

# Information Technologies and the Global Political Economy

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## Introduction

Scholars have argued about the impact of information and communications technologies (ICTs) on the global political economy. The industries associated with these technologies have grown more rapidly in the past three decades, on the average, than other industries. As a result, some argued that their importance in the overall economy at both the national and global levels increased in recent decades. Rises and declines in the importance of specific industries are part and parcel of the approach to international relations taken by long-wave theorists. In contrast, many economists were skeptical about claims that newer industries were more important than older ones. In the United States, just such skepticism led to the “a computer chip is not a potato chip” debate.

Economists, at first skeptical about the effect of ICTs on economic productivity, changed their views on this in the 1990s. A few argued that ICT industries were subject to virtuous circles of innovation and growth that created the basis for an economy immune from the up and down cycles of the past. During the so-called dot.com bubble of 1998–2001, a decline in the growth rates of ICT industries resulted in some scholars reminding the world that all industries are subject to economic cycles and that the ICT industries are not so different from other industries, but others argued instead that the rise of the ICT industries had forever changed the world economy in important ways.

The increased availability and declining prices of many products and services made possible by innovation in ICTs, they argued, reduced many of the costs associated both with doing business and with organizing social and political movements. Declining transportation and communication costs and declining transaction and coordination costs resulted in higher levels of international trade and investment and greatly reduced the importance of geographic distances in global commerce. The decreased importance of distance led to an increased trend toward globalization of economic activity. Below, scholarly arguments about how this affected production, retailing, and finance will be reviewed to demonstrate the trajectory of research on these questions.

The diffusion of ICT technologies was not uniform domestically and internationally, and there was concern that a “digital divide” might contribute to maintaining or increasing existing domestic and global inequalities. Some scholars were pessimistic about the digital divide, saying that the further diffusion of ICTs would create even greater inequalities. Others were optimistic that diffusion of ICTs would reduce inequalities by evening the playing field for all those wishing to compete in the world economy.

## Growth of ICT Industries

Scholars have examined the growth of ICT industries for a number of reasons. First, many start from the assumption that industries differ in both their economic and

political characteristics and that industry-specific research can yield important insights into the relationships between politics and economics. Industry studies have long been a part of research on comparative political economy. An important innovator in this field was Andrew Schonfeld (1965). Schonfeld compared and contrasted the economic and political institutions of advanced capitalist countries in different industries in order to explain variations in outcomes across countries. Schonfeld was most concerned with the variations in the amount of governmental intervention in the economy.

The contemporary school of thought in comparative political economy inspired by Schonfeld's work is called the "varieties of capitalism" approach (see Hall and Soskice 2001), although originally works inspired by Schonfeld focused on the relative strength of the state in economic affairs (see, for example, Zysman 1977; Katzenstein 1978). The basic hypothesis of the varieties of capitalism school is that variance in advanced capitalist institutions explains variance in both domestic and foreign policies and outcomes.

Comparative political economy research of this sort obviously had international implications. Countries with "strong states" could engage in industrial policies that might (or might not) create advantages for their domestic firms in international competition. Testing this hypothesis became a major focus of work in international political economy, especially during the 1980s, when it looked like strong states such as that of Japan had an advantage in international competition with countries with weak states like those of the United States and the United Kingdom. More specifically, the ability of Japan to quickly catch up technologically with the United States in high technology electronics gave scholars a strong incentive to examine specific ICT industries in order to test these theories or to provide alternative explanations (see, for example, Hart 1993).

ICT industries include both goods producers and service providers. ICT manufacturing includes all the goods-producing industries that use semiconductor components, such as consumer electronics, the computer industry, the telecommunications equipment industry, and industrial and military electronics. Within each of these groups, there are sub-industries that specialize in particular segments of the market. In the computer industry, for example, different firms specialize in the production of main-frame computers, minicomputers, and microcomputers. Within the microcomputer cluster, firms may specialize in the production of desktop computers, laptop or notebook computers, and more recently "netbook" computers.

The dividing lines between these market segments are shifting all the time. Many cellular telephones (traditionally considered part of the telecommunications equipment sector) function like small computers; some digital televisions can be used as gateways for information services, thus blurring the boundaries between the consumer electronics, computer, and telecommunications industries.

The services side of ICTs is also very large in terms of revenues and employment, and is growing rapidly. ICT services include, among others, the software industry, telecommunications services, data processing, and web-based information services.

Table 1 shows estimates made by the Japan Electronics and Information Technology Industries Association (JEITA) of global revenues for global electronics and information technology industries in 2008. JEITA estimated total revenues to be over \$2 trillion.

### **Importance of ICT Industries in the Global Economy**

Many scholars argue that the importance of ICT industries goes beyond the revenues and employment generated in the industries themselves. ICTs may be transformative in that they reduce transaction and communications costs in the overall economy

**Table 1** Global revenues of the electronics and information technology industries in 2008 (estimates)

<i>Industry</i>	<i>Revenues (\$ billions)</i>
Audio-visual equipment	228
Communications equipment	287
Computers and information terminals	413
Other electronic equipment	123
Electronic components	203
Display devices	133
Semiconductors	293
IT solution services	477
Total	2,157

*Note:* Original figures in yen converted by the author at a rate of 113 yen to the dollar.

*Source:* JEITA (2007)

(Milner and Keohane 1996). They make possible new forms of organization of human activity and not just in the business world. To stick with business, however, a good place to start would be with a review of the literature on global production networks.

#### *Global Production Networks*

One response by American and European firms to the increased competitiveness of East Asian firms has been the creation of global production networks. A production network is “the nexus of interconnected functions and operations through which goods and services are produced and distributed” (Global Production Networks 2009). What makes a production network global is the complexity and geographic extent of the network (see Borrus and Zysman 1997; Ernst 2005b).

The success of Japanese firms in innovating new production technologies in the 1980s, such as just-in-time production in the auto industry and advanced automation in the electronics industry, led to an effort elsewhere to harness information technology to go one better. This occurred not just in the United States and Western Europe but also in lower-income East Asian countries like Korea and Taiwan wanting to compete effectively with Japan. US and European firms partnered with East Asian firms to become more globally competitive. Later on, China and India entered the picture – China focusing on manufacturing by attracting global firms with low-cost labor, through investments in advanced production technologies, and by offering access to large domestic markets; India concentrating on selling the services of inexpensive but skilled and semi-skilled workers to foreign firms via the “business process outsourcing” markets.

The most dramatic example of the construction of global production networks was that of the semiconductor industry. A global division of labor emerged in the 1990s between firms that designed and firms that manufactured circuits. In order for so-called “design houses” that specialized in circuit design to succeed, there had to be “foundries” – firms that specialized in circuit manufacturing on a contractual basis.

Foundries arose first in Taiwan, as key firms in that country decided that their best strategy for becoming internationally competitive in the industry was to focus on perfecting the process technology and let others do the designs. These firms were founded or run by Taiwanese nationals who had been trained in the United States or who had worked for US semiconductor firms previously. The Taiwanese firms that adopted this strategy did not do so until it was clear that their earlier strategy of doing

both design and manufacturing would not succeed. The Koreans, who entered the markets at about the same time, mostly avoided the foundry strategy (Ernst 2005a; Macher et al. 2008).

Global revenues in the industry were over \$260 billion in 2006. Two US firms were among the top ten firms in terms of revenues in 2006: Intel and AMD. Intel was the top money earner, accounting for over 12 percent of world revenues, while Samsung of Korea was second. Intel's and AMD's US operations, especially their R&D operations, were crucial to the overall success of the two firms, but both had invested in foreign fabrication facilities in order to service foreign markets in Europe and Asia.

In short, the rise of Japanese firms as competitors primarily to US firms in semiconductors led to a response on the part of US firms that effectively globalized the industry. While control over the most valuable underlying technologies remains closely held by US and Japanese firms, Korean and Taiwanese firms have become key technological players in the industry, not just in production but also increasingly in product technology as well, and assembly and packaging operations in many lower-wage countries are a necessary adjunct to the strategies adopted by the primary competitors.

This vigorous global competition in semiconductors has been a key factor in reducing the prices of information technology equipment and services worldwide, thus accelerating the globalization that depends on digitalization. Evidence of this can be seen in the way that firms in Asia, North America, and Western Europe manage their global production networks. As in the past, they continue to rely on snail mail, telephony, telegraphy, faxes, and face-to-face communications via frequent air travel of executives and engineers. But to reduce costs they increasingly rely on email, digital video conferencing and telephony, and a variety of web-based systems to manage the intense communications necessary for coordinating such far-flung business networks.

One key question for research is whether and to what extent the globalizing practices of the semiconductor industry have influenced those of other industries. Much of the rest of the electronics complex seems to have been similarly globalized, but heavier manufacturing industries such as iron and steel, motor vehicles, and heavy machinery are less likely to adopt the far-flung approach because of the continuing importance of transportation costs. It does not make sense, for example, to create global foundries for autos as happened for semiconductors. Nevertheless, the division of labor within industries between component producers and final assemblers and across countries has been changing rapidly, and some of that change has been driven by the decreasing costs of communication made possible by the diffusion of ICTs.

Global production networks made possible a type of production that permitted design and technological innovation to take place at great distances from the places where products were produced or assembled. Inexpensive transportation and communications meant that production did not have to be near final markets. Because production could occur in places with plentiful and therefore relatively inexpensive labor, costs of production were even lower than they had been when they were located closer to final markets. In the part of the economy dedicated to selling products to consumers, the retail sector, some scholars argued that this enabled the rise of a new phenomenon: the big-box retailer (Basker 2007; Vedder and Cox 2007).

#### *The Rise of the Big-Box Retailers*

A big-box retailer is a large chain store that sells items in larger than normal quantities. Examples include Wal-Mart, Kmart, Target, Carrefour (France), and Big Bazaar (India). The revenue growth of these retail stores has been much faster in recent decades than that of smaller stores, and there is some speculation that such growth has been both the result of globalization and an accelerator of the same.

Digital technology contributed to it primarily through the deployment of systems that track products through the entire chain from producers to final customers by scanning barcodes when the products come off the assembly line, are shipped to retailers, and are purchased at registers. All big-box retailers employ sophisticated software systems to keep track of customer demand for a large number and variety of products and to make sure that automated restocking orders accurately reflect sales at individual stores.

Because big-box retailers focus on high-volume products and offer these products to consumers at low prices, they gain bargaining power with producers, who need orders from big-box retailers to remain profitable. The retailers use this bargaining power to insist upon cost savings that they can pass along to consumers, and some, like Wal-Mart, push producers to relocate production to low-cost (generally low-wage) locations as part of their overall cost-reduction efforts. Thus, the relationship between big-box retailers and producers of consumer goods may have accelerated the globalization of production of high-volume consumer goods via the relocation of labor-intensive activities to low-wage countries. Wal-Mart alone currently accounts for 15 percent of total US imports from China.

One of the types of goods carried by big-box retailers is consumer electronics products like TVs, video game consoles, and MP3 players. The production of these goods was already extensively globalized, but there is evidence that the big-box retailers exerted pressure on their suppliers to move to lower-cost locations, especially to China, in assembling the items they carry.

It must be said that this strategy would not have been available to the big-box retailers if there had not been liberal trade regimes in place and if the governments of countries with plentiful low-wage workers had not encouraged the relocation of labor-intensive processes inside their borders. The shift in development strategies, particularly in East Asia, to encourage export-oriented business investment is a major part of the explanation of the success of the big-box retailers.

### Digitalization and Globalization

Globalization is “the increasing integration of input, factor, and final product markets coupled with the increasing salience of multinational enterprises’ cross-national value-chain networks” (Prakash and Hart 2000:2). Digitalization is the “integration of digital technology into everyday life” (BusinessDictionary.com 2009). Both have been increasing in recent decades and so it is natural to argue that there may be a causal connection.

While the literature on globalization frequently mentions the connection between digitalization and globalization, it does not address directly the question of how much global economic activity was stimulated by the rapid diffusion of ICTs and by the declining costs associated with them. It is much less common to find in the literature on digitalization assertions that globalization was a causal factor. However, the market for digital technology is partially a function of the cost of producing and merchandizing digital products and services, and those costs could have been affected by globalization.

One conceivable causal link could be through the reduced prices of digital equipment and services made possible by liberalization of trade and investment flows. Access to cell phones and personal computers, for example, increased at impressive rates, especially after the prices of equipment and services began to fall. How much of the decline in prices was due to globalization as opposed to other factors not directly connected with globalization?

The author who is generally associated with the argument that the diffusion of digital technologies drove the current wave of globalization is Thomas L. Friedman,

a journalist who, besides writing popular books, also pens an op-ed column in the *New York Times*. Friedman claimed in *The Lexus and the Olive Tree* that he discovered globalization while covering the Arab–Israeli conflict in the 1990s. The Cold War, which was a global system based on the division of the world into two camps, had been replaced by a global system of interconnection, according to Friedman, “symbolized by a single word: the Web” (Friedman 2000:8). Later on, when asked about the book, he said, “globalization is not a choice. Basically 80% of it is driven by technology” (Bricklin 2000).

In *The World Is Flat*, Friedman used the term “flatness” instead of globalization but clarified later in the book that the two are the same thing. He came to the realization that the world was flat from a discussion with Nandan Nilekani, the CEO of an Indian business process outsourcing firm called Infosys. He quoted Nilekani thus:

Outsourcing is just one dimension of a much more fundamental thing happening today in the world [. . .] What happened over the last [few] years is that there was a massive investment in technology, especially in the bubble era, when hundreds of millions of dollars were invested in putting broadband connectivity around the world, undersea cables, all those things [. . .] [that] created a platform where intellectual work, intellectual capital could be delivered from anywhere. It could be disaggregated, delivered, distributed, produced, and put back together again – and this gave a whole new degree of freedom to the way we do work. (Friedman 2007:6–7)

Friedman went on to argue that thanks to ICTs the world was becoming flat in the sense of a more level playing field or platform for all those who wanted to participate in the global economy. This meant that barriers to entry were reduced or even erased by the existence of a new technological infrastructure. Talented people in poor countries like China and India were suddenly able to compete with people in rich countries. The consequences of a flat world, in Friedman’s view, were so deep and so extensive that wealthy countries like the United States had to adjust their policies and institutions to deal with them.

Although Friedman is a journalist and not a scholar, the publication of his books about globalization encouraged many social scientists to examine, in a more thorough and systematic manner, the evidence for his arguments for changes in the world economy brought on by the diffusion of ICTs. For example, Elizabeth Hanson, in *The Information Revolution and World Politics*, took a more cautious view than Friedman about the role of technological change. She argued that “the information revolution was a necessary but not sufficient condition for globalization.” Instead, “the extent of globalization and the form it took are the product of a conjuncture of technological, political, economic, and social forces interacting and reinforcing each other” (Hanson 2008:152–4).

What could these other forces be? One argument was that the progressive construction of liberal monetary, trade, and investment regimes by the advanced industrialized nations, led by the United States, after World War II, was also (along with the spread of ICTs) a necessary cause of globalization (Spero and Hart 2010). To put it more precisely, without the liberal regimes for international trade and investment flows embodied in the G8, the IMF, the World Bank, the GATT, and its successor, the WTO, it would have been impossible for the current form of globalization to exist. Firms would not have had the wide variety of internationalization strategies currently available to them; governments of nation-states would have been obligated, as they were in the period between the two world wars, to enforce national laws that restricted international flows of capital, goods, and services. Even a temporary and partial return to the protectionist policies of the past, therefore, could put a stop to the trend toward globalization.

Friedman's view that globalization was primarily the result of technological change was challenged by Hanson and others. It will be helpful, therefore, for IR scholars to continue to review the available evidence on the role that both technological and non-technological factors have played in enabling or facilitating globalization. One place to start is in the one area of economic globalization that is probably the most advanced: the integration of financial markets.

### **Financial Globalization and Digital Technology**

Some scholars contended that progress toward economic globalization has been greatest in the area of financial markets. There is a good case to be made for the argument that technological change was an important driver of financial globalization. But it is also important to acknowledge that changes in national and international regulatory regimes were also major contributors to the current crisis.

The global diffusion of information technology made it possible for people around the world to trade foreign currencies, stocks, bonds, and other securities at any time of the day. The forex system, for example, allowed individuals or firms to trade in foreign currencies on a 24-hour basis. Similar systems were developed for equity markets, bond markets, commodity futures, and derivatives. New regulations allowed the creation of electronic trading systems, which gave investors direct access to markets, thereby eliminating or reducing the role of intermediaries like the traditional stock brokerage houses.

The new technology both forced and enabled banks and investment firms to create new financial services to replace revenues that had been lost as a result of reduced trading fees. Computing and communications systems also made it possible to create new, structured financial products such as securitization, i.e., asset-backed securities created out of income streams from credit cards, auto loan payments, mortgage payments, and various so-called derivatives. A derivative is a contract, the value of which depends on (is "derived" from) the price of some underlying asset (e.g., a raw material like petroleum or an equity share of a corporation) or a particular reference rate such as an interest rate or stock market index like the Dow Jones Index.

Similar changes occurred in other countries such as Japan, the United Kingdom, and Mexico. As those countries replaced traditional trading floors with electronic trading systems, they realized reduced costs, increased speed of execution, and improved efficiency. Another characteristic of financial globalization was the proliferation of securities markets. Many countries that had not previously had a stock market or other kinds of markets for trading in securities established such markets for the first time in the 1990s. Other countries that already possessed such markets improved or enhanced them.

Financial institutions increasingly became truly global in operations and ownership. A new wave of mergers and acquisitions resulted in the creation of larger banks in the United States, Europe, and Japan. About 400 bank mergers occurred each year in the United States. The number of banking organizations in the United States decreased from approximately 12,300 in 1980 to approximately 7,100 in 1998. The percentage of domestic deposits held by the 100 largest organizations increased from 47 percent in 1980 to nearly 69 percent in 1997 (Ferguson 1998). In the 1990s, the number and value of bank mergers and acquisitions in the major industrialized countries increased markedly. Many large banks merged to form even larger banks. As a result, concentration of ownership in the financial services industry rose substantially during this period (Bank for International Settlements 2001).

It should be noted, however, that despite a global trend toward liberalization of financial flows, the financial services industries continued to be carefully regulated

in most countries. Canada, for example, regulates its banks more carefully than the United States. France and Japan are widely acknowledged to have government agencies that intervene regularly in financial markets in pursuit of national aims.

One area in which the regimes changed simultaneously with technology was in the broad and growing acceptance of the desirability of eliminating capital controls. Capital controls were used (mainly in the past now) to reduce the rapid inflows and outflows of capital that could destabilize domestic economies. Similarly, many advanced industrial countries deregulated their financial markets to take advantage of the growth and innovation in new financial instruments like derivatives and asset-backed securities that came with deregulation and to stave off losses in business to overseas competitors.

Despite efforts to ensure that banks and other financial institutions had adequate reserves to cover possible losses (led primarily by the central banks of North America and Western Europe in the Bank for International Settlements), innovation in deregulated financial markets resulted in just the opposite outcome (especially, for example, in the case of credit default swaps). The deregulated financial markets also had come to depend too much on private credit ratings agencies like Moody's and Standard and Poor's to assess the risk of complex financial instruments.

In conclusion, changes in both technology and regimes and regulations played a key role in the evolution of the financial system in recent decades.

### Cultural Globalization and Digital Technology

According to some scholars, another area of globalization, cultural globalization, has been strongly affected by the spread of digital technologies (see, for example, Appadurai 1996). Because of the development of digital technologies, more and more cultural artifacts are being produced, stored, and delivered digitally. The increased speed of digital devices and innovations in computer networks and digital compression technologies make it both easier and less expensive to deliver words, music, symbols, and images (in fact, anything that can be digitized) to consumers around the world (Negroponte 1995).

This began before the age of digital devices. The building of global undersea cable and satellite TV networks and the use of analog direct broadcast satellites made pay TV services like MTV and CNN available in many parts of the world. The movie industry and recording industries used LPs, audiocassettes, and VHS videotapes along with foreign box office and concert receipts to internationalize their sales. The invention of digital playback devices like the compact disc player and the DVD player and corresponding digital recording media – CDs and DVDs – accelerated that trend. Audio content is now increasingly distributed via the Internet in the form of digital files (via both legal web businesses and illegal file-sharing sites) and video is headed in the same direction.

In the last decade or two, we have witnessed a major upturn in globalization of pop culture, most but not all of it originating in Hollywood. J-pop – anime, video games, graphic novels (*Manga*), etc. – is becoming popular with pre-teens and teens around the world. Some of this is due to pre-digital distribution forms, but more and more of it is being distributed digitally.

The regime changes that made this possible went beyond the liberalization of the trade and investment regimes to include the wider acceptance of intellectual property rights modeled after those in advanced industrialized nations and particularly the United States (Ryan 1996; Sell 1998; Marlin-Bennett 2004; May and Sell 2005; Singh 2008). Others argued that the combination of technological and regime changes contributed to cultural globalization as well as to a revival of some local cultures that



had difficulty thriving in the age of analog communications networks. So, they said, the winners were not just in the North.

Some legal scholars argued that the current regime for intellectual property favored large media companies too much and, as a result, actually discouraged creative activity (e.g., Lessig 2001). Others focused on the growth in the relative importance of intellectual property over traditional forms of property (e.g., real estate and tangible goods) as a result of the growing political power of ICT industries (Hart and Kim 2000). International relations specialists tended to study the conflicts between rich and poor countries over the enforcement of intellectual property rights in the developing world (Sell 1998; Marlin-Bennett 2004; May and Sell 2005).

### The Digital Divide

One of the long-term issues associated with globalization and digitalization was the degree to which digitalization helped or hindered efforts to reduce global economic inequality. Those who argued that digitalization either preserves or accentuates pre-existing inequalities in income and wealth are obviously critical of the diffusion of information technologies to the developing world. Thomas Friedman, among others, argued, in contrast, that digitalization created a more even playing field in the world economy and by doing so had at least the potential to reduce preexisting inequalities (Friedman 2007). Others argued the opposite, that the diffusion of ICTs created a digital divide on top of existing inequalities that made it more difficult for people in both rich and poor countries to compete (Norris 2001; May 2002; van Dijk 2005). There were similar arguments regarding the impact of globalization on inequality.

Global income is distributed quite unequally, and that inequality may be increasing. Absolute gaps in per capita income between the high-income countries and others increased markedly between 1980 and 2006, continuing the postwar trend. During the five years from 2001 to 2006, average growth rates were 6.1 percent in the low-income countries, 5.6 percent in the middle-income countries, and 2.2 percent in the high-income countries. Average annual growth in nominal GDP between 1991 and 2000 was 4.6 percent in the low-income countries, 3.8 percent in the middle-income countries, and 2.5 percent in the high-income countries. While economic growth rates were higher on the average in the South than in the North during the past four decades, high population growth rates kept per capita income growth rates modest for most of the South's people, with the notable exception of a small number of very fast-growing developing countries. It is a hopeful sign, of course, that the two largest low-income countries – China and India – have experienced rapid growth in recent decades (Milanovic 2005; Panagariya 2008).

There are a variety of ways to measure the amount of inequality within and across nations. One commonly used measure is the GINI coefficient of inequality. The GINI coefficient measures the degree of variance from perfect equality, by determining the area between the Lorenz curve of distribution and the diagonal which represents perfect equality. The GINI coefficient ranges from zero (perfect equality) to one (perfect inequality). Economists have attempted to measure global income inequality over relatively long periods of time. These efforts have yielded consistent findings that inequality increased steadily between 1820 and 1970, but began to decrease from 1970 on (Bourguignon and Morrison 2002; Sala-i-Martin 2002). The GINI coefficient for global income inequality ranges between 0.5 and 0.65 for the period between 1820 and 1998 and recently has stabilized around 0.6, while the GINI coefficient for domestic income inequality tends to range between 0.3 and 0.4 for most countries (World Development Report 2006:7). In short, the empirical evidence on income inequality fails to support the view of some critics that the intensification of globalization after

**Table 2** Internet users by country, rank ordered, 2005–2008

<i>Rank</i>	<i>Country</i>	<i>Internet users</i>	<i>Date of information</i>
1	World	1,018,057,389	2005
2	China	253,000,000	2008
3	European Union	247,000,000	2006
4	United States	223,000,000	2008
5	Japan	88,110,000	2007
6	India	80,000,000	2007
7	Brazil	50,000,000	2007
8	Germany	42,500,000	2007
9	United Kingdom	40,200,000	2007
10	South Korea	35,590,000	2007
11	Italy	32,000,000	2007
12	France	31,295,000	2007
13	Russia	30,000,000	2007
14	Canada	28,000,000	2007
15	Iran	23,000,000	2007
16	Mexico	22,812,000	2007

*Source:* CIA (2008)

1989 has resulted in increased global and domestic inequality. Rather it indicates that there has been a major decline in the number of people living on less than a dollar a day and in other indicators of “absolute poverty.”

Thus, some scholars argue that the aggregate data on income inequality indicates that digitalization has not accentuated preexisting inequalities. To the extent that globalization made it possible for China and India to grow faster in recent decades through outsourcing, they argued that globalization reduced both global inequality and the digital divide. In 2008, for example, CIA data indicated that China had more Internet users than both the European Union and the United States (see Table 2). Although per capita use was still lower in developing countries than in developed countries, in some large developing countries like China that gap was growing smaller.

#### International Governance of ICT-Related Activities

Much of the attention of IR scholars in the past decade was focused on international regimes governing ICT-related activities. There was excellent research on the domain name system and the international body that was in charge of overseeing registrars of domain names, the Internet Corporation for Assigned Names and Numbers (ICANN). The pioneering work of Milton Mueller (Mueller 2002) seems in particular to have stimulated other IR scholars to delve more deeply into this subject (see Franda 2001; Cogburn 2003; Braman 2004; Hart 2005; Drezner 2007; Singh 2008).

There are many areas of international ICT governance that remain to be fully explored. One important example is the area of e-commerce (Wunsch-Vincent 2005 is the exception that proves the rule).

In the next decade or so, IR scholars will be reviewing the work of scholars who dealt with issues relating to communications technology and the media (Cherry 1980; de Sola Pool 1983; Beniger 1986; Innis 1986) and the work of legal scholars who are addressing the relationship between technology and the law (Lessig 1999, 2001; Benkler 2006; Zittrain 2008). More attention will be paid to work on the role of ICTs in the

organization of social movements and political parties (see for example Rheingold 1993, 2002; Bimber 2003). The network-like nature of transnational terrorist groups, like Al Qaeda, means that scholars will be thinking about whether the existence of ICTs makes it easier for networked terrorists to operate and elude the bureaucracies in charge of domestic law enforcement and international intelligence gathering or for those bureaucracies to exploit technology to defeat terrorists. There will be continuing work on the relationships between the diffusion of ICTs and the ability of governments to surveil their citizens (Lyon 1994; Marlin-Bennett 2004; Braman 2006).

### Predictions about the Direction of Future Research

The study of ICTs in international relations is growing with the increased diffusion of ICTs in all aspects of daily life. It may become less necessary in the next decade to convince others in the field that ICTs constitute a potentially transformative force in world politics. IR scholars will continue to conduct research on the global digital divide as part of the larger agenda of studying global inequality. The geographic reach of ICTs is already extensive enough to justify further research on international regimes and institutions that are designed to govern ICT-related activities. IR scholars are particularly likely to continue their earlier work on international regimes for the domain name system and for intellectual property protection. Hopefully, they will pay more attention to emerging regimes for e-commerce and the implications of developments in the related fields of e-society and e-government.

The study of ICTs in international relations will continue to be challenging because of the technical nature of some of the issues raised, and will require IR scholars to continue to look outside IR and political science for ideas about what are the most important questions to pursue and what are the best theories and methods for pursuing them. IR scholars will continue to employ and modify existing theories, such as theories of regime change and the varieties of capitalism approach, to explain important phenomena in this area.

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### Online Resources

Citizen Lab. At [www.citizenlab.org](http://www.citizenlab.org), accessed Aug. 2009. Ronald J. Deibert has created a website for research and activism connected with monitoring the censorship of the web by authoritarian governments.

Information and Communication Technologies for Development. At [www.idrc.ca/en/ev-43441-201-1-DO\\_TOPIC.html](http://www.idrc.ca/en/ev-43441-201-1-DO_TOPIC.html), accessed Aug. 2009. This is a site on ICTs in the developing world produced by the Canadian International Development Research Center.

Internet Governance Forum. At [www.intgovforum.org/cms](http://www.intgovforum.org/cms), accessed Aug. 2009. The official site of the United Nations Internet Governance Forum.

Internet Society. At [www.isoc.org](http://www.isoc.org), accessed Aug. 2009. The Internet Society is a nongovernmental organization devoted to the resolution of technical issues connected with the Internet. It is the organizational home for the Internet Activities Board (IAB) and the Internet Engineering Task Force (IETF).

Lessig Blog. At [www.lessig.org/blog](http://www.lessig.org/blog), accessed Aug. 2009. Everything you ever wanted to know about Larry Lessig and his work.

Organization for Economic Cooperation and Development (OECD), Information and Communications Technologies. At [www.oecd.org/topic/0,3373,en\\_2649\\_37441\\_1\\_1\\_1\\_1\\_37441,00.html](http://www.oecd.org/topic/0,3373,en_2649_37441_1_1_1_1_37441,00.html), accessed Aug. 2009. This site is dedicated to the OECD's work on ICTs, and particularly its research on the diffusion of broadband networks.

Howard Rheingold. At [www.rheingold.com](http://www.rheingold.com), accessed Aug. 2009. Everything you ever wanted to know about the author of *Virtual Community* and *Smart Mobs*.

Global E-Government, 2006. At [www.insidepolitics.org/egovt06int.pdf](http://www.insidepolitics.org/egovt06int.pdf), accessed Aug. 2009. This is Darrell West's attempt to systematically compare national governmental websites across a wide variety of countries.

World Summit on the Information Society (WSIS). At [www.itu.int/wsis/implementation/igf/index.html](http://www.itu.int/wsis/implementation/igf/index.html), accessed Aug. 2009. This site is primarily of historical value since WSIS lasted only from 2003 to 2005.

### About the Author

Jeffrey Hart is Professor of Political Science at Indiana University, Bloomington, where he has taught international politics and international political economy since 1981. His first teaching position was at Princeton University from 1973 to 1980. He was a professional staff member of the President's Commission for a National Agenda for the Eighties from 1980 to 1981. Hart worked as an internal contractor at the Office of Technology Assessment of the US Congress 1985–6 and helped to write their report, *International Competition in Services* (1987). His books include *The New International Economic Order* (1983), *Interdependence in the Post Multilateral Era* (1985), *Rival Capitalists* (1992), *Globalization and Governance* (1999), *Managing New Industry Creation* (2001), *The Politics of International Economic Relations* (6th edition, 2002), and *Technology, Television, and Competition* (2004), and he has published scholarly articles in *World Politics*, *International Organization*, the *British Journal of Political Science*, *New Political Economy*, and the *Journal of Conflict Resolution*.