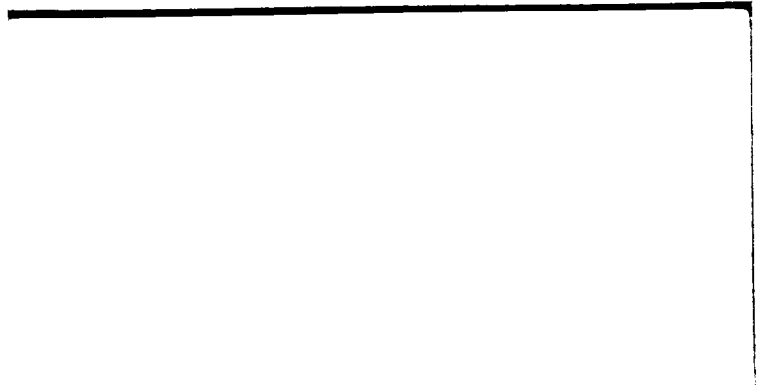


CITIC



Broadbanding the Last 15 Inches
and the Regulation of Information
Screening

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My assignment is to be futuristic in my speech. Unfortunately, the two words "futuristic" and "state regulation" are not often heard together in the same sentence. But I will try. My talk will be about information screening as a social and technological issue, and about its regulatory policy implications in terms of common carrier principles.

In my view, the real challenge for the future technology is not what we normally talk about, how to transport more information, but rather how to deal with it once it's there.

As you know, sometimes the worst that can happen is to get what one wants.

And perhaps this is happening to us with the revolution in information and communications.

This information revolution is progressing, on the whole, very successfully, and by so doing creates its own problems. We can speak of "information pollution," or of the information revolution devouring its own children.

The technical trends are toward digitalization, broadbanding the last mile, abolishing all bottlenecks.

Except one.

This last bottleneck I'd like to call the last 15 inches, those 15 inches from the display terminal to the human brain. The human eye, ear, and brain can only handle so much information. There are biological constraints.

A tidal wave of info. is flooding society. Xerox machine, e-mail, voice mail, junk-mail. Fax now adds midnight junk mail, at your own expense. There are more books written than ever, and probably less books read than ever. Cable TV provides dozens of new channels of TV. And just wait until voice recognition technology will finally reach the state that any random thought of yours will be typed as you speak, and instantaneously distributed to your favorite 700 people.

Can we quantify this trend? I don't have a study for the office setting, but I have some figures for residential media use.

One study, by Pool & Neuman, found that in 1960 mass media supplied to an average HH about 3 million words per day, including unwatched TV, unread papers, unlistened to radio, etc. By 1980, this figure had increased by 267% to 11 mil. words.

Obviously, only a tiny fraction of these media words that reach the average household is actually consumed, about 60,000 media words/day, or about 1 word per second. This number was up

by 51% from 1960 to 1980. TV, incidentally, accounted for 64% of word consumption, and this doesn't even count the visual images that are not part of the analysis.

When you start factoring in the price per word of different media, you also find that broadcast words are a real bargain for consumers relative to print words, which explains why their share increases while attempts are made to charge more for them than before.

Given the steady increase in info., the real issue for future technology is not the one of production and of distribution of information, but rather of dealing with info. flow by humans. Information Load becomes an overload.

There are several strategies possible to deal with this

1. strategy: Education: i.e. Make humans smarter, so that they can absorb and process information faster. But there are severe limits to this, as you find out after about 2 weeks of teaching experience. There is only so much the human brain can handle. After all these years of education, try to multiply 73 X 86 in your head.

2. strategy: spend more time on informational activities. That is clearly happening. The average cable TV HH has its set on for 8 1/3 hours per day, which is 2 hours more than HH

without cable. Individuals create coping strategies, such as reading a magazine while watching television, while answering a telephone call. In office settings, people spend more time on paper flow; lunches get shorter, work hours longer. There are clear limits to that approach, physical as well as social and economical.

3. approach: tinkering with mother nature, by pharmacological or biological engineering. Some drugs enhance memory and reception. This is not an attractive proposition. Probably and hopefully it has natural and ethical limits.

A 4. approach could be called Information Darwinism: Survival of the information fittest. Let the computer chips fall where they may. Its consequence is that you will have an under class of those unable to handle demands of the info society. And this can become a permanent under-class if info handling ability transmits itself across generations by social environment or heredity.

A 5. approach is to substitute information storage for information reception. We all have ever-increasing piles of things to read, eventually, and bulging files of papers we think are useful. One major function of changing jobs is to lead to a shedding of stored but basically useless information.

6. This then gets us to the most promising strategy, namely that of creating screening mechanisms for the information tidal wave.

Examples are

(a) screening Professionals, such as journalists, editors of specialized publications, or administrative law judges.

(b) intra-organization screens, such as secretaries and staff. As recent Presidents proved, one can boil down any issue under the sun onto one index card. It helps, of course, if you have 3 mil. people working for you. What is likely is that there will be increasing formal and informal rules on keeping memos short, and executive summaries will become the main event. Brief may be brief again.

(c) A third form of a screen is using economics as a screen, for example, by imposing an access charge on senders. Why is my time a free good for anyone who wants to access my mailbox or telephone receiver? Now I even have to pay the thermal paper for somebody sending me a fax?! Let them pay for access to me!

(d) Most important is an automatization of the info. screening process. This, to me, is the key technological challenge for the info. sector. Never mind the super pipe. What is needed is the super screen, technologies to help us get only information we want or need.

One example for a very simple screening mechanism is a personally customized newsletter, which has only info that one individual is really interested in. For me, for example, it would have only items on Columbia University football victories and the swinging Albany night scene. Of course, this makes for a

very short newsletter. So the screen works. As everyone who ever used the Nexis data base can tell, the tricky part of that form of a screen is to automate and tailor information systems so you won't get repetitive or unimportant information. That is, one needs a screening by quality. Expert systems and artificial intelligence applications will be useful here, but I wouldn't hold my breath.

A 7. strategy of dealing with info flow is to affect the way info. gets presented.

(a) maybe one could bypass eyes and ears and get directly into the brain. Remember as kids having a book under the pillow rather than studying it? Some form of brain-modem interface that bypasses the sensory organs of the body and links directly and more efficiently with memory or other brain functions is at least a theoretical possibility, though one shudders at the totalitarian potential.

(b) maybe the ways we get info. input needs change. Eyes can get visual info. at a broadband Mega bit-rate. In fact, if the TV action is too slow, one gets bored, which means that you can pack a lot into the visual, as TV advertising proves.

On the other hand, written info. gets absorbed at a much slower bit rate. 300 words/min., or 200 bits per second. Ears are even slower about 200 words/min. or 150 about 200 bits per second. And the tactile sense can get you up to perhaps 20 words/min., or about 15 bps, in Braille.

Thus, visual info. is by far and away the fastest, if it uses the entire bandwidth of the eye's ability.

But print language can't do that. Print takes up only a tiny fraction of our absorptive capacity. We are talking here hopelessly outmoded phoenician and latin communications protocols. But we are stuck with them. Changing the form of written language is radical, and the written word is often sacrosanct. Try to change a word in the Bible, and you start a religious war. The form of written language has hardly changed in centuries. We have a big social investment in this particular form of standardization. We need compatibility, and the social and cultural fabric revolves around it. Therefore, even streamlining the needlessly complicated spelling of the English language would be a culturally traumatic event.

So instead of junking the latin alphabet, and traditional form of written language, what is more likely to happen is a shift to a multimedia form of communications with more visual, and more symbolic info.

TV-ads are an example. They pack a lot into 30 seconds of picture, voice, music and written language, all superimposed on each other. Another example is visual presentations, with slides, transparencies, etc., and now also video clips.

The future therefore belongs to communications services that can provide parallel info. tracks. Just as computers move into parallel processing to overcome the von Neuman bottleneck, so will communications media move into a parallel tracks mode. Take voice telephony. It is very inefficient, in terms of information flow per time unit. That's why I believe that there is a great future for picture phones in the office setting. (Unfortunately, I seem to be the only one who thinks so.) That's also why fax will have an enormous future, because it's much faster than voice. In New York some deli sandwich places now accept orders by fax, because it's faster to transmit the order this way than by voice phone. Also, you don't need someone who can speak English to fill the order. In Aspen they have 2 credit-card operated fax machines at the top of the mountain. You may remember that the details of the AT&T divestiture were settled by the Assistant Attorney General for Antitrust, William Baxter, while he was skiing in Utah, using various payphones. Imagine what Bill Baxter could have done with those fax machines 7 years ago.

Once you have picture phones, you'll also have what could be called "video memos" combining written info., spoken word, film clips.

There should also be a promising future for info media that can be used in a split-screen fashion, where you get supportive

info. as you speak, for example on-screen messages from whoever tries to reach you as you talk, or rapid access to data bases that will help you know what you are talking about as you are talking.

In the long term, this multi-channel communications leads also to new forms of communication language. Many more symbols will be used, because this can speed up the absorption process considerably, and it combines abstraction of written language with speed of visual message.

Of course, Chinese and Japanese have been doing some of it for a very long time. Their absorption of words/min. is, I am told, slightly higher. But their ideograms are frightfully hard to read and write. So it's an inefficient system.

New info. technology makes it possible to simplify the use of symbols of this system considerably, because you can input by traditional letter-by-letter typing; or by voice recognition.

But the output can be displayed partly traditionally, partly symbolically. So that if you type H-O-U-S-E, the output may be a little picture of a house.

So written language is likely to be changing with technology, and with it how we speak, think, and interact.

Thus, we may be talking about emerging broadband network technology as if its just getting movies into the home and stock market data into the office. But it's naive to think that it will stop there, and not affect us much more deeply. When the automobile was introduced, it was thought as a horseless carriage. But it didn't stop there.

Common Carriage

As these changes unfold, they challenge traditional regulation of communications. If information screening becomes central, the question is raised who may and who may not do the screening. Let me therefore move to what I consider the central theme of the new communications environment, the question of common carriage of broadband communications.

The upgrading of the telephone network toward broadband capability and its use for video, data, and text transmission will bring telephone transmission ever-closer to mass media. Mass announcement services have exploded in use. And in recent years we have seen claims by network operators to possess the status of "broadcasters" or "publishers" of information.

Telecommunications have traditionally operated under common carriage principles. These principles guaranteed that no customer willing and able to pay the going rate could be denied lawful use of the network. For over a century this Common

Carrier principle has aided users by stimulating the wide distribution of the telecommunications network.

As with other efforts to balance private and public interests, common carriage is at times burdensome to one party or another. Yet in the aggregate, the balancing act helps the flow of societal and commercial transactions, and benefits the public as a whole. It permitted society to entrust its vital highways of information to for-profit companies, without the specter of discrimination and censorship by government or private monopolies; it was an important element in establishing a free flow of information, neutral as to its content; it reduced the administrative cost and the burden of liability of the network operator, since it needed not inquire as to a user's background (beyond credit-worthiness) and intent; and it protected the telephone industry from various pressure groups who would have it otherwise not deal with their targets of protest or competition.

In telecommunications as in other areas, the common carrier principle extended the reach of personal and business liberties beyond the immediate sphere of the user to many other users at great distance, and this encouraged usage and benefitted industry and society. As an institutional arrangement, Common Carriage did for the transportation and communication sectors what free speech did for the press, limited liability did for corporations, legal tender did for banks, and negotiable instruments did for

commercial transactions. It has probably resulted in a broader, more useful and more profitable network system than would have developed without common carriage principles. Nevertheless, the telcos have recently nibbled at the edges of the Common Carriage principle, which to me sounds like the communications equivalent of eating your young.

While common carrier principles go back a long time, their application are in a constantly shifting terrain, and require continuous updating. Broadband Telecommunications are such a challenge, and raise the question how a principle going back to the Elizabethan Age should continue to apply.

This is not the time or place to provide all the answers to Common Carriage in the age of broadband communications, but I'd like at least to mention some of the questions which I'd like to raise more formally in a regulatory setting. Here are some of the questions:

- To what extent do common carrier principles allow network providers to become involved with the content of communications over their networks? Can they be censors, especially if they want at the same time to be in the information provision business themselves? Should pre-subscription be permitted, despite its restrictiveness on info flows?
- Can or should common carriage and private carriage

coexist in the same entity? Can a telecommunications carrier function as a common carrier to users at one end of a communications link, but as a private carrier to the user at the other end?

- What parts of a carrier's business activities fall under the mantle of common carriage? How finely segmented must they be?

- What is the relation of 1st Amendment rights and C.C. principles?

- Where and to what extent should considerations of market power or monopoly enter into common carrier issues?

- Do common carrier principles apply to resellers? To enhanced service providers?

- What restrictions are permissible on use, users and user groups? How closed can closed user groups be?

And I could go on and on.

The importance of these issues extends beyond telephony. Their resolution also may influence the realms of regulated broadcasting, publishing, and cable television. These communications media operate under different regulatory regimes from that of telephone.

Print publications are virtually free from the constraints of government regulation, except those laws affecting other unregulated businesses and exert nearly complete control over

their content. In recent years, both broadcasters and cable television operators have gained additional rights that move them more in the direction of publishers. Also, the status of broadband telephony is of vital interest to the cable industry. And so the question arises what the status of telephone carriers and will be.

These questions about the nature of common carriage seems to me central for communications in the future, and it is terribly important that we don't slide into a legal, political, and economic morass, which we already seem to have done recently, but instead we should protect the principle that has served us well.

There is a song by Tom Lehrer about the late rocket scientist Wernher von Braun, and it goes like this: "The rockets go up, the rockets come down. Where they come down is not my department."

I hope that we remember this attitude when we deal with broadband issues, and that we not let regulatory and managerial micro decisions add up to a change of the macro system that negatively affects the nature of information flow in the information society.

A few months ago Esquire magazine published a list entitled "Great things they haven't screwed up yet." Common carriage, in my view, belongs on that list, and I hope that it stays there.