

ICT & Innovation: Facing the Global Challenges

Dr. Robert D. Atkinson

Information and communications technology (ICT) has the potential to revolutionize the lives of people around the world, in developed and developing countries alike. While ICT alone cannot solve all of the problems facing nations, it can and should be a key part of solutions.

Let's look at four key global challenges and how ICT can address them: 1) raising productivity in developed nations to cope with the rising share of the population who will be elderly and in developing nations to help bring people out of poverty; 2) directly improving the quality of life of people in developing world; 3) addressing the challenge of global warming; and 4) increasing governmental transparency and global understanding and cooperation.

Raising Productivity and Reducing Poverty

A central challenge for developed nations will be to raise productivity so that the future smaller share of younger workers will be able to support a larger dependent elderly population, while at the same time seeing an increase in their living standards. In developing nations the challenge is not so much demographic (their populations are in most cases younger), it is economic – these nations suffer from extremely low productivity and hence poverty. In both developed and developing nations the widespread use of ICT has been shown to be the key driver of productivity.

The integration of ICT into virtually all aspects of the economy and society is creating a digitally-enabled economy that is responsible for generating the lion's share of economic growth and prosperity. And this digital economy engine is conducted on more than just the Internet. Rather, it represents the perva-

sive use of ICT (hardware, software and telecommunications) in all aspects of the economy, including internal operations of organizations (business, government and non-profit); transactions between organizations; and transactions between individuals, acting both as consumers and citizens, and organizations. ICT has enabled the creation of a host of tools to create, manipulate, organize, transmit, store and act on information in digital form in new ways and through new organizational forms. And its impact is pervasive as it is being used in virtually every sector from farming to manufacturing to services to government.

The use of ICT by organizations turns out to be a powerful driver of growth, having an impact on productivity three to five times that of non-ICT capital (e.g., buildings and machines). In the United States ICT was responsible for two-thirds of total factor growth in productivity between 1995 and 2002 and virtually all of the growth in labor productivity; and since then almost half of productivity growth. Other nations have benefited from the transition toward a digital economy. Economists have found significant impacts of ICT on productivity in many other nations, including Australia, Canada, Finland, France, Germany, Korea, Japan, the Netherlands, and Switzerland. Although, for many of these nations the challenge will be to match nations like the United States in its ability to drive high levels of productivity in its business sector through ICT.

While its impact is not as large in most developing nations, ICT is making a difference there as well, in part because ICT expenditures rose twice as fast from 1993 to 2001 compared to the OECD average. And these expenditures have driven growth. In China ICT usage (as

opposed to production) was responsible for 38 percent of the increase in total factor productivity growth. A World Bank survey of over 20,000 businesses in low- and middle-income countries found that firms that use more ICT have faster sales and employment growth and also higher productivity.

Boosting Quality of Life in Developing Nations

At the end of the day the single biggest factor to boosting quality of life in developing nations is higher incomes. However, ICT is also playing a key role in boosting quality of life directly.

For example, the Internet is bringing educational opportunities to many more people. In many nations, schoolteachers can download educational materials and lesson plans for their students. In Brazil, an Internet radio production training offered by the nongovernmental organization called CEMINA (Communication, Education, and Information on Gender in Portuguese) offers a women's radio network that promotes communication and education on gender and civil rights issues. In the past few years, CEMINA has formally trained over 1,500 women in Internet radio production at community telecenters in underserved communities.

ICT is helping to improve health care. Patients in remote villages can see specialists online rather than traveling for hours to the nearest clinic. In Uganda and Mozambique, for example, since 2003, the AED-Satellite Center for Health Information and Technology has distributed 600 personal digital assistants (PDAs) to health care workers, who use them to collect public health data, which they upload to a central server. Health care professionals analyze the data and send responses and other information back to the local health

care workers, thereby helping to educate them and improve the services they provide.

ICT is providing people in developing nations with increased access to information in a host of areas that can improve their lives.

Energy and Global Warming

Until recently, many have overlooked the role of ICT in reducing carbon emissions; in fact, some even saw ICT as contributing to the problem. Yet by transforming all sectors of the economy and society – from e-commerce and just-in-time manufacturing to telecommuting and clean alternative energy technologies – ICT is allowing the global economy to become more energy efficient and less carbon intensive. ICT lets many energy-intensive physical activities be substituted for more energy-efficient digital activities, such as buying digital content rather than content printed on paper. ICT enables individuals and organizations to adopt more energy-efficient practices and processes, such as automated control systems on energy-intensive factory processes. ICT is also rewriting the rules of electricity production, distribution, and consumption, particularly through the “smart” electric grid.

The bottom line is that the transformation to a more digital and information-driven economy will be a key factor in reducing energy usage and carbon emissions globally. Indeed, Lawrence Berkeley National Laboratory in the U.S. estimates that ICT could reduce the growth in projected carbon emissions by one-third over a 10 year period.

Transparent Government

By its very definition, ICT enables more information to be more easily communicated – whether through better telecommunications, websites, or social networking applications. As such ICT has the potential to play a key role in making progress on two interrelated challenges: the widespread presence of corrupt and/or authoritarian governments that limit economic growth, enhanced opportunity and democratic participation; and the importance of building an interconnected community of global citizens.

With respect to corruption, not only does it disproportionately impact poorer citizens but it also makes businesses less competitive. One study has shown that corruption has increased the cost of doing business for SMEs in India by 20 percent. ICT helps make governments become more transparent by giving leaders who want to be responsive to their citizens the tools to do so and by increasing accountability for leaders who do not act in their people's best interest. By automating procedures that would tra-

ditionally require interaction with a local bureaucrat, ICT helps reduce the power asymmetries between officials and citizens, thereby reducing the likelihood of forced bribes and corruption. A recent World Bank survey of eight e-government projects across India found a decrease in corruption for each area once the government program became computerized – and in one of the areas, bribes were reduced from 30 percent of transactions to less than 1 percent.

Far more detrimental to developing countries than bribery is what developmental economists call “the resource curse” – where countries rich in natural resources produce little long-term growth because leaders derive wealth from selling their country’s natural resources instead of growing a vibrant domestic economy. ICT is beginning to bring greater transparency to governments in the developing world. The partnership created in 2007 between South Africa Press Association (SAPA) and the Extractive Industries Transparency Initiative (EITI) to link the sale of resources to economic growth and poverty reduction by requiring governments and companies to disclose statements of all financial transactions. More than half of the 54 resource-rich countries in the world have committed to implementing EITI or are in the process of doing so – and Nigeria received a mark-up in its sovereign risk rating after implementing EITI, showing that investors believe the program will help stabilize the country.

ICT is increasing government accountability via the Internet. Blogs, e-mail, and search engines have allowed people all over the world to communicate and shine light on inappropriate action from unrepresentative governments. The recent protests over the repressive ruling junta in Myanmar were far less violent than in 1988, and one of the reasons suggested is that, unlike the 1988 protests, the more recent demonstrations were all over the Internet and people across the globe could watch how the military treated protestors. In the information age, repressive governments are finding it harder to hide behind national boundaries.

The Global Village

With the rise of interactive video games, Internet telephony, and of course, social networking applications such as Facebook, ICT is leading us, slowly and inexorably, toward Marshall McLuhan’s notion of a global village, where individuals regularly communicate with others around the globe. This was reinforced personally for me a few years when my teenage son – who was an online gamer – came face to face with the realities of the global economy. In this game the players (mostly, it seemed teenage

boys) formed clans. My son’s small clan was an amalgam of boys from around the world: Estonia, Brazil, England, and other places. And they regularly communicated with each other, not just about the game but about what life was like in each boy’s home community/nation. In fact, one of the boys lived in Thailand and after a terrible typhoon and tidal wave in 2004 the boys communicated with one another to try to find out if their fellow clan member was okay and if they could do anything to help. Thankfully he was okay. This “digital generation” is the first one to grow up in a digitally connected world where a video phone call is as easy to make halfway around the world as halfway around the block. And while it is too early to know exactly how this will play out or when (especially given the large numbers of the world’s citizens that are digitally disconnected) the process is surely one of the most promising for the future of the globe.

Taking Advantage of ICT

ICT can play a key role in addressing these global challenges and creating a world that is dramatically better in 50 years than the one we live in today. But it will do that only if policy makers make concerted efforts to spur digital transformation. They will need to be active in at least four key areas.

First, the ICT system needs to remain global and interoperable. On a recent overseas trip with my son I had to make sure I brought by electric adapter with me to deal with different voltage and plug configuration. I commented that going forward, technology will be developed that is globally interoperable because it will be developed around a global standard. But there are troubling signs that this global technology system could become balkanized and regional if

some countries have their way. Already some nations are seeking to distort what are essentially global standards for their own short-term competitive advantage. For example, some nations are tempted to develop their own standards. Another case is the dispute over International Corporation for Assigned Names and Numbers (ICANN) and the Internet root systems where some nations want to gain control over the Internet in order to control content. These kinds of steps should be resisted with the utmost effort by the community of nations committed to a global Internet.

Second, nations need to focus more on the use of ICT than the production of it. Too many nations look at ICT as a quick way to get jobs in the ICT industry itself – software production, computer factories, chip production, etc. But not only are such strategies not sustainable – there are not enough global ICT jobs for every country to have the amount they want – they are bad economic policy. Economists have clearly shown that it is the use of ICT in all sectors of the economy – banking, retail and wholesale trade, government, logistics, etc. – that drives productivity growth, much more than the production of ICT.

Take India as a case in point. While the Indian ICT sector has created new opportunities for India, it accounts for only about 3 percent of national value-added. But productivity in India is just 6 percent of U.S. rates and Indian retail banking is just 9 percent of U.S. levels. If India could raise productivity in these two sectors to just 30 percent of U.S. levels, it would raise its standard of living by over 10 percent. Likewise, Korean services productivity is 50 percent of U.S. levels. ICT can play a key role in boosting the productivity of the services sector and in

so doing raise standards of living.

Transforming national economic policies toward domestic-focused, ICT-led productivity efforts means working to develop a global consensus that this strategy should be the key focus on economic policy in every nation. International organizations like the WTO, World Bank and the IMF, and national or regional development organizations like the Agency for International Development, the Overseas Private Investment Corporation, and the European Bank for Reconstruction and Development will have to not only stop promoting high-tech export-led growth as a key solution to development, they will have to tie their assistance to steps taken by developing nations to promote domestic growth based on ICT use. And related to this, it is time to dramatically expand the 1996 Information Technology Agreement that dramatically lowered tariffs on ICT products. More nations need to commit to the agreement and the agreement itself needs to be broadened to include more ICT products and services.

Finally, governments need to take steps to encourage broader digital literacy and digital technology adoption: Ensuring that societies take full advantage of the ICT revolution will require that the large majority of citizens participate in the digital economy. National governments need to work in partnership with the for-profit, non-profit, and state and local government sectors to help citizens use and access technology.

In short, ICT is the major driver of today's global economy. But just because ICT has been the leading engine of growth does not mean that policymakers can afford to be complacent. Ensuring that societies fully benefit from the ICT revolution means that policymakers must put issues of digital transformation at the front and center of economic policy.

About the Author

Dr. Robert D. Atkinson is the founder and president of the Information Technology and Innovation Foundation (ITIF). He is also the author of the State New Economy Index series and the book, *The Past and Future of America's Economy: Long Waves of Innovation That Power Cycles of Growth* (Edward Elgar, 2005). Before coming to ITIF, Dr. Atkinson was Vice President of the Progressive Policy Institute (PPI), the first Executive Director of the Rhode Island Economic Policy Council (RIEPC), and Project Director at the former Congressional Office of Technology Assessment (OTA). He received his Ph.D. in City and Regional Planning from the University of North Carolina at Chapel Hill in 1989.