

Globalization and Knowledge Generation

Carlos Alberto Primo Braga¹

INTRODUCTION

Mr. Chairman and distinguished participants:

I am honored to have this opportunity to participate in this dialogue with you on a key dimension of the debate about economic globalization. I am the Senior Manager of the Informatics Program at the World Bank, but my remarks today are being made in a personal capacity.

The world holds 6.1 billion people, with more than one-fifth of them living in abject poverty. We know that 1.5 billion people do not have access to clean drinking water, and that 125 million children do not attend primary school. But consider this significant demographic shift, which adds to the drama of the current situation. In 25 years, as children born today reach adulthood, there will be 2 billion more people added to our world population. And almost all of them will join the 4.8 billion who currently live in developing countries. Their capacity to aspire to a better future will be a critical factor in determining the shape of international relations and the dynamism of the world economy.

It is broadly recognized that powerful technological and economic forces are increasing the interdependence and interconnectedness of the world economy. Relationships between North and South and between the rich and the poor become everyday more intense and complex. As the events of September 11 underscore, however, the effects of this growing interconnectedness – globalization, if you will – go well beyond the field of economics, affecting power relations, political and cultural interactions, and the balance of peace.

There is an obvious nexus between poverty and disenfranchisement. As the world economy comes “closer” and images from the most distant corners are shared instantaneously, the contrasts between the powerful and the powerless, between North and South, and between rich and poor become more vivid. Unless we can find the ways and means to address the questions of poverty and inequality – at national and international levels – unless we are able to provide meaningful hope for inclusion and opportunity for everyone, the future of our children is very much in danger.

One of the main weapons in our fight against poverty is knowledge. The same technological forces that are increasing our interconnectedness and making income and social inequalities more obvious, are also creating new opportunities for knowledge

¹ The author is the Senior Manager of the Informatics Program, Information Solutions Group, The World Bank. Comments and assistance from Connie Eysenck, Riva Eskinazi, Carsten Fink, Eleanor Fink, John Daly, Walter Terry Maguire, and Erich Vogt are gratefully acknowledged. This note was prepared as background for the Public Hearings of the Study Commission on “Globalization of the World Economy – Challenges and Answers,” Bundestag, Berlin, 10 December 2001. Its findings, interpretations, and conclusions are entirely those of the author. They do not necessarily represent the views of the World Bank, its Executive Directors, or the countries they represent.

sharing and creation. Allow me, therefore, to address some of the questions posed by the Commission with respect to the role of knowledge in the process of globalization, with an emphasis on the implications of this debate for developing countries.

THE EMERGENCE OF THE NETWORK SOCIETY

Many books, theses, and articles have been written over the last ten years, describing the transition from industrialism to the “new economy,” which is also often referred to as the “knowledge economy” and/or identified with the emergence of the information or the network society.² A common thread in this literature is the proposition that the world economy is becoming more knowledge-intensive. The proposition that knowledge is at the very core of the “new economy,” however, does not help much our understanding of the phenomenon. After all, throughout history, knowledge has been a critical variable in the structure of power of nations, and a major determinant of economic success.

What *is* new is the growing influence of information and communication technologies (ICT) in *all* aspects of economic and social life. This new technological paradigm affects our capacity to create and disseminate information and – more substantively – to foster the transformation of information into knowledge. It is also influencing social structures around the globe – as economies become increasingly services-oriented, companies shift from hierarchical structures to networked modes of production, and the “knowledge worker” emerges as a critical actor in the economies of many countries.

These shifts have profound implications for the fields of research, education, and culture as well as for democracy. At a functional level, ICT opens the doors for new ways to conduct research and education, enhancing productivity in these fields and allowing for much more dynamic cross-border interactions. In the same vein, the “digitization” of everything allows for new forms of dissemination and projection of cultural values. Moreover, ICT can empower the disenfranchised and their intermediaries (as illustrated by the growing influence of non-governmental organizations), while promoting transparency of governmental actions and market outcomes.

Some of the signs of the arrival of the “network society” are as follows:

- **First**, communication networks and digital devices are becoming ever more pervasive in day-to-day activities, as their costs continue to decline and their quality improves.
- **Second**, in a networked environment, the incentives for specialization and outsourcing are multiplied. This puts a premium on flexibility and responsiveness as business cycles shorten and interactions with clients multiply.
- **Third**, electronic commerce – that is, the use of electronic networks to support business transactions – is expanding rapidly. This process, in turn, further contributes to the internationalization of service activities as the feasibility and competitiveness of long-distance provision increases.

² See, for example, the three volumes by Manuel Castells on The Information Age: Economy, Society and Culture (Malden, MA: Blackwell, 1996, 1997 and 1998).

These developments challenge the status quo and elicit economic and social frictions, as illustrated by the cycles of wealth generation and destruction in financial markets, the “dot com” phenomenon, the impact of new entrants in the media business, and the emergence of anti-globalization networks. They may also become forces of exclusion as those not properly equipped to take part in these transformations are left behind. This, in turn, is often identified as the problem of the “digital divide.”

In analyzing if modern networks will become a force for inclusion or exclusion, it is useful to organize the debate in terms of their impact on knowledge dissemination and innovation. Let me declare here my own bias, by stating that I believe that the potential for a positive impact dominates the intrinsic dangers of the emergence of the network society. At the same time, the dangers are real and may affect not only those on the wrong side of the digital divide, but also those who are riding the digital wave to the extent that the power of networks can be used by a few to disrupt the lives of the many.

NETWORKS AND KNOWLEDGE DISSEMINATION

The word “knowledge” elicits many interpretations. In communications theory, it is often identified as the factual and conceptual contexts that enable social actors to interpret and extract meaning from information and data.³ In the 1998/99 World Development Report, published by the World Bank, knowledge is distinguished between “knowledge about technology” and “knowledge about attributes.” The latter category refers mainly to the knowledge required for agents to make efficient decisions in the marketplace. It may refer, for example, to choices about distinct diets (implicitly balancing nutritional and economic considerations) or the capacity to recognize employment opportunities.

“Knowledge about technology,” in turn, is typically associated with the efforts of the academic communities and of “proprietary research communities.” ICT tends to affect the conduct of these efforts along the following lines:

- **First**, ICT facilitates the process of codification and transmission of knowledge about technology;
- **Second**, ICT enhances the positive learning externalities of knowledge generation by magnifying the possibilities for recombination of ideas and information;
- **Third**, ICT dilutes the “tyranny” of geography by providing new ways for researchers to escape national boundaries. The rate of international co-authorship of scientific and technical papers, for example, has increased significantly over the last decade.
- **Fourth**, ICT increases the “distribution power” of innovation systems, diminishing the time to market of new products and services, while enhancing the dissemination, application, and use of “mature” technologies.

At the same time, the emergence of modern virtual networks may disrupt conventional institutional arrangements for the dissemination of knowledge (for example, the capacity

³ For further details see Paul A. David and Dominique Foray, “Accessing and Expanding the Science and Technology Knowledge Base,” *STI Review*, no. 16 (1995): 13-68.

of traditional universities to compete in the area of e-learning) and brings new challenges for our capacity to cope with information overload.

As it is often pointed out, to use the Internet to access information is like trying to “drink water from a hydrant.” In this context, efforts to catalog and to assure the credibility of available information are a priority area for action. In the field of knowledge about development, for example, the Development Gateway portal, that has the support of the World Bank Group and the Federal Government of Germany among other partners, illustrates an innovative way to approach this problem.⁴

NETWORKS AND INNOVATION⁵

Intellectual property rights (IPRs) play a critical role in the process of innovation (generation of new knowledge) in market economies. Over the last fifteen years there has been a clear trend toward the strengthening of IPRs around the world, a process closely associated with multilateral negotiations.⁶ Although recent developments – as illustrated by the outcome of the WTO Ministerial Conference in Doha – suggest that this trend may be somewhat reversed, most owners of intellectual property will continue to press for higher standards of protection at national and international levels.

As pointed out by Lawrence Lessig in a recent book, the explosion of creativity and innovation associated with the Internet has occurred, ironically, in a setting that had at its core a non-proprietary approach to the protocols and, in part, to the content on the network.⁷ Moreover, the rise of the Internet gave new relevance to the issue of extra-territoriality, and increased the demand for convergence among national intellectual property rights regimes.

The Internet not only opened new possibilities for dissemination of information, but also expanded the scope for activities that may infringe on someone’s IPRs. With a few computer strokes, one can download copyrighted material in bulletin boards around the world in an anonymous fashion. It can be argued that this is simply another chapter in the history of technological progress and that as in the case of photocopying, audio, and videotape capabilities, the law will adapt – as time goes by – to face these new challenges. The expansion of legitimate videotape rental facilities around the world illustrates how the legal system can cope with decreasing costs of copying, while enforcing the protection of IPRs.

A more fundamental question, however, is the following. Is there anything intrinsic to the economies of the digital era that makes the rationale for IPRs protection obsolete?

⁴ Visit www.developmentgateway.org for details.

⁵ This sections relies on C.A. Primo Braga and C. Fink, “The Economic Justification for the Grant of Intellectual Property Rights: Patterns of Convergence and Conflict,” in F. Abbott and D. Gerber, eds., Public Policy and Global Technological Integration, (London: Kluwer, 1997).

⁶ For details see, for example, C.A. Primo Braga, “Trade-Related Intellectual Property Issues,” in W. Martin and L.A. Winters, eds., The Uruguay Round and Developing Economies (Cambridge: Cambridge University Press, 1996).

⁷ See L. Lessig, The Future of Ideas (New York: Random House, 2001).

There are some analysts who believe that to be the case. Barlow, for example, argues that encryption (that is, technology), rather than laws, provides the only effective way to protect intellectual property in “cyberspace.”⁸ The gist of his arguments can be captured by the following propositions: (i) “all information wants to be free”; (ii) the economics of information in a networked economy will increasingly be associated with relationships (for example, selling ancillary services) rather than property; and (iii) the transaction costs to enforce IPRs in a networked environment are too high.

Some aspects of propositions (i) and (iii) can be addressed by the supporters of IPRs orthodoxy without major problems. After all, IPRs do not protect information in the abstract. In the case of copyright, for example, the requirement of creativity allows one to argue that the protection of intellectual property promotes the production of knowledge and works of art without hampering the possibilities of dissemination if information *stricto sensu*.⁹ In the same vein, the issue of transaction costs is not a new phenomenon and IPRs laws have been flexible enough to cope with this problem, as illustrated by the special treatment given to private use of copyrighted works in most countries. From this perspective, laws will adapt as experience with the economics of a digital environments accumulates.

Proposition (ii), however, poses a new challenge to IPRs orthodoxy. If the economics of networks evolves in such a way that the business model of content providers in cyberspace increasingly relies on the free distribution of intellectual property, while charging for ancillary services and products, then attempts to strengthen IPRs enforcement in this environment may become counterproductive.

More fundamentally, attempts to strengthen protection – as illustrated by the drive toward the application of patents to software and business processes in the United States, and the *sui-generis* approach to database protection in the European Union – may chill innovation by fostering rent-seeking and confining the “commons” under which cyberspace has prospered.

NETWORKS AND DEVELOPING COUNTRIES¹⁰

Let me conclude by briefly discussing the implications of ICT for developing countries. Polar views seem to dominate the debate about the welfare implications of the information revolution for those who live in the developing world. Some stress ICT as mechanisms for developing countries to “leapfrog” stages of development, and others see the emerging global information infrastructure as contributing to even more economic divergence.

It is broadly recognized that the countries that are better positioned to thrive in the new economy are those that can rely on: (i) widespread access to communication networks for

⁸ See John Perry Barlow, *The Economy of Ideas: A Framework for Rethinking Patents and Copyrights in the Digital Age* (Everything You Know About Intellectual Property is Wrong), Wired, March 1994, at 84, 129.

⁹ For more on this, see Bruce A. Lehman & Ronald H. Brown, Intellectual Property and the National Information Infrastructure: Report of the Working Group on Intellectual Property Rights 19-23 (1995).

¹⁰ This section relies on C.A. Primo Braga, “Inclusion or Exclusion?” *The UNESCO Courier* (December 1998): 24-26.

its companies and citizens; (ii) the existence of educated labor-force and consumers; and (iii) the availability of institutions that promote knowledge creation and dissemination.

Against this background, developing countries seem to be at a significant disadvantage vis-à-vis industrialized countries. By 1999, for example, low-income economies averaged less than 3 telephone lines per 100 inhabitants and less than 5 computers per 1,000 inhabitants, in contrast to a teledensity of 58.3 per 100 and a computer penetration of 346 per 1,000 in high-income economies. Internet penetration is even more skewed with the OECD area accounting for 95.6 per cent of the existing Internet hosts by October 2000.

The quality and coverage of schooling at all levels, including vocational training, are also characterized by significant gaps between industrialized and developing countries. These gaps reinforce income inequality, not only internationally, but also within nations. The gaps are even more dramatic when one looks at the area of computer literacy.

In a nutshell, all these indicators seem to point in the direction of a social transformation that will *increase* rather than *diminish* economic divergence at the international level. Developing economies would be condemned to fall further behind in the international economic race because of their lack of connectivity and ability to transform the information explosion into a knowledge revolution.

Technological developments, however, are rapidly eroding economic and technical barriers to entry into communication networks. Developing countries can, for example, leapfrog stages of development by investing in fully digitized networks rather than continuing to expand their outdated analog-based infrastructure. The opportunities for latecomers – for example, not having to cope with the technological obsolescence of wireline networks – are illustrated by the fact that low-income economies presented a higher share of digital telephone lines than high-income economies by the end of the last century. ICT is also creating new development opportunities to address some of the handicaps of developing countries noted above.

First, by developing a modern information infrastructure countries can reduce isolation and exclusion. Many countries are experiencing fast expansion of cellular telephony as an alternative to inefficient conventional network services. Wireless technology can also provide affordable connectivity to rural areas in a fraction of the time that was previously required to expand conventional telephone networks. Moreover, community information centers with access to value-added services can be customized to the needs of the poor. In many places such centers are being used to provide access to the Internet and to help answer questions concerning health, employment, and human rights issues.

Second, countries can benefit from distance education. The costs and effectiveness of such programs are improving dramatically, although many challenges still remain in the development and adaptation of educational software to the needs of developing countries. Teacher training is one of the most promising areas for developing countries as ICT helps to address a serious bottleneck – the availability of qualified teachers. ICT is also being used for lifelong learning, opening opportunities for new players in education systems. In developing economies, the dynamism of these new entrants – from courses dedicated to

computer training to virtual schools in the Internet – can challenge conventional educational systems, playing a catalytic role in the transformation of educational systems.

Third, a modern information infrastructure can also be a powerful force for better governance. It can, for example, enhance tax administration, auditing, and control or increase the transparency of government transactions via e-procurement.

Summing up, the logic of the networked economy can be one of inclusion rather than one of exclusion. As technological progress continues to push the costs of ICT down, opportunities for development-oriented applications will multiply. These considerations point toward a more optimistic scenario for developing countries' participation in the emerging knowledge economy. It is incumbent upon all of us to work together to make this prediction a reality. Arthur Schopenhauer (1788-1860) once said that "everyone takes the limits of his own vision for the limits of the world." Networks can help us magnify our own visions and, in this context, create a much greater vision than the sum of our individual dreams in the fight against poverty.

Thank you!

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