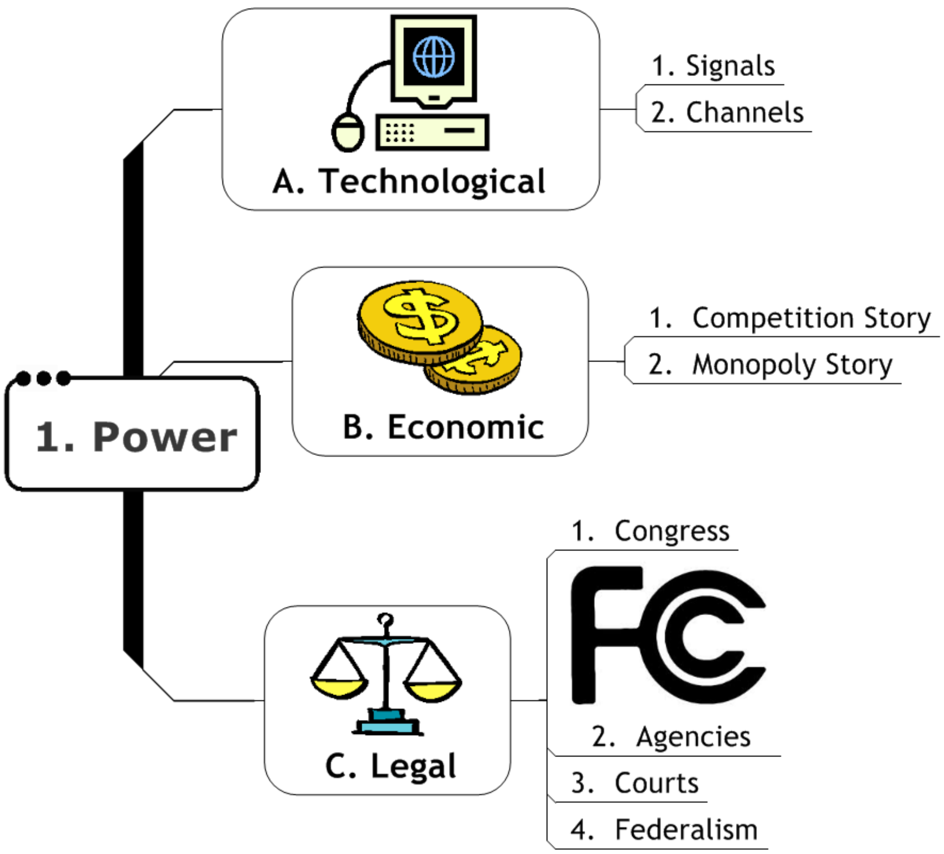
CHAPTER 1

Power



Human ingenuity has created extraordinary tools of cheap, ubiquitous global communications. These tools allow us to send voice, images, video, and data across great distances almost instantaneously. Consider, for example, how easy it is to make an international telephone call. By punching a few numbers on a keypad, we can converse with people on different continents as if they were next door. If telephony no longer amazes you, consider what the Internet has enabled. Two decades ago, no average American could publish a message accessible worldwide. Now, doing so is as easy as blogging on the World Wide Web or updating one's status on a social media network.

The *technological power* of modern communications allows us to receive breaking news, coordinate activities across great distances, engage in electronic commerce, enjoy entertainment, and share culture. Obviously, this communicative power can be used for good. In 1989, Chinese student dissidents used fax machines to reveal the truth about Tiananmen Square. In 2011, Arab Spring protesters used social media, such as Facebook and Twitter, to help organize demonstrations. Yet any potent tool can also be used for ill: Consider how easily one student can send an anonymous threat to another student via e-mail. As communication technologies improve, all of our communicative powers increase, for better and for worse.

How does society distribute these wonderfully powerful communication products and services? In the United States, we leave that generally to the marketplace. Ideally, the push and pull among myriad suppliers and customers set a market price for communication equipment and services at just the right level. At this market price, consumers neither under- nor over-consume, which means that society is allocating its resources in a sensible way. But in practice, markets do not function perfectly. For example, certain corporations may gain sufficient *economic power* so that they can set prices higher than they should be. This deprives consumers of valuable communication services even though they are willing and able to pay a fair price. In addition, through economic dominance, a few media conglomerates may gain the power to frame the news, entertainment, and information that shape our culture and politics.

Too much is at stake—economically, socially, and politically—for society not to respond to the rapidly changing technological and market environments. Often, society responds by enacting laws—for example, to regulate the firms that provide communication services or the content they carry. Government regulation thus implicates power in yet another sense. This *legal power* is exercised horizontally across the various branches of government—legislative, executive, judicial, and regulatory. At the federal level, which is the focus of this text, legal power is wielded principally by Congress (e.g., by enacting statutes such as the Communications Act of 1934, updated by the Telecommunications Act of 1996), the Federal Communications Commission (FCC) (e.g., by issuing regulations), and the courts (e.g., by reviewing agency action). This power is also shared vertically between the federal government and state and local governments.

The fundamental concept of *power* thus lies at the foundation of our study of communications law and policy. First, technological power creates new forms of information exchange and social interaction, which generate new possibilities (such as electronic commerce) as well as new problems (such as easy access to pornography by minors). Second, in the competitive arena of the marketplace, certain communications firms may come to achieve substantial economic power with which they can set prices, policies, or conditions that are not only economically inefficient but also politically worrisome. Third, legal power (ideally) encourages beneficial development and deployment of communications technologies while attempting to constrain their harms. This chapter examines power in all three senses, as well as their complex interrelations.

A. Technological Power

To start a legal casebook with a technological discussion is unusual. But, a better understanding of technological power is crucial to understanding the principles and policies that drive modern communications law. It enables judges and policymakers to exercise legal power more intelligently; it also enables lawyers to invoke legal power more persuasively. Just as a medical malpractice lawyer must understand medical science and health care practice to advocate effectively, a communications lawyer or policymaker must understand the fundamental technological building blocks of her subject matter.

At its foundation, communication involves transmitting a message between a source and a destination. This process can be modeled by the following simple steps:

(1) the *source* has some *message* to convey;

(2) a *transmitter* converts that message into a *signal*;

(3) the signal is transmitted along a *channel*, which inevitably adds some noise;

(4) the *received signal* is converted back into the message by a *receiver*;

(5) which is (hopefully) comprehended by the *destination*.

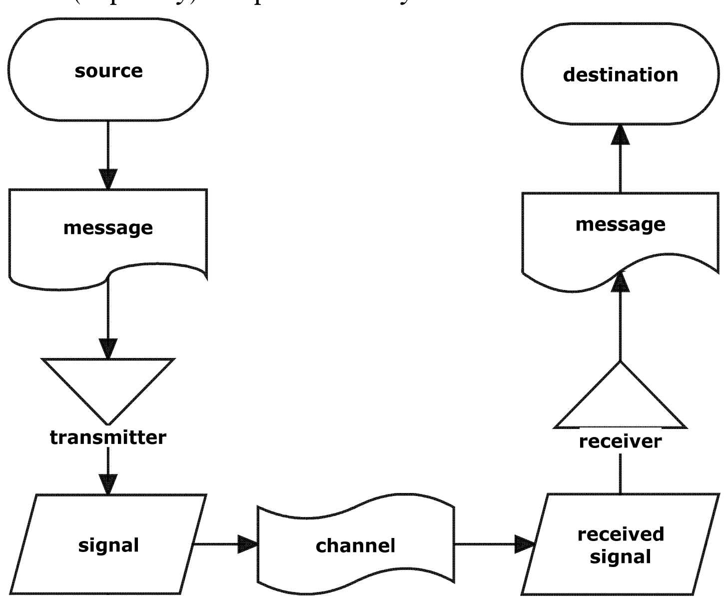


Figure 1.1: Basic Communication Model

This basic model can be applied to any sort of communication. Consider, for example, what your professor might say in class. She (source) wants to convey an order "No surfing the Web during class!" (message). Her vocal cords convert that message into atmospheric vibrations (signal). Those vibrations move through the air (channel) competing against the clickety-clacks of laptop keyboards. Those vibrations (received signal) are then converted by your ear drum (receiver) back into the message, which prompts you (destination) to minimize your web browser window.

1. Signals

a. Signals Explained

A *signal* is a physical characteristic of the world to which we can attach meaning. It can be any physical characteristic, such as puffs of smoke, lit lanterns, or changes in atmospheric pressure such as the sound of your professor's voice. As long as both source and destination can associate the same meanings to these physical characteristics, a message can be communicated.

Certain physical characteristics function better than others as signals. For instance, smoke signals cannot travel long distances before being scattered by the winds. Whether there are one or two lit lanterns might be hard to see a half mile away. Your professor's voice, as blaring as it may be, cannot be heard past a few hundred feet. For modern computing-communications, which require rapid transmission of huge amounts of data across tremendous distances, the signal of choice is electro-magnetic (e-m) energy. E-m energy is a fundamental phenomenon of nature possessing miraculous properties. Most important, in a vacuum, changes in e-m energy propagate at the speed of light (3×10^8 meters/second). Because it is critical to understanding modern communications, we explore the concept of the e-m wave more deeply.

An *e-m wave* is a self-sustaining oscillation of perpendicular electric and magnetic fields, which propagate through empty space at the speed of light. We are already familiar with e-m waves even if we don't call them as such: They bring us television over the air (broadcast waves), cook our food (microwaves), allow us to see (visible light), and diagnose our fractures (X-rays). Simple e-m waves can be described mathematically as a sine function with three basic variables: amplitude, frequency,[*] and phase. For simplicity, we discuss only amplitude and frequency.

[*] In communications law, e-m waves are discussed in terms of their frequency. However, one can equivalently describe them in terms of their wavelength, which is simply the inverse of the e-m frequency. That means the higher the frequency, the lower the wavelength; the lower the frequency, the higher the wavelength. To understand this inverse relationship, note that the speed of any wave can be computed by multiplying the frequency by its wavelength. For instance, suppose that a wave completes two full cycles in one second (frequency = 2 Hz). If this wave moves 10 meters per cycle (wavelength = 10 m), then in one second the wave will