TV or Not TV: Three Screens, One Regulation?

Eli M. Noam
Professor of Finance and Economics
Director, Columbia Institute for Tele-Information (CITI)
Columbia University
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Table of Content

Abstract

The question addressed is how to regulate television when it adds the internet and mobile wireless as vehicles. Should the new styles of TV be regulated in the same way as the traditional model? Should traditional regulation be modified? Since the new styles of TV travel over telecom-style infrastructure, what should be the role of telecom regulation in all this? And what are the special concerns for Canada?

The analysis reaches a framework for a long-term approach to the regulation of television media in the age of the internet and mobile wireless. Its conclusion is a two-tier model of TV regulation, differentiating between the content segment and the conduit segment. The principles would be:

1. Content. Implement two harmonizations of TV:

a. Regulate all types of television content activities along the same lines. and principles.
b. Regulate TV media content activities in the same way that media in Canada are treated generally.

2. Conduit.

a. Expect regulation of new types of TV to emerge through the nexus of the underlying conduit providers—telecom, cable, and wireless.
b. Assure a common carrier style access for video content, for a fee, to the internet and mobile TV platforms.
c. Permit the conduit providers' own content provision activities

3. Funding. Pursue specific Canadian content and other goals for new types of TV through a funding mechanism of support based on a surcharge on ISPs that is similar to the one on cable TV and satellite providers, as well as through a spectrum trust fund.

top

I. Overview

Introduction

Few questions are fraught with more long-term implications than the way we shape our communications system. If the medium is indeed the message, and if these messages influence people and institutions, then today's media policy will govern future society and economy.

We are privileged to live in extraordinary times. Within just a few years we have moved from a communications system that provided us individually with a mere trickle of information (a few kilobits of transmission), to a stream (megabits over broadband), and soon to a veritable flood (gigabits of ultrabroadband communications). It is the equivalent of moving from horses, to trains, to personal automobiles, to personal jets all within a few years.

But this also means that the structure of the media business and its public regulation needs to be reviewed and revised. Institutions cannot change at the rate of Moore's Law for semiconductor technology. But if they fall too far behind in adjusting, they will fail or cause harm.

For over half a century, the basics of the media structure in most Western countries were relatively stable. They include, in the order of seniority:

- A newspaper sector of regional, and a handful of national, papers; private and largely unregulated, often connected to other print media such as magazines and books.
- Telecom network providers for individualized communication; mostly with market power, mostly regulated.
- An audio-visual content production sector in film, TV programs, and music; often subsidized or protected.
- An over-the-air television and radio sector with a mix of private and public broadcast organizations; a mix of advertising, subscriptions, and public funding as an economic base; a mix of national and regional distribution; and a mix of licensed or regulated restrictions and press freedoms.
- Multichannel distribution platforms of video content over cable and satellites; usually franchised and regulated.

In each of these media, the role of government control differed; but this role and structure formed quite early in the life of the medium. Though the details varied over time, and subsequent changes were imbued by stakeholders with major import, it is remarkable how sturdy the basics of a medium's regulation proved over its lifetime.

The agents of change today are three related technological developments that rapidly transform media:

1. The broadbanding of networks, in which an increasingly powerful transmission infrastructure creates platforms for the individualized production, distribution, and consumption of media content such as video. The most formidable such platform is the internet.

2. Wireless ubiquity, which creates a wide geographic reach for two-way communications through cellular networks of increasing power, and enables the transmission of media content such as video.

3. Digital convergence, which removes many of the technical barriers that separated the various media activities, companies, industries, and regulations.

Together, these forces transform the media landscape. They also raise the question of the role of government.

Television, in particular, is caught in the cross-currents of change. For half a century, it has arguably been the most influential medium for popular culture and politics. It is also a huge business and the main vehicle of consumer marketing. Its role and control have been fought over, and this has resulted in a certain regulatory structure.

Today, the traditional television transmitted to the home TV-set by terrestrial broadcasting or over cable and satellite is being joined by a TV over the internet that reaches, in the first instance, home computers or other displays. And it is joined by the wireless television delivery aimed at the user's mobile phone.

Thus, television is moving from its traditional single screen to one of three types of screens. (This description is part real, part metaphorical insofar as the TV platforms that serve the three types of screens with content are not neatly separated from each other or limited to one type of screen. But the image helps understanding better than "multiple platform delivery.")

And the question is whether the system of government policy and law directed at the "first screen" of TV should also apply to the second and third screens; or whether the regulatory system that applies to those new screens should also cover the first screen; or what other new system should be created.

I interpret my mandate to address this question—and the fact that an academic from outside of Canada has been assigned to the task—as one of stretching the 'here-and-now' in favor of the 'new-and-next.' In consequence, I have paid no undue respect to the politics of media, which are always sensitive. As a former politically appointed Public Service Commissioner for New York (by a Democrat), and White House Presidential board (by a Republican) I am mindful of the limits of policy analysis, especially in this field. However, one must think ahead and have a goal and a direction in mind. Self-censorship at the outset will improve neither analysis nor strategy.

Given that policy processes grind slowly relative to the changes on the ground, it is essential to think ahead strategically rather be overrun by unfolding events.

top

The Emerging System of 3-Screen TV

The first generation of television was that of *Limited TV.* It was limited in most countries to a mere handful of channels held by a few media companies; or often controlled by government or the major political parties. TV broadcasts, watched by huge audiences simultaneously, were politically powerful. Because of their near-monopoly status, TV companies were also highly profitable, and could expend relatively high budgets for production—though not at the level of premium theatrical films. (Such films were shown on TV, though with some delay as part of a release sequence.) Many programs were imported, especially from the US, at prices relatively low in comparison to production costs.

The second generation of television was the Multichannel TV Stage. It included Cable TV, DBS, home video such as VHS and DVD. Today, advanced cable infrastructure operates at about 700 MHz- 1 GHz, which is around 20 times greater than the bandwidth of terrestrial broadcasting. Whereas first-generation TV may have typically offered about 7 over-the-air channels, on digital cable 150 or more became routine. This extra transmission capacity was used first in a horizontal fashion—more channels, using traditional analog, 6MHz, one-way TV. But after a while, digital technology also enabled an extension to a "richer" channel. Thus emerged high-definition television, HDTV, with twice as sharp a picture resolution in each dimension, and with added picture width. Digital TV also permits the fitting of several standard-definition channels into a single previously analog channel.

Now, the third generation of television is emerging, *Individualized TV*. It consists of internet TV with its diverse content, and Mobile TV with its ubiquitous availability. This next step of TV is based partly on the increase of transmission capacity to that of "broadband." The definition of broadband is relative. It starts, according to the FCC in Washington, at 256 Kbps, but a better measure is around 1 Mbps. A well-compressed video channel fits such transmission capacity in real-time. (A lesser transmission capacity can still be used for video with advance downloading.) Broadband is mostly based on the upgrade of regular telephone copper infrastructure to "digital subscribers loops" (DSL); or to new-generation fiber optic access lines; or on cable-TV coax lines; or on hybrid combinations. Mobile and fixed wireless connections add an increasingly strong pathway; and 2-way satellites and electric power lines are potential contenders in niche situations.

The other technical element enabling individualized TV, besides transmission capacity, is cheap *storage* which permits on-demand access to content. This is a change from the past, when some basic content individualization for electronic media was done by expanding the transmission path while transmitting content synchronously. This became known as ‘narrowcasting.’

But more recently, the direction has been less to added channels for increased content diversity, and more to "video on demand". This approach relies on increased storage capacity, not on increased transmission capacity, beyond a certain amount needed for several video channels. Such capacity is already easily available over cable TV networks if they allocate part of their channels (bandwidth) to it.

The difference now is the introduction of the storage element. It can provide a huge diversity of content, but based on storage, not on greater transmission. It requires individual access transmission capacity for a single video channel, plus maybe a little more for multitasking, per person.

Such individualization enables a major liberation of the viewer from schedules and mass markets. It even permits a customization of content, with programs tailored to individual like "my news," targeted advertisements, plot modules and action speed that can be put together to fit individual tastes.

As mentioned, once a certain level of cheap storage and transmission infrastructure is in place—it already is for cable infrastructure—diversification of content and source will soar. The rate of this expansion will greatly surpass the speed of the previous expansion from broadcasting to narrowcasting. It will also be much easier to upgrade storage than it has been to upgrade existing transmission capacity. Therefore, this expansion of TV will be explosive and will require policy makers to be well prepared in advance.

Neither does user-created content such as P2P video (content created by users for each other) or wiki-video (content contributed and modified by users to a common project) require large last-mile access transmission beyond decent regular broadband. These require storage (on both the user end, and by intermediaries like YouTube and Daily Motion), and a strong core network.

Large transmission on the user end is required only if there is a large demand for uploads from outside. This is the reason for intermediaries. Even multi-player games do not use all that much transmission capacity. The limiting factor is the processing capacity on the central node.

Broadband leads to a further diversification horizontally, and to the ability for individualized casting. The content options for this kind of TV are in different categories.

1. Traditional style TV; but at different times, and potentially from additional providers. An example would be the watching of Fox or NBC network episodes on Hulu.
2. Specialized content for niche audiences ("long tail" content).
3. Global aggregation of nationally thin audiences, such as specialized feeds from the Beijing Olympics of a "Women’s Field Hockey Channel."
4. Watching of regular TV from other countries, such as BBC News from other countries.
5. User generated content. The combination of cheap storage, cheap transmission, and cheap production equipment, has created the ability for users to create content and make it widely available. Intermediaries emerged such as YouTube and Daily Motion. Video quality is generally poor (in bit terms, transmission rates about 300 kbps), but this will certainly improve.
6. Download of movies. Such VOD distribution could become part of a film studio’s release sequence—maybe even at the top spot to generate premium revenues and advance buzz, at a high price point for users with inelastic demand.

It should be pointed out that we have not quite reached this stage of television. A multi-person household may need the simultaneous real-time connection speed for 2 standard and 2 high definition TV channels, plus some capacity for gaming, VoIP, and other applications. This might add up to about 35 Mbps of unshared household capacity broadband. Such capacity is still the

exception on the consumer level, but its widespread adoption is not far off. And it is closer still if one accepts a lower grade of service.

Further bandwidth—which is clearly emerging on the consumer level—will frequently be used for "richer" media (i.e., for media applications with a higher "bit" level to generate a stronger visual experience above previous standards of sensory intensity). Eventually, the dimensions of richness will be better quality of picture in terms of resolution ("4K"- TV); multi-dimensionality ("3G"-TV); and full-immersion in virtual worlds and into the media content itself.

Individualization of TV has 3 dimensions:

1. The individualization of content *type*:
    - Narrowcasting, more channels
    - Even customization
2. Individualization of content *source:*
    - User-generated content, P2P (Peer to Peer)
3. Individualization of consumption mode:
    - Asynchronous viewing
    - Temporal asynchronicity: on demand. Any time
    - Spatial individualization: Follow-me media like Sling. Any place

top

How Rapidly is this Happening?

Are the new forms of TV imminent and revolutionary, or are they evolving more gradually, leaving us with time to consider and adjust where necessary? The answer is somewhere in-between, but closer to the former. While it is of course true that reality rarely changes at the speed envisioned by its promoters and true believers, the signs from around the world are out there to indicate rapid adoption of new-screen TV.[1] [2]

One media measurement for the US found that in February 2008, a huge number of people—134.7 million unique viewers—watched US-based online video, averaging 205.8 minutes per viewer, and watched over 10 billion video clips from US locations alone. The study also found that:

- 72.8 percent of the total US internet audience viewed online video.
- 80.4 million viewers watched 3.42 billion videos on YouTube.com (42.6 videos per viewer).
- 50.2 million viewers watched 539 million videos on MySpace.com (10.7 videos per viewer).[3]

The US based internet TV service Hulu was visited by 5 million viewers in February 2008. Rival Joost had 1 million beta users in July of 2007. In mid-2007, there were about 38 million viewers of mobile TV in Japan and Korea. In Korea, users watched 159 minutes per week; in France, 69 minutes. French IPTV providers Illiad had 2.1 mil subscribers in January of 2008; rivals France Telecom and Neuf Cegetel had 1 mil and .6 mil, respectively. In Spain, Telefonica had almost half a million IPTV subscribers.

Canada has been for years the leader among the world's front-running economic countries—the G8—when it comes to a penetration of broadband. [4] Furthermore, broadband in Canada is based on two strong infrastructure systems, whereas in many countries of the world it is mostly based on a single telecom infrastructure. But it has not been a leader in fiber infrastructure all the way to the home (FTTH), with the telecom carriers instead opting to limit cost and risk by running fiber to a neighborhood node, and from there to use the traditional copper to reach the user's home. Yet the market structure of rivalry between telecom and the active cable industry suggests that once content applications require a more powerful telecom access link, telecom networks will have to be upgraded or else their carriers will be relegated to a secondary status.

Given the growth rates for IPTV and mobile TV in other highly developed countries, the new types of TV should move beyond the early buzz stage and become economic and media factors within five years—probably less. Even if it would take a few extra years, this would still be a blink of an eye in terms of media history. A robust economy would accelerate these trends on the infrastructure and entertainment levels. Cumulatively, the upgrade of the infrastructure will elevate an information-based economy. [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] What may seem a desire for more entertainment will prove a shift to greater productivity.

At present, pay-TV or pay-VOD over IPTV has not been particularly successful, and program providers have moved to an advertising-based model. The user experience is negatively affected by the greater effort in seeking the program, by the often lower picture quality, and by the inconvenience of making a payment. But these disadvantages are only temporary. Soon, the visual range

of IPTV will be superior, the content selection will be more plentiful but also more guided and customized, and the payment mechanism will become seamless. It is therefore only a matter of time before internet delivery will be the setting for the distribution of the most attractive types of premium content (as well as for low-budget, low cost content). One can therefore expect that premium content will utilize IPTV also in its early stages of release, even at the top spot at times, charging high prices for the privilege to watch a talked-about film ahead of anybody else. In other cases, the content would be interactive and would not even lend itself to theatrical or pay-TV distribution.

The emergence of the two new screens does not mean that the first one—broadcast, cable, and satellite TV—will disappear. Media rarely vanish as completely as the telegraph did; more common is a gradual decline from former glory days, like in the case of movie theaters or the radio. Furthermore, over-the-air broadcasters, too, experience technological improvement through digitalization.[16] Current over-the-air TV will maintain large audiences for what they do best—synchronous and real-time content like sports, news, and contests, and for large-audience programs with limited shelf life like talk and reality shows. For other program types, like premium entertainment, there will be a place for them in the release sequence, though further down the chain. All media will be negatively affected by the diversion of some attention time, and by the creation of new content models through the internet's interactivity. For cable infrastructure providers, an offsetting benefit is that they can repurpose part of their channels (bandwidth) for internet TV use.

With these trends in television upon us, we need to discuss the implications for TV regulation.

top

Reasons for TV Regulation

Because industries were separate in the past, laws were separate, too. This was the case even where the regulatory agency was unified, as with the CRTC and the FCC. In Canada, the main laws are the Canadian Federal Telecommunications Act, enacted in 1993, and The Broadcasting Act, enacted in 1991. These laws were drafted before VoIP, IPTV, and mobile video.

Societal control over media has been around, in one way or another, since our stone age ancestors danced around the fire. When print media emerged in the 15th century, they were censored and licensed; though eventually they emerged with substantial freedoms. More recently, television media were tightly controlled through a variety of means such as the requirement to obtain a scarce license that came with ample conditions.

The trajectory of print towards substantial deregulation raised expectations that, in time, television would follow a similar path. Populists looked ahead to a time when the scarcity of spectrum would cease to be a bottleneck, and when any and all could become providers of TV. This withering away would happen, perhaps, when television would migrate to a delivery over the internet.

The first issue to address is the notion that it was spectrum scarcity that gave governments a reason for control of television. In many ways, this scarcity was artificial. TV spectrum was scarce because governments chose to make it so, by allocating frequencies only grudgingly. Dozens more TV channels could have been established. One reason was the fear of unbridled private broadcasting and its powers over politics and culture. Also, existing private broadcasters generally preferred a profitable exclusivity. Thus, in effect, the government's control over the distribution medium—the electromagnetic spectrum—provided leverage for some control over content and conduct of media companies, and over the structure of the television sector.

But if scarcity was not at the heart of television regulation, what was?

Each society wants to facilitate the creation of distribution of "merit" programs, while preventing or reducing "non-merit" programs. The former are perceived to contribute positively to societal goals while the latter detract from it. What constitutes merit is contextual to the particular country, and will vary greatly. Each society has its concerns, problems, issues, traditions, priorities. When it comes to non-merit programs, to simplify considerably, Americans worry about sex more than do the French, who in turn are more concerned about their linguistic purity and cultural role. Swedes fret about violence. Germans, burdened by their past, are sensitive about racist incitement. Many Italians worry over Silvio Berlusconi and his combined media and political role. Canada is concerned about a weakening of its national identity and of bilingualism.[17] [18] [19] China protects party control. Saudi Arabia upholds religious orthodoxy. Malaysians are concerned with multi-ethnic content and control. Whether these concerns are justified or in their own public's interest is not the main question here. What is important is that governments, and often societies, hold these concerns and act on them. The main purpose of television regulation is to advance such goals,. Spectrum scarcity, and the consequent need to allocate frequencies by a license to which conditions and regulations were attached, provided the nexus and rationale. But scarcity is not an essential condition for pursuing these goals. None of the societal objectives will vanish just because

television signals travel over digital pipes rather than analog airwaves. It seems unlikely that societies will simply give up on their societal priorities just because the video information now takes a different path or is encoded in different way. Instead, they will simply adjust the tools to the new environment.

It is therefore unlikely that societies will leave TV alone, whether analog, digital, or IP; whether over the air, over cable, or over IP networks, or whether there is a bottleneck or not.

In countries with a democratic political system and a mixed economy, the goals of TV regulation are generally:

1. Change the market based-balance of "merit" and "non-merit" content, in order to benefit, in particular:
    a. Children & education
    b. Social harmony
    c. National culture
    d. National media producers
2. Assure a vibrant democracy through diversity of:
    a. Content
    b. Sources

In the Canadian context, special aspects of these issues include:

Modifying the market balance of US vs. Canadian content and ownership

Maintaining a balance in the content for and by the two major language groups.

Other societal media policy goals not necessarily provided by competitive market forces are: Privacy and security. Morality. International trade. Protection from defamation. Consumer protection. Standardization. Technological innovation. Coverage across geography and income.

For the telecommunications sector, societal goals are related, with a stronger technology and economic dimension. They include:

- Wide availability and connectivity across geography and society.
- Affordability and consumer protection.
- A free flow of information.
- Innovation for technology and applications.
- National sovereignty.
- Generation of revenues.

The question is always what to do when the market solution is not the social optimum. Attention must be paid to what the problems are; how to address them; and how not to create new and potentially bigger problems in the process.

It is easy to slide into a regulatory system that resembles a Christmas tree of worthy provisions. How to pay for them? This leads to the question of funding. Television regulation has 3 major legs: the regulation of the conduit; regulation of the content; and provisioning the funding base. The funding element of policy is less important in US terrestrial broadcasting since most of it is commercial and advertising-based. It is much more developed where public television is important, such as in Western Europe or Japan, or where certain programs are being supported financially. Canada, in particular, has a highly evolved system of direct public payments from the general budget; payments from funds maintained through earmarked taxes on revenues of some categories of media companies; indirect allocation of funds to domestic producers through mandates on specialty channels to spend set percentages of revenues (assuming that the rules exist because this spending would not be forthcoming otherwise, this is the equivalent of a tax; and similarly, indirect allocation through other requirements such as universal service obligations for infrastructure providers). Funding regulations have at least two aims: one is to create content deemed meritorious; and the other is to provide an economic umbrella for industries and employment deemed important.

top

Emerging Inconsistencies in TV Regulation

Broadcast TV, in the US, is required to provide a number of hours of quality educational children's TV. It must police its content for unacceptable sex, violence, and profanities. It is subject to ownership restrictions, and of compulsory licensing of its content. In most European countries, broadcasters are limited in the amount of advertising they can carry and in its nature (e.g., no tobacco products); they must be balanced in their political coverage; they must be protective in content to children and racial minorities.

None of this was required in the past for online TV or Mobile TV. In the US, TV programs require captioning; must report a content rating to enable a parental blocking through a "V-chip"; and stations must participate in periodic alerts as part of a national and regional emergency system. These mandates either do not exist or are difficult to implement for internet-based television. [20] Thus, the same program delivered by a broadcast network over-the-air with captions does not require captions when distributed online. Nor is it required for programs available on the iTunes or YouTube servers.

In the UK, a TV-viewing license must be paid for by viewers; but not for watching mobile TV. In India, if IPTV and mobile TV are not considered to be TV operations but telecom operations they are eligible for 74% foreign direct investment, whereas TV channels can have only 49% foreign ownership, or just 26% for a TV news channels. [21] Similarly, In India, internet TV sites may provide channels, such as Al Jazeera and adult channels, which are not permitted on regular TV.[22]

Not surprisingly, these discrepancies have raised questions of principle, public interest, and self interest. Traditional media and the employees and creators in their orbits are threatened by their unregulated counterparts and ask for a "level playing field." [23] They argue that public policies enacted for good reasons are being undermined.

top

Organizing Harmonization

One step taken in several countries is to "harmonize" regulatory institutions as a way to harmonize regulatory approaches. Thus, there has been a global movement among regulatory bodies that span television and telecommunications. This does not necessarily reach the internet, but it moves in its direction. The US and Canada, traditionally featuring a converged regulator, have been joined in recent years by Australia, UK, Malaysia, Brazil, Finland, Italy, and a handful of other countries. [24]

In France, on the other hand, the French regulatory authority became Arcep (l'Autorite de Regulation des Communications Electroniques et des Postes) for wired, wireless and internet communications, and radio spectrum. But broadcasting content remained under the supervision of the Conseil de l'Audiovisuel.

Even when agencies are merged across media, this does not mean that regulations are harmonized. In the US as well as in Canada, the agencies operate under different laws or parts thereof. Different parts of the same agency may develop different approaches and philosophies towards different services, even if provided by the same company.

As important as institutional harmonization is, one should also recognize its potential drawbacks. One potential danger is the aggregation of too much power into a single body. A monopoly in regulation can be a problem just as a monopoly in the market. [25] A harmonized bad policy may be worse than an inconsistently good one. Russia created a converged super-regulator to oversee the media and telecommunications industries. But critics fear that the new agency was created, in an election year, to establish control over the largely uncensored Russian-language internet. [26]

While regulatory harmonization is a positive value one should not make a fetish of it. Some inconsistency is unavoidable—too many goals, too many industries, and not enough variables to deal with all of them. Some inconsistency is positively desirable—it enables national or regional diversity of approaches, and creates an opportunity for experimentation. Enveloping a new activity in the framework of an established regulatory system may strangle it in the cradle.

But on balance, the disadvantages of disparate regulation and policy in a central aspect of society and economy—media—seems more problematic than its downsides. Treating the same media content widely differently, depending on which transmission route it chooses, invites ongoing legal, regulatory, political, and business battles.

In a globalizing world, national media policies are effective only to the extent that they can maintain a segmentation of one's country from others. Rules that can be easily circumvented by operating from across a jurisdictional line will rarely be effective. For cable television, such segmentation can be done fairly easily, given the defined footprint of its physical distribution plant. For terrestrial broadcasting a segmentation can be accomplished through the licensing mechanism, but keeping control was more difficult in areas where broadcasts could be received across the borders. For satellites segmentation is hardest, given their huge footprint, but could be done insofar as the DBS providers are typically subscription-based and hence must rely on collaboration with the regulating country if they are to sign up subscribers there.

What then is the ability to maintain nation-specific control over the new forms of TV? Internet TV can be controlled to some extent through various techniques that identify content, or recipient, or sender, and treat them differently. An example is 'geo-blocking' in which packets with certain IP addresses can be denied either access to or from certain servers. Thus, Canadians might be restricted from reaching US-based video servers. Technically, geo-blocking can be circumvented by determined viewers using

proxy servers or other techniques which disguise or alter addresses of recipients or senders. However, for mainstream users this will require too much technical effort, and it is more likely that they will just go along with the national restrictions, as most Chinese do today.

It must be understood that the major media companies, too, support such blocking, as long as it does not exclude exporters from reaching the foreign market in other ways, and as long as they do not face a "monopsony" (buyer monopoly) on the other side of the border. Canadian companies do not wish their audiences to seek US netcasters. And American media firms, too, seek the segmentation of global markets since they want to price-discriminate among them based on size and ability to pay. Thus, a Hollywood studio would not agree to license a film to a small or poor country's internet TV provider under favorable conditions if this would mean giving such provider the ability to distribute that content to anyone in the global market at a lower price. To prevent such arbitrage, the alternative to mandated geo-blocking would be for the studio to create its own segmentation system, by establishing its own servers all over the world, setting different prices, and limiting access to the low-priced offerings to users with certain IP addresses.

Thus, there is a confluence of interest for geo-blocking as a concept—though not necessarily in its execution—among the national regulator, the domestic established media companies, national culture advocates, and the foreign content producer. On the other side are consumers who desire more choice and lower prices, as well as free speech and free trade advocates, and those who want to keep the internet free of regulatory obstructions.

The impact of mobile-TV on national segmentation is more ambiguous. Clearly, national rules can be readily applied to the use of regulated mobile networks for asynchronous, internet –style TV. Such rules can similarly be applied to synchronous, broadcast-style use of the mobile networks, or to the use of their cell-sites for TV transmission. But mobile TV could also be transmitted from satellites directly to the mobile handsets, outside the service control of the regulated mobile networks. Satellite broadcasters could therefore emerge that are outside of Canada. If they do not target Canada specifically, and are based on an advertising rather than subscription model, they would be outside of direct Canadian jurisdiction. They could reach, in principle, a large number of Canadians, unless they are restricted through international licensing and frequencies agreements or by national technical restrictions on what the handsets may receive.

Having discussed the nature of regulatory divergence in a converging TV world, we can now move to the question of what kind of rules should be applied.

There are at least 6 options for the regulation of internet-TV and Mobile TV:

1. The Internet/ Print Model
2. The "Layered" Model
3. The Television Model
4. The Film Model
5. The Public Broadcasting Model
6. The Telecom Model

These will now be discussed.

top

The Internet/Print Model

The first option of how to treat internet TV is that of internet-style or print-model regulation—which means no regulation of content or conduit.

Generally speaking, the internet's culture has been staunchly libertarian. [27] Barely a decade ago, several of the internet's public spokespersons had declared in their 1994 Charter for Internet Liberties: "Government, leave us alone, we did not call you, we don't need you."

But just a few years later, the tune is quite different. Now, the internet's advocates seek a large set of supportive governmental policies such as in taxes on e-commerce and R&D credits, loosening of immigration restrictions, subsidies to school, etc. And in particular, they seek governmental protections from the powers of the telecom and cable companies over pricing and quality of network access.

There is nothing wrong with these goals. [28] But, they are not exactly libertarian. Yet they are not hypocritical, either. They reflect the discovery of the reality of the market power inherent in last mile delivery networks, and its implication to regulatory rules and institutions. The reasons are not those of conspiracy but rather those of economies of scale, sunk costs, and network effects.

Some people still believe that one cannot regulate the internet, even if one wanted to. After all, don't high school kids run electronic circles around government and corporate enforcers? And can't one locate media servers in offshore locations, far from the regulatory powers of a particular country? But that only proves that it is difficult to go after the electronic part of their communication. If one cannot reach the bits themselves and their source, one can still go after the physical elements of delivery: the networks. Those cannot hide, and in a two-way medium cannot easily operate across borders without permission.

Actually, the internet provides the tools for restrictiveness. Contrary to the conventional notion that a bit is a bit, internet bits come in identifiable packets with address and sender included—as mentioned already in our discussion of geo-blocking. And once information is identifiable, it becomes differentiable, and hence "regulatable". One can regulate packetized and identified information in a granular fashion. Preferential treatment, pricing, and must-carry initiatives become possible with identification. Internet regulation actually becomes a more powerful tool for the state relative to what existed in the past. But just because regulation is possible does not mean that it should be exercised. One should determine major arrangements in a society for reasons of policy, not for lack of choice.

The internet model as applied to internet-TV would closely resemble that of print publications, which in most democracies are largely free of content restrictions. Such a model would put internet television comfortably within the core of free speech protections of constitutions in the US, Canada, Europe, and other countries. The print press has no regulated assured access to distribution networks, which is an issue discussed below in the chapter on infrastructure access. Furthermore, most internet content providers are not financially supported by government. Hence, a pure internet or print model would not address the conduit access issue or deal with funding.

top

The 2nd Option for Internet TV Regulation: The "Layer" Approach

The layer approach is beloved by technologists. It is based on an "ISO hierarchy" with a panoply of transport layers, protocol layers, presentation layers, applications layers, and more. Instead of vertical silos, one would regulate horizontal layers separately. There would be one set of rules for layer 3 and another set of rules for layer 7. All this techno-talk tends to intimidate a non-technical people. But the notion of segmentation is not very practical.

First, there is the problem of horizontal symmetry. Such approach does not really answer the question of what kind of regulation there should be for internet TV. It just says that it would be the same for all content. Thus, all internet video content could be regulated according to the traditional TV rules expanded to all video, whether linear or interactive, for-profit or user-created, mobile or wireline. Newspapers and other print media would fall under the same rules; after all, they are on the same "applications layer."

As for the vertical separation, the problem with the layer-approach is that companies and operations cross layers all the time. The neat separation exists only in theory. Television broadcasters operate on several layers, as do cable TV companies. And the more complex a service, the more layers it is likely to cross. Therefore, regulations that are layer-specific would run right through firms and operations.

There is a lot of history here. In the U.S. and now Europe, the problem of dealing with firms that operate across layers has led to a variety of attempts to segment and separate firms. And if history is a guide, these separations become increasingly complex and eventually break down.

The layer-approach suffers from technocratic complexity. But it is useful if the multiple 'techie' layers are ignored in favor of a simpler, more intuitive, and less comprehensive differentiation. We recognize that:

1. The primary separation in regulatory subject matter is between content and infrastructure.
2. Providers are likely to be often in both of these areas, for historic or practical reasons, and will remain so.

The discussion that follows will provide a regulatory framework for these two segments. We begin with content.

top

II. Content

Expanding TV-Style Regulation

The third approach for internet TV is the TV-model approach. The TV model is based on the view that traditional TV regulation must expand to cover internet and mobile TV in order to maintain a level playing field across all three screens.[29]

This is the approach coming from Brussels. It aims to extend TV regulations to the new delivery platforms, and do so Europe-wide. These regulations cover:

- Protection of children.
- Restrictions against hate speech.
- Protection of national production and national culture.
- Right of reply.
- Restriction on the quantity of advertising, of ad for certain products (tobacco, pharmaceutical drugs), and on product placement.

Having been subjected to a barrage of criticism, many of the rules were limited to "linear" video, to longer video, and to provider-edited video.

The TV-centric approach is also evident in a decision in Germany by the federal states (*laender*) to charge a broadcasting license fee on all computers and mobile phones that can receive TV programs—in other words, to practically all computers and cell phones—whether they are used for public TV—or any TV—or not, and whether they are in homes or in offices. In the UK, the viewing of TV over mobile phones requires the payment of a regular TV license fee, or that the viewer already does so for his home TV.

The TV-centric approach exists, similarly, in the approach of Korea, where TV content providers for internet TV must obtain broadcast licenses. But, as of April 2008, nobody has received such a license.

Extending the traditional broadcast model to new types of TV has significant and persistent problems. For example:

- How would one distinguish one type of TV from another? (e.g. user-generated vs. "commercial") [30]
- How would one enforce these content rules? The volume of internet video will be huge. The only way to keep control is to limit content supply to a few providers, such as the case for broadcast TV.
- A differentiation of commercial vs. non-commercial, linear vs. two-way, regularly scheduled vs. unscheduled video media may, and without a fundamental technical reason such a spectrum shortage, well be illegal under the free speech laws of many countries.
- It is restrictive to international flows of information when there are different rules in different countries.
- It may be unnecessary. When it comes to the protection of children or racial minorities, or on libel and obscenity, most countries already have general media laws that apply to magazines, film, and can be applied to the new-screen TV as well.

One main reasons for this TV-centric approach is that it is politically relatively easy to institute. Existing broadcasters—whether private or public—do not wish alternative platforms to gain advantage from laxer rules. Similarly, the political supporters behind the traditional broadcast TV rules will oppose the creation of loopholes to their applicability on the new screens. These rules may enjoy significant public support, which is why they exist or survive.

Extending legacy television rules to video content on the other two screens will become bogged down in its contradictions and practical problems. This does not mean that ‘anything goes,’ and this will be discussed further below.

If the proverbial level playing field is desired for reasons of competitive equity, this should not be achieved by extending broadcast content regulation to the other two screens, but rather by extending to television content the same substantial absence of regulation that is exists in the content fields of books, newspapers, music, film, and internet.

This does not mean that such non-regulation is always successful, or that one ignores the rationales for existing rules that apply to television. To the contrary. But there are different ways to achieve these goals. In the traditional system of licensed broadcasting, one set of tools could work. In the new environment, it is necessary to take a different approach in pursuit of policy priorities.

top

The Public Broadcasting Model

In many countries including Canada, public service broadcast institutions create or fund content often not available from commercial broadcasters who are optimizers of advertising revenues. There are several reasons for public service broadcasting:

1. Advertising revenue optimization means that commercial companies serve the center of the taste distribution rather than those seeking a higher quality.
2. Positive externalities exist, in which quality content will create beneficial societal spillover effects. Some forms of content are merit goods that are socially desirable for consumers to access.
3. The same factors exist for the two new screen platforms.
4. Even though a volunteerism in the user community can supply some forms of public service content, other types of programs cannot be done on a shoe-string or a garage, and require the organization of a sustained production effort by specialized professionals who must make a living—which requires money.

Public broadcasters already have taken a role in the new forms of TV. They can distribute traditional programs over the other platforms; they can reformat such content for new screens, for example in short "webisodes", or supplementary content to the TV program; or, they can create entirely new programs. The BBC, ARD/ZDF, and PBS have already made important contributions. The CBC runs the most popular television-related website in Canada, reaching 4.3 million unique visitors per month in 2007. [31]

In creating Canadian content for the new screens of television, the existing public broadcasting system would play an important role. [32] Much of the television content over the two new screens is repurposed content produced for the first screen. [33] VOD aspects facilitating a much longer shelf life for quality content, revenue mechanisms (pay or subscription), plus easier access to viewer markets in other countries—in particular the US— would all help support the production of additional such programs.

top

The Film Model

We discussed earlier the rationales for regulating TV, and why societies are not likely to give up on them. The adoption of the largely non-interventionist newspaper/internet model to the new types of TV will result in a certain program mix. If a government wishes to change this mix in pursuit of some social and political objectives — and absent such goals, the entire discussion is academic — it will find it difficult to add some programs and subtract others through the traditional mechanisms of exclusion and quotas. To create content that is otherwise unavailable it must use positive mechanisms of creation rather than negative ones of exclusion. To do so, it needs to establish arrangements and institutions of funding, production, and distribution for the favored type of content. In Canada, this means content reflecting unique aspects of the country, its traditions, culture, and diversity.

Fortunately, institutions already exist in the form of a public broadcasting system and of public mechanisms for the funding of private film and TV. These approaches could be applied to the two new screens. They would result in a system that is based on the twin pillars of free speech and free market, while providing Canadian content through the mechanisms of public support.

For Canada, import restrictions and domestic quotas will not work for internet TV or mobile TV. Unless Canada is prepared to go to considerable lengths in blocking internet streaming, many of its citizens will find ways to view content from abroad. [34] Access to information should not be stratified according to technological sophistication.

Internet distribution, of course, is a two-way street. It facilitates the export of Canadian content to the US and around the world. And it can do so with less dependence from Hollywood distributors/competitors. However, this is likely to benefit more the type of content that may be Canada-produced but not particularly distinct culturally.

The problem of imports is greatest for "blockbuster" content, which in the new environment will actually be more expensive than ever. It is true that production technology drops in price in a static way. But the greater competitiveness of media content means that everyone must try harder than ever to gain attention and to dazzle with newer and better effects. On top of that, marketing efforts keep rising. There will be a great pressure for "blockbuster" content that stands out from the crowd, and for content that makes the most of the multi-media and interactive features of broadband communications. It will use elements that go beyond regular linear TV: interactive, asynchronous, linked, multimedia, high visual and sound quality.

To produce such new-style content is expensive. It requires creativity, programmers, performance testing, and continually new versions. Such content exhibits strong economies of scale on the content production side, and strong network effects on the demand side. After an early phase of experimentation, this favors content providers that can come up with big budgets, diversify risk, distribute also over multiple platforms, create product tie-ins, and establish global user communities.

Therefore, the type of content that gathers mass audiences from Albania to Zanzibar is likely to remain the domain of the major media production firms, often in Hollywood, surrounded by satellite specialist companies from around the world.

This does not mean that major media companies will dominate all of future TV. The whole point in the merging new-screen TV is not just to give existing content more distribution platforms but also to enable new producers and types of content. Canadian user-generated content—the "long tail"—should more than hold its own, being low budget in creation and distribution, operating in a media and techno-savvy environment, and using two major languages. The same holds true for narrowcast commercial content, though it might become skewed towards a more global and less Canadian orientation. And for news and sports, the distance discount is so high that they will always have a strong local and national presence.

Perhaps the hardest question is how to deal with the existing Canadian content requirements for commercial broadcast TV. [35] [36] [37] In the long term, they are likely to be replaced by direct content production support and incentives. But in the short term they are deeply embedded in the Canadian production industry. Thus, the transition from this TV system would have to be gradual, and tied to benchmarks in the actual provision of direct support.

Would subsidies to Canadian content be forthcoming through a different system? The overall magnitude of the direct and indirect subsidies is quite large and often non-transparent; but judging from public surveys and political decisions, many in Canadian society support it. This would suggest that the subsidy would also be forthcoming in different forms appropriate to a different TV system. To conclude otherwise would imply that the present financial assistance, direct and indirect, does not enjoy informed public support. If such support does not exist, it will reduce, sooner or later, any subsidy mechanism. And if it exists, it will carry forward into new arrangements. That should be the main answer to the question of whether, for example, a move from content-based to a conduit based funding system would be viable, and whether it would generate enough funding.

top

Film Model Funding

Public service television is one mainstay for the creation of domestic programming. A second one is grant programs. [38] [39] These are funded in Canada by the government from its general budget, and by cable and satellite firms through earmarked levies.

To help interactive digital cultural content products, a New Media Fund was created, [40] supported by the Department of Canadian Heritage. The overall budget is modest, at $14.5 mil. [41] There are also Canadian Culture Online funding programs to provide access to content that encourages an understanding of Canada. [42]

Larger amounts come from a levy on cable and satellite companies. The CRTC and the Department of Canadian Heritage established, in several stages, the Canadian Television Fund, to support Canadian high-quality shows. [43] It also aimed to generate media jobs and exports. The fund spent $2.5 billion for more than 4,900 Canadian-made productions over 11 years. [44] Cable and satellite providers must contribute 5% of their annual revenues to Canadian programming, mostly through the CTF. There are also 5% company contributions through the Bell Broadcast and New Media Fund, ($9 million a year) and from Bell ExpressVu, a satellite broadcasting system. Together with government contribution, all this amounts to about $288 million per year. The 5% levy has not been without opponents. Cable companies suspended their payments in 2007 and demanded a federal review CTF spending.[45] [46] One problem with public support funding is the skewing of competition with unsubsidized private providers. In Europe, private publishers and broadcasters have called for a rigorous application of state aid rules to publicly-funded broadcasters, complaining about inadequate financial transparency in publicly-funded broadcasting.[47] They argue that public broadcasting was the third most highly subsidized industry in Europe, and that this has undermined the competitiveness of television, cable, program production, and internet content. [48]

Generally, broadcasting distribution undertakings (BDUs) in Canada contribute 5% of their revenues to Canadian content production. Such a contribution could be established for the other screens, too. As an increasing portion of internet traffic is video, the internet is becoming part of the Canadian broadcasting system. When internet service providers (ISPs) distribute broadcasting, it has been argued that they are acting as BDUs.[49]

In 2007, the internet service providers had residential broadband revenue of about 3 billion. Any levy on this growing base would generate a considerable sum. [50] [51]

The issue of funding new-style TV has caught unprepared even countries which have traditionally supported non-commercial and non-traditional media. In France, the funding agency CNC which manages the state's financial support for the film and television industries also supports interactive cultural content for the internet and mobile devices, as well as for artistic digital creation.

However, this assistance is quite trivial, amounting to 1.3 million Euros. In comparison, the fund's film support budget for 2006 was 495.5 million. [52]

The EU has a program for the support for the development of on and off-line interactive works. But support was modest. The maximum grant is €60,000, but the total budget is estimated to be €1.5m, [53] a tiny amount in comparison to the subsidies for film and TV content production.

The smallness of these supports reflects the uncertain and experimental nature of new screen TV. But this will soon change, whereupon the traditional panoply of societal goals will be brought to bear. Whatever they are, to implement them will cost real money. Which requires some funding base. What are the basic options? A list follows.

1. Tax Revenues. But such funding might not be easily forthcoming if it must compete with all other claimants; and it would be subject to budgetary or ideological politics. Hence, funding from within the communications sector itself may be superior in terms of budget policy and politics.
2. A Raised TV License Fee. This may work in Europe but is not a system traditional to Canada or the U.S.
3. A Surtax on ISP or Infrastructure Carrier Revenues. [54] It would be levied on telecom and cable broadband providers, and on independent ISPs. It is relatively easy to administer since the number of such companies is small. But if it is passed on to users in a flat charge form, it would be regressive and reduce connectivity for low-income users. To avoid this, the charges would have to be usage-based, which would require some usage metering by the ISPs. This could change the present "all-you-can-eat" model of web use.
4. A Surtax on Internet Bills. This is essentially the same as the ISP surtax. If levied as a flat charge rather than usage based, it could be a regressive tax when the services (broadband and wireless) are essential.
5. A Tax on Advertising or on All Revenues of Providers of TV Content Over the New Screens. This would be a charge on the providers of content, not on the ISPs.

A Spectrum Trust Fund. Such a fund would be financed by the spectrum payments by commercial operators (either auction revenues or annual payments).It would create a link between the rising value of spectrum due to new applications, and the development of such applications. The more successful these applications, the more valuable the spectrum, and the more support there is for the next generation of applications which are a societal priority. If done well, this can generate a virtuous circle. In contrast, the present system in most countries is to use spectrum as a cash cow for general budgetary purposes, thereby taking money out of the communications system and slowing it down instead of re-cycling it to create further sectoral and cultural growth.

The fourth major way Canadian content is generated through public intervention (public service TV, grants programs, and tax credits being the other three) is through program mandates. These are either requirements of minimum Canadian content, in the case of broadcasters, or, for specialty and pay TV channels, a minimum expenditure share for Canadian content. Currently, narrow-cast (specialty) channels on cable and satellite are regulated in favor of Canadian content by 1.) excluding US channels that compete, leaving US providers with only the less attractive market segments; and 2.) by requiring the Canadian channels to dedicate a certain percentage of their revenues to Canadian produced content. This percentage is quite high, about 45% on average but in some cases higher. And the question is whether such a system can be maintained in a 3-screen broadcast environment.

Since cable and satellite TV will not vanish, the specialty channels providing them with content will remain. These are likely to be also available over the other two screens; and their revenues could be included in the Canadian Program Expenditure (CPE) requirement as well. But such a levy would disadvantage them in the long term against internet-based content packagers which do not presently have to allocate money to CPE. One needs to anticipate the future. As these packagers become a more significant presence, the requirement would have to either be extended or dropped. The former will be difficult to administer and enforce; the latter will create dislocations in the production industry unless alternative funding mechanisms can replace the lost support. The discussion above lists some of the options. Are they enough? As argued before, if the present public support exists for the present funding system, it ought to support also an alternative mechanism of a similar magnitude.

Broadcasters and unspecialized cable channels must devote a certain percentage of their broadcast time to Canadian content. Can this requirement endure? As in the case of the specialty channels, this requirement can survive the short and medium term. But even some Canadian media institutions wonder if this is the long term road to follow. When new-style providers on the new screens come to represent a major presence in the Canadian media landscape, the Can-con requirement would have to be extended to them, too, or dropped.

top

Alternative Public Online Institutions

Public funding support and public broadcast institutions are not synonymous. In Britain, Ofcom, the UK regulator, floated for a while the concept of a "Public Service Publisher" (PSP)—as an option to establish a secure, strong, and plural public service system for the online future. [55] The PSP could be a new organization, or attached to an existing institution. Either way, it would not be a replacement but complementary.

Principles for the PSP would be:

1. The PSP could be a commissioner rather than producer of content, relying on a diverse range of suppliers.
2. The PSP would also not be a distributor or creator of platforms, but could partner with other organizations for such distribution—whether traditional broadcasters, community media, or alternative platform operators.
3. The PSP could establish an open rights model based a participatory media environment. This would allow content to be re-used by others. [56]

top

Content Regulation

The issue of sexually explicit TV content over the two new screens provides an example on how content regulation might proceed.

Both internet TV and mobile TV provide an effective means for adult entertainment, given their easy access, individualization, and privacy. [57] According to Larry Flynt, founder of Hustler Magazine, "Hustler Mobile is doing exceedingly well in Europe…I feel that wireless is the wave of the future, the crown jewel in the electronic distribution and delivery of [adult] content." [58] Providers include Xobile.com with 2-minute pornographic video clips formatted for mobile devices. Such offerings cannot be banned in ways that go beyond those of other adult media. In the US, the US Supreme Court in the case *Sable Communications v. FCC* rejected the FCC's enforcement of a law that completely banned sexually explicit and obscene telephone dial-a-porn messages. Mobile TV is similar to the dial-a-porn service in *Sable*. Both require consumers to take an action in initiating the contact with the content provider. [59]

Similarly, internet video has come under attack around the world. In consequence, portals for user-generated content have attempted self-regulation. The UK has a voluntary code for mobile content to prevent children from accessing unsuitable content. [60] But complaints from charities and the Home Office asked Ofcom to examine the self-regulatory scheme. The new wave of on-demand services are self-regulated by a group called the Association for Television on Demand, whose code broadly mirrors that of Ofcom. [61] Online videos are much harder to regulate because anybody anywhere can upload a video to the internet. [62] Major sites have snitch-systems in which users can warn them about inappropriate material posted by others. YouTube does not allow pornography, violence, or dangerous or illegal acts. [63] The company states that it is not "for people under the age of 13, at all," but how it can enforce this is unclear. [64]

In 2005, the cellular industry trade association in the US, CTIA, adopted wireless content guidelines. These guidelines established a voluntary pledge by the industry to proactively provide tools and controls to manage wireless content. They establish a standardized rating system for mobile video content based on the familiar film rating system. The CTIA system classified mobile video material as either unrestricted 'Generally Accessible Carrier Content' or 'Restricted Carrier Content.' To offer Restricted Carrier Content, it must provide access to controls to consumers. Parents could select the classification of content they deem appropriate for their children. A second phase initiative will be for carriers to develop filters and other content-blocking technologies. [65]

The European Union is in the process of updating its legislation for audio-visual broadcasts, which will contain safeguards in areas such as protecting children from sex and violence and setting limits on advertising. This section was to have covered all new media, including online video—but has been scaled back to just cover TV and "TV-like" services such as video-on-demand.

top

Conclusions on the Content Regulation of 3-Screen Television

The discussion suggests that television, on each of its screens, should be treated equally and in a way that resembles film media: largely unregulated, with a mechanism for public financial support for the production and distribution of content which would include public broadcasting; a surcharge on ISP/carrier revenues; and a spectrum fund. Content issues that raise consumer

protection problems should be dealt with, in the first instance, through self-regulation; with government only a second line, where constitutionally permitted. Public service TV institutions would be augmented by the funding on new, internet-oriented production organizations and creators.

top

III. Infrastructure

The previous section analyzed content policy for new-generation TV. The next section will develop the principles for the infrastructure that carries the content.

The Telecom Model of TV Regulation

We have discussed how difficult it will be to achieve the goals of TV policies over the two new screens if traditional tools are used. The result would be administrative and legal complexity and a heavy price in terms of technological and content innovations. One of the principles of regulatory enforcement is that if regulate one must, it is more efficient to target the least mobile and elastic elements, such as land and physical goods. A second principle is that it easier to regulate the element with the fewest providers. Not only does this deal directly with a problem of concentration in the provision of that element, but it also provides an indirect tool to reach the rest of an industry more easily.

Both of these principles favor for TV the choice of the conduit or delivery networks as the nexus for regulation and funding, when regulation is sought. This is less a recommendation and more a prediction of what is likely to happen. Why? First, these networks are quite limited in number. Though the notion of the internet as wide-open and competitive prevails, the fact is that a number of its basic instrumentalities are quite concentrated, foremost among them the "last mile" delivery networks. In most countries only one such infrastructure is prevalent, that of the incumbent telecom company. Some countries add the cable TV infrastructure. Cellular carriers are another alternative, though with a more limited capacity. Satellites, fixed wireless, or powerline communications may provide other options. But when the dust settles, these alternatives will serve market niches, and often be owned by the incumbent cable and telecom companies anyway.

Why is the delivery of bits typically such a concentrated industry? While the details vary from country to country, the primary reasons are economies of scale and sunk cost. Last-mile delivery networks, whether wireline or wireless, are expensive to create and maintain. This results in battles, both in the market place and increasingly also in the policy arena.

In much of Europe, broadband is carried to the user's home over the copper phone lines of the telephone companies using a technology known as DSL. DSL is the cheap way to go and does not require much investment. But it is relatively limited in data capacity and range. In contrast, in the US and Canada, broadband is in the process of increasingly being carried over fiber cable TV networks, which are vastly more powerful.

There are several reasons for this. The first is the prevalence of cable TV in North America. In the larger European countries, in contrast, multichannel TV tends to be carried over one-way satellites. There is relatively little of cable in France, Italy, Poland, or Spain, and it is struggling in Germany and the UK. In North America, it was the cable TV companies which pushed broadband most aggressively over their powerful coax lines. In response, the phone companies had to hustle to catch up. After starting with DSL, like phone companies around the world, the two major US phone companies, Verizon and AT&T, have embarked on a major upgrade program into fiber. Verizon, much to the unease of its investors, is putting $20 billion into the ground. AT&T, too, is upgrading at a rapid clip. Given the competition from the cable pipes, the phone companies feel they must catch up or become the next Western Union.

Thus, North America (as well as most of the world’s ten most advanced broadband countries) is moving to what may be called a "2.5 platform" infrastructure. This means two powerful wires—fiber and the cable TV—plus a few other, smaller, often weaker infrastructures for niche applications. In contrast, the major European countries seem to be moving mostly to a "1.5 platform" system, centered on the DSL phone infrastructure, which will eventually be upgraded to fiber, plus smaller options. It is not realistic to look to mobile wireless as a major alternative, because it cannot match the power of fiber for ultrabroadband, unless vast amount of spectrum is allocated, or every hill is dotted by transmission towers—which must still be connected by fiber lines.

What then is the implication? It means a very different media market structure, which in turn has an impact on content, prices, investments, and regulation. A 1.5 system is basically a telecom monopoly, whereas a 2.5 system, such as the U.S. and Canada is more of an oligopoly. 2.5 platform countries have more competition, lower prices, greater dynamism, but also greater volatility. 1.5 platform systems are more profitable, safer for investors, but also have a much greater gatekeeper power over content providers and pricing power over consumers. That is why they require more regulation of access and prices. A 2.5 platform system is riskier for investors, though as an oligopoly it is likely to keep price competition under control. It is also more likely to vertically integrate network and content operations, and this creates incentives to keep content rivals out.

top

Access Regulation

A prime example for a telecom-style conduit regulation is "net neutrality," an issue that has achieved much prominence in the US and Canada. Its meaning is a bit fuzzy, there being at least eight different ways to define it, but the central issue is clear: the power of the last-mile delivery networks — mostly traditional telecom or cable companies — to select, price, or differentiate among the internet information streams that pass through their pipes. Fearing such gatekeeping power, internet content and applications providers, as well as traditional media companies, have banded together. They seek protection from the network companies' power over access prices, quality, price discrimination, and the likelihood that they will favor their own content subsidiaries.

Setting the rules for "net neutrality" provides government with a tool for affecting both the infrastructure itself, and the content. The infrastructure is affected because giving infrastructure providers control makes them more profitable and enhances their investment level in upgrade infrastructure. Providing strong common carrier access, on the other hand, gives content and applications providers additional rewards and incentives.

Net neutrality proposals in the U.S. diagnose the problem but offer a remedy that will require a complex regulatory apparatus. A much simpler system has been proposed by the author [66], termed "enduser sovereignty", in which consumers become responsible financially for the last half mile from their home to the neighborhood node, and control what quality level they seek and whose content they give access to, without gatekeeping by an infrastructure provider or a charge by that provider for traffic on the last segment. For the core network, no access obligations exist as long as competition exists. This system would combine ease of access by content providers with an absence of traditional common carrier regulation.

Today, increasing bandwidth usage due to broadband internet leads to fiber-based networks on the local access level, and economies of scale are rising for networks. Huge capital outlays are needed. Fixed costs are up, marginal costs down.

But at the same time, the economies of scale and entry barriers for many categories of content production have declined. Following the trajectory of Moore's Law, powerful information and media technology devices have become affordable, and they enable millions of websites, user-generated content, and file-sharing of content. So we now have a lot more –hugely more—content and applications providers facing fewer pipes.

Telecom regulation, though derided as "legacy," has evolved for a reason. We must first jettison the view that it is inherently backwards. If regulate we must rather than let market forces prevail, then telecom regulation is really quite a sophisticated tool relative to regulation of other industries. Take the concept of forward-looking incremental cost pricing for unbundled network elements. Neither aviation, pharmacological drugs, environmental controls, rail transportation, nor electric utilities have anything that comes close in terms of economic sophistication and institutional complexity. This is not to say that it is a "better" regulation in terms of policy objectives, just a more complicated one dealing with numerous factors, and conducted on an economic level of significant expertise.[67]While broadcast regulation could be learned by an attentive student fairly quickly, and while aviation regulation is heavy with details but feather-light on concepts, in telecom regulation even experts can be lost in explaining the relation of reciprocal compensation to access charges.

A major reason for the complexity and sophistication has been the large number of goals that telecom regulation tries to accomplish. In the US, these range from general coverage and affordability (universal service); to openness to users (common carriage); control of market power (price or profit regulation); integration of networks (interconnection requirements); international collaboration (accounting rates); encouragement of competitors (wholesale retail pricing); consumer protection (quality regulation); protection against interference of transmissions (spectrum licensing); innovation (information services); vertical protections (divestitures and fully separated subsidiaries); national security (wiretapping laws); personal safety (911); consumer choice (number

portability); federalism (state and federal jurisdiction); rural-metropolitan equity (rate averaging and direct transfers); social equity (lifeline); promotion of the internet (i.e., support of schools connection); and quite a few more. The result has been a highly complex set of rules which tries to balance the multiple objectives and accommodate the various political forces behind them.

By regulating the infrastructure core, one can indirectly reach the edge of applications — of which TV is one. After all, everything travels over the infrastructure. This is of direct relevance to internet TV. One can make the infrastructure provider the enforcer of more general media policy goals, such as protector of privacy; provider of blocking tools; assurer of widespread connectivity; and collector of revenues for content production.

Thus, for better or worse, over time the political system will increasingly use the infrastructure providers as, in effect, the tax collector for societal information policy goals such as content production, digital divide issues, etc. This will be an unwelcome message to the infrastructure companies, but it seems likely. It is the kind of tax that is hard to escape; that, if levied across all broadband providers, will be relatively neutral in incidence; and which, since it is for a service that is considered increasingly essential by consumers, can be mostly shifted to them.

top

IV. Conclusions

The significance of this discussion lies in the fact that most next-generation media applications will run over the internet, loosely defined, and its fixed-line and wireless pathways: music; video; film; interactive games; and online news media. And therefore, as the internet becomes the main platform for most media uses, the regulatory rules for the internet become the rules for much of the media system as a whole.

We have concluded that:

1. Regulatory treatment for television over the three screens should be harmonized
2. The rules for television content will be essentially those of film: free in content and diversity, but supported by public funding or direct production and distribution.
3. This public funding would be created by a combination of public funds; an excise tax on ISPs and carriers that would be harmonized with the existing levy on cable and satellite TV providers; and the use of spectrum sales revenues into a special trust fund.

For the conduit aspects of TV, a system of infrastructure will emerge that operates with common carrier elements or similar but self-regulatory mechanisms to assure the absence of gatekeeping. But the infrastructure firms would neither be separated functionally nor structurally from the content segment, and could operate in both.

Thus, if one wants to simplify considerably, the system would be one in which traditional television regulation would be replaced by a combination of "film + last mile common carrier:" free (and in Canada, partly publicly supported) content riding on an internet infrastructure that would be open for its bottlenecks.

At the end of this process, television-specific regulation would have largely disappeared in content while that of telecom endures in the conduit.

Together, these approaches would assure a dynamic Canadian internet industry and user activity, operating on infrastructure that functions with considerable openness to all television providers and viewers, and at the same time is respectful of Canada-specific societal goals.

top

Notes:

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