Highways, Wires, and Tubes:
The Regulation of Communication Networks (and what it means for archivists)

Introduction

Communication systems are all around us, and yet we have a hard time seeing them. In some cases - such as the row of boxes to distribute free papers you probably saw if you came out of the subway, or the numerous mail boxes you passed on your way here - they are made invisible by their ubiquity. In others - the radio waves and telephone signals buzzing through the air around us - by the technologies with which they are built. If these systems are invisible, the regulations that are attached to and become entangled with these systems are even more so. As I hope to demonstrate over the next few minutes, regulations embed themselves deep in the structure, organization and content of such networks until one is indistinguishable from the other; until the regulation is the network and the network is the regulation.

As archivists, we traffic in invisibility; we understand how organizational structure affects organizational function and shapes the records left behind. We understand how and why certain narratives are silenced, marginalized, or ignored. This concern with, and understanding of, the invisible is precisely why I contend that the mechanics of regulation are of vital importance to archivists. I also contend that we are uniquely positioned as a profession to understand regulatory forces, and the ways in which they act on communication systems.

I'll start out by asking a few basic questions about regulation. What is it? Why does it exist? What is it trying to achieve? Then I'll discuss characteristics of communication networks, illustrated with the help of three examples.

What is the point of regulation?

On a very basic level, regulation operates on the principle of 'addition by subtraction'; acknowledging from the start that they involve losses, limits and restrictions, but also posit that there are benefits that outweigh these costs. In the context of communication networks, such as broadcast radio, telephones, or the internet, regulation promises that, in exchange for the losses it exacts, such as a loss of privacy, or higher costs, it will deliver a more stable and predictable system which can, on average, more quickly move larger amounts of information.

On the one hand, regulation purports to protect the public sphere, for example by limiting the dissemination of obscene or immoral materials, or limiting the power of private capital and corporations to shape public discourse.

On the other hand, regulation may also act in the interests of corporations. In certain cases, it helps them avoid competition, plan the process of technological obsolescence, and provides mechanisms to discipline labor. When federal regulation of broadcast radio first began, for example, it tended to be targeted at the margins of the media; fringe stations such as "The Goat Gland Doctor" John Brinkley's KFKB that were used to sell medically dubious products and "Battling Bob" Schuler's KGEF which served as a platform from which to attack the political establishment of Los Angeles, were the first to be sanctioned by the Federal Radio Commission. Even WNYC, a radio station owned by the city of New York and used to broadcast material that could only be the very definition of "public radio," found its reach curtailed.

What forms does regulation take?

It's worth noting that regulation takes a number of forms. Although we generally understand regulation as a legislative force initiated by local or national governments through statutes or policy, communication systems can also be regulated through technological fixes, such as digital rights management and bandwidth throttling.

In addition to these external sources of regulation, it's also worth thinking about the ways in which systems are self-regulated by social norms and mores, by the users' expectations of privacy, and the means by which the system is created and maintained; in short, all of the ways in which individuals read the characteristics of a system and respond to its opportunities and limitations. What we think Facebook, Google or the NSA might (or might not) be doing with the data we create or move through their systems, changes the ways in which we interact with those systems.

Of course, many different kinds of regulation often act on a given system simultaneously, and the complex interplay between all these forces can be difficult to parse out. Is it possible, for example, for private capital to act in the public interest? And what are the ways in which explicit regulations are amplified or extended by "soft" or implied social regulations?

The questions I'll be poking at over the next few minutes revolve around a single central question: how can the characteristics of a communications system be understood as markers of the power of regulation? Specifically, at what points in a communications system does regulation act? Where and how can we see regulation working itself out?

What are the characteristics of a communications system and how are they regulated?

In thinking about this, I've conceptually separated characteristics of communications systems into three categories: flow, structure and commodity. I'll be using three corresponding examples of communications networks to help illustrate my points: broadcast radio, the post office, and the telephone system.

Flow/Broadcast Radio

Analyzing the ways in which data and information flow through systems can give us a sense of how these systems work, but more importantly it can illuminate the ramifications of regulation on the system; which valves control which pipes; where things flow from and to, and what effect restricting a channel has on the speed of the information flowing through it. Secondarily, it can tell us what other channels might open up as a result of excessive restriction on one channel of information. For our purposes, it's useful to think of this idea of flow as defined by the following properties: direction, volume and speed.

Direction may be thought of as the way in which information and communication flows. Is it unidirectional or bidirectional? Does it flow from the center to the periphery, from the grassroots to the mainstream, or is it moving in multiple directions at the same time?

Volume, or the amount of information or communication being carried over, on or through the wires, tubes, channels or pipes of the system. Is it a trickle or a flood? Is it comprehensible by a human being? How does the volume of information communicated by the system affect the uses to which that information can be put, and how does it affect the way in which that information is valued?

Finally, speed, or the velocity with which information travels through the system. How fast can communication travel from point to point? Is it a matter of weeks, days, hours, or seconds? How constant is this speed? Are there moments or situations when it is decreased, and why?

A good example of this idea of flow is broadcast radio, a medium that strings blocks of programming content and paid advertising together in a continuous stream that moves from center to periphery at the speed of sound. At least partially because of its constancy of flow, broadcast radio was seen as an instrument of social control; as a danger in the wrong hands and an opportunity in the right ones. As a result, it was subjected to intense regulation almost from its very inception.

The Radio Act of 1927 established the Federal Radio Commission (which later became the Federal Communication Commission) to take appropriate regulatory steps to ensure that radio acted in the "public interest, convenience, or necessity." In this case, regulatory efforts sought both to control the existence of a flow (by granting or denying licenses) as well as its volume (by limiting the power levels at which licensed radio stations were allowed to operate), thus weaving together abstract concerns over the public interest and social morality together with the hard sciences of frequencies and amplitude.

Structure/Post Office

The ways in which communication systems are structured can also reveal the values of the system as well as the particular kinds of regulation through which the system can (or cannot) be controlled. As with flow, this notion of structure can be further analyzed by looking at how the network is distributed and what standards it is subject to.

The distribution of a communication network, or the relative distance between its nodes, audience or consumers has implications not only for flow within that network, but also for how that network can be regulated. A fluid, dispersed, and anonymous network cannot be controlled in the same way that a closely clustered network with fixed nodes and credentialed users can. Networks that are intended to move information from a single point to another are vulnerable to far different kinds of restrictions than those that spread information from a single point to many, or funnel communication from multiple channels to a single point.

Standards also play an important role in the structure of communication networks; most often we think of structure standards which govern the structure of information packages exchanged within the system; as well as content standards, which determine what kinds of content can or cannot be transmitted via the network. Protocols, or the systems of rules for data exchange between physically disparate nodes in a network, are often overlooked but have a profound impact on what a network is, how it operates, and the uses to which it can be put.

To illustrate these points, let's look at a communication network we're all familiar with; the US postal system. Founded under the aegis of the Second Continental Congress in the early 1790s, the system was essential in the process of nation-building in the United States and, as scholars such as Richard John and David Henkin have argued, it made possible several institutional innovations, including the mass party and the voluntary association. It also served as the space in which diverse forms of communication such as the personal letter and the penny press were developed and solidified.

Structurally speaking, this system took the shape of a series of hubs - usually major cities - connected by spokes, usually established transportation routes such as railway lines. This allowed for transportation of mail to be regularized, and therefore to become far more cost-

effective. Because the postal service supports both public and private communication, information flows both from one point to many (as in the case of books and newspapers) as well as from a single point to another single point (as in the case of personal correspondence).

Regulation of the US Postal service established several important precedents. First, the system provided a variable rate schedule depending on the nature of the package being sent. For example, newspapers could be sent for reduced rates, thereby ensuring low-cost access to news and information throughout the country. Second, it guaranteed the privacy of personal correspondence, establishing the principle of privacy in the context of a federally-regulated communication system. As such, because of the manner in which the structure of the system was regulated, it contained the capacity to both facilitate the creation of a shared public narrative--through cheap and easy access to newspapers--as well as a means for subverting that same narrative, through confidential personal correspondence

However, you can't just send anything through the mail. We're all probably familiar with restrictions on items considered "hazardous, restricted or perishable" such as firearms, prescription medicine, cigarettes or alcohol. Perhaps more relevant to our panel today are the Comstock Laws of 1873 which prohibit the transmission of "obscene literature and articles of immoral use" through the US Postal Service. It's important to note here that these laws came into effect largely because the wide availability of pornography (enabled in no small part by the postal service) inspired an anti-pornography movement which took aim at the system seen as the main distributor of these materials. In other words, it's the transmission and exchange of these materials - rather than their existence - which is legislated.

Commodity/Telephone
In addition to thinking about the flow and structure of a communication network it's also worth understanding the commodity that these systems trade in. While we often assume the commodity of value for a communication system is the information it moves from place to place, that is not always true. In some cases, particularly when the network serves as a means to distribute content among socially, politically or geographically disparate points, the commodity with the most exchange value is in fact the network itself. Sometimes this means that the consumer of content may be the most highly prized commodity; in other cases (for example social media services) the relationships between consumers may be of extremely high value. None of these are mutually exclusive, of course, but it's worth understanding what is specifically valued by different systems and how that impacts the effects of regulation on each system.

An example that helps illustrate this point is the proliferation of "penny presses," or newspapers that were sold for a penny (or in some cases given away for free). Labor and printing costs were offset by by advertising revenues; because their low consumer cost enabled wide distribution, these newspapers could charge a premium for advertising space. This same model was also employed in broadcast radio, in essence commodifying both the network as well as its audience and spurring the creation of rationalized packages of information that could be delivered in a predictable manner, interspersed with advertising spots.

The telephone system exemplifies a different model of commodification, one that demonstrates a shift from a per-item cost model to a time-based subscription fee. Instead of consumers paying for delivery of a single item on an as-needed basis, the telephone system required a monthly subscription for an "always-on" service that could be employed at any time.

This is due in large part to the relative lack of governmental regulation during the early days of the telephone system. Unlike the US Postal Service, the telephone system was built almost

entirely at the expense of large corporations like AT&T or Bell. Wires were strung, exchanges built and operators hired at substantial loss to these companies both as a utopian effort to connect businesses and individuals, but also as a clear-eyed business strategy to achieve a "natural monopoly" by controlling all aspects of a system's technological infrastructure. By doing this, the telephone industry was essentially able to "self-regulate," thereby avoiding unpredictable governmental regulation.

Conclusion

As I hope I've demonstrated, the regulation of communication networks is a complex and intricate balancing act of addition by subtraction: the promise of bigger, better and faster networks that elevate public discourse through limits, controls and loss. It can be enacted through legislative processes, technological "fixes," or social norms and expectations. It interacts with the characteristics of communications systems such as flow, structure and commodity in myriad of ways, many of them invisible and unexamined.

Archivists understand the ways in which invisible or ignored forces shape the world around us; things like organizational functions, systems of recordkeeping and the evidential values of records. Regulation, I'd argue, is another one of those forces, and we have to deal with it whether we like it or not. Put bluntly, regulation determines what's left for us to work with. Understanding how regulation works helps us understand where and why archival silences exist, and offers windows into what those silences say. Without understanding these silences, without knowing what's missing, how can we know what to preserve or how to preserve it? Without understanding the means by which communications data travels from one point to another, how can we claim to provide accurate information about the context of its creation? How can we hope to provide effective access to what does exist in the absence of what is gone?

In a 2011 interview in the Paris Review, science fiction author William Gibson discusses how technology always seems to be of a time other than our own. "" Let's pay attention to the now so we can provide access to the past in the future.