Center for Advanced Studies in Science and Technology Policy
www.advancedstudies.org

• Information • Environment • National Security •

Preliminary Research Overview: 2003-2004

For Discussion Purposes Only
Fall 2003 v.1.35B

Center for Advanced Studies Document
PRO-0310-v133
• New York •

K. A. Taipale

Circulation Draft • Fall 2003 • v1.33

Preliminary Research Overview for 2003-2004

Introduction.

My current research interest is information and communications policy and, particularly, the political, economic and social effects of such policy on economic development, domestic, national and global security, international relations and world trade. In addition, my interest encompasses the impact of information and communication technologies on environmental policy and regulation.

My involvement with these issues is intended to inform and have influence at the decision- and policy-making level in both the public and private sectors. During the 2003-2004 period, my research and publishing agenda includes the following areas:

1. the regulation of "cyberspace" – in particular, intellectual property, privacy and free expression,
2. the role of advanced information technology in law enforcement and national security,
3. the allocation and regulation of spectrum and other telecommunication infrastructure,
4. the development of international institutions and common regulatory policies to address challenges to national jurisdiction over global information resources, and
5. the role of information technology as an agent of change in environmental policy.

Information Policy.

It is cliché, of course, to say that the world is at the beginning of an information revolution that, in historical retrospect, will have as profound affect on global social evolution, political and economic power allocation, and public policy development as did the industrial revolution. Nevertheless, advanced information, communication and media technologies have already significantly transformed the existing world order and they continue to unleash powerful forces that increasingly realign political, economic and social relationships.

These same technological forces that have the power to undermine totalitarian public regimes and destabilize entrenched private economic orders, however, can also threaten both legitimate public authority as well as individual liberties and future economic and social development opportunities if existing regulatory structures and policies are unable to easily adapt to new circumstances.

These challenges are particularly acute in information and communication policy where traditional regulation and control based on geographically-determined jurisdiction, and regulatory structures and economic interests aligned according to the type of information infrastructure, are undermined by the global nature of the information infrastructure and new communication capabilities that eliminate historical distinctions among communication platforms. Applying incompatible rules to global information flows raises serious efficacy issues and brings into direct conflict disparate approaches and standards for regulating information and the attendant political and economic power.

How we structure and allocate rights in the physical infrastructure that mediates these information flows and human communication (that is, telecommunications policy); how we regulate the creation and use of information and knowledge (intellectual property); how we balance the rights of individual users (privacy law and free expression) and society (cybercrime and national security); and how we apply the infrastructure and information technologies to manage our physical resources (as agent of change in environmental policy) is the focus of my research.

Regulating "Cyberspace".

The new information technologies significantly affect the five matters that give ideas value in human activity – their production and reproduction; their storage; transmission; selection; and intelligent processing. Thus, existing policies and regulatory and economic structures premised on old models for assessing and controlling these activities are under significant stress.

In general, the regulation of cyberspace (or, digital communication generally) involves the following four policy queries:

1. how to manage the production and distribution of culture (intellectual property),
2. how to manage information about the users of the system (privacy),
3. how to manage individual user's rights to use the system (free expression), and
4. how to protect societal interests (cybercrime and national security).

A global market economy that is increasingly dependent on the free flow of information is at risk as irreconcilable information policies come into conflict. Compounding the problem is that free information flows themselves exacerbate stresses resulting from disruptions to traditional cultural and political governance stemming from globalization and international intercourse.

Much has been written about how the low marginal cost and perfect fidelity of digital copying is undermining the existing production and distribution mechanisms for music, film and other cultural product and how software patents are used to maintain trade barriers. Entrenched economic interests and cultural exporters are trying to use existing policy to protect their traditional business models while jockeying for advantage in new emergent markets. Powerful corporate interests find themselves on opposing sides of the debate with shifting alliances depending on the particular issue or interest at stake – one company's file-sharing pirate is another company's broadband customer. Additionally, individual nation-states seek to apply or enforce different rules depending on whether they are producers or consumers of information. Intellectual property issues have become fundamental interests in international trade policy.

So too, the issue of privacy in cyberspace has been much debated – both in the context of consumers and their relationship with commercial enterprise as well as between the state and citizen in the context of national security and individual freedom. Even among the Western economic powers, conflicting notions of privacy challenge multinational business interests as well as national security. For example, conflicting database privacy requirements for consumer information between the United States and the European Union restrict the ability of international financial corporations to manage their global enterprise. And, conflicting privacy requirements for sharing personal information about airline passengers between Europe and the United States impacts both national security and international air travel. These problems are magnified when Asia and the developing world are included.

In the area of free expression, conflicting values give rise to conflicting policies. For example, the development of an international retail trade in books creates problems even among the Western democracies where European policies favor free expression about sex but may restrict political or religious expression while United States policies provide political or religious expression with almost absolute protection but pornography is regulated. Differing standards for defamation create tension between publishers in the United States and subjects in Commonwealth countries.

New categories of crime (for example, spamming, cracking, and malicious programming) as well as new ways to commit old crimes (for example, emailed Nigerian 4-1-9 scams, online gambling, child pornography traded through file sharing networks, cyber stalking and money laundering using online banking) increasingly require international cooperation for effective law enforcement and prosecution. International terrorism requires developing effective international frameworks for information sharing and analysis.

Inconsistent regulatory structures will increasingly result in "flag of convenience" jurisdiction shopping that could lead to the application of a lowest- (in the case of crime) or highest- (in the case of centralized control over individual liberties) common denominator regulatory regime with a consequential stifling of both technological innovation and democratic freedoms and security.

The practical consequences of these developments are that information policies significantly change what people can do in life. Although new technologies do not determine human fates, they alter the spectrum of potentialities within which people act. As success in work and leisure increasingly turns on using new forms of information and communication, information policy transforms the range of options within which people determine their lives. In a digitally networked world, wealth creation, as well as full social participation, requires people to access, organize and use information, and to create new knowledge, both personal and public.

Consequently, information policy is becoming the prime determinant of opportunity and human fulfillment and will have a profound effect in shaping an equitable and humane global polity . Information and communication policies determine the very potentialities and opportunities that increasingly define the intellectual, social and economic existence of individuals within society.

Jean-Francois Lyotard wrote:

> "A *self* does not amount to much, but no self is an island; each exists in a fabric of relations that is now more complex and mobile than ever. Young or old, man or woman, rich or poor, a person is always located at "nodal points" of specific communication circuits … "

Thus, it is not mere hyperbole to imbue current developments in information policy as historical determinants in the course of future human evolution. The rules that are being developed now will govern the relationship among individuals and public and private institutions in the primary sphere of future social, political and economic activity. Adapting old policy to new circumstance or developing new policy to address novel problems requires informed debate and a sound understanding of how technologically enabled change interacts with existing policy and doctrines in order to ensure continued human development, collective security and a civil society.

My specific research interest in this area is in understanding and articulating how technical characteristics and the potentials of new technologies are changing the nature of information and knowledge production and its use for social, political and economic purposes; what the effects of these changes are on existing regulatory policies and concomitant political and economic structures; and how these changes interact with and influence developments in economic opportunity, individual autonomy, domestic, national and global security, international relations and world trade.

Telecommunication Infrastructure and Spectrum.

Wide area networking and telecommunications are currently mediated through complex, infrastructures consisting of two parallel systems, both heavily regulated. The "hard wired" infrastructure consists in the main of the remnants of the landline telephone systems and the newer cable television systems. The current "wireless" infrastructure consists of the traditional broadcast media (radio and broadcast television), satellite and the more recent wireless communication services industry.

Each of these systems is subject to different, and in many cases, inconsistent regulation and discriminatory treatment under domestic and international law. The hard-wired infrastructure was initially developed and regulated under theories of natural local monopoly and state ownership (abroad) or common carrier status (in the United States) and has recently been subjected to privatization or regulatory pressures to provide open access to private competitors. The wireless infrastructure – essentially frequency spectrum – for broadcast was originally either allocated by

government fiat (U.S.) or subject to outright government control (abroad) and content and service obligations were imposed based on a premise of spectrum scarcity. More recently, spectrum for new communication services has been allocated by auction without content or service obligations but still premised on scarcity or exclusive use. Each system – wired, wireless, and satellite – is currently subject to various domestic regulatory regimes and international treaties, and is dominated by large, capital intensive corporate organizations that compete at the periphery of their primary "traditional" business for new "data" based services.

Digitization and related technologies, however, are making all content – whether voice, text, audio or video – indistinguishable binary code, that is, "bit streams", that are transport medium indifferent. Obviously, the existing legal and regulatory system based on discriminatory treatment of different telecommunications platforms providing substantially similar services and based on geographical political boundaries that do not conform to emerging information flows or communication patterns is unstable. Thus, extant infrastructure providers are battling for market advantage by using the existing regulatory structure to try and protect their traditional businesses from competition while allowing themselves competitive entry into new services (or old services provided by others) and markets that supplant their traditional businesses.

More importantly in the long run, new developments in technology – in particular ultra-wide band and software-defined radio together with mesh networks – have the potential to make the entire existing infrastructure and regulatory regime obsolete. Indeed, they may challenge the very notion of regulation and control itself by eliminating scarcity in spectrum. Thus, determining spectrum policy is fundamental to the continued development of "cyberspace" as a platform for human communication and culture, as well as for continued economic growth and development.

The two primary policy determinants in telecommunications are the related issues of allocation and governance. That is, how will spectrum (or built infrastructure) be allocated – by government fiat, free market or auction, or for free as a public good, and how will it be governed – by national or international regulation, by market or property law regulation, or as a commons. Current national developments in these areas will have significant international effects.

Where there is economic, legal and regulatory instability and significant rapid technological change, as there currently is in telecommunication policy, there is need for new analysis, understanding and doctrinal developments.

Environmental Policy.

At the same time as these transformative technologies are allowing advanced industrial societies to evolve into information societies, industrialization, global population growth, immigration flows, and other pressures have severely strained our natural resources.

Many environmental problems and their potential solutions are impacted by the use of information technologies. Technological solutions can lower transaction costs and improve information flows, as well as discover and help manage complex interrelated environmental causes and effects.

A focus of my research in this area is how information technology creates opportunities for new regulatory approaches and structures to emerge by changing certain initial conditions, in the main, lowering transaction and information costs and improving analytical and monitoring capabilities.

Conclusion.

The importance of information policy to world affairs is highlighted by the upcoming World Summit on the Information Society, which takes place under United Nations auspices in Geneva in December 2003. I intend for my future work in these areas to have influence on the public debate about information policy as it unfolds over the coming decades.