1

Perspectives on the Global Flow of Information

Ramesh Subramanian and Eddan Katz

PATTERNS OF INFORMATION FLOW are one of the most important factors shaping globalization. The sheer scope of these flows is vast, encompassing global intellectual property, scientific research data, political discourse, brand names, and cultural symbols, to name just a few. Digitally networked environments subject information to ever newer methods of distribution and manipulation. Today, individuals, groups, countries, and international organizations actively promote and try to control the flow of different kinds of information across national borders. Conflicts over control of information flows help define who holds power in the global information economy. The information infrastructure—which includes methods of production, reproduction, and transmission and transformation of information symbols and artifacts—as well as economics, politics, and culture, determines who does and who does not have the power to control access to information.

Globalization's biggest enabler is the Internet, which began as a government-funded, mostly academic project and has now become the single most important network facilitating most, if not all, global information flows. In doing so, it has also become the single most profound transformative force that informs today's conduct of commerce, culture, education, politics, and war. Transformations wrought by the Internet,

both massive and swift, show no signs of abating. Rather, they continue to accelerate exponentially as they have over the past decade and a half, strengthening and confirming the ever-expanding extent and reach of the global networked society.

From the ARPANET to the "Network Society"

The evolution of the Internet, starting from its ARPANET beginnings in the late 1960s to the colossal global "network society" that it is today, is a fascinating story of collaboration among computer scientists (seeking better, bigger, and faster networks), sociologists (seeking to use this new network to enhance human collaborations), and entrepreneurs (seeking to provide newer, more innovative services). A bit of this history is worth more than just a mere mention.

In 1971, just a few years after the "birth" of the Internet, Murray Turoff, a computer scientist working in the Office of Emergency Preparedness, Executive Offices of the President of the United States, was tasked with developing an electronic information and communication system to aid the U.S. government's response to emergencies. The resulting system, EMISARI (Emergency Management Information System And Reference Index), is considered to be the first computer-mediated, multi-machine communications and conferencing system and an early precursor to many of today's chat, messaging, conferencing, and collaboration systems.[1] Throughout the 1970s, sociologists, noticing the promise of social transformations emanating from networked communities, began actively studying the phenomenon. In 1978, collaboration between Turoff and the sociologist Roxanne Hiltz resulted in the earliest and brilliantly prescient seminal work on the emerging networked nation, described in their book *The Network Nation*.[2] The book became a defining document and a standard reference in computer-mediated communications. In her 1993 review in *The Village Voice*, the Pulitzer Prize–winning author Teresa Carpenter said the book contained:

> . . . a fascinating vision. In it home computers are as common as the telephone. They link person to person, shrinking, as the authors put it, "time and distance barriers among people, and between people and information,

> to near zero." In its simplest form, the Network Nation is a place where thoughts are exchanged easily and democratically and intellect affords one more personal power than a pleasing appearance does. Minorities and women compete on equal terms with white males, and the elderly and handicapped are released from the confines of their infirmities to skim the electronic terrain as swiftly as anyone else.

Around the same time *The Network Nation* was published, Barry Wellman, a University of Toronto sociologist, was also studying the emerging network society, but from a purely sociological angle, arguing that societies are best seen as networks of people rather than as hierarchically organized social structures. He developed this theory in his 1979 article "The Community Question" and then expanded that idea substantially in his 2001 article "Physical Place and Cyber Place: The Rise of Personalized Networking"[3] to include technological advancements that enable individuals to expand their individual networks temporally and spatially.

The early 1990s saw a major escalation of the networked society. The nascent Internet, which had maintained a predominantly academic presence through the 1980s, suddenly became a household presence with the development of the World Wide Web (WWW). A network that connected all of global humanity became a clear possibility, prompting more scientists and sociologists to study the shape of things to come in this new environment.

One of those attracted to this area of research was Jan van Dijk, a Dutch professor of communications science, who, in a seminal 1999 book, *The Information Society*, noted the rise of the networked society and the inherent dualities that existed in it:

> A combination of scale extension and scale reduction marks all applications of the new media in the economy, politics, culture and personal experience. This combination is the prime advantage and attractiveness of these media. It explains their fast adoption in what was considered to be a communications revolution. A dual structure returns in several oppositions described in the former chapters: centralization and decentralization, central control and local autonomy, unity and fragmentation, socialization and individualization.[4]

Van Dijk foresaw the tensions that such networked flows would cause:

> The main actors designing and introducing this advanced and expensive technology are at the top of corporations and governments. They are the investors, the commissioners and the decision makers. It is to be expected they use it to strengthen central control, be it in flexible forms, and to limit personal autonomy and free choices at the bottom of the organization not matching their interests. In this book it was noticed several times that ICT [Information and Communications Technology(ies)] enables better means of advanced and intelligent forms of central control than old technologies. It is a matter of social and organizational struggle whether the (other) opportunities of ICT to spread decision making will be utilized.[5]

He also predicted that the changes wrought by the networked society would be evolutionary rather than revolutionary, and that the networked society would not be an altogether *different* type of society.

Of the many works of this period, perhaps none has so comprehensively catalogued the coming networked society as that by Manuel Castells, a sociologist from Barcelona, Spain, working at the University of California, Berkeley. In his voluminous 1990s trilogy *The Information Age*,[6] he presciently portrayed the advent of a hyper-networked society, terming the new mode of development "informationalism"—paying tribute to Max Weber, who published his classic essay "The Protestant Ethic and the Spirit of Capitalism" in 1904–5 and whose ideas Castells used as a guideline in his theory of informationalism. Castells addressed many topics in his trilogy: the promise of a new networked world in the development of communications among peoples, the economic benefits and the cultural changes that this networked world would herald, the crisis of identity that it could lead to, and the real possibility of disintegration of societies "left behind" by the fast-moving train of globally networked economies. Even though Castells did not specifically focus on the power and expanse of the Internet, he nevertheless noted its enormous influence on the ongoing "network age"—the "microelectronics-based, networking technologies that provide new capabilities to an old form of social organization: networks."[7]

The most impressive aspect of Castells's work is the depth of empirical data he deployed to explain informationalism's connections to numerous apparently unconnected phenomena—such as the economic successes of Southeast Asia; Russia's capacity to retain a healthy civil society after the fall of communism; the future likelihood of Japan's regaining a leadership role in the Asia Pacific region; and even cocaine-trafficking networks around the globe. Castells also noted that new networking technologies are fundamentally different from older networking technologies by virtue of their being more adaptive and flexible and by their enabling decentralized structures to flourish, whereas older networks were characterized by their focus on the private life and vertical organizations such as "states, churches, armies, and corporations that could marshal vast pools of resources around the purpose defined by a central authority."[8]

Castells's trilogy covered the three sociologic dimensions of production, power, and experience. His real feat was in synthesizing these dimensions with the emerging network technologies and offering a theory of cyberculture that stresses the role of the state, social movements, and business. He observed that each of these entities has a competing agenda and interests, and there exists a permanent tension among these entities in controlling the flow of information.

Castells is often the most-cited socioinformation theorist and is often compared to Karl Marx and Max Weber in his analysis of modern production, its destabilizing effects on capitalism, and the meaning and role of identity politics, which in turn determine social relations among classes, all within the context of the networked society. As noted by Andrew Calabrese[9] in his extensive review of Castells's trilogy, the areas that Castells focused on in the most sustained manner are the nature and status of sovereignty, citizenship, and democracy in light of the globalization of information flows—which are also the topics of focus in this book.

Effects and Consequences

All of these early scholars of the information society—from Turoff to Castells—easily recognized that the network age is characterized by global flows of information. The flows shrink the spatial and the temporal and have the effect of exhilarating, aweing, and shocking their global

participants. For better or for worse, network-enabled global information flows are here to stay, and here to change. Changes include cultural assimilation, unified standards of governance, massive decentralization of all matters commercial, global access to goods and services, and global projection of power. To critics, the network age aids and speeds up monoculturization, imposes particular governance standards (such as democratization) on all regions of the globe, increases global outsourcing leading to massive shifts in jobs, and forces unneeded products and services on countries that don't need them. Even modern terrorism conveniently places its *raison d'être* on the alleged threats to culture and values—posed by global information flows—mostly from developed Western nations. And distressingly, terrorists use the same global networks and network flows to promote their philosophy, propound their propaganda, gather recruits, and plan and implement their destructive agendas.

But the criticisms have come not just from the developing world. Many experts and commentators from the developed world—those that have advanced well into the network age—have also been equally strong in criticizing many of those governments that initiate, support, and extend policies that seek to impose a cultural hegemony on the rest of the world. Of course, some extreme critics of these practices (e.g., anti–world trade activists) have sought to neutralize the effects by commandeering the same technologies that enable the functioning of the network age (and thus global flow) to pursue (sometimes) violent and asymmetric struggles against those whom they perceive to be perpetuating globalization. An excellent example of this was the anti–World Trade Organization protests in Seattle in 1990. The primary agenda of anti–world trade activists is to negate, neutralize, or just strenuously oppose what they consider systematic efforts by developed economies—especially the United States and to a slightly lesser extent the European Union—to dominate the world economically through international IP laws and agreements. While it is easy to categorize these activists as belonging to fringe groups, it should be noted that impediments to free global flows of information orchestrated by developed countries are most often the cited reasons for such protests.

Impediments to the Free Global Flow of Information

Impediments to free information flows have also been extensively studied and catalogued by scientists, activists, lawyers, and humanists. Peter Drahos and John Braithwaite catalogue the impediments to free global flow by developed countries and call it a form of "information feudalism." They argue:

> Information feudalism is a regime of property rights that is not economically-efficient, and does not get the balance right between rewarding innovation and diffusing it. Like feudalism, it rewards guilds instead of inventive individual citizens. It makes democratic citizens trespassers on knowledge that should be the common heritage of humankind, their educational birthright. Ironically, information feudalism, by dismantling the publicness of knowledge, will eventually rob the knowledge economy of much of its productivity.[10]

Such proponents of truly free global flows of information have further sought to focus on the economic efficiencies, not to mention global equity, that could arise out of free flows of information unrestricted by stringent and often self-defeatist forms of copyright and other control regimes that seem to stifle, not further, innovation. Lawrence Lessig, the "American academic and political activist"—according to Wikipedia—and an ardent advocate of free culture, notes that the Internet is a prime answer to those who suggest that innovations can take place only in a controlled sphere. He notes:

> . . . always and everywhere, free resources have been crucial to innovation and creativity; that without them, creativity is crippled. Thus, and especially in the digital age, the central question becomes not whether government or the market should control a resource, but whether a resource should be controlled at all. Just because control is possible, it doesn't follow that it is justified. Instead, in a free society, the burden of justification should fall on him who would defend systems of control.[11]

Yochai Benkler of Harvard Law School goes further in explaining the networked information economy (NIE) and the challenges it faces from entrenched economic interests. He argues in favor of creating appropriate social structures (by the mechanism of public policies) by governmental bodies that would promote and help retain the "commons-based peer production." However, these "free flow" arguments face constant challenges from various fronts—the content providers, service providers, intellectual property guardians (mostly consisting of industry lobbyists, who effectively pressure governments and influence more protective laws).[12] Jonathan Zittrain, also of Harvard Law School, notes that industry pressure to enact and retain control over copyrights all over the globe is killing the "generative" characteristic of the hitherto "free" Internet, causing it to become fractured into smaller and smaller components, each governed by its own technological walls, rules, culture, and laws. Unfortunately, governments have only aided this unwelcome development, seeing that it would eventually provide them with more control over their own vested interests. This, argues Zittrain, is much to the detriment of free global information flow.[13]

Global Flow of Information: Current Perspectives

This book, coming a full twelve years after Castells's trilogy was published, aims to provide more contemporary perspectives to the nature, effects, and consequences of global networks and corresponding information flows. It takes a multidisciplinary approach to examining current facets of the Internet and the patterns that it weaves, be they political, economic, social, or cultural. The plurality of views expressed here covers international law, culture, global inequities, modern practice of war, governmental actions, and culture—all touched by current global information flows. Consequently, the book features essays from key experts from a variety of disciplines—from sociology, law, and culture to technology and economics. Given its preeminent role in the world today, the Internet—and its effects—forms a constant undercurrent in most, if not all, of the chapters. Many discussions focus on how the Internet is shaping the forces of globalization and, in turn, how the Internet is itself being continually reshaped by the politics of globalization in areas ranging from culture to commerce to warfare. The essays, taken together, focus on five key questions:

- Can the flow of information across national borders be controlled? If so, how?
- Whose interests are going to be affected by flows of information across borders? Who will be empowered and who will lose influence and authority?
- What role can or should international law play in securing freedoms, rights, and democratic accountability as individuals, groups, and nations struggle over access to and control of information flows?
- What are the cultural impacts of such global information flows?
- What lessons can we learn about how to regulate information flow from experience with other kinds of flow across borders—for example, flows of goods, services, people, and capital?

Three Models of Globalization

Following this chapter, the book starts with an introduction of the global phenomenon by Victoria Reyes and Miguel Angel Centeno (chapter 2). They offer three models of globalization—the "Corner Deli" model that illustrates a completely unstructured form of globalization wherein the "local" completely intertwines and coexists with the "regional" and "global"; the "Wienerwald" model akin to the restaurant chain in Germany and Austria, which offers a regional perspective focused on a specific region or culture, also known as "clustered globalization"; and the "hegemonistic globalization" model exemplified by the global restaurant chain McDonald's, which closely resembles a rimless bicycle wheel—a strong center with ever-expanding spokes in all directions.

Reyes and Centeno observe that despite much theoretical scholarship, there is a striking lack of empirical work in studying globalization—which limits our determination of "the structure of participation in this global net," which in turn affects our ability to truly determine the political, economic, and cultural ramifications of the same. They then use data from the Princeton International Networks Archive (INA) and the Mapping Globalization Project (MGP) and network analysis to map global network connectivity to locate various nations within their three models.

Starting from this perspective of globalization, the rest of the book is organized into thirteen chapters thematically categorized into five parts:

Culture, Politics and Law, Science and Medicine, War, and Power. This categorization is neither mutually exclusive nor collectively exhaustive. It does, however, provide different and interesting perspectives on the phenomenon of the global information society and corresponding information flows. We describe here each of the sections along with the essays contained within them.

Part I: Culture

Pervasive interconnection is the hallmark of the global information society—everyone is linked to everyone else. A new potential global audience has shaped the production of movies, music, books, and other cultural works, and these, in turn, have penetrated local and national cultures. Multinational corporations seeking ever new markets have spread images and ideas through branding and advertising campaigns. Sometimes existing cultures successfully integrate this influx of new forms of global culture, but sometimes they may also try to resist or reject it.

The essays in Part I focus on the capabilities and limitations, the benefits and detriments of new forms of global culture in the digitally networked environment. They discuss the effect of information flows on the production and evolution of culture and how nations and local communities adapt to the global flow of cultural information while attempting to control it. Some countries, for example, discriminate against foreign cultural products and promote national works, or try to keep out what they consider harmful or dangerous forms of culture. Intellectual property rights, the broadcast flag, and anticircumvention laws help facilitate control over culture and provide new forms of control over its dissemination.

One promising development arising from the global spread of the Internet is the global flow of filmed entertainment through Internet TV. Of course, critics of globalization have immediately jumped upon this as another example of colonization of the world by (mostly) American cultural artifacts. The same arguments and attributions that preceded this development—namely, the success of Hollywood in exporting American culture to the rest of the world—have been advocated in this case, too. Eli Noam (chapter 3) takes each one of these "causes" and argues that none

of them is the real reason for the success of Hollywood productions in the world. He thus pours cold water on such causes as market capture emerging from the destructions of war; dumping movies cheaply that have been primarily paid for by American audiences. Rather, Noam argues that the success is attributable to other factors, some well known—namely, Hollywood's high productivity and industry structure. He argues that it is managerial responses to the concept of globalization, manifested through such strategies as extensive outsourcing of production (e.g., animators from Japan, special effects software programmers from India, venture financing from London, postproduction in Shanghai, and marketing and advertising in New York) and the free-agent culture of Hollywood, that prevails in the end, in spite of cultural criticism and political protectionism from the rest of the world's detractors to this global spread of digitally transmitted entertainment.

In chapter 4, Lawrence Liang provides an intriguing insight into how copyrights are perceived in emerging economies. This is the only chapter in the book whose author represents an emerging economy—that of India. In looking at how copyrights have been handled in emerging economies, Liang sees a dichotomy of approaches. By and large, governments in emerging economies adhere to international laws and treaties in the hopes that they may benefit from increased trade with developed economies on which they depend on for exporting their products. On the other hand, their private citizens exuberantly participate in a parallel, gray economy almost entirely devoted to creating pirated versions of movies and music in complete contravention of all existing international laws. Liang focuses entirely on this phenomenon—the people involved, their motivations, and the infrastructure. Much has been said about the detrimental effects of copyrights. But even champions such as Lawrence Lessig eventually concede the argument that pirating involves no creativity, and thus profiteering from such copying is, and should be, illegal. Lessig's arguments, however, do not gain much ground with Liang, who frames the whole issue of copyright violations in the emerging world context as one pertaining to access to knowledge and right to livelihood, arguing that piracy actually increases the visibility of the works and thus may actually promote future sales of such works even in emerging economies. Liang convincingly argues for an equitable pricing of books and other

copyrighted works in developing countries vis-à-vis the developed countries, employing a pricing strategy that uses percentage pricing based on disposable income, rather than the current practice of pricing that uses simple dollar-to-rupee or euro-to-rupee conversions.

In chapter 5, Stanley N. Katz addresses the preservation of and access to digital cultural artifacts.

When it comes to the issue of preserving and making accessible cultural artifacts using the new digital environments, many age-old contradictions seem to reemerge with greater emphasis and significance. Katz offers numerous examples. For instance, the new digital environments have been used and abused to the fullest extent by terrorist organizations like Al-Qaeda, yet use of the similar telecommunications and social computing infrastructure by American soldiers blogging from the battlefields of Iraq has been frowned upon. The new copyright and IP battles between rights holders and consumers make one wonder whether technology shapes the law, or whether the law shapes technology. The Google Books project, which ostensibly seeks to open up orphaned and other hard-to-get works to consumers, has heightened resistance from authors, publishers, and especially academics, who would, at first sight, only stand to gain from the project. Members of the European Union, especially France, are wary of Google Books because of fears that it may foment cultural imperialism, wherein (to take one example) French masterpieces might be controlled and made available by Google to world audiences.

Not to be outdone, the UN has also immersed itself in this argument, and the United Nations Educational, Scientific and Cultural Organization (UNESCO) has convened a committee to draft a statement on "the Protection of the Diversity of Cultural Contents and Artistic Expressions." The committee has issued preambles that confuse, rather than clarify, the issue of how to use digital technology to enhance the global reach of cultural artifacts while at the same time protecting the cultures whence such artifacts emerge. Katz concludes that his point is not to showcase the inconsistencies but rather to raise questions that will have to be addressed in the future, where much global flows of cultural significance will take place in the digitized environments.

If there is one thing that new telecommunications technology does exceedingly well, it is in the realm of communication between and among

people. Technology is the biggest enabler of interactions between people and cultures. It facilitates the "doing of," and the consumption of culture. Given that cultural interactions "produce meaningful personal experiences and increase not only personal but also collective capacities that are beneficial to members of the community beyond the individual actor,"[14] it is useful to explore the nexus between technology and culture. The late Edwin Baker (chapter 6) explores the economic and cultural aspects of products whose costs of reproduction, once the first copy is made, are almost zero. This, however, poses problems—on the one hand, a product with zero marginal costs of production would swamp the entire market and prevent other comparable, and sometimes better, products from seeing the light of the day. But sometimes the larger audience could also encourage new innovators to enter the field and deliver alternative products. The trick, then, is to determine a way to measure these phenomena to determine which actually works.

The fact that technology enables cultural transactions is not without its detractors, who believe that technology-enabled cultural exchanges could somehow dilute their own culture or hasten cultural colonization of some nations by others. Some of these actors propose cultural isolationism as a solution, through "strong" protectionist measures—despite the fact that such measures may not be economically beneficial. Baker proposes an alternative concept: "weak" protectionist measures that would tax imports to fund local products within a democratic framework. Baker in general seems to imply that weak protectionist measures have a beneficial effect, overall, to society.

Part II: Politics and Law

The essays in Part II discuss how global information flows affect national and international politics, and, conversely, how global politics affects information flows. Information flows can change the political dynamics both intranationally and internationally, and they can reinforce or destabilize governmental and nongovernmental power structures. Information flows made possible by digital networks can support new political coalitions, form new communities, and reshape the public sphere. At the same time, traditional politics, through governments and international

organizations, often defines how information, and what kinds of information, will be permitted to flow across borders. Governments establish regulatory frameworks for information flow, control the various layers of networks and communications systems, and impose filtering strategies to control information flow. Some of these strategies are fairly successful, while others fail. Some help their societies, while others help oppress people within them.

The tussle, tension, and distribution of power between global civil societies and governments are the subject of Daniel W. Drezner's essay (chapter 7), which takes a politicoeconomical view of the development. Ever since the Internet became a global, commonsense phenomenon, civil society groups such as NGOs and other activist/watchdog groups have been very quick to adapt to the new communications technology. They have successfully used it for political purposes to organize protests, to inform the community, and to direct actions against the government. Drezner attributes these successes to the fact that the nature and structure of the Internet resemble those of global civil society. However, such success is just one part of the story. There is a second view of the spread of the Internet—one in which governments have sought to gain control either by blocking entire swaths of the Internet's content or by skillfully infiltrating citizen groups with a view to exposing them, as well as scare them away through laws, as well as "requests" to cooperate. The primary question Drezner attempts to answer in his chapter is "Does the Internet empower the coercive control of governments at the expense of citizen activists, or vice versa?"

Drezner first addresses the rise and spread of smart mobs and their initial successes in a variety of international negotiations as varied as human rights advocacy to the Landmine Convention. He then juxtaposes this against the reactions of the state's seeking to regain control and neutralize such movements. He uses a transaction cost approach to explain why ICT affects the tussle between the state and civil society groups. It seems that the same ICT which helps reduce the transaction costs of the citizen by shrinking the hierarchy of his global organization, thus allowing for more rapid communication, also empowers the state to reduce its own hierarchy, thus nullifying the effects.

Governments use this effect not just to control but also to enable citizen participation to the extent they deem appropriate. In some cases, countries such as the United States have actually begun to invest resources to enhance citizen participation. It has sent even teams to other countries ostensibly to aid and educate other governments in their quest to reach their people through Web 2.0 technologies, while at the same time teaching the nuances of maintaining secure systems with high levels of data integrity. However, Drezner warns that the positive actions of the governmental and civil groups organizations will go only so far, and it is a fallacy to think that the Internet will aid only "good" groups. He points out that the Internet is also currently infiltrated by illiberal elements who may want to control and negate the efforts of the government to support legitimate groups.

These ideas gain further traction in John G. Palfrey Jr.'s essay (chapter 8). Notwithstanding several gains made by global citizen groups and individuals as a result of the rise of the Internet, it is disappointing that the Internet still faces considerable censorship and control by states. As the phenomenon of control rises, world governments have started to debate the issue at "Internet Governance Forums." However, meetings such as the World Summit on the Information Society (WSIS) have and the Internet Governance Forum (IGF) have not resulted in any substantial improvement on the censorship issue because of the participants' reticence to indulge in hard conversations on thorny topics. The OpenNet Initiative has undertaken research to determine the depth and breadth of Internet filtering in various countries and concludes that some form of filtering takes place in almost every nation. While much of the most determined filters focus on stopping access to pornography and "anonymizing" sites, many countries filter content for political reasons, with a view to retaining control over their citizens.

Palfrey suggests that Internet Governance Forums have focused more on mundane topics such as port number assignments and spam while avoiding issues of Internet censorship and controls practiced by member nations. Palfrey emphasizes that such discussions should be much broader in nature, so that these thorny issues can actually be discussed in the open.

Dan L. Burk (chapter 9) considers the intriguing possibilities and consequences of treating law like a product, much like a commercial product, governed by market economics and affected by phenomena such as Tiebout's application of interjurisdictional competition theory to public services, and "cartelization" effects. Burk suggests that just as citizens and businesses migrate to jurisdictions or cities that have laws and codes favoring them, and away from jurisdictions that are not favorable to them, purveyors of "protected" informational products such as copyrighted books, music, and other media forms would also be inclined to move to locations where the existing laws favor them and are less obstructive to their endeavors.

In response, developed nations (where a majority of information products are developed) may resort to international-standards agreements and "laws as products," combined with a "cartel" approach—that is, entering into agreements with similar nations to impose laws and restrictions on lesser developed countries and thereby maintaining their stronghold over such products. This approach may again break, as cartel members may resort to bilateral agreements or rent-seeking "quid pro quo" arrangements with politicians of certain emerging economies. In discussing these issues, Burk successfully details the interactions and connections between technology-based standards setting and international law and illustrates some of the problems that may arise from these.

Part III: Science and Medicine

Nowhere is the conflict between the radical potential of globalized information flow and the profound consequences of the interruption and regulation of this flow more apparent than in the domain of science. This is especially true in the life sciences: From traditional medicine to the map of the human genome, the processes of science are increasingly globalized. But the AIDS epidemic has highlighted a crucial disconnect between the possibilities of global science and the realities of the distribution of its production and consumption.

In the name of more and better science, treaties such as TRIPS and regulatory bodies like WIPO are ratcheting up intellectual property protection around the world. These changes are affecting the conduct and

progress of science, controlling the flow of scientific information internationally and changing models of scientific research and production. A key debate in science policy is the extent to which science will be "open" or "closed" and the role that intellectual property rules should have on the shape and direction of future scientific research.

Frederick M. Abbott addresses the issue of what global flows of information could do to the whole notion of right to medicines and the global pharmaceutical industry in his insightful and highly informative essay (chapter 10). While it can be argued that enhanced global flows of information would also enable easier flow of information products such as pharmaceuticals, Abbott notes that this is sadly not the case. Pharmaceutical companies from developed economies have made it difficult for citizens of emerging economies to have access to the medicines, but often the medicines are prized unrealistically high for anybody in the developing world. Efforts by the developing countries to resist and overcome the problems are being challenged and frustrated by developed pharmaceutical companies through various means, including pushing unpalatable international treaties that safeguard patents by these companies, lobbying domestic governments to offer additional protections, controlling distribution channels, and, finally, acquiring pharmaceutical companies in developing countries. Given this, the only solution for the developing countries seems to be to mount a concerted attack through affirmative action, placing legal limits on foreign acquisitions, and protectionist measures.

Part IV: War

Modern warfare and diplomacy would be impossible without global flows of information, but at the same time, both war and diplomacy must try to control these flows and turn them to their own purposes. Current national security policies attempt to construct a unified information warfare plan to handle the various aspects of the "information front." These include influencing public opinion, defending the nation from harmful information, maintaining the quality of information used to make important decisions, and initiating offensive strategies targeted at the enemy's information systems. In the modern world, military and political strategy is inseparable from concern with patterns of information flow.

The essays in Part IV examine the strategic use of information flow: the use of misinformation and disinformation techniques, accreditation and disaccreditation of sensitive sources, control over informational access to the battlefield, and the use of manipulative techniques to dominate information search and retrieval access points. "Information warriors" filter traffic, reroute and channel flow or block information nodes, and attempt to reshape patterns of information flow. Through this process, they create innovative defense methods that seek to interfere with the flow of information by polluting the environment or subverting the architecture of flow and, in the process, actually change the global information ecosystem. But information warfare is a tool of offense as well as of defense: Information warriors try to penetrate, demolish, or undermine the enemies' information infrastructure, using methods such as hacking into information sources, inserting malicious code, jamming traffic, and attacking information systems to harm critical infrastructure or to amplify a physical attack.

Jeremy M. Kaplan poses several questions in his essay (chapter 11): What is the connection between the global flow of information and wars of the future? Kaplan notes that the same developments and technologies that enable the information flows among citizens of the world can also be used for conducting future wars. Indeed, this notion of open flows of information in the conduct of a nation's wars is counterintuitive at first. For instance, how can a nation open up its information infrastructure with a view to providing just-in-time information to a soldier in the battlefield? How can the information from that soldier about possible enemy targets be sent to appropriate weapons platforms without any information leakage to the enemy? How can the battlefield's operational and supply needs be transmitted to the suppliers and how can the suppliers tap into the needs on the battlefront seamlessly, through interoperable, interconnected networks? What will be the future of such "net-centric" wars?

More important, Kaplan raises critical issues that emanate from such open net-centric military structures and compares them to net-related security, privacy, and information assurance issues that exist in the civilian and commercial world today. The issues seems to be the same, but the concerns of the military are radically different, more critical, and more urgent and could result in more devastation if mishandled. Kaplan

addresses possible solutions to the problems that might arise as a result of global information flows and their use in the conduct of modern warfare.

From fighting wars of the future, we focus next on the structure, role, and function of information flows in war and peace. James Der Derian (chapter 12) argues that global information flows have brought with them a world of enhanced communication, transparency, and productivity (the "good side" of information). But unfortunately, the same have also brought about surveillance, terror, and war (the "bad side" of information). Instead of focusing on one or the other, it is useful to analyze both aspects of information, recognizing that the "good" and the "bad" are simply symptoms of the stresses induced by the information revolution. Tackling the notion that global flows enhance the ability of the terrorist, Der Derian avers that it is very difficult even to identify and define terror—as one man's terrorist could just as easily become another's freedom fighter. So instead of wasting time and effort in trying to define who is a terrorist, and what actions and uses of information constitute terrorism, he suggests that the whole notions of "information age" and "information revolution" should be studied using a multidisciplinary lens. An interesting observation that Der Derian makes pertains to the transmission of images rather than words in influencing people around the world—a technique used very effectively by terrorists.

In order to study the information revolution, Der Derian proposes a framework in the form of eight propositions that will form the basis in studying "infoflows." He describes the concept of information as one that exists in a continuum, with the extreme positions being "infowar," categorized by the use of information to wage war, terrorize, demonize, target, and even kill the enemy; and "infopeace"—which is focused on the reduction of personal and structural violence, thereby enhancing the mediation and resolution of wars.

Part V: Power

The book concludes with two wide-ranging chapters about information flow as power, and how control over information flows becomes a central source of power in a globalized world. The first chapter considers how individuals and nation-states wield many different types of information flows strategi-

cally to enhance their power over others. It treats information as a kind of power that people can consciously use to achieve their goals so that as globalization proceeds, it will amplify the strategic and instrumental uses of power.

Dorothy E. Denning (chapter 13) looks at the notion of power and its effects on information flow. As she notes, current information flows are dictated by two powers that are often in conflict with each other—the power to enable the flow of information, and the power to block such flow. These powers manifest themselves at all levels—that of the individual users as well as that of the government infrastructure. Individuals and organizations enable, and often desire to exert control over, information, whether it is to enable the flow or to block it. And sometimes, entities act in cross-purposes. While an individual may seek unfettered access to information, government may seek to block the information or prevent it from leaving or reaching the individual. Governments may also use pressure on individual citizens and make sure that only "approved" information is accessible to the individual. To this scenario a third entity could be added—that of the malware creator and digital attacker. Malware and attacks can occur in the form of computer viruses, worms, or attacks using various techniques. Sometimes the perpetrator is a lone thief, and at other times the attack is the result of an organized group effort. Sometimes, it is also the government apparatus itself aiming to control another country or to spy on its own citizens.

Denning notes that localized rules, laws, and regulations enable governments as well as individuals to exercise more control over the digital information "new west" while also enabling some information flow deemed appropriate by either party. But she also notes that in the end, "it is not the ability to control flows that matters as much as the ability to influence decisions and actions."

The second chapter, by contrast, begins with the assumption that information creates forms of power that may transcend anyone's grasp or use. It asks how the development of increasingly interconnected global networks of power ensnare individuals, groups, and nations in ever-proliferating networks of power that they do not control and that, in fact, are in the control of no one in particular.

Thus power is at the heart of Jack M. Balkin's theorization of global information flows (chapter 14). He offers a different, antihumanist perspective on the whole notion of power, its effects on global flows of infor-

mation, and the effect that such flows have on people. Instead of looking at the Internet and accompanying global flows as a strictly human creation that is completely under human control, he proposes an interesting theory: that the Internet actually projects its own power to a human race that may, or mostly may not, even be aware of, much less be able to counter or control, such projection of power. He develops the theme by looking at three theories to explain the flow of information: memetics, Gaia, and the proliferation of information power.

The memetic theory speaks to the reproduction of memes—a cultural reproduction, aided by the technologies that humans willingly and almost unwittingly develop. From the memes' point of view, humans and their technologies are simply means to aid the reproduction and proliferation of memes. The Gaia theory considers the entire globe as one "system" whose quest is continually to learn more about itself. Thus the global flow of information—in all directions—is simply a means for Gaia to learn more about itself. The "proliferation of power" theory takes as its bases those of Marx, Weber, and Foucault and proposes that technology gradually evolves bureaucracies and various forms of subordination that eventually regiment and subjugate human behavior. Balkin cites the spread of pornography and spam as examples to illustrate his theories and suggests that while we as humans promote human rights, we should also be aware of these alternate forces of nature that work orthogonally to human rights. Such awareness, in the end, would enable us to "divert this new form of power toward human ends."

Balkin's powerful antihumanist theorization about global information flows provides a fitting conclusion to the overall theme of the book. Along with everything else in this world, information is also an evolving phenomenon. Over eons, it has been created by humans, disseminated by humans, and controlled by humans. However, over time, a profound change may have taken place—information may have gained a life of its own, and all our attempts to use information simply plays out in its own playbook of spreading itself to every corner of the human mind's reach. Humans, thus, can no longer claim complete control of information, or the way information flows and spreads around the globe. We hope that this book will give the reader a plurality of current perspectives on the multifaceted nature of information flows, their use and misuse, and the future they are likely to bring.

Notes

1. See Stewart, Bill, "The Living Internet," http://www.livinginternet.com/r/ri_emisari.htm. In 1971, EMISARI was put to one of its first practical uses to coordinate policy information for U.S. President Richard Nixon's wage and price control program to fight high inflation. Users of EMISARI accessed the system through teletypewriter terminals linked to a central computer through long-distance phone lines. The EMISARI chat functionality, called the Party Line, was originally developed to replace telephone conferences that might have thirty or so participants and in which no one could effectively respond and take part in a meaningful discussion. Party Line had a range of useful features familiar to users of modern chat systems, such as the ability to list the current participants and the invocation of an alert when someone joined or left the group.

2. See Hiltz, S. R., and M. Turoff. 1978. *The Network Nation: Human Communication via Computer*. New York: Addison-Wesley. [Revised Edition. Cambridge, MA: MIT Press, 1993.]

3. See Wellman, Barry, "The Community Question: The intimate networks of East Yorkers," AJS Volume 84, No 5, March 1979, pp 1201–1231.

4. See van Dijk, Jan, "The Network Society: Social Aspects of New Media" (1999, 2nd edition 2005), pp 220–223.

5. Ibid.

6. See Castells, Manuel (1996, second edition, 2000), *The Rise of the Network Society, The Information Age: Economy, Society and Culture Vol. I*. Cambridge, MA; Oxford, UK: Blackwell; Castells, Manuel (1997, second edition, 2004), *The Power of Identity, The Information Age: Economy, Society and Culture Vol. II*. Cambridge, MA; Oxford, UK: Blackwell; Castells, Manuel (1998, second edition, 2000), *End of Millennium, The Information Age: Economy, Society and Culture Vol. III*. Cambridge, MA; Oxford, UK: Blackwell.

7. See Castells, Manuel, "The Network Society: From Knowledge to Policy," © Center for Transatlantic Relations, 2006. Pp 4.

8. Ibid.

9. See Calabrese, Andrew, "The Information Age according to Manuel Castells," in the Journal of Communication, Summer 1999, pp 175–176.

10. See Drahos, Peter and John Braithwaite, Information Feudalism: Who Owns The Knowledge. Economy, Earthscan Publications, London, 2002, p. 219.

11. See Lessig, Lawrence, *The Future of Ideas*, Random House, 2001. P 14.

12. See Benkler, Yochai, *The Wealth of Networks*, Yale University Press, 2006. Chapters 11 & 12.

13. See Zittrain, Jonathan, *The Future of the Internet and How to Stop It*, Yale University Press, 2008. Chapters 4 & 5.

14. See Balkin, Jack M. "Digital Speech and the Democratic Theory of Culture: A Theory of Freedom of Expression for the Information Society," 79 *NYU L. Rev.* 1 (2004).