

# Does the internet have the potential to accelerate development in poor nations?

[Technology](#), [Internet](#)



## 1. INTRODUCTION

The Internet and information technology (IT) represent a revolution that may well have an economic impact corresponding to the wave of innovations that made up the core of the industrial revolution two centuries ago. The industrial revolution dramatically increased global economic inequalities, which in the 19th and 20th centuries produced discrepancies in political power among nations that led to imperialism and warfare. After a discussion of earlier technological breakthroughs, this paper presents data that show a significant gap between wealthy and poor countries in the rate of diffusion of the Internet. The evidence suggests that poor countries are being left further behind as a result of the ongoing technological revolution elsewhere in the world. We consider proposals for helping developing countries participate in the “new economy” by improving their communications infrastructures and transferring technology from technological leaders to poorer countries, as well as whether it might be in the interest of leading nations to sponsor such efforts.

The last half of the 20th century has witnessed a revolution in information technology, capped off at century's end by the Internet. Numerous popular and academic articles describe the “new economy” and new business models stimulated by IT. Computers, databases and communications networks are pervasive in post-industrial countries. The Internet provides standards for worldwide connectivity, and its impact on business and commerce has been dramatic. The impact of IT on economy-wide measures of productivity is also

increasingly evident, particularly but not exclusively in the United States, the leader in applying information technology.

The Internet allows global market access for a vendor; over 150 million people can access the web site of someone with a product or service to sell on the Net. Many organizations are developing electronic customer/supplier relationships, resulting in a dramatic increase in efficiency. There is a movement toward purchasing “ hubs” in which a web site joins together buyers and sellers, for example, shippers with trucking companies. Led by Detroit automakers, a number of industries are establishing purchasing sites to reduce the cost of dealing with suppliers. Companies are integrating their supply chains and providing suppliers with access to their production plans.

The Internet has given rise to new business models. Companies such as Dell Computer and Cisco Systems integrate technology into all of their operations. Cisco processes almost all of its orders on the Web, and handles approximately 85% of its customer service on the Internet. Companies adopting the Internet are substituting technology for physical assets. In addition to developing commerce, the Internet offers the potential for new forms of distance-education and learning, and for improving the quality of medical care.

The Internet needs a robust telecommunications infrastructure to function well. In the United States, there are a number of Internet Service Providers (ISPs) that connect individuals to the Internet backbone. Companies like UUNet provide high-speed fiber backbone communications to carry Internet

traffic. In 1999 UUNet was reportedly expanding its capacity 10 times a year to keep up with demand.

Individual organizations connect to the Internet through leased lines to a service provider, generally at a much higher speed than the 56Kb of a typical modem. Many home users only have the option of a modem, but increasingly high-speed home service is available through cable TV companies, DSL lines from the Phone Company, or satellite TV providers. A communications infrastructure is a prerequisite for obtaining maximum benefits from the Net.

The Internet in 1999 connected 58, 000 separate networks with an estimated 150 million users world-wide . A UN Human Development Report (1999) noted that the lead of the US in Internet development has resulted in 80 percent of web sites being in English and 26 percent of Americans using the web, whereas only 3 percent of Russians, 0. 04 percent of South Asians, and 0. 02 percent of people in Arab states do so. The US has more computers (potential web access) than the rest of the world combined. Moreover, while an American can buy a computer with a month's salary, a Bangladeshi would need 8 year's income to buy one. Nearly half of U. S. homes have Internet access in 2000. By implication, the reduction in worldwide economic inequality that occurred in the last half of the twentieth century is being reversed, contrary to the rosier scenarios of some economists who argue that the recent reductions in inequality are likely to continue in the twenty-first century.

An optimistic scenario has developing countries adopting the Internet to stimulate economic growth. There are many stories of artisans in poor countries marketing their products world-wide through a web site. The Internet is promoted as a technology that will enhance education and expand commerce, allowing developing countries to make rapid advances.

The Internet is a kind of technological infrastructure, however, and developing countries are notoriously short of infrastructure. The Internet also requires a level of education and training to use, and educational opportunities in poorer countries are generally inferior to those in wealthy countries. Unfortunately, our data analysis shows that poor countries are almost “ off the screen” as far as Internet capabilities. The data suggest that what appear to be key determinants of the Internet’s penetration in more developed country settings have almost no explanatory power for developing countries. If this situation persists most of the continued diffusion of Internet technologies will occur in wealthy countries, and the likelihood increase based on the historical impacts of earlier network technologies that economic inequality and political and social instability will increase in the world.

The consensus of economic historians is that roughly two centuries ago there was far less economic inequality among the world’s major regions and societies than there is today. From then to the present, the gap in average incomes between rich and poor societies became much wider. Two hundred years ago it is estimated that the was on the order of 2 to 1; today it is more like 30 to 1.

Consider the three most populous nations in the world today, China, India, and the United States of America. Together the three have about 40 percent of the world's people. The succinct phrase economic historians have used in response to this question is "the industrial revolution." The initial industrial revolution, England's, began with late 18th-century technological breakthroughs in the production of textiles, coal, and iron, and the innovation of steam engines. Economic historians use these specific or "core" examples of innovative change to develop general principles underlying industrialization.

Spinning and weaving breakthroughs in textiles represent the general principle of substituting power-driven machines for human labor.

Technological developments in iron (and coal) processing illustrate the substitution of abundant mineral substances for scarcer animal and vegetable materials. Steam engines generalize to the substitution of inanimate converters of energy for traditional animate (human, plant and animal) converters. Each specific technological breakthrough represented a quantum leap forward in production and the productivity of human labor. As the general principles involved were extended to other industries, economic growth—production per person—increased and became self-sustaining. From textiles, machine production spread to other industries.

Iron led directly to steel, and as the chemical technologies involved were increasingly understood, a host of new materials were developed and used across a range of modern industries. Steam engines were forerunners of internal combustion engines and nuclear reactors. With these epochal

developments, living standards rose. But not everywhere, or at the same rate in different societies. England, which by the mid-nineteenth century.

Among this group of industrializes, the followers or late-comers tended to grow faster than the pioneers, so that eventually the differences in income levels among all of them became much less than between them and the non-industrial rest of the

World. Well into the twentieth century, that “ rest of the world” lagged well behind

Europe, North America, and Japan. But in the second half of the twentieth century, it too

Began to industrialize.

This traditional economic-historical account of the industrial revolution helps to explain the dramatic increases in economic inequality among nations that developed during the past two centuries. It also indicates how that inequality eventually tends to be reduced. The latecomers grow faster than the pioneers, reducing the income gaps that the industrial revolution initially engendered among them. In a recent article, Robert Lucas, a prominent economic theorist and Nobel laureate, utilized these stylized facts of economic history to develop a model predicting that economic inequality in the world would be far lower a hundred years from now than it is today.

Suppose, however, that the Internet and related IT, as some argue, are really epochal innovations such those of the British industrial revolution two

centuries ago, or the railroad technologies that came along in the middle decades of the nineteenth century, or the electrical and automotive technologies that were developed in the late nineteenth and early twentieth century's. If so, these new technologies, like the older ones just mentioned, might well increase inequality in the world for decades, with political and social consequences that do not differ from those that came with inequalities brought by industrialization after 1800

A newer interpretation of the past two to three centuries from the one above puts this possibility in historical perspective. This new interpretation of economic history, while not denying the importance of the great inventions and innovations of the industrial era, gives more emphasis to the importance of network innovations and network externalities in shaping the modern economic world.

In the new view, the Internet and IT technologies in general are the latest of several major breakthroughs in network technologies that were fundamental in promoting and sustaining industrialization where it took place. The earlier network technologies, in order of their appearance, were modern financial systems in the seventeenth and eighteenth centuries early transportation networks from the late eighteenth to the late nineteenth centuries, and, finally modern transportation (highway, airway), communication (telegraph, telephone) and electrical networks which began in the late nineteenth and early twentieth century's.



Each of these historical network breakthroughs can be associated with the industrialization of the modern world and the income gaps among nations and world regions to which “selective” industrialization led. In the first (and least recognized) of the great network technologies of the modern world, finance, which adopted and added to British financial techniques in late 18th and early 19th centuries.

All of these countries early in their modern histories had what some have termed “financial revolutions.” In all three, financial networks—banking systems and securities markets, for example—were in place to mobilize and allocate capital before the Industrial Revolution, so that the revolution could advance rapidly without capital-supply

## **2. The Internet and Prescriptions for Economic Growth**

Landes (1998) has proposed the following factors for stimulating economic growth in developing nations:

1. Manage and build instruments of production; master the technological frontier
2. Impart knowledge to the young
3. Hire and promote based on competence and relative merit
4. Encourage initiative, competition and emulation
5. Allow people to benefit from their labor and enterprise
6. Practice gender equality

7. Have a political system that:

a. Secures the rights of private property

b. Secures the rights of personal liberty

c. Enforces the rights of contracts

d. Stable government of laws rather than men (not necessarily democratic)

e. Provides responsive and honest government

f. Moderate, efficient and non-corrupt government keeping taxes down

8. An ideal society would be honest

To successfully integrate the Internet into an economy, a country's leaders will have to follow many of Landes's suggestions. The instrument of production for the Internet is a telecommunications infrastructure, something that is expensive and competes with other infrastructure projects such as roads. While a developing country may be able to use wireless technology for phone connections, high-speed Internet access demands either fiber optic lines or satellite communications. <sup>1</sup> The rich countries have the capital and know-how to develop such new infrastructures and are doing so. The poor countries likely do not.

### **3. THE GROWTH AND DISTRIBUTION OF THE INTERNET**

Which countries are using the Internet today? What is the extent of Internet use among developing countries? What factors predict the intensity of Internet

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use in a particular country. The answers to these questions are important in formulating policies to assist developing countries take advantage of technology.

### **3. 1 Research Design**

To address the questions above, we collected data from the World Bank on 1998 economic development indicators. We added to these data information about the number of Internet hosts in each country from the Network Wizards Web site: <http://www.isc.org/ds/>. Hosts are the computers on the Internet that contain content; they respond to requests from client computers. A PC in one's office running a browser like Netscape Navigator or Internet Explorer is a client computer. It requests information from a variety of servers using a URL or Universal Resource Locator. As an example, the URL for the Stern School of Business at New York University server is <http://www.stern.nyu.edu>. A country with a large number of hosts or servers is indicative of more Internet penetration and activity than a country with fewer hosts.

### **3. 2 Internet Hosts**

#### The Data

We obtained development-indicator and Internet-host data from the World Bank and from a survey of Internet Domain names by the Internet Software Consortium. There are some problems with the data. First, the World Bank data for different countries may not be for the same year due to different practices on collecting and reporting information in various countries. The Internet host data are based on high-level domain names. For example, a

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domain name that ends in “ com” generally is from the United States, while one that ends in “ sg” is from Singapore, “ ca” from Canada and so on. However, there is no law that says domain names have to reflect the physical location of the server. The Taliban government in Afghanistan has a Web server, but the host data showed no hosts in Afghanistan in 1998 or 1999.

However, none of the countries with less than a 100 hosts in the Network Wizards survey has 100 or more hosts in the MMQ data. The largest discrepancy is for Canada where MMQ estimates almost 600, 000 more hosts than the Network Wizards data show. MMQ also estimates a quarter of a million more hosts in Taiwan than Network Wizards. In the analysis below, we estimate our basic model with combined data from both surveys. We use the MMQ data when it exists for a country, and the Network Wizards estimate where it does not.

#### **4. CONCLUSIONS**

The UN Development Report data and the results above suggest a wide gap between countries that have adopted the Internet extensively and those that have not. The major factors associated with Net adoption are GDP and telecommunications infrastructure as measured by the number of phones per 1000 people. For the countries with the lowest adoption in the analysis, these variables are only modestly associated with the number of Internet hosts, and the model explains little variance. The conclusion is inescapable that less developed countries are significantly behind on Internet technology compared to those with more resources. If we assume that the Internet and

associated technologies are important for economic growth, then what are the policy implications of these findings? What factors inhibit the adoption of the Internet, and what can be done to mitigate them???

## 5. REFERENCES

Adams, Henry, History of the United States of America during the First Administration of

Thomas Jefferson, New York: Charles Scribner's Sons, 1939 [first ed., 1889].

Burkhart, G., S. Goodman, A. Mehta, L Press, " The Internet in India: Better Times

Ahead?" Communications of the ACM, Vol. 41, No. 11 (November 1998), pp. 21-26.

Daly, J., and R. Miller, " Corporations' Use of the Internet in Developing Countries," IFD

Discussion Paper Number 35, (www. ifc.org/DEPTS/OPS/ECON/PUBS/DP35/Dp35. htm),

Gibson, R., " Informatics Diffusion in South American Developing Economies," Journal

Of Global Information Management, Vol. 6, No. 2, pp. 35-42, 1998

Kedia, B., and R. Bhagat, " Cultural Constraints on Transfer of Technology Across

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nations: Implications for Research in International and Comparative Management,”

Academy of Management Review, Vol. 13, No. 4, pp. 559-571

Landes, D., The Wealth and Poverty of Nations: Why some Are so Rich and Some so

Poor, New York: W. W. Norton & Co., 1998.

Lucas, Robert E., Jr., “ Some Macroeconomics for the 21st Century,” Journal of Economic

Perspectives 14 (Winter 2000). Pp. 159-168.

Montealgre, R., “ A Temporal Model of Institutional Interventions for Information

Technology Adoption in Less-Developed Countries, JMIS, Vol. 16, No. 1, pp. 207-232.

Petrazzini, B. and M. Kibati, “ The Internet in Developing Countries,” Communications of

the ACM, Vol. 42, No. 6 (June 1999), pp. 31-36.

Press, L., “ The Role of Computer networks in Development, ” Communications of the

ACM, Vol. 39, No. 2 (February 1996), pp. 23-30.

Press, L., "Tracking the Global Diffusion of the Internet," Communications of the ACM,

Vol. 40, No. 11 (November 1997), pp. 11-17.

Pomeranz, Kenneth, the Great Divergence: China, Europe, and the Making of the

Modern World, Princeton: Princeton University Press, 2000.

Sylla, Richard, "U. S. Securities Markets and the Banking System, 1790-1840," Federal

Reserve Bank of St. Louis Review 50 (May/June 1998), pp. 83-98.

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Sylla, Richard, "Emerging Market in History: The United States, Japan, and Argentina,"

in Ryuzo Sato et al., eds., Global Competition and Integration, Boston: Kluwer Academic Publishers, 1999, pp. 427-446.

World Bank, Knowledge for Development, Washington: World Development Report, 1999.

UNDP, Human Development Report, 1998, New York, Oxford University Press, 1998.

UNDP, Human Development Report, 1999, New York, Oxford University Press, 1999.

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