The Information and Communication Revolution and International Relations

I. The Information and Communication Revolution

The networked information infrastructure that blends computing and communications is the largest construction project in human history. During the last two decades advances in information and communication technology (ICT) and an accompanying revolution in logistics (e.g., the advent of containerization) fundamentally reshaped the global economy. The production and the distribution of goods changed fundamentally as complex global supply chains changed where and how the world undertook these functions. The services supporting and complementing the "goods" economy, ranging from research and design through finance and logistics, became the dominant share of the world's output, and all these activities grew markedly more global, more information intensive, and more communications intensive. These upheavals resulted in a significant increase in the world's productivity and wealth (Mann & Rosen; Mann; Levinson). They also transformed important aspects of the conduct of international relations.

This chapter is divided into five distinct sections. This section reviews the major trends in information and communication technology that are transforming the commercial and technology landscape. The second section argues that the United States will continue to serve as the demandeur in international high technology policy for the next two decades. Section three considers the implications of the ICT revolution for international institutions and governance. The final two sections consider the consequences of the ICT revolution for foreign policy making and for the conduct of

international relations.

In considering the technology and communication revolution we first specify three long-term trends that revolutionized the ICT infrastructure. The first trend involves the end points on the ICT networks: What is their number, scope (ubiquity), and heterogeneity? How many and what type of processors and data sources connect at the edge of the network? Consider the evolution of terminals. First there were voice-only dumb terminals, then there were dumb data terminals, and finally powerful, networked personal computer (PC) terminals emerged. The number, ubiquity, and heterogeneity of network end points accelerated as PC connections to the Internet proliferated and as voice and data mobility spread. The second trend involves the price point for a specific speed or quality of service in ICT markets. This point determines which applications might be usefully deployed across a network. Sometimes performance levels are not available. In the twenty-five years leading up to 1984, the price for services of comparable quality and speed declined sharply. The decline in cost structures spanned applications and services. The third trend was that the breadth of applications supported by the network increased substantially, as determined by the processing capabilities, the location of the processing and application logic, and interoperability across the network. Mainframes were limited in their processing power and in their ability to run applications that relied on data from multiple systems and resources. Client-server architectures continue to evolve. Cable televisions running on cable networks once mainly relied on dumb data-entry terminals. But as applications increasingly run partly in “the Cloud” and partly on devices at the edge, additional flexibility and resources both at the edge and in the network will be needed.

A second stage of the technology and policy revolution continued the convergence of computing, software, and communications began with the breakup of AT&T in 1984 and extended through 2000. After the decision to break up AT&T, the US government began to preach the virtues of facilities-based competition (Aronson & Cowhey). In the United States and internationally the telecommunications market experienced the gradual but forceful introduction of competition in all infrastructure, hardware, software, and services segments. Three important commercial developments spilled over into international relations.

First, the gathering momentum of the microprocessor revolution for personal computing, competition in communications networking, and a second generation of computer networking architecture shifted the market horizon again. By the mid 1980s, the semiconductor industry began to enable deeper network architecture changes and revolutionize ICT devices' power at the edge of the network. Telecommunications switching grew more sophisticated, but this happened more slowly than intelligence could be incorporated in computers and other devices operating at the network's edge. This "flipped" the logic of network architecture even as Moore's Law took hold and the spread of PCs in business and consumer arenas created new demands for networked applications and services.

Second, there was as explosive growth of mobile wireless. In developing countries mobile wireless connections rapidly overtook wireline connections when the introduction of second-generation (2G) systems greatly upgraded capacity and quality while reducing costs. By 2000, mobile communications had emerged as a vertically integrated competitor to the wired network in all market segments except for data. (A

decade later mobile broadband data services (3.5G) began to explode in Japan, Korea, and elsewhere.)

Third, the Internet and its commercialization also were hugely important. The Internet revolutionized the architecture and underlying capacity of the network. Cisco shipped its first router in 1986 allowing companies and network providers to began to "inter-connect" their networks. In 1991 US policy changes enabled the commercial use of the Internet. This set the stage for the ICT growth of the 1990s. By 1994, the Internet swamped commercial email services. In August 1995, Netscape went public, igniting the "dot com" boom. In the United States, and to a limited extent elsewhere, new Internet services providers and later large content and e-commerce applications aimed to take advantage of the network's power and scope. A myriad of smaller, more specialized applications also emerged that built their businesses on powerful, cheaper PCs, broadband networking at the office, and widespread narrowband networking in the home. These opportunities spread rapidly throughout industrial and developing countries.

The emergence of the Internet provided Tim Berners-Lee with the base from which he launched a suite of software applications—now known as "the World Wide Web"—that further altered these dynamics (Berners-Lee). HTML, the programming language that enabled the Web, consciously avoided the Microsoft approach and embraced open application programming interfaces (APIs).[1] Netscape's Web browser and the subsequent inclusion of Microsoft's browser in Windows sounded the death knell of Internet Service Providers (ISPs) that forced consumers and countries to rely on

[1] An API is a set of routines, data structures, object classes and/or protocols that support the building or applications.

proprietary software systems to access the Web (Greenstein).

As policy and technology development progressed in the United States, parallel changes were underway elsewhere. Usually changes originated first in the United States, but not always. A significant exception was the takeoff of the mobile wireless infrastructure. But, change remains dynamic. Starting in the late 1990s new computing and information architectures (e.g., "the Cloud" and "the Grid") began emerging that implicitly rest on a much different set of capabilities and market organization than in the past (Stockinger).[2] These architectures assume that powerful broadband networks intersect with two other emerging trends: (1) the integration of massive and inexpensive information storage with network architecture and services and (2) the emergence of virtual computer systems that collectively and flexibly harness many computers, including high-end supercomputers, to mesh on demand to meet user needs.

In short, the global information economy—including telecommunications, information technology, and increasingly all forms of copyrighted content—is at an inflection point. At this inflection point, if policy permits, a shift in the strategic context of the market invites a new direction in networked ICT infrastructure. But we believe that more and more the new leverage points are pervasive modularity in ICT capabilities and ubiquitous, inexpensive broadband networking.

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[2] There are disputes over the definitional lines. We use "the Grid" to indicate an architecture that joins multiple computing platforms within a predefined organization. It is a subset of "the Cloud," a virtual "on demand" approach that allows decentralized users to tap networked computing and storage as needed. Interfaces must be open but we do not assume that they must be produced by open-source code.

The Cheap Revolution, a pithy sobriquet coined by Rich Kaarlgard (2002), captures the consequences for commerce of the cumulative impact of (1) the dizzying price-performance dynamics ranging from microelectronics innovations involving computer chips through data storage, (2) innovations in regard to fiber-optic and wireless bandwidth, (3) changes in software design and costs, and (4) the emerging cost and delivery structure of digital content. All four of these processes reflect the advantages of modularity, but software and content were the slowest to yield to the logic of modularity. This process also will have continuing implications for international relations.

Briefly, first, a microelectronics revolution enabled the Cloud architecture, but also spawned two other forces. Terminals became more powerful and escaped the desktop. For many in the developing world, the first experience of the Web will be on phones, not personal computers. In addition, terminals and devices on the edge of the network, as exemplified by radio-frequency identification devices (RFIDs) and sensors, open entirely new applications and architectures with huge growth potential. A second driver of the Cheap Revolution is the ubiquitous broadband packet-switched network, which will stimulate network traffic and the geographic spread of ICT applications in unexpected ways. With the predominately wireline, circuit-switched, telephone architecture in rapid decline, incumbent networks and their suppliers tried to slow the transition in network architectures, but after 2000 a transformation began to accelerate and a general telecom infrastructure (Endlich).

Broadband service will become faster, ubiquitous, and a hybrid of many network infrastructure (Cave, et al). This combination will support new information services, a dizzying array of applications, and content delivery to an ever-growing number of

subscribers. Figure 1 illustrates the most important trends.

The third part of the Cheap Revolution is software. Although modularity began when IBM broke up the integration of its hardware and software components (which led to the creation of an independent software industry), modularity has been slower to come to software. Software is becoming more open and modular, especially at the infrastructure layer, in part because the rise of the Web propelled changes in software design (and associated standards) and in part because of market pressures. A critical change is the growth of multiple operating systems as a reality that informs any major suppliers to the enterprise IT market. Figure 2 shows the stunning impact of operating system (OS)-Agnostic Applications on software. A huge percentage of the applications routinely run on Windows. The inflection point means that applications can run on anything. A significant factor in promoting this shift is that large users demanded that their huge investments in heterogeneous software systems, each installed for a special purpose, become interoperable (Cortada).

Fourth, a parallel change is underway in media content, which has far-reaching consequences for commerce, journalism, and international politics. Specifically, digital content is more convertible across networks and terminal systems. As the media industry is disaggregated, screens for television shows are migrating to mobile phones, computers, and iPods. The distribution pipe includes broadband, cable, satellite, and now mobile broadband. Smart terminals plus broadband are challenging media stalwarts. These devices challenge the geographic boundaries of traditional broadcast models.

{Insert Figure 1 here}

Figure 1

The mobile network revolution begins. Sources: http://www.chetansharma.com (mobile data users and total mobile internet subscribers); http://www.cdg.org (provider data costs and mobile download rate).

{Insert Figure 2 Here}

Figure 2

The growth of agnosticism. Source: Gartner Research 2005.

II. The United States Will Remain the Agenda Setter

Since 1945 the US market has been the most consistent agenda setter for the global market. American policy choices shaped other countries' strategic choices. This is not a uniform story; but overall on international economic, trade, and ICT issues the US was the dominant force. Now, as economic gloom haunts the world, even as a new President settles in the United States, predictions abound that American dominance in international relations will give way to the leadership of China or others. By contrast, we believe that if the United States acts vigorously on the policy front, it can maintain its international leadership position until at least 2025. Substantial policy missteps could markedly alter the situation, but especially before 2020 a combination of inertia and continuing American dominance in many arenas should guarantee that the US remains the pivot of global relations.

This view rests on five premises. First, the US has a large lead in its deployed ICT stock that is extremely difficult for other countries to overcome. This creates meaningful advantages in America's ability to deploy complex innovations across the economy. The United States has both the experience and the cumulative infrastructure investment to innovate rapidly and massively. Second, the US has the largest investment base and flows in the critical areas for innovation—national R&D spending, capitalization of the high tech industry, and private venture capital expenditure in IT and telecom. Third, the US will remain the leader for the foreseeable future in software, networked digital applications, high-value-added commercial content, and high-end IT computing systems and solutions. Fourth, the US will continue to be among the top three global markets across the full range of ICT markets, from networking to software to services. In view of the breadth of the US position, the relative US position in any specific market segment (such as the world telecom service market or particular equipment markets) is less relevant than commonly claimed. Moreover, in view of the still sometimes fragmented nature of the "single" European market and the complexities tied to the less-than-transparent Chinese technology market, the effective market power of the US often is greater than the raw numbers suggest. The US is a single giant market that operates under relatively transparent rules and with a market framework that involves flexible capital and labor resources. Fifth, the United States is the leading producer of high value-added content (movies, television, music, video games), a critical element at present. Further, US legal decisions related to content (digital rights management (DRM), intellectual property rights (IPR), sharing, and monetization issues) would set the stage for any global arrangements in this arena.

Two counter arguments sometimes are raised to suggest why the United States might not continue as the pivot point in the world ICT relations. We believe that these suggestions overlook the fundamental market situation. The first argument for decreasing US importance in world markets revolves around China. The increasing numbers of Chinese engineers, the emergence of Chinese firms such as Huawei as global leaders, and the sizzling Chinese domestic market are cited as evidence that China is assuming a global leadership position. Central to this argument is the ability of China to parlay the size of its domestic market into scale economies on the production side and the ability to leverage homegrown standards into leadership positions in adjacent market areas. This reasoning assumes that China can develop a shrewd plan and implement it, but for familiar political reasons including corruption, huge labor displacement, changing demographics as the pool of younger rural workers available to industry shrinks, skyrocketing demand for natural resources, and environmental and health crises, China's continued economic boom is not a sure thing (Kennedy).

A second argument is that the continuing decline of US spending in major ICT market segments will erode America's dominant position. We believe that these stories are overblown. The US still is the largest player in world ICT across the board. It ranks between first and third in world standings for most market categories. Inferring leadership for hardware is trickier because of hardware's global production model. The largest segment of the market is communications. The OECD communications services data from 2005 placed total revenues at $1.22 trillion, about 39 percent of which was from mobile. The United States accounted for about one-third of the OECD market and was the largest revenue market for mobile in the OECD. Together, the US and Japan

constitute 47 percent of the OECD mobile market (OECD*).* The US also remains the dominant ICT market overall with between 30 and 40 percent of the $3 trillion services and equipment market, but European IT spending is approaching US levels. Although Europe is growing faster, the US still dwarfs all other geographic regions in total ICT spending (more than 40 percent of the total in 2005). In short, although the United States may grow less quickly relative to other market centers, it remains the dominant market across the full ICT landscape. Although the EU (with 27 member states in 2009) now exceeds the American market in overall size, it is a less perfectly integrated market. Still, its magnitude means that it is the logical starting point for US international policy negotiations about ICT.

III. The Impact of the ICT Revolution on Institutions and Governance

The changing of actors' roles in international relations was accelerated by the information revolution. The Web and the information revolution resulted in tremendous security, political, economic, social, and cultural consequences. These changes altered the roles of countries, companies, non-governmental actors, and international institutions in the conduct of international relations.

The information revolution altered the role of government policymakers in four main ways. First, policymakers now have access to far more information, perhaps too much information. Paralysis through information overload is a real danger. Second, global networks mean that decision-making can be centralized or decentralized. Governments generally have centralized decision-making, reducing the importance of ambassadors and embassies and tempting political leaders sometimes to micro-manage military situations and economic negotiations in distant lands because they can, not because they should.

Third, global networks erode the monopoly of information in the hands of governments. Firms, journalists, and non-governmental organizations often have better information than governments. Fourth, global networks provide greater transparency to everybody making it difficult for countries unilaterally to take national policy decisions when the problems are global.

Globalization and global networks also allow business firms to think and act in terms of a global marketplace, heightening their international influence. The global movement of money and information allows firms to achieve global production strategies and simultaneously makes it more difficult for national governments to regulate them. In the absence of effective international regulation, especially after the push towards deregulation by the George W. Bush administration, these firms gained considerably greater influence.

Global networks empowered non-governmental organizations (NGOs) and led to a vast increase in their numbers on the international stage. NGOs now create, track, disseminate information, and motivate and organize individuals and groups sympathetic to their goals to pursue specific policy outcomes in areas such as human rights advocacy, environmental protection, and women's rights. A striking example of the positive influence of NGOs was their major role in the negotiations to ban landmines that resulted in the Ottawa Treaty.[3] Similarly, NGOs drew attention to the plight women and children being

[3] The Ottawa Treaty, formally the Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, completely bans all anti-personnel landmines. As of May 2009, 156 countries had ratified and two

trafficked across borders and raised the issue much higher on the international agenda. NGOs can also block government action as when environmental NGOs and labor unions joined to disrupt the attempt by governments to launch a WTO Trade Round in Seattle in November 1999.

Ironically, international institutions such as the WTO and the IMF are both more important and less effective international actors because of the rise of global networks. They are more important because in the absence of effective national policies to deal with globalizations these institutions are the logical venues through which to organize co-operative international policies. They are less effective because critics of such institutions, who complain that they are neither democratic nor even-handed, have stymied their initiatives at major junctures.

As globalization proceeds, governance issues grow more complicated. At each stage governments and private firms react to new developments and which in turn alter the dynamics of globalization and international relations. At the same time social movements, religious groups, terrorists, revolutionaries, and criminal organizations, which are focused on their own goals and interests, try to manipulate globalization and global networks to their own advantage. As complexity and numbers increase, international relations grows ever more complicated and the chance that networks will fall apart, leading to system breakdown, economic collapse, and violence increases. Unless a flexible system of

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more have signed but not yet ratified it. An additional 37 countries, including the United States, Russia, China, and India have not become signatories.

governance emerges, challenges that undermine cooperative international relations are likely to persist and grow.

There are three main options. First, governments can try to muddle through, reacting as new circumstances and issues arise. The problem is that national regulations are less and less effective when dealing with global issues and transnational movements. Second, governments can maintain a deregulatory stance, step aside, and put their faith in the magic of markets. However, as they pursue power and profit, large firms and their well-compensated executives frequently distort markets. Over time, firms may behave better and practice self-regulation, fearful that their behavior will be exposed globally. However, as events surrounding the global economic downturn that began in late 2008 demonstrated, the record of self-regulation is spotty at best. Further, criminal organizations, terrorists, and other rogue actors can be counted on to "cheat" whenever it is in their interest. Third, governments may try to work through international institutions such as the ITU, WTO, or IMF. Here too there is a problem. Activists and NGOs fear that international institutions are undemocratic and serve as puppets for rich firms and governments. Thus, although the international telecommunications regime was significantly amended and updated since1984, the effort to achieve improved international relations has proceeded only in fits and starts.

With technology changing so rapidly, rules negotiated in prolonged negotiations are always out of date before they come into force. Thus advances in telecommunications during the 1990s, did not address important information issues raised by the proliferation of the Internet and World Wide Web. The only hope to remain relevant is if the rules are flexible enough to evolve along with the system. But that is so complicated that critics

worry that if the wrong rules are negotiated too early, the impact could be negative. The challenge for policy-makers is to be sensitive to inputs from firms and NGOs, to figure out which rules are needed (and which are not) and how they should be structured, implemented, and enforced.

Nobody has solved the challenge of constructing and implementing a sustainable regime for managing global networks, global firms, and global economies. The task grows ever more complex because there are increasing numbers of relevant players—developing countries, global firms, labor unions, and NGOs. Moreover, as the Web powers the transition towards globalization, every country, large firm, and NGO is actively engaged in the process because they realize that the agreements that are struck will determine whether they are winners or losers in the emerging world information economy. Their future is at stake.

There is considerable debate about the impact of globalization on risk and uncertainty, growth and inequality, democracy and freedom, and family and social relationships. But globalization is a dynamic process that governments and other actors continuously influence. The information revolution caught policy-makers unprepared but, as it continues to unfold, the choices that governments (and other actors) make about policy do matter. So far governments and international institutions have no coherent plan about how or even whether they should guide the information revolution or about how to create an international regime for cyberspace. Here, four key challenges facing policy-makers with regard to cyberspace, which knows no geography, are considered.

The legal and policy areas most directly affected by the ICT revolution can be grouped into four main areas that impact (1) individuals, (2) the content that flows over

global networks, (3) the global communication infrastructure, and (4) the global regulatory environment, and issues related network security--cybersecurity. Each of these areas requires attention because of the global nature of cyberspace; all of them may require global co-operation and co-ordination. The relative influence of governments, firms, NGOs and IGOs, religious and social movements, criminal and terrorist organizations, and individuals will be critical as the information revolution continues to unfold and globalization proceeds. Yet, the balance of influence among these actors varies from issue to issue.

IV. The Consequences for Foreign Policy

A. ICT and the Conduct of Foreign Policy

There has been considerable discussion of the impact of the Internet and Web on democratic and authoritarian rule (Kamarck & Nye; Kalathil & Boas). Less attention has focused on the impact of ICT breakthroughs on the conduct of foreign policy (Dizard). In general, the foreign policy information cycle unfolds over four stages. (1) Relevant information is collected using various technologies from a wide array of sources. (2) Information is transmitted across a secure global network. (3) Specialists analyze, synthesize, and present masses of information to the appropriate officials who then must take decisions. (4) Governments try to implement their decisions by winning support legislatures, courts, and other powerful interest groups. Advances in ICT significantly improved governments' ability to collect and transmit information. Progress at the other two stages is more problematic because "in many cases bureaucracies and leaders are overwhelmed by the information they collect and decision-making may actually be impaired by information glut" (Aronson 1991). The failure of the intelligence agencies to

prevent the events of 9/11 and the false claims that Sadam Hussein possessed weapons of mass destruction were just the most prominent examples of failure.

The global spread of the Internet and its bottom-up nature generates terabytes of new information waiting to be analyzed. Surveying opinion is more precise, affordable, and focused. And, that is just the publicly available information. Security and intelligence services generate mountains of their own classified data. However, the collection of information does not translate automatically into better outcomes. The gatekeepers may not be able to distinguish relevant information from meaningless garbage. Further, key policymaker may simply fail to take in the information that they need to inform their decisions.

Satellites and fiber optic cables made global networks easier to build and more secure. Information can be transmitted with speed and security from any point on the planet to any other point. The cost of transmission and storage of a set amount of information has fallen drastically, even as the amount information transmitted has skyrocketed. By the mid-1970s it already was possible for the words spoken by an American pilot flying over the SS *Mayagüez*, an American freighter seized in May 1975 by Khmer Rouge forces of Cambodia, to be repeated to President Ford in real time. The speed and capacity to transmit information has increased steeply since then. Still, this is not altogether a good thing. Secure fiber optic cables operated by other countries, are much more opaque to US authorities than old cable and satellite transmissions.

Decision-makers are struggling to cope with masses of information. Information management techniques often have replaced intuition, historical parallels, and years of experience as the main guides to decision-making. Policymakers receive piles of data

generated by computers, satellites, and human assets, which are analyzed and synthesized by their subordinates. There is a danger that one form of bias is being substituted for another. An additional consequence of the advent of advanced information gathering capabilities is that decision-making is growing more centralized. The president and his top political appointees can make most of the important decisions, even when lower-level official in the field are better positioned to make decisions. In many case Ambassadors are relegated to the role of cheerleaders for American business who have marginal decision-making authority. This is particularly the case in large, important countries when friends and supporters of the President are nominated without much regard to their foreign policy credentials. These ambassadors are symbols of America, but the important decisions are made in Washington.

During the lead up to the final implementation of policies, new ICT technologies allow government decisions to be widely disseminated and quickly explained. These same technologies allow others interested parties to communicate their views just as effectively. Bloggers and talking heads, NGO and corporate enterprises all air their views and influence the debate. Further, new ICT technologies make it almost impossible to keep secrets. It probably is more difficult than ever before for quiet diplomacy to succeed because almost everything leaks out. Similarly, policy compromise and agreement is more difficult because so many countries and interest groups are involved. For example, when the list of official representatives who converged on Tunis in November 1995 for the World Summit on the Information Society (WSIS) grew to 335 single-spaced pages, the likelihood of any significant breakthroughs was vanishingly small from the start. (ITU)

B. The CNN Effect: Top Down and Bottom Up

The CNN effect relates to the idea that since the late 1980s broadcasts from CNN, BBC, and other news channels has a major impact on the conduct of foreign policy in the United States and elsewhere. The CNN effect, a phenomenon that may alter "the extent, depth, and speed of the new global media" is a development of the past two decades (Livingtone). CNN's wall-to-wall coverage of the collapse of communism, the Tiananmen Square protests in 1989, and the first Gulf War all brought critical images and foreign policy issues to forefront of America's political consciousness. The CNN effect usually refers to a range of real time modern media, and is not exclusive to CNN or even 24-hour broadcast cable news.

Almost twenty years later the polarity of influence reversed. Individuals at the grassroots level could upload their photos and thoughts from any part of the globe onto the Internet. Using Web sites such as Youtube, Flickr, Facebook, and Twitter individuals can rapidly reach larger number of sympathizers and policymakers. These innovative web sites helped foster the rise of "citizen journalism" that allows individuals with no formal connection to news organizations to become an integral part of the news reporting process (Gillmor). Online news is growing in importance and influence. Social networking now allows individual to coordinate their activities and rapidly gather into "smart mobs" that grab the attention of the media and of policymakers (Rheingold). NGOs, smart mobs, and determined activists may not immediately change policies, but they do elevate issues higher up the policy agenda (Keck & Sikking). Simultaneously, the future of traditional print media is in doubt.

V. The Consequences for International Relations

As the ICT revolution spreads across the planet it resets the international relations' playing field. The possibilities for winners and losers going forward are reshuffled. Old ways of doing business and conducting policy are being thrown into questions. These shifts have significant consequences for security, political, economic, and social, and cultural interactions.

A. Consequences for International Security Relations

The information revolution altered the nature of intelligence operations, political opposition, and the waging of war. Robert Keohane and Joseph Nye have distinguished among three different kinds of information: (1) free information that is made available at no charge to the recipient, (2) commercial information that is made available for a price, and (3) "strategic information that confers great advantage on actors only if their competitors do not possess it (Keohane & Nye). It is this third category that takes precedence and may provide special insight for foreign policy makers. However, access to more information does not automatically translate into better policy decisions or greater national security. Three components of this sea change are discussed: intelligence gathering and its impact on foreign policy; the rise of "activism, hacktivism, and cyberterrorism;" (Arquilla & Ronfeldt) and the use of networked information in military conflict (Snyder).

First, global communication networks help governments collect and analyze vast quantities of information to inform their decisions. But, greater intelligence collection often does not translates into better policy or prevention of terrorism. The information collection capabilities of modern intelligence services were already evident in 1984. Within hours after a Soviet fighter downed Korean Airlines 007 President Reagan released

the taped conversations between the Soviet pilot who shot down the plane and his ground base. Twenty-seven years later, despite extensive efforts and intelligence gathering technological advances, efforts failed to prevent the September 11, 2001, terror attacks on the World Trade Center and the Pentagon or the Madrid train bombings 2 1/2 years to the day later. Similarly, despite confident claims by American and British leaders that Iraq was poised to unleash weapons of mass destruction, a year after the spring 2003 invasion of Iraq, no weapons of mass destruction were ever found. Even when important information exists, locating it and recognizing its importance in time to prevent disasters can be challenging.

Thus, figuring out what intelligence matters becomes imperative in the conduct of electronic espionage, especially because cyber-terrorists have access to almost the same information on the Web. Information overload may also leave less room for intuition, trust, and secret understandings that were traditional instruments of the process. In short, more information may be a blessing when bureaucrats and political leaders can manage, analyze, and synthesize the data. It can be a curse when abundant information overloads or dehumanizes the decision-making process to the detriment of creativity and flexibility. Similarly, global networks allow governments to centralize decision-making, increasing the influence of a narrow range of top leaders. This may not translate into sound, efficient policy choices. Indeed, many large firms have decided to decentralize their decision-making processes to give more authority to those closer to the customers.

Second, governments and others now routinely try to use “soft power” to influence the views of others through television, radio, and print media and via the Web. Those who generate the information view it as “public diplomacy.” Those on the receiving end are

more likely to see such broadcasts as propaganda. The United States in the aftermath of 9/11 launched an Arabic language radio station to provide an American perspective to those who otherwise might not listen. Famously, in the mid-1990s the Zapatistas in Chiapas, Mexico, knowing they could never win a military struggle, launched a social netwar to make their case against the Mexican government to the world. By making their plight transparent to the world, they created a playing field on which they could compete and sometimes triumph (Castells 2004).

Those dissatisfied with the current order found in global networks a tool that allowed diverse individuals to organize make their voice heard. Activists and NGOs of all political persuasions have seized on the Web as a mechanism to maximize their influence and lobbying clout. Advocacy networks in support of human rights issues, the environment, to oppose violence against women, and to seek the end of landmine use have been especially noteworthy (Keck & Sikking). Similarly, during the Battle at Seattle, anti-globalization activists used new global communications technologies to organize against the WTO and the forces of globalization that they opposed. A more virulent form of activism occurs when hackers, for fun, fame, or politics, break into networks and try to cripple or sabotage them or infect them with viruses, worms, and other forms of attack.

There also is significant evidence of government sponsored cyber attacks. For example, in 2001 at the nadir of U.S.-Chinese relations, Chinese hackers launched waves of cyber attacks on US government computer systems in an effort to penetrate and sabotage them. Moreover, since 2003 American computer networks run by, among others, NASA, the national Laboratories, and major defense contractors have been the target of coordinated attacks (sometimes designated as Titan Rain) that appear to be examples of

state-sponsored espionage, originating in China. Other examples include the 2007 massive, crippling cyber attacks launched from Russia that targeted a wide range of Estonian organizations (Economist), and the August 2008 cyber attacks originating in Russia that swamped Georgian websites as Russia and Georgia battled on the ground.

In addition, the Pentagon apparently has considered launching direct cyber attacks on its foes to bring down their computer and communications systems, but there is reluctance to go all out because there remains uncertainty regarding cyber warfare's place amid the rules of armed conflict. Weaker states and terrorists organizations cannot compete with the military firepower of the United States and Britain, but they can respond robustly in attacking computer networks.

Third, global data communication networks and new information technologies are changing modern warfare. Knowledge is the key to destruction as well as to production. The potential power of information weapons was demonstrated in the 1990 and 2003 invasions of Iraq. The military was bolstered by AWACS (Airborne Warning and Control System), which scanned the sky for enemy aircraft and missiles and sent targeting data to allied forces from modified Boeing 707s. In parallel, J-STARS (the Joint Surveillance and Target Attack System) helped detect, disrupt, and destroy Iraqi ground forces during Desert Storm with speed and precision. Similarly, the battle for Kosovo was fought from the air. Smart planes directed by smart computers delivered smart bombs. In this virtual war the attacking forces suffered no fatalities during the fighting. The continuing conflicts in Iraq and Afghanistan have been notable for substituting drones, robots, and other technologies operated from afar to substitute wherever possible for troops of the ground.

B. Consequences for International Politics

The political consequences of globalization and global networks also are both positive and negative. E-government that engages citizens more directly in the political process is technologically feasible. E-government could evolve into "information government" that concentrates on "information flows within government and between government and citizens" (Mayer-Schönberger & Lazer). At the same time, the process, politics and political implications that result from the new technologies could foment civil unrest and confusion.

On the positive side, new communications and information technologies are beginning to enable advances in e-government, e-democracy, and e-participation (UN World Public Sector Report). Governments and candidates now routinely use the Web to provide citizens and supporters with information. Digital-media also can promote E-democracy across the globe (Boler, et al). Politicians and parties now rely on the Web to solicit contributions. Increasingly, governments and candidates use the Web to elicit views from their people and to seek input to assist them in their decision-making. A few isolated localities have also experimented with E-voting in elections. The lasting legacy of Governor Howard Dean, the unsuccessful Democratic Party Presidential candidate in 2004 who became head of the Democratic National Committee, was to show the way to the use of the Internet to motivate and involve supporters and raise funds. Barack Obama took the use of the Internet, the Web, and even sites like YouTube to new dimensions in his successful run for the presidency in 2008. Simultaneously, sponsored and independent bloggers informed and commented on all things political.

Indeed, it is striking that governments are losing their hegemony over the political process. New communications and information technologies empower NGOs, firms,

revolutionaries, terrorists, fundamentalist religious leaders, extremists of all stripes, criminal syndicates, and political subversives as well as well-meaning social movements, reformers and activists. This raises concerns that decentralized, fragmented, anarchic chaos is on the horizon that may overwhelm the positive benefits of communications and information technology. Or, alternatively, governments well beyond China may feel that their only option is to crack down and reassert their control over the Internet and their citizens.

C. Consequences for International Economic Relations

The strongest case for globalization and global networks was that they promote economic growth through increased trade and investment. Companies and countries that are early adopters of communications and information technologies may enjoy and information edge as they compete and grow. Globalization and global communications does not, however, guarantee that growth will be distributed equitably within or between countries. Furthermore, global flows of funds and information may undermine national policies and facilitate crime and corruption. It is unclear, for example, whether national monetary authorities can control money supply or exchange rates in a globalized economy, especially when large sums are being illegally laundered. In short, national governments are challenged as they try to effectively manage global firms and markets.

The problem of the “Digital Divide” is especially poignant. Manuel Castells notes, "Uneven development is the most dramatic expression of the digital divide." Moreover, the digital divide within and between countries should not be "measured by the number of connections to the Internet, but by the consequences of both connection and lack of connection." The "social unevenness of the development process is linked to the

networking logic and global reach of the new economy. … Education, information, science, and technology become the critical sources of value creation in the Internet-based economy" (Castells 2001). To be competitive within a networked world economy countries and firms and individuals within them must have access to global flows of capital and information. It is but a short logical jump from this starting point to contend that if legitimate, legal capital flows and especially information flows are restricted, alternatives will be found. If large parts of the population in poorer countries are shut out of the new economy, global criminal activities will arise to create illicit transnational networks instead. Inevitably, such activities undermine the legitimacy and stability of governments and the civic culture and can, in extreme instances, result in the destruction of the rule of law, the collapse of state authority, and sometimes to violence and civil war.

Similarly, illegal activities could undermine the trust in and functioning of the world economy. Organized crime has a long history. The Sicilian mafia, Cali cartel, Chinese triads, Japanese Yakuza, Russian criminal networks, and their predecessors have operated for centuries. But, globalization and global networks has prompted criminal networks to form transnational strategic partnerships to ply their illegal, often violent trade. Since the 1980s sophisticated transnational criminal organizations used global communications and transportation technologies to expand their grasp and become more efficient. The United Nations Conference on Transnational Crime noted in 1994 that criminal organizations were active in crime involving the transnational movement of drugs, weapons and weapon-grade materials, people and body-parts, and money. Drug smuggling is the dominant global criminal activity from Colombia to Thailand. Ironically, the greatest

threat facing the drug trade may be drug legalization, not government success at shutting down the supply side. Weapons trafficking is a multi-billion dollar business that can easily spillover to supply arms and munitions to revolutionaries, terrorists, and criminals. Smuggling of nuclear weapons-grade material for possible use by "rogue" states or terrorists is a rising concern. Concern for the safekeeping of Russian nuclear material has long worried specialists; in 2004 the head of Pakistan's nuclear program confessed that he had sold materials abroad illegally. The smuggling of illegal immigrants eager for a better life has increased as opportunities diverged in richer and poorer countries. The trafficking in women for menial work and prostitution, of children, and of body parts also has increased. Money laundering through global networks is the glue that holds all of the other transnational criminal activities together.

D. Social Networking, Global Culture and Public Diplomacy

The rise of new information and communications technologies creates a second digital divide separating those who are comfortable using new technologies from those who are not. Those who are connected to the technology also are increasingly connected to virtual communities with which they regularly share information and ideas, even if they have never met in physical space. These smart mobs gather and disperse, intellectually and physically with remarkable speed (Rheingold). The rise of the personal network platform also appears to be on the horizon. In short, one consequence of global networks is that it enables individuals and non-state actors to relate and interact with institutions and with one another in new ways. Another consequence, related to the transparency created in an interconnected world, is that individuals lose significant amounts of their privacy. It now is routine to "google" those you meet. A slightly deeper examination will reveal credit

reports, parking tickets, and employment records. Ironically, those plotting terrorism often choose not to use new communications sources precisely because that could expose their activities in advance.

On the cultural side, communications networks redefine questions of identity, of determining "Who is us?" Again technology pulls identity in conflicting directions. On the one hand, the Internet allows people to get in touch or stay in touch with their roots and maintain their family, ethnic, religious, and cultural ties. Unlike travelers and immigrants in previous generations, those who move across the globe today do not cut ties with family, friends and their workplace because phone and email connections are usually cheap and available. At the same time, cultures blend into one another and become more global today because of shared attachments to news, movies, video games, fashion, design, and even cuisine. It allows them to create new groups of friends and associates online using games like World of Warcraft and by meeting in virtual worlds like Second Life. Thus hyphenated identities are slowly giving way to multiple identities shared among global citizens.

On the diplomatic side, communications networks may bolster the prospects for successful public diplomacy. Once America reached out to citizens of other countries through Voice of America and Radio Marti. The United States sent art exhibits, jazz artists, and cultural exhibitions on tour. Today, the idea of public diplomacy and the possibilities of "soft power" are popular notions, and the tools provided by the information revolution are constantly in flux (Nye 2004). One week after taking office President Obama reached out to the Muslim world by granting his first formal interview as president to Al Arabiya, an Arabic satellite television station (Obama to Arabs). Presidential

addresses and press conference are now routinely streamed live on YouTube. Diplomats may reach out or negotiate via teleconferences, saving time, money, and preventing jet lag. Second Life and other virtual worlds may open up new ways for policy-makers to coordinate among themselves or to just introduce themselves, their countries, and their cultures to others

In summary, globalization has tremendous consequences in different arenas. But, globalization is a dynamic process not an end point. As new consequences emerge, companies, countries and individuals adjust. These adjustments feedback and impact factors driving globalization, so the process continues to unfold. To borrow a popular notion, globalization is a journey, not a destination. International communications and information technologies shrink the world and make it accessible people everywhere.

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Key Words

CNN Effect

Inflection Point

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Information and Communication Technology (ICT)

Social Networking

Online Resources

European Commission, Information Society and Media Directorate-General. At http://ec.europa.eu/dgs/information_society/index_en.htm.

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***International Journal of Communications Law and Policy.* At http://www.ijclp.net/. An excellent source of articles on legal, economic, and policy perspectives.**

International Telecommunication Union. At http://www.itu.int/net/home/index.aspx. Provides a vast array of statistical data on national and international communication and information measures. This is the best single source of data in ICT activities and impacts available.