting information technology as having the same type of short-term payoffs and profile as a large infrastructure project. But more imaginative and far-sighted leaders may see that embracing technology can help build greater public support as more people feel a part of the emerging new economy.

B. What Does Technological Change Mean for Businesses and Their Workers?

Although thus far I have focused on the role of government, the truth is that, ideally, it is the private sector that is best positioned to develop the best means for utilizing new technologies. The private sector needs to provide the initiative and the entrepreneurial spirit that drive the process of adjusting to technological changes and finding the means to benefit from them. I say "ideally," however, because obviously in many developing countries the private sector remains weak and poorly organized, and the central government will continue to play a huge role.

Let me offer three quick examples of what new information technologies can mean for even the most modest businesses in a developing country where

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[7] *See Speech by Minister of Posts, Telecommunications, and Broadcasting to the National Assembly on the Occasion of the Budget Vote for the Department of Communications,* May 13, 1998 (visited July 8, 1999) <http://www.parliament.gov.za/papers/sp/1998/sp980513.html>.

there is enough creative spirit and energy. All three demonstrate the power of the new "digital marketplace" and its impact on those who, not long ago, were confined to doing business only with a narrow group of local customers.

First, there is Helen Mutono, a Ugandan woman who uses the Internet to sell locally made baskets – with the proceeds going to help children orphaned from the AIDS epidemic in Uganda. She recently wrote to President Clinton and told him that E-commerce is probably the only way she will be able to market her handicrafts on the global market.[8]

Next, there is the farming village in Peru which uses the Internet to market its vegetables to buyers in New York and elsewhere. The income of the fifty families has grown *fivefold* because of the newfound ability to market their goods on the Internet.

Finally, we have the women rug weavers in Morocco who are now selling their goods on-line, creating big implications for their bottom line. Previously, they sold their rugs to a middleman who took them to the city market (souk) where he sold them to a vendor, who then in turn sold them to a Western dealer. Now, having cut out three layers of middlemen to deal directly with potential buyers, the rug weavers get back a much higher percentage of the final sales price, meaning higher profits and more opportunities to grow their businesses.

By citing these three "grass roots" examples, I do not intend to suggest that the developing world is filled mainly with such success stories. Indeed, it is quite possible that new on-line competition has meant disruption for other businesses, especially smaller ones. What this *is* meant to convey is the reality of the new digital marketplace and the opportunities that exist to exploit its vast potential. Those who adjust and innovate will be in a position to prosper, perhaps as never before. Those who do not, by contrast, risk failure.

One also has to take some care in citing these admittedly compelling cases of craftspeople marketing their goods via the Internet. Many developing countries are seeking a great deal more from the technology revolution than individual success stories of increased sales over the Internet. And government and business leaders appreciate the fact that new technologies put an increased premium on those who possess the needed education and skills. This means that, as developing countries gain access to new technologies, they face challenges in trying to assimilate them and build a real "knowledge base," especially where their talent pool has been sapped by years of "brain

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[8] *See Clinton Promotes Cyber-Shopping, Urges Industry to Ensure Security, Fraud Protection*, NEWSDAY, Dec. 1, 1998, at A51. *See also PEOPLink: AIDS Victims Fund: Ugandan Tragedy Brings Blues, But Sapphire Women Conquer* (visited July 8, 1999) <http://www.peoplink.org/products/ug/av/sw/index.htm>.

drain" and the loss of the best-educated citizens to better opportunities abroad. These countries desperately need more skilled workers, and that requires more of their "best and brightest" to stay and help build stronger educational systems, training programs, and the like.

C. What Can More Economically Advanced Countries Do to Help?

There is some temptation to think that when developing countries provide, for example, better intellectual property protection or more transparent legal regulations, that will primarily help foreign investors from the United States, Canada, and elsewhere. And we should acknowledge that these often are preconditions for companies which have many options for where they want to invest and do business. But the point here is that developing countries need to evaluate their policies and programs in light of the increased importance of knowledge and information to their own economic growth. While better intellectual property protection, for example, may stimulate more foreign investment, it ultimately is a means for promoting more innovation at home.

The Commerce Department and other government agencies are prepared to help developing countries respond to technological change through a variety of programs. I will quickly cite just a couple of examples to illustrate what we can do to help developing countries in this regard. There is new money in the President's FY 2000 budget proposal to help developing countries strengthen their legal and regulatory infrastructures – including through increased commercial law development, intellectual property protection, and standards setting procedures.[9]

There is also the "Wire the World" program being organized by the World Intellectual Property Organization in Geneva, with significant input from our Patent and Trademark Office. The goal is to use new telecommunications and information technologies to link patent offices through a secure network, making the patent examination process more coordinated and, in the process, help to avoid duplication of effort and waste of precious government resources as developing countries must deal with a surge of new patent applications.

Finally, there is USAID's Leland Initiative for Africa, now in the process of being expanded to other markets as well through a new Internet Economic Development Initiative. Here, the goal is to help develop public-private part-

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[9] *See Budget of the United States Government*, Fiscal Year 2000 § 14, INT'L AFF., at 173-76.

nerships to extend the reach of the Internet and other telecommunications
services to rural areas.[10]

That is just a sampling of what we can do to help developing countries
adjust to, and benefit from, technological change. Ultimately, however, the
key decisions will be those made by the leaders themselves, both those in
government and the private sector.

D. What Is the Impact of Technological Change on Developing Countries?

On the one hand, the impact of these new technologies seems over-
whelmingly positive. They provide new access to information, the ability to
communicate with others around the world, and once-unimaginable opportu-
nities to do business globally. This is not just about emerging forms of busi-
ness communication, but it is also about new opportunities affecting educa-
tional, medical, public safety, and other types of critical services. There is,
for example, a project in Malaysia connecting seven hospitals, some in the
capital of Kuala Lumpur, others in remote rural areas, which allows them to
engage in joint consultation, diagnosis, and treatment. And there are tech-
nologies to help with weather forecasting, crop yields, and so on.

On the other hand, there also are great challenges for developing coun-
tries as a result of new technologies. The first thing that comes to mind is the
potential impact on indigenous culture. I suspect that some people in this
room have given considerable thought to the impact of information generated
in one country on the culture of its neighbors. This obviously is not merely a
developing country concern.

It goes without saying that there are no easy answers. But, while there
may be differences of opinion about the threat to local cultures as informa-
tion becomes globally accessible, those who fear American "cultural hegem-
ony" should not overlook examples of how new information technologies
may actually help support and promote indigenous cultures there. In this re-
gard, I think of PEOPLink, which utilizes the Internet to bring local cultures
to a worldwide audience, while providing a means for artists and crafts peo-
ple in developing countries to market their goods globally.[11] Its Web page
explains that electronic communication is a major force that is revolutioniz-
ing the ways societies interact and goes on to note how new technologies can
help expand the economic pie, not widen existing gaps.[12]

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[10] *See USAID Leland Initiative: African Global Information Infrastructure Project* (vis-
ited June 30, 1999) <http://www.info.usaid.gov/regions/afr/leland>.

[11] PEOPLink is a non-profit global marketplace.

[12] For more information about PEOPLink, see *More About PEOPLink* (visited June 30,
1999)
<http://www.peoplink.org/scripts/web_store.cgipage+/gen/about.htm&cart_id=3869934.

A second key challenge is that, while technology presents new opportunities for those well-situated to take advantage, it at the same time risks further widening the often vast gaps between the "haves" and the "have-nots" within a given society. This is not simply the concern that technology will substitute for labor in certain sectors, pushing more people out of the job market. It is also a fear that, in some countries, the elites in government and business may not be predisposed to share the benefits of technology more broadly and help empower the dispossessed parts of their populations.

Finally, there is, as noted in a recent World Bank report, "Knowledge for Africa," the danger that the rapid growth in global knowledge and the explosion in technology will leave poorer countries even farther behind richer ones. Even as communications costs fall, making the transfer of knowledge cheaper, developing countries must cope with an ever-changing knowledge frontier that threatens to create even wider gaps.[13]

There are obviously no easy solutions to these, or other challenges faced by developing countries in today's Information Age. Hopefully, though, the success stories highlighted here do provide evidence of the potential benefits of information technology for developing countries.

III. CONCLUSION

Let me conclude with a few thoughts about what all of this means for the relationship between developed and developing countries as we prepare for the new millennium.

We often talk about growing global interdependence, and in so doing, we tend to point to increasing trade and investment flows and the reduction of barriers between countries. Yet without diminishing that, which is, after all, what I tend to focus on day-to-day, the truth is that nothing is driving such interdependence nearly as much as the rapid pace of changes in information technology. That was the theme Vice President Al Gore stressed in his remarks last October at the Fifteenth Plenipotentiary Conference of the International Telecommunication Union in Minneapolis, where he focused on steps to increase international cooperation and the opportunities such technology can afford to strengthen global ties.[14]

The bottom line is this: access to new technologies should be seen as a way for developing countries to move forward, to help achieve important but

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    [13] *See World Development Report 1998/99 Background Papers: Knowledge for Africa* (visited June 30, 1999) <http://www.worldbank.org/wdr/wdr98/africa/bparfl.htm> [hereinafter *Knowledge for Africa*].
    [14] *See* Eric Wieffering, *Gore Urges Telecom Union To Foster Universal Internet Access*, MINNEAPOLIS-ST. PAUL STAR-TRIB., Oct. 13, 1998, at 8D.

often long-unfulfilled policy objectives. As the recent World Bank report explained, those countries that adopt policies to make the most of knowledge will have major advantages in improving the lives of their citizens.[15]

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[15] *See Knowledge for Africa, supra* note 13.