

# New Media & Society

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# A social shaping perspective on the development of the world wide web

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## The case of iCraveTV

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EDWARD LENERT

*City University of New York*

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### Abstract

This article uses the Social Shaping of Technology (SST) framework to analyze the case of a Canadian internet company called iCraveTV, which captured broadcast television signals off the air and retransmitted them over the internet. The case study identifies and discusses the social and legal mechanisms by which relevant social groups can exert substantial force on the development of the web. The example of iCraveTV directs attention to questions about the interactions of domestic and transnational forces in the shaping of internet and world wide web technologies. The article concludes that the path of development of the internet and the world wide web remains open to potential intervention and regulation.

### Key words

borders • cultural contradictions of capitalism • iCraveTV • interpretive flexibility • social shaping of technology • sociotechnical ensembles • stabilization • webcasting

## WHAT IS iCRAVETV?

In the autumn of 1999 a Canadian company called iCraveTV began operating an internet site that retransmitted television signals. It acted as an online webcaster and provided internet users with the opportunity to watch television in real time on their personal computers. Technically, iCraveTV was far from revolutionary. It used streaming technology to feature standard television fare on a two-inch viewing screen, with an often-blurry image, and a jerky, intermittent feed. iCraveTV's antenna picked up over-the-air broadcast signals in Toronto, digitized them, and then sent them out on the internet. It retransmitted these television signals intact and without editing, but it placed its own advertisements in the surrounding space on the user's computer screen. The website allowed users to click on a menu for one of 17 channels of television, including all the major Canadian broadcasters (CBC, CTV, Global, and City-TV), as well as the ABC, NBC, and CBS network affiliates in Buffalo, NY (Lang, 2000).

Very soon iCraveTV's apparently unremarkable business idea provoked strong controversy, legal action, and eventually congressional hearings in the USA. In January 2000, iCraveTV was sued for copyright infringement in the USA. In the lawsuit, the Canadian company faced some of the biggest names in entertainment, including Disney, Metro-Goldwyn-Mayer Studios, CBS, and Fox Broadcasting, as well as the National Football League (NFL), and the National Basketball Association (NBA). These forces joined together to call iCraveTV's rebroadcast of their copyrighted content 'one of the largest and most brazen thefts of intellectual property ever committed in the United States', demanding an injunction against iCraveTV's webcasts and millions of dollars in damages (Borland, 2000).

The legal result was swift. In late January 2000, only a few days before the broadcast of the NFL Superbowl, a federal district court in Pennsylvania issued a temporary restraining order against iCraveTV. Then, in early February 2000, the same court issued a preliminary injunction and forced a settlement, resulting in the shutdown of the iCraveTV service (Bloomberg News, 2000).

To resume operation, the court required iCraveTV to restrict its service to Canada (where its retransmission of television signals was lawful), keeping it out of the USA (where it was not). In response to the February 2000 injunction, iCraveTV initiated attempts to build a feature into its webcasting technology that would allow it to stream live TV only to specific markets. In other words, the goal was to create geographic 'borders' on the web, or – in the words of one iCraveTV official – to create a '49th parallel' on the internet (Craig, 2000). Expanding on this idea, Herbert Becker, president of iCraveTV, stated that he sought technology that would allow him to model iCraveTV's operations on a conventional cable system, including the ability to 'black out' reception of the signal by geographic areas (Mariano, 2002).

As this example illustrates, the litigation against iCraveTV initiated efforts to reconfigure (at least in part) how the world wide web functions, and create borders in a previously borderless internet. In addition, it resulted in a transformation of iCraveTV's technology itself – one that was brought about by social rather than technological or scientific needs.

The case of iCraveTV, where a court ordered a company to reconfigure its service or cease operation, raises two important issues. First, was iCraveTV's enterprise really a case of 'brazen theft', or was it an earnest attempt at technological innovation? Second, is the standard conception of a borderless internet being transformed and by what processes and means is this transformation occurring?

To address these questions, this article presents a case study of iCraveTV. The analysis uses the theory of Social Shaping of Technology (SST) to discuss the iCraveTV example and direct attention to the interactions of domestic and transnational forces that are shaping the technologies of the internet and the world wide web. After a brief overview of the origins of the world wide web, the article presents the basic framework and some key concepts of the SST theory. It then applies the SST framework to the case of iCraveTV. The analysis illustrates how social and economic forces are exerting substantial pressure and transforming the web through the process of social shaping. The article concludes with some policy implications that can be derived from the examination of this case study.

## ORIGINS OF THE INTERNET AND THE WORLD WIDE WEB

When considered as a communication technology that is distinct from the older underlying structure of the internet, the web has been around only since the early 1990s. The internet itself began in 1969 as a project of the US Defense Advanced Research Projects Agency. The original conception of the internet had nothing at all to do with streaming video to a consumer's computer. The internet was originally designed as a communications system that could survive a nuclear war. Its technical qualities were mandated by the military necessity of having a communication network that did not depend on any single path of information flow or central server.

As the internet expanded, it became known as the 'network of networks', a description based on the observation that the internet's architecture was characterized by open interconnection where no single computer acted as a central authority (Boyle, 1997). Until the late 1980s, access to the internet was largely confined to government and university users. However, as networking technology improved and personal computers became widely available, the internet changed from a purely text-based medium into a graphical one known as the world wide web. The web is a subset of the internet, and is characterized by graphical and multimedia elements that are connected to one another by hypertext links.

Tim Berners-Lee devised the first web browser in 1990. It was only in 1991 that the first US website, which was comprised of a total of three lines, went online. Speaking on the 10th anniversary of that first webpage, researcher Paul Saffo (in Benson, 2001) observed that the course of the web's development is still largely undetermined because it is 'the most mutable, plastic medium' we have had since the printing press. Saffo's observation is a good point of departure for studying the web as it moves into its second decade. If the web is malleable, by what means is it shaped? The SST theory offers one way of formulating answers to this question.

### **SOCIAL SHAPING OF TECHNOLOGY THEORY: ASSUMPTIONS, CRITIQUES, DEFENSES**

The SST theoretical perspective draws upon a range of academic traditions. Taken together, they share a critical approach and investigate the ways in which social, institutional, economic, and cultural factors shape the direction and rate of innovation, the form and content of technological artifacts and practices, and the outcomes of technological change for different groups in society (Williams and Edge, 1996). Although the SST framework has been mostly elaborated by European scholars (Bijker, 1995; Bijker et al. 1987; MacKenzie and Wajcman, 1985), some of its premises have been adopted by US writers concerned with the development of electronic media (Douglas, 1987; Marvin, 1989; Streeter, 1996).

SST holds a middle ground in a heated theoretical debate between two conflicting views on the relationship between society and technology. Simply put, on one side of the debate are the technological determinists who foreground the power of technology to transform society. On the other are the social determinists who stress that social relations – and especially economic relations – are the most important considerations.

One of the most influential writers in the technological determinism school is Ithiel De Sola Pool. De Sola Pool's view of the interaction between technologies of communication and society is sometimes described as 'soft technological determinism'. In this conception, the 'relationship between technology and institutions is not simple or unidirectional, nor are the effects immediate' (De Sola Pool, 1984: 5). This qualification to one side, the very title of his book, *Technologies of Freedom*, encapsulates De Sola Pool's position. In Pool's view, printing is a technology of freedom because it facilitates 'autonomous communication by private individuals' (1984:18). While he admits that 'the path from printing to liberalism is not a straight one', printing itself functioned as a 'technology of liberation' from the oppression of kings and the Catholic Church (1984: 14). In De Sola Pool's deterministic conception, printing possessed technical characteristics that made it conducive to individual freedom in such a way as to affect the course of history and human development (1984: 5).

Today many intellectuals, like De Sola Pool, continue to see emancipatory, if not revolutionary, potential in communication technologies. When an outlook of hard determinism is adopted, the latest technological innovations, such as the internet, are depicted as a force outside history and politics. Moreover, futurists often portray the industrialists and scientists of the emerging communication technologies as guardians of the public interest rather than as a technological elite usurping social and economic power. In extreme versions of this line of thinking the internet is, by itself, a force that will bring freedom, prosperity, and enlightenment (Gates, 1996). But the optimists often miss an important point: new technologies create new opportunities, but they also generate new problems. However, in the view of optimistic technological determinists, technology is a self-correcting system which resists attempts to restrict its progressive power of innovation.

In contrast, social and economic determinism has its intellectual roots in the writings of Karl Marx. In this conception, technological innovations are the result of the social relations of production, which also govern the nature, direction, and rate of technological advancement. One leading writer on the evolution of communication technologies from this perspective is Brian Winston. In *Media, Technology and Society* (1998), Winston argues that the development of new media is the product of a constant interplay between social necessity for new forms of media and efforts to suppress the new media by socially dominant forces. He concludes that new technologies are introduced into society only when their disruptive potential has been limited.

Winston's view of media technologies emphasizes the concept of supervening social necessity, defined as a concentration of generalized social forces which are responsible for determining the process of innovation. In his view, the forces that can act as supervening social necessities can range from 'the objective requirements of changed social circumstances' to 'the subjective whims of perceived needs' (1998: 6-7). The counterparts to the forces of social necessity are termed 'brakes'. In Winston's formulation, brakes are general social constraints that coalesce in order to limit the potential of a device to disrupt pre-existing social formations. In this way, dominant social forces reassert themselves in the domains that are opened up by the new technology. For example, Winston considers the commercialization of the internet inevitable, as is illustrated by his statement that: 'As surely and as naturally as water runs downhill, the Information Highway will transform itself even more than it is at present into the Information Toll Road' (1998: 336). In his view, once we get beyond the hype, the internet is just another network.

Upon examination of these two essentially deterministic positions, it becomes evident that it would be useful to have a middle-ground theoretical alternative in order to examine the dynamic relationship between

technology and society. One such framework is offered by the SST perspective. SST finds its origins in the 1970s, where some historians of technology critiqued the premises of technological determinism. This critique was consistent with a general shift in thinking about science and technology as socially-constructed discourses. The new fields of sociology of knowledge and sociology of science (to which SST theory is intellectually related) had philosophical underpinnings in the work of Thomas Kuhn (1970), as well as in the relativist, deconstructionist project of postmodern thinkers. Indeed, one of the goals of some SST scholars was to launch what they termed 'an empirical program of relativism' that would put the presumed fixed nature of scientific and technological innovations under intense scrutiny (Pinch and Bijker, 1987: 26–7).

SST scholars explicitly reject the doctrine that particular paths of technological development – and hence, social change – were inevitable. Instead, they assert that innovations do not have an inner logic or rationality that requires particular kinds of social change and that each invention develops within the context of economic and social relationships. That is, technological change takes place within society, rather than outside of it. SST begins with the assumption that technology is a dynamic relationship among inventions, economic institutions, and culture in the context of large and intricate systems (Hughes, 1987).

The social shaping perspective has grown into a diverse field that encompasses work ranging from constructivist analyses to industrial sociology and political economy. While these strands differ substantially in certain ways, they are united by a critical perspective and agree on one major point. They all see the social shaping of technology and the technological shaping of society as two sides of the same coin, rejecting the idea that technology can be examined as if it were separate from society (Williams and Edge, 1996).

The SST framework recognizes that technologies are objects that have long and complex histories. It does not explain social change through a single principle, such as power, class conflict, or technological innovation, but attempts to develop concepts that allow for multi-causal explanations. SST has made use of empirical and historical methods, influenced to some extent by the genealogical analyses of discourses that Foucault (1978) introduced. Historian Wiebe Bijker, one of the best known proponents of SST, has acknowledged the influence of Foucault's thought on his own articulation of SST theory, and especially in his conceptualization of power (Bijker, 1995). Bijker exposes the socially-constructed character of technology most explicitly in his book *Of Bicycles, Bakelites and Bulbs: Steps Towards a Theory of Sociotechnical Change* (1995). In carefully documented examples Bijker illustrates how technology is a social product, patterned by the conditions of its creation and use. A variety of technical options are

available at every stage, in both the generation and implementation of new technologies. The option that is selected cannot be reduced to simple technical considerations, but is shaped by a broader range of social, economic, and political factors.

SST shares its rejection of technological determinism with other theoretical perspectives, such as political economy. However, the social shaping approach makes a contribution to an understanding of the history of technological artifacts that is different from that of political economy. Scholars operating from a political economy perspective often emphasize how the logic of capital shapes the production, distribution, and consumption of cultural products. For example, Bettig (1996) argues that copyright and intellectual property laws have allowed capitalists to gain, maintain, and expand wealth based on control and commodification of intangible cultural goods. Bettig's focus is upon the inherent contradiction between freedom of access to, and private control of, cultural goods. In Bettig's view, the site of struggle is tilted in favor of owners of the mass media and against cultural producers and audiences. In a similar fashion, Miller et al. (2001) also emphasize how copyright entrepreneurs are 'enclosing' the internet and commercializing once free content into pay-per-view or subscription.<sup>1</sup>

Unlike political economy, SST is not convinced that an analysis of the relations of production alone presents sufficient explanation for the development of particular technologies, especially before they have become fully commodified and integrated into the system of capitalist production, distribution, and consumption. While SST does not contradict the insistence of political economy that capital has a privileged position in the process of developing and exploiting technologies, it does look to expose certain contradictions within capital itself that affect the process of technological development. These are contradictions within the ideological discourse of capital in reference to technology, or, to borrow a phrase from Daniel Bell (1976), 'cultural contradictions of capitalism'.

One such contradiction that pertains to technological development (and is of central importance to the case discussed in this article) is the conflicting need of capital to protect private property and, at the same time, to foster innovation. Exploring how this particular contradiction plays out in the case of iCraveTV is one of the purposes of this article and will be discussed in detail in the Analysis section.

Due to the diversity of work in the SST perspective, some of its terminology deserves further definition here. There are three major constructs of SST, articulated in greatest detail by Bijker (1995), that are relevant to the analysis of the iCraveTV case study:

- (1) sociotechnical ensembles and relevant social groups;

- (2) interpretive flexibility and semiotic power; and
- (3) stabilization.

The concept of sociotechnical ensemble emphasizes SST's assertion that technological artifacts do not exist in isolation. For example, a single facsimile (FAX) machine, standing by itself, is merely a device that serves no useful purpose. A functional facsimile device requires, at minimum, a matching device at the other end of the line, a compatible telephone network, and a system of billing for telecommunications services. Unless the facsimile machine is connected to society through a web of relationships, it is of no practical use. Therefore, a facsimile machine is a sociotechnical ensemble whose meaning and existence is established through the dynamic relationships between heterogeneous technical and social elements and specific social practices. The SST conceptualization of sociotechnical ensemble is similar to the idea expressed by Carolyn Marvin, that 'media are not fixed and natural objects; they have no natural edges' (1989: 8).

The concept of sociotechnical ensemble is related to the concept of relevant social groups. Bijker defines relevant social groups as social actors that hold a stake in the development of a new technology. He further emphasizes that 'all relevant social groups – and not only the engineers and producers – are involved in the social construction' of a technology (1995: 200). In other words, an artifact's technological development is a dynamic, and often deeply-contested, interrelationship among social groups.

Illustrations of this process of negotiation and struggle over a sociotechnical ensemble by relevant social groups can be found in critical histories of radio in the US. Media historian Susan Douglas (1987) examines the origins of broadcasting in order to show that the practice of radio was invented by groups of people who were working with different visions of the technology. Her analysis foregrounds the influence of competing social and cultural forces on broadcasting. Susan Smulyan agrees with Douglas' view, characterizing the development of radio as a site of social struggle where, in the evolution of the technology from wireless telegraphy to broadcasting, 'nothing was inevitable, and every step involved conflict' (Smulyan, 1994: 1). The eventual form of broadcasting in the US reflected the relative balance of political and social power among the commercial, educational, and not-for-profit sectors (McChesney, 1993).

As the example of radio suggests, when something is invented there usually is a range of potential uses for the device, some of which may not be imagined by the inventor. SST theory terms this range of potential uses 'interpretive flexibility' (Bijker, 1995: 30). Relevant social groups use their power in efforts to narrow down the interpretive flexibility of a new technology and assert a definition of it that best serves their particular interests.

Drawing upon Foucault, Bijker writes that an important part of this struggle concerns the creation and maintenance of the 'taken-for-granted categories of existence' that are represented in the names of things (1995: 263). Bijker calls the form of power that concerns the ability of relevant social groups to fix meanings 'semiotic power'. The semiotic power to authoritatively depict or define sociotechnical ensembles is not equally distributed among members of society and usually is linked proportionally to other forms of power, such as economic, political, or legislative power. Thus, within a specific system of socioeconomic organization, some groups possess a higher capacity to shape socially the evolution of a technology than others.

The link between interpretive flexibility and semiotic power is briefly illustrated by the following example. The introduction of improved coaxial and microwave communication technologies significantly influenced the course of development of cable television in the US. As cable television grew in social and economic influence, a number of social groups attempted to name the emerging technology. Cable was first called community antenna television (CATV). As cable evolved, a significant pluralism arose among relevant social groups as to the name of the technology. During the 1950s and 1960s, public utilities commissions (PUCs) attempted to define cable television as a public utility so that they could treat it the same way as electricity or telephone service. The Internal Revenue Service (IRS) tried to categorize cable as a communication service. Broadcasters tried to establish that cable television was a common carrier (*Mullens TV Cable Service v. US*, 1956; *Television Transmission Inc. v. PUC of California*, 1956; *Carter Mountain Transmission Corp. v. FCC*, 1962). Lying just below the surface of these competing definitions were the competing economic and social interests of the relevant social groups. The PUCs wanted a definition of cable that permitted regulation; the IRS asked for a definition that permitted taxation; broadcasters wanted a legal definition that facilitated the further deployment of cable but prevented it from becoming a competitor. In resolving these conflicting interests, naming the technology was part of striking a balance in both economic and cultural terms.

In a fashion similar to cable, competing social groups conceptualize the world wide web in different ways: a computer network, an advertising medium, a means of communication, an educational tool, even a site for building a community. According to SST theory, the web's high level of interpretive flexibility will be narrowed down gradually through a process called 'stabilization'. A close analysis of the process of stabilization provides an explanation as to why some groups' meanings ascribed to the technology are socially adopted and why other interpretations are consigned to irrelevance (Klein and Kleinman, 2002).

An important moment in the stabilization of a technology occurs when privileged actors, such as the judicial system, use semiotic power to define a technology authoritatively. By giving a technology one name as opposed to another, the judiciary helps to establish the technology's function and its use. For example, Historian John Woodforde observed that the status of pioneering cyclists in Britain rose abruptly when it was decided that the 'bicycle' was within the definition of 'a carriage' and therefore entitled to a place on English roads (1970: 93). In this example, the legal definition of a bicycle as a carriage did not change the artifact; it changed the social facts.

It should be noted that stabilization is a process, rather than a stage in the development of technologies, and there may be degrees and phases of stabilization. Technologies that have been stable for a period of time may become destabilized by new technological or social developments and undergo changes until they reach a new point of stability. Generally, however, because the relevant social groups invest scarce economic and social capital into specific technological configurations, an invention's meaning becomes fixed and cannot be easily changed once a high degree of stabilization has been achieved.

One example of the difficulty in dislodging a highly stabilized technology is the continued dominance of the QWERTY keyboard style. This design, which was patented in 1868, aimed to solve a problem with early typewriters. When certain combinations of keys were struck quickly, the type bars jammed. The QWERTY layout of the keys made typing slower and solved the problem of jamming. A different layout, patented by August Dvorak in 1936, has been shown in tests to be faster but has never been widely adopted. The entrenching factors of habit, perceptions, and expectations have resulted in a 'lock-in' for the QWERTY keyboard even when alternative arrangements are available (Arthur, 1989).

## **ANALYSIS OF iCRAVETV**

Returning now to the case of iCraveTV, this article will examine the relevance of the SST concepts outlined above to the social shaping of iCraveTV's technology. As in the earlier example of the FAX machine, webcasting represents a combination of interlinked technologies. The sociotechnical ensemble of iCraveTV consists of many social and technical elements, including the availability of over-the-air broadcast signals, the entrepreneurship of the company that captures and transmits them, the internet's technical capability to carry these digitized television signals, and a user's act of logging onto a server and receiving the video on a home computer. Figure 1 lists some of the elements that can be identified in the sociotechnical ensemble of iCraveTV.

A closer look at the elements in Figure 1 reveals many levels of interrelation. One could begin the analysis with the television stations in

- 
- Television signals originating from US television network affiliates in Buffalo, NY
  - Rooftop antenna at iCraveTV's company headquarters in Toronto, Canada
  - iCraveTV's video digitizing and streaming equipment
  - The internet and world wide web
  - Internet service provider
  - Telephone service
  - Modem or high speed internet hardware such as DSL or cable modem
  - Consumer's personal computer with operating system and streaming media player
- 

- Figure 1 Technological elements of iCraveTV as a sociotechnical ensemble

Buffalo, NY, broadcasting their signals in the usual way. By their nature, these signals do not stop at the US–Canadian border but continue on to Toronto, 60 miles to the north-west. At this point, they are picked up by a rooftop antenna on top of iCraveTV's building. This transnational reception is made easier by the fact that the US and Canada share identical standards for analog television.

Once the signals reach the building, they are converted into a digital format by iCraveTV's computers. At this point, additional content (such as iCraveTV's advertising) is added to the mix. The new package of content is placed on servers, which respond to requests for data from other computers via the internet. At this stage, the television signals that originated in Buffalo can travel anywhere in the world easily, in response to a request from any internet-connected computer. Needless to say, the internet itself is a vast network of networks linked together by common protocols and procedures.

There is another plane of complexity at the local level, since the typical residential user of a computer can only reach the internet through an internet service provider (ISP), such as Earthlink or America Online (AOL). The typical home connection to an ISP is by a telephone line. A functioning telephone connection from the user's home to the internet should not be taken for granted, as it is comprised of many interoperable technologies that represent a complex subsystem as well. Further, a modem device that connects to the telephone system and the user's computer both change digital computer signals into analog signals and back again. More advanced home users may have a broadband connection to the ISP using a cable modem service, such as Time Warner's Roadrunner service.

Finally, each user's hardware and software is also part of the sociotechnical ensemble of iCraveTV. Each computer must have an up-to-date operating system, such as Microsoft Windows, and other software that is necessary to present audio and video, such as Microsoft's Windows Media Player or Real Networks' Real Player.

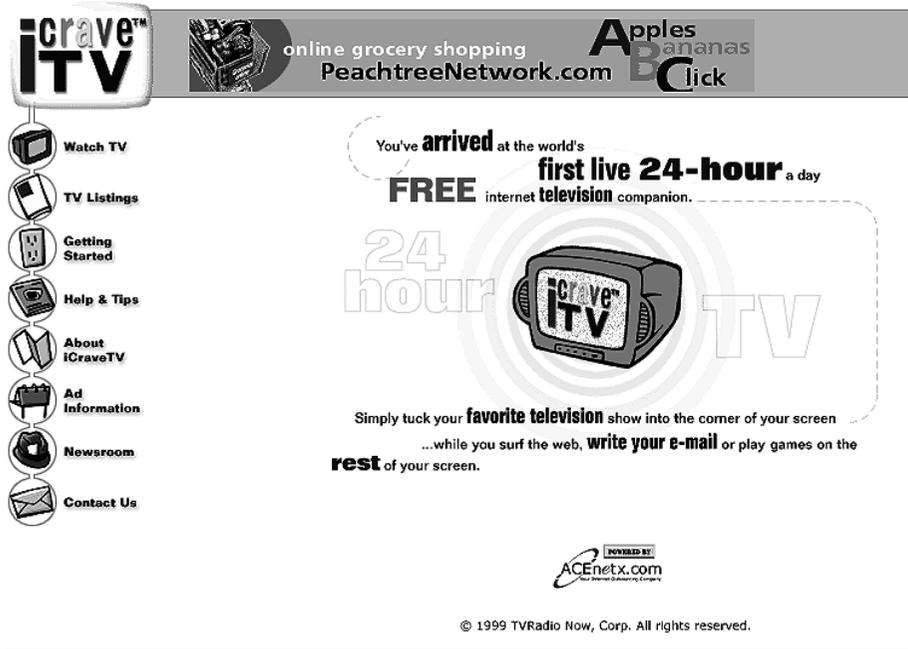
As detailed as this description is, it refers primarily to the technological parts of the sociotechnical ensemble. In addition to the primarily technical

elements highlighted in Figure 1, a complete analysis of the sociotechnical ensemble of iCraveTV should also consider the economics of broadcasting in the US. These encompass the advertisers that support the cost of content creation, production and distribution companies, as well as the advertisers that support iCraveTV's internet operations. Together, all of these actors make possible the media content that consumers see on their computer screens (see Figure 2).

Examining these social components leads to a discussion of the relevant social groups. As a general rule, differing social groups contend with each other in order to define the economic and social aspects of the technology. Figure 3 lists some of the readily recognizable relevant social groups for iCraveTV.

As illustrated in Figure 3, there are a wide variety of social actors that have a stake in the development of the sociotechnical ensemble underlying iCraveTV. High on the list are the social actors with significant interests in exploiting the value of copyrights that they hold. For example, one of the lead plaintiffs in the action against iCraveTV, the NFL, is the copyright holder for the national telecast of football games.

Another distinct interest is that of television distributors. In the case of iCraveTV, the ABC television network functions in the role of content distributor. Its interest in the outcome is dictated by the fact that ABC pays



• Figure 2 Screenshot of iCraveTV when it was in operation

SAMPLE SOCIAL GROUP	TYPICAL ROLE
NFL	Creator of content and copyright holder
Disney/ABC	National distributor of television content
WKBW-TV, Buffalo, NY	Local distributor of television and ABC network affiliate
USA and Canada	Legislative and judicial branches of governments
Intel, and Real Networks	Consumer computer and electronics firms
Consumers	Computer users with internet connections
Ford Motor Co.	Sponsor of content by advertising on TV

• Figure 3 Relevant social groups in the shaping of iCraveTV

content creators, such as the NFL, millions of dollars for exclusive rights to distribute content and sell associated advertising time to sponsors. In ABC's view, iCraveTV is cutting in on exclusive distribution rights for which ABC has paid the NFL handsomely. WKBW-TV is the retail distributor of the ABC network content in Buffalo. WKBW-TV's interest in the outcome of the iCraveTV litigation is at least twofold. First, it has a copyright interest in the television signal that iCraveTV has intercepted and is retransmitting over the internet. Second, at the retail level, WKBW-TV is the exclusive affiliate of the ABC network in the geographical region defined by the reach of its broadcast signal. When viewers in Buffalo watch ABC-distributed content over the internet via iCraveTV, iCraveTV is infringing on WKBW-TV's exclusive rights of distribution for ABC network content.

Additional relevant social groups include the US and Canadian governments, who have had a long series of disagreements over trade issues, including intellectual property. Indeed, the iCraveTV case reprises the US-Canada cable television retransmission disputes after the US Copyright Act of 1976. In those cases, Canadian cable operators resisted payment demands from US copyright owners, based on the lack of synchronization between US and Canadian legislation. The free trade agreement between the USA and Canada, which was reached in the 1980s, prohibited the royalty-free retransmission of US television signals by Canadian cable operators and closed the issue (Bettig, 1996).<sup>2</sup>

Yet another relevant social group in the iCraveTV case includes the manufacturers of the computer technology that makes iCraveTV's service possible, such as Intel Corporation, the maker of computer chips used in personal computers, as well as Real Networks, which developed the technology for streaming audio and video via the internet. Also counted among the relevant social groups are consumers who use their personal computers to receive iCraveTV signals, as well as advertisers (such as the

	CONTENT ORIENTED GROUPS	TECHNOLOGY ORIENTED GROUPS
Characterization of iCraveTV	Copyright infringer; 'not TV'	Legitimate innovation; 'internet TV'
Interpretive flexibility of iCraveTV	Limited	Wide open

• Figure 4 Interpretive flexibility of iCraveTV

Ford Motor Company), who seek to reach consumers through a variety of media.

Given the range of relevant social groups, one can begin to imagine the various conflicts that may result among them, as well as the range of definitions that each may attempt to impose on iCraveTV's technology. However, one line of conflict became most prominent in the resolution of the iCraveTV legal case. The relevant social groups in this case used both public opinion and regulatory action to frame the issue. Figure 4 illustrates two of the conflicting definitions of iCraveTV's technology that became prominent.

As Figure 4 shows, the content-oriented entertainment industry favors the framing of the issue in terms of intellectual property rights, emphasizing iCraveTV's infringement of the content producers' copyrights. By contrast, technology-oriented advocates foreground the necessity of continued technological innovation. Typically, the latter group includes individual innovators and technological visionaries, as well as companies that are investing in the development of new technologies, such as Intel and Real Media.

While, initially the case of iCraveTV may appear to be an isolated conflict between content providers and technology developers, the contradiction is more fundamental. It is a contradiction within the discourse of capitalism in relation to technology, which is being framed in two divergent ways. On the one hand, technology is viewed as stable, fixed, and subject to private ownership and property rights protection – it is just another commodity to be bought and sold in the marketplace and exploited for profit. On the other hand, technological innovation is viewed as a dynamic force, a driver of social progress, and therefore worthy of encouragement even at the risk of disrupting certain well-established socioeconomic relationships.

This dichotomy is captured in the May 2000 cover story of the trade publication *Business 2.0*, 'Hollywood versus High-Tech' (Lardner, 2002). The magazine's cover sports a photo of former Intel chairman Andrew Grove with the caption, 'Is this man a pirate?'. Grove responds to charges that companies such as Intel are encouraging piracy by calling attention to the fact that Hollywood interests have a history of opposition to new

technologies. One of the most prominent examples is the case of *Sony Corp. v. Universal City Studios, Inc.* In that case, the US Supreme Court rejected Hollywood's argument that Sony, the maker of the Betamax video cassette recorder (VCR), infringed upon the copyright interests held by Universal. The Court found that the typical viewer used Sony's product to record television programs for watching at a later time. While individual viewers could still be liable for violating Universal's copyright by buying or selling these off-the-air tapes, there was no basis in the Copyright Act for finding that Sony, the manufacturer of the VCR, was liable for copyright violations. After losing the legal battle in the Supreme Court, Hollywood discovered that the users of VCRs created an important new source of revenue. So much revenue, in fact, that after less than a decade, the income from cassette rentals and sales equaled box office receipts. Drawing on the Sony experience, Grove (quoted in Lardner, 2000) and others argue that Hollywood's inflexibility in the face of technological change is shortsighted, stifling innovation and new sources of profits.

This conflict within the discourse of capitalism has important implications for the social shaping of the internet. First, it points to the fact that technologies often have uses that are different from that which their creators intended, or what their detractors fear. Second, the argument of the unforeseeable profit-generation potential of new technologies has been used to attract the attention of venture capital and has rekindled a Schumpeterian spirit of 'creative destruction' among technological companies (Schumpeter, 1942). Third (and perhaps most important), the same argument has given courts the impetus to look at a range of possible uses for technologies when considering cases on copyright infringement and, on occasion, has provided a line of defense for technological developers against the interests of copyright owners.

Recently, a number of legal cases against internet-based companies have been framed in terms of property rights versus innovation needs. Two of them provide a useful illustration, namely, the lawsuits against Napster and Grokster. Both of these web-based companies offered peer-to-peer technology that allowed users to share music and other files via the internet. In the case of Napster (*A&M Records, Inc v. Napster*, 2001), the court ruled in favor of the copyright owners and ordered the Napster service to be shut down. However, in the case of Grokster (*Metro-Goldwyn-Mayer Studios Inc v. Grokster Ltd*, 2003), the court allowed for continued operation on the grounds that the file-sharing technology had potentially beneficial uses other than copyright infringement. In the eyes of the law, Grokster was in a similar position to Sony, the creator of the home VCR.

While the specific details leading to these divergent court rulings cannot be examined in more detail in this article, once again, the rulings illustrate the present contradictory discourse on technology, and internet-related

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PATH	RESULT
Social	Development of social practices that lead to settled expectations. Over time public opinion solidifies gains so that they cannot be reversed.
Judicial	Court decisions that create binding texts which govern social and economic interaction.

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• Figure 5 Paths of iCraveTV's stabilization process

technology in particular. Indeed, the SST perspective would suggest that the central battle fought in each of these cases is one over the process of stabilization of the internet. The various start-ups can be seen as illustrations of the range of possibilities that internet technology can support, or, in SST's terminology, they are markers of the internet's tremendous interpretive flexibility. Inevitably, stabilization – the process of narrowing down this interpretive flexibility – goes through a number of battles that are fought in the arena of public opinion and the courts, as well as through legislative and political processes.

In the iCraveTV case, the process of stabilization proceeded along two main paths: first, through the adoption of the iCraveTV technology by interested users; second, through the court proceedings and the actions required by the court's order. Figure 5 outlines the two modes of stabilization relevant to iCraveTV.

By using the iCraveTV service, consumers were playing an important part in beginning to stabilize iCraveTV as a technological artifact. As a general rule, the higher the level of adoption and penetration of a certain technology, the harder it is for it to be disrupted or dislodged. This trend has also been recognized for its economic implications and has been dubbed 'first-mover advantage'.

Consider, again, the example of Napster, the peer-to-peer networking technology that consumers used to share music via the web. In the 1990s, Hollywood interests looked on with horror as computer users helped themselves to unlimited servings of copyrighted music (Lardner, 2002). Despite the best efforts of the music industry to control it, once the practice of downloading songs and 'burning' them onto CDs was established, the technology formed 'a part of a hardened network of practices, theories and social institutions', making it difficult to completely eradicate (Bijker, 1995: 282). Although the recording industry took action against Napster, it did not move fast enough. Napster had gained the adherence of millions of users who had been socialized to the practice of sharing music with strangers via the internet. When Napster was shut down, other similar technologies such as Grokster sprung up in its place (Mount, 2002).<sup>3</sup>

Drawing lessons from Napster, Hollywood executives and their allies acted forcefully against iCraveTV so as to avoid risking a similar stabilization of webcasting. Their fears are illustrated in Disney lobbyist Preston Padden's

statement that the industry needs to get ‘a reasonably secure environment before 50 million Americans get used to downloading their movies for free’ (Musgrove, 2002: E01).

In the iCraveTV case, the legal issue concerned the judicial system’s characterization of webcasting technology: did iCraveTV’s retransmission of copyrighted material make it an internet pioneer or pirate? The court answered that question indirectly, framing it as a procedural issue as to whether the law of the US or Canada applied to iCraveTV’s activities. If the lawsuit against iCraveTV had been brought in Canada (where iCraveTV was located), it is likely that a Canadian court would have found that iCraveTV’s activities made it an innovator and not a pirate. Under Canadian law, a company is free to retransmit broadcast signals without the permission of the broadcaster, provided that it pays into a copyright fund, and iCraveTV had complied with Canadian rules concerning copyright compensation (Handa, 2002).

However, the entertainment industry sued iCraveTV in a US federal district court in Pittsburgh, PA, and a different result was reached. First, the court chose to apply US law because iCraveTV’s signals easily crossed the border into the US via the internet. Once the signals crossed the border, the court found that their presence was ‘performance’ of a work by iCraveTV in violation of US copyright law (Saverimuthu, 2001).

Therefore, after finding it had jurisdiction to decide the case, the court specifically enjoined iCraveTV from retransmitting copyrighted programming ‘into the United States via the iCraveTV.com site or any other internet site or any online facility of any kind’ (*National Football League*, 2000; *Twentieth Century Fox Film Co*, 2000). In other words, the judge recognized a kind of supervening social necessity for the introduction of technologies that rein in the geographic reach of the world wide web.

Further examples of the pressure to impose geographic limitations on the web are found in a 2000 congressional hearing on iCraveTV. In his testimony before Congress, Paul Karpowicz (2002), vice-president of LIN Television, stated that his primary concern was the inability of iCraveTV’s technology to ‘respect geography’. He noted that when his company bought the right to distribute the television show ‘Friends’, it only purchased the rights to specific markets and did not have any right to exhibit the show in others. Karpowicz emphasized that, unlike the business of television, the internet is not bound by geography. He stressed that the geography-based legal protection of television stations from importation of programming into their markets is an essential part of broadcasting, and cited network non-duplication, syndicated exclusivity, and sports blackout rules as examples. He concluded by stating:

We have to protect local television stations' ability to maintain a discreet marketplace and any distribution system that threatens that it can take other product and distribute it beyond our market area . . . is very disruptive to the very fabric of the relationship that exists today between networks, affiliates, studios and content providers. (Karpowicz, 2002)

In the same hearing, the owner of WKBW-TV in Buffalo (who involuntarily supplied iCraveTV with its signal) voiced a similar concern over territorial exclusivity.<sup>4</sup> He noted that the station's economic relationship with advertisers could be damaged by iCraveTV's signal and its lack of respect for the geography of commerce. He suggested a hypothetical scenario where his TV station had sold to a local Ford dealer a contract for exclusive advertising rights on WKBW-TV's local 11p.m. newscast. That Ford dealer would react negatively if it found that its supposedly exclusive arrangement for automobile advertisements was violated when iCraveTV showed the same programming but surrounded by competing advertisements for Chevrolet, presumably sold by iCraveTV (US House of Representatives, 2000).

It is not surprising, then, that in response to the commercial need for regional divisions of the world wide web several firms have developed software that creates 'borders' on the web. This software allows companies to provide separate content to different geographical regions. For example, Digital Island introduced a technology in 2000 called TraceWare, which can identify the location of website visitors with 96 percent accuracy. This software works by scanning internet traffic for its internet protocol (IP) address. It then matches users' IP addresses with a database of IP address locations indexed by geography. Media companies, such as the *Financial Times*, use TraceWare to determine a user's physical location and send customized webpages that contain the appropriate language and correct currencies (Cave, 2000).

In 2001, one year after iCraveTV was shut down by the injunction that was issued in Pittsburgh, a second effort to distribute television via the internet was made by another start-up, JumpTV (Careless, 2001). It was also unsuccessful as Canadian broadcasters and producers, who had allied themselves with the US entertainment industry against the practices of iCraveTV, also protested against JumpTV. Canadian broadcasters argued that companies such as iCraveTV and JumpTV were not entitled to the benefits of Section 31 of the Canadian Copyright Act, which secures a license from copyright owners for use of their content to qualified retransmitters. In 2003, the window of opportunity for iCraveTV-type businesses was closed when Canadian regulators issued a ruling that it is unlawful to put broadcast TV signals on the internet without prior permission. The justification for the rule was that internet distribution would undermine traditional

producers and distributors of TV content if Canadian rules permitted internet distribution without regional restrictions (Borland, 2003).

## CONCLUSION

In his comprehensive history of American business, historian Alfred Chandler (1977) argued that the technologies of the telegraph and the railroad enabled the transformation of commerce from traditional, local small businesses into a system of national commerce dominated by large corporations. As the internet became widely diffused in society, there were many predictions that, like the telegraph and railroad, it would bring about a reorganization of the economy by further loosening the ties of locality (Cairncross, 1997; Negroponte, 1995).<sup>5</sup>

Indeed, in the 1990s, many imagined that the internet was 'borderless' due to its technological characteristics, and it was widely believed that the diffusion of the internet would reduce the authority of national governments. Internet activist John Perry Barlow proclaimed a 'Declaration of the Independence of Cyberspace' (1996) and asserted to the governments of the world: 'Cyberspace does not lie within your borders.' Barlow imagined cyberspace as an exciting new frontier where traditional geography did not apply and freedom from government regulation prevailed. As Bettig (2003) has concisely summarized, the problem with this view is that 'by vesting hope in the internet, and ignoring the logic of capital and copyright, such arguments lapse into a form of technological determinism, i.e., that technology will set information free'.

iCraveTV is a useful example of the increasing trend towards enforcing traditional borders in cyberspace. It also shows that technology cannot stand outside of, or above, society for long. As iCraveTV illustrates, rather than the predicted destruction of place and geography, the social shaping of webcasting technologies is reaffirming, at least in one significant case, the traditional borders of old media.

The case of iCraveTV shows how the interaction of social, technical, and economic forces is narrowing down the web's flexibility in a manner consistent with the interests of dominant social groups, and to the exclusion of others. Most specifically, evidence from the iCraveTV case suggests that recent technological developments have counteracted, at least partially, libertarian conceptualizations of the web as an 'open frontier' that is 'borderless'.

The iCraveTV case also has broader implications. The same technologies that can serve the needs of business can serve the needs of the state, even repressive ones. It is particularly troubling to many observers that at the same time that software companies are creating the technological means of enforcing geographic boundaries on the web for commercial purposes, authoritarian regimes are recognizing the potential of the same technology

to isolate their internet users from the rest of the network. To give just one example, a report on the world wide web's impact in China by the Carnegie Endowment for International Peace (Yu, 2002) found that the Chinese government has been able to permit diffusion of the internet while limiting the range of online political discourse. Chinese citizens are encouraged to access the internet but access to overseas sites is strictly controlled.

While the final judgement is still open, it appears that corporations and national governments will have a great deal of sovereignty over cyberspace, making it subject to the rule of law and the practices of traditional geographical borders. As Zook (2001) and others have argued, the cyber-libertarian assertions that the internet 'ends geography' and creates a 'placeless cyberspace' have been exaggerated. Similarly, in a March 2003 report on technology, David Manasian of *The Economist* argues that it was naive to imagine that the global reach of the internet would make geography irrelevant and that, 'increasingly, technologies are being developed to link places on the internet with places in the real world – stitching together the supposedly separate virtual and physical worlds' (Manasian, 2003: 1).

Yet the continuing development of internet and world wide web technologies creates opportunities for change. As Raymond Williams has observed, we need to see technology as a social process where the determining factors are the distribution of power and capital, social and physical inheritance, relations of scale and size between groups. However, he asserts that these factors may set limits and exert pressures, 'but [they] neither wholly control nor wholly predict the outcome of complex activity within or at these limits, and under or against these pressures' (Williams, 1974: 130).

The iCraveTV case study raises important policy questions about the future of the web, while offering a structural explanation why some forms of web-based technology are adopted and others are not. SST theory holds that the evolution of the web is a process that produces different outcomes depending on the social circumstances of its development, design, and use. In Jonathan Benthall's concise phrasing, 'a complete historical analysis of any technology must study the reciprocal action between technical and social factors – "social" including economic, political, legal, and cultural' (Benthall, 1976: 145).

In sum, the SST perspective on policymaking would highlight the idea that the technological development of the world wide web is a social process and, as such, it is subject to pressures and interventions from a variety of social groups. Indeed, this process may be subjected often to the interests of dominant social forces (Latour, 1988) but it is, nonetheless, not entirely predetermined. In other words, neither technological nor social

determinism is in control. Rather, the technologies of the web have not yet been stabilized and there remains the potential for them to develop in a number of ways.

If the process of the internet's development is not yet complete, then it is still open to potential social intervention. From a policy perspective, the SST framework allows for the conceptualization of technology as an arena of social activity and economic competition and – as with other domains of human behavior – this may be the proper subject of regulation to achieve social goals.

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### Notes

- 1 While Bettig (2003) criticizes the idea that the intellectual commons will be able to resist the local power of capital, others such as Vaidhyanathan (2001) note that traditionally, and to a significant extent, legal institutions have balanced fair use and freedom of expression against the monopolistic nature of copyright. However, Vaidhyanathan also recognizes that this balance is threatened by the extension of copyright to the emerging media.
- 2 However, in this case, broadcasters in both Canada and the US were in agreement about iCraveTV. Michael McCabe, president of the Canadian Association of Broadcasters, stated that companies such as iCraveTV were stealing product and misusing trademarks. 'We want them off the air,' he was quoted as saying (Craig, 2000).
- 3 In February, 2001, Napster reached over 13 million users in the US. However, Napster's short but celebrated life ended in September 2002 when a US bankruptcy judge blocked its sale to a Bertelsmann, a German media company (Ahrens, 2002).
- 4 A similar example of the social shaping process forcing new technologies to recognize the boundaries of old media can be seen in the Satellite Home Viewer Improvement Act of 1988. An amendment to the Satellite Home Viewer Act of 1988 permits satellite companies to provide local broadcast TV signals only to subscribers who reside in the local TV station's market, called designated market area (DMA), as defined by Nielsen Media Research (<http://www.nielsenmedia.com>).
- 5 A decade earlier, William Gibson, author of popular science fiction books, such as *Neuromancer* (1984: 51), popularized the term 'cyberspace' in order to describe 'humanity's shared and universal space, a place that does not belong to anybody because it belongs to everybody'.

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EDWARD LENERT is Assistant Professor of Media Studies at Queens College, CUNY. A graduate of the University of Texas at Austin (PhD) and Georgetown University Law Center (JD), his interests include emerging media technologies such as webcasting, the public sphere, and the public interest principle in the American system of broadcasting. Address: Media Studies Department, Queens College, City University of New York, 65–30 Kissena Blvd, Flushing, NY 11367, USA. [email: EdwardLenert@AOL.com]

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