The Economics of Information

Public and Private Domains of Information: Defining the Legal Boundaries

by Anne Wells Branscomb

Editor's Note: The following paper is adapted from the keynote address presented at the 1994 ASIS annual Meeting in Alexandria, Virginia. Anne Wells Branscomb kicked off the meeting with fresh insights into some of the difficulties surrounding the assessment of the value of information.

Information has always been a valuable asset to those who possess it. Where the fish were biting was an important piece of information to tribal societies. They shared this information because it was in the interests of the community to do so, and the catch was shared by all members of the tribe. Today where the fish are biting is a carefully guarded secret by fishermen who store the longitude and latitude in the memories of their Loran equipment on their fishing boats. Their boats are also equipped with satellite antenna in order to obtain access to the remote sensing satellite data that discloses where the schools of fish are concentrating and what prices are offered for their catch on the global markets.

The U.S. economy has been in a state of transition from an agricultural economy in the 19th century to an information economy in the 21st century. In 1790 we were largely an economy of farmers. Today we are predominantly an economy of information workers. According to U.S. Commerce Secretary Ron Brown, about 60% of our work force today is engaged in activities that are producing information products.

The United States has passed all too briefly, it seems, through an industrial economy that was the envy of the world. The agrarian economy was one in which information was most often cherished as a public resource that should be shared in order to enhance the collective performance of all agricultural components. These were highly disaggregated and could not be expected to fund their own research. An information society is also disaggregated, but one in which the primary foundation of the economy may become collecting, processing, distributing and archiving information as a primary source of income upon which the society must rely for its economic health. We are at that crossroads now.

Thus we have a thriving information industry that has been growing at some 20-25% per year for the past several decades. However, as we see the burgeoning growth and use of new information technologies, we also see an erosion of the traditional public institutions that support information processing and distribution.

An information economy is based upon the premise that information has economic value and requires an information marketplace in which such value can be exchanged. However, this economic reality runs counter to the popular historic notion that information is free.

Confusion about What We Mean

In discussing the information is free notion, we often create immediate confusion. First, we apply the terms public and private to information, but without clarification of their meanings. We may mean that the information itself is from public or private funding sources, e.g., tax-funded or from foundation grants or purchase orders. Or, we may refer to the physical spaces in which information is found, i.e., either a private place for which our entry requires permission, or a public space in which everyone is invited, such as a public library. Or, we may wish to suggest the uses to which information is put or the means by which it is distributed, e.g., a memorandum to a private group or public dissemination on television. Finally, we may mean what the economists mean when they differentiate between public and private goods.

Whatever we mean, economic costs are associated with discovering, gathering, processing, manipulating, archiving and even using information. We invest time, which is a constant and not variable. As much as I admire the volunteers of Project Gutenberg, who are busily rendering into machine-readable form all of the great works of literature, their efforts are not free. They are spending, and I use the term advisedly, their time and skills to assemble this gift that they are putting into the global information commons.

We also spend money on the resources we need to gather, process and distribute information. Most expensive of all, we deploy humans in the form of professionals skilled in producing computer software, designing search algorithms and developing more user-friendly interfaces to the world's cornucopia of knowledge.

Intellectual property is financed in basically three ways: by patronage, procurement and property. Patronage refers to the funding of information producers, processors or archivists within fully funded and budgeted institutions such as the Library of Congress, the U.S. Geological Survey or ARPA.

Procurement means the contracting out of information products by institutional mandate, as, for example, the purchase of product from independent contractors who provide the information services and deliver the completed product for a stated price. This methodology is used widely in economically advanced economies and intergovernmental institutions such as the Organization for Economic Cooperation and Development (OECD) and the World Bank. Such independent contractors, often telecommuting workers, are a fast-growing segment of the information economy in the private as well as the public sector.

Financing intellectual property by property rights means the undertaking of information gathering and processing by independent entrepreneurs who anticipate that they will be able to obtain compensation for their labor on an open market when their product is made available to the consuming public. Human capital must be provided with a reasonable expectation of a return on the investment of intellectual skills as well as the use of the information processing machines that support productivity. The marketplace of information depends upon informatics professionals whose financial health depends on their ability to attract customers willing to pay either from public or private coffers for their labors.

But this form of funding, unlike patronage and procurement which provide a source of income for the writer, video artist or information providers, requires legal protection of intellectual property rights for effective performance in the electronic marketplace. And as yet, we have not managed to translate our legal system for the protection of information property into a viable system for the information age.

Legal Tools for the Protection of Information

A genuine marketplace of information products cannot be sustained without the existence of a fairly sophisticated and mature legal system that guarantees proprietary rights to the producers and processors of information products and the providers of information services. The legal tools for protecting proprietary information are expensive and complicated. Let us look at the legal domain in three separate ways:

looking at creativity as property;
looking at the public domain as a form of public ownership and control; and
viewing privacy or control over personal information as property.

Creativity as Property. Knowledgeable information professionals understand well the differences between copyright, patents and trade secrets as legal methodologies for protecting proprietary interests in the creative work products of the mind. But not everyone is so aware of the new concepts that are creeping into legal practice in the software industry to differentiate between kinds of users. Shareware, for example, is software that is issued without charge, with the expectation that satisfied users will send in payment. Freeware, on the other hand, is issued with no strings attached and becomes a part of the public domain, available for the taking. Copyleft is a mechanism, enforced by contract or hope by Richard Stahlman, that if you take his freeware issued into the public domain and enhance it or offer value added, you may not then appropriate it to your own proprietary domain, but must re-issue it as freeware available to the world at-large. Misappropriation is a theory of law that lawyers turn to when all else fails to protect their clients in the expectation that judges and juries will see the merit of their arguments and award what we call equitable relief.

Public Information as Property. Information in the public domain, at least theoretically, belongs to the body politic, although there is some ambiguity as to which body politic the information belongs. If the information is truly public domain, in other words, belonging to the global commons, and not proprietary to any government or worldwide institution, then it may meet with what is called the tragedy of the commons: either it will be overused and misused, or nobody will take care of it. If the information is public but entrusted to a public institution, then there is the difficulty of dwindling public financial support.

An issue has arisen with respect to software products developed by the government. Unlike patents which can be licensed, software generated by the U.S. government is legally prohibited from becoming private domain under the copyright act. Where will the support come for enhancing and marketing these products?

Personal Information as Property. What disturbs many people is transaction-generated data, that which is captured from purchases of merchandise or services or from telephone calls. Such data can easily be correlated in order to produce reasonably accurate

information profiles of individuals. Furthermore, there seems to be little legal control over the redistribution of this information far and wide.

One of the major inadequacies of the system of intellectual property rights is that facts are not protected. Under the U.S. Supreme Court's Feist v. Rural Telephone decision, Justice Sandra Day O'Connor made it abundantly clear that copyright was only intended to protect original expression, not factual information. But what we really seek to protect in today's computerized marketplace is autonomy over personal data about ourselves and our purchases, travels, activities, health care. We fear a personal dossier that knows everything anyone ever wanted to know about each of us, that may be packaged and sold to others without our knowledge or permission. There is no law that prohibits most of the private sector from doing just that.

What happens with a compilation or computer database is that facts are, in effect, withdrawn from the public domain by a user who enhances the value which itself becomes marketable. Although the facts may not be appropriated, and another user is free to take the facts, what is valuable is the manner in which the facts are organized by the searching methodology deployed to make access to the facts more useful. Since the Supreme Court has ruled that facts may not become the subject of copyright protection, regardless of the amount of labor involved in collecting and organizing them, there remains some doubt concerning the amount of protection databases may maintain over the content of their products. The European Community has proposed protection of databases with a compulsory license to be available so that the new provider of the factual data may be assured of compensation for the effort. A compulsory license is a legal technique for compelling a proprietor to share information by permitting a statutory charge for the sharing.

Deploying the concept of property to personal information does not necessarily mean that each of us would be entitled to payment for the use of our names and addresses, although at least one proposition has been offered that a few cents should be deposited into our social security accounts by direct mail marketers who intend to address us. There are other mechanisms, such as barter arrangements. Oftentimes user groups or professional peers exchange valuable information on a quid pro quo basis or barter arrangement. For example, scientists share their scientific data with colleagues in order to have it vetted and verified by a peer group which later releases it to the public through scientific journals. Much of this exchange takes place over electronic networks, such as the Internet, where lurkers who are non-scientists, and, indeed, may be journalists, download and use it before it has received the thorough review sought by those who are sharing the information among a private peer group.

One difficulty with the application of absolute property rights to personal information is that it would inhibit governments from taking the data without compensation and due process, possibly affecting the collection of census and other important research data needed in the aggregate to supply information both for public and private decisions. However, there is no reason why we cannot develop a theory of personal choice and control over personal data that requires a fair exchange. Indeed, a law was passed this summer in the Omnibus Crime Bill requiring state motor vehicle license bureaus to provide an opportunity for those who feel vulnerable by having their names in a public

registry to "opt out," forbidding release of their records to the public.

Inhibitions and Concerns in the Electronic Marketplace

With such a rich heritage of legal concepts, why do we not find it easy to transfer the legal system which we have deployed for the agricultural and industrial economies to the electronic information marketplace?

Expense of Computerization. A primary reason is that the information technologies with which we now deal require an expenditure of funds which we are often not willing to make from public resources. We turn instead to private enterprise to provide the capital investment. This is a conscious choice within a democracy, not something which has been decreed based upon malicious or wrathful Gods. We are moving more and more into an economy based upon information processing and distribution, because most of us like white collar jobs better than we like blue collar jobs, and nationals in other countries are willing to provide the output of blue collar jobs at less pay with higher quality, so that we as consumers prefer to purchase the products of their labors rather than our own.

Whether we can sustain such an economy based upon information alone, which does not also have a substantial base in agricultural or manufacturing productivity, remains to be proven. In order to sustain such an economy, it is vital to derive value from the labors required to produce income. Thus, we are seeing much more of our information sector commercialized. We can only sustain a public information sector dedicated to the support of other primary sectors if they, and not the information section, are the primary sources of our national wealth.

The Notion That Information Wants to Be Free. Information has no desire to be free, meaning unfettered or without compensation, nor does it want to be caged, meaning contained or kept secret. Information has no persona to will either freedom or incarceration. It is inanimate, subject to the will of its users and seekers, its generators, collectors and archivists. While some data may be free, however, capturing it in machine-readable form and turning it into information which can have value usually requires at a minimum human labor and often the use of expensive equipment. For example, information about geological resources is generally in the public domain (although some countries claim legal rights to prevent the taking without compensation of data concerning their natural resources). To acquire and use the information requires the expenditure of money to fund the remote sensing satellites, the highly sensitive cameras, the computers to analyze the data and the human resources to interpret it. Thus, the information becomes valuable through the human capital and equipment invested in the effort. In this way, what was public domain information may be exploited by entrepreneurs and become a valuable commodity that can be marketed in the information marketplace.

However, if such information has been generated through the investment of public funds, maybe it should be available to all for the taking. But what of public funds that come from one nation-state intended for the benefit of its citizens? Arguably, it should be available only to citizens and companies of that nation state. Thus, one can argue that valuable information resources, to which all of the nationals of the world lay claim, should be both funded and captured by a pool of capital supplied by contributions to a

central fund and then become part of the global information commons.

Inappropriateness of the Concept of Copyright. Copyright law is turned on its ears within many of the early electronic environments such as the Internet and the bulletin board systems where there has developed a presumption that what is entered is in the public domain available for downloading or retransmitting at will. This is contrary to the current presumption of the copyright law that any original expression belongs to the utterer and needs no notice to establish the proprietary right. What is needed is a recognition within the electronic environment that counter notions prevail, and electronic notices are needed to establish at the outset into which kind of electronic domain one is entering and the circumstances under which one may establish a proprietary claim to the information entered into an electronic conference.

Electronic markers need to be devised to warn users of the rules of the electronic highway regarding downloading for personal or secondary purposes and re-distribution of information within the network itself. Further development is needed to design a system capable of tracking uses which are permitted and to bill for commercial transaction on the network. More than 70% of the domains on the Internet are now commercial. No doubt such developments are on the drawing boards of all commercial information providers. Inaccurate Concept. Another major problem is the paradigm of a copyright, whose roots are embedded in the printing press and the notion that there is an artifact which can be copied. Although the legal regime has been able to expand its horizons to cover artistic and musical works of all kinds, the aspect of a copy as the right which is to be protected stems from the notion that it is copies which are marketable.

In the computerized environment it is access to organized information which is valuable and everything is copied. It is impossible to use a computer program without copying it into the memory of the computer. It is impossible to use an online database without copying the electronic signals onto your disk or video monitor. Thus the use of the term is an anomaly.

An Alternative to Copyright. A networked world will be better served by a paradigm based upon uses of information rather than sales of copies. This paradigm would acknowledge several types of uses:

Prohibited Uses - by and large bits of information which are private for individuals or secret for institutions and nation states.

Permissible Uses - for example, newsworthy events, medical records of presidential candidates, and legally mandated uses, such as compulsory licenses, patents and copyrights.

Mandated Uses - such as disclosure of one's name, address and birth date to obtain a social security card and disclosure of one's medical history to obtain an insurance policy.

Misuses - such as libel or slander or misappropriation of the commercially marketed work product of another. It may be misuse of private information to disclose the nature of the books one has been reading or the videotapes one has viewed. Remember the public reaction to the release by the press of Robert Bork's videotape rentals? Congress reacted summarily with the Video Privacy Protection Act of 1988, rejecting the notion that one's

viewing habits as reflected in one's rentals of videotapes could be made public knowledge.

Fair Uses - such as quoting from an academic journal or critical analysis. The law has in prior years permitted only snippets of information to be considered as "fair use," but that too is changing with acceptance of the copying of entire works, as in the case of recording television programs on videotape and the reverse engineering or decompilation of computer code for the purpose of designing interoperable software.

The paradigm would also acknowledge abuses, of which there are many. The trend today is to assume that many of the abuses can be avoided by use of the technology itself, anti-virus software for detection of infection, encryption to protect against unauthorized access and imbedded coding for the detection of infringement. However, the enactment of criminal statutes, even if not broadly applied, serves as a benchmark of what the society is unwilling to tolerate in computer abuse and encourages industry teams to work diligently to protect their rights.

A paradigm based upon the type of use, as well as abuse, seems imminently more sensible than one based upon what is or is not copied.

Economic Support of Universal Service. Yet another difficult question is how we guarantee access to this great new electronic marketplace. Worldwide statistics of who has a telephone, the instrument of first accessibility to the global grid, look dismal. The correlation between income and the number of persons having access to each telephone is almost directly linear with a rising income. If you compare Switzerland with one phone for every citizen and a per capita income of $32,680 with Chad, which has 1068 inhabitants for each telephone and an income of only $190 a year per capita, it is difficult to deny the relationship between greater accessibility to the global grid and economic status.

The constraints upon providing universal service both at home and in the world at-large are economic - the costs of installation and development of the human resources to provide both hardware and content; cultural - concerning community autonomy; and political - the more difficult questions concerning national sovereignty and complex relationships in the real world.

Technology Offers Solutions

The answers for more advanced nations are offered by the informatics technology itself. It is not necessary for all inhabitants of planet Earth to have their own computers and fiber optic cables to their homes. It is necessary that people become competent to use computer terminals, that they have access to the global grid at public places and that they have the economic capability to deploy the technology to their own needs. The technological tools being developed and deployed are the smart card, digital cash, electronic markers and audit trails.

The smart card is color blind, sex blind and religion blind, though it is not, of course, income blind. It may imbed a line of credit along with personalized information and digital cash to pay for transactions. Its greatest asset may be its ability to record transactions and leave an audit trail. You could purchase a book or have access to an

online library as easily as you could use food stamps instead of a credit card. Indeed, smart cards can be used to acquire information in much the same way that they are used today to purchase fuel and food and, if there is no immediate indication of the source of the card (i.e., public subsidy or private bank account), their use would be enabled without stigma.

But who will pay for the subsidized services and where will the access be provided?

For those who can't or don't own their own equipment, there should be public terminals where one can easily plug into the information marketplace. Such terminals can be offered by public sector institutions, such as libraries or post offices, or by any number of private sector institutions.

With the explosion of information, the expansion of electronic highways and the increase of knowledge generally, there should be no information poor. Our information environment can be enriched for everyone, if we deploy the hardware and software wisely within a legal structure which is fair and just.

The world may not have the collective will to provide universal service. It will be a long time before the private sector looks upon the aborigines in Australia as an attractive market opportunity, but we have the tools to provide all inhabitants of the this planet with satellite-delivered mobile access to the global infobahn.

Some Observations about Today's Partnership Between Public and Private Domains

Today, less and less information seems to come to us from public funds and private philanthropy. More and more information is offered as a commercial product for which direct compensation must be paid by the user. In other words information is not free.

There are both advantages and disadvantages to this growing marketplace. Computerized searching permits the finding of a needle in a haystack, but such a finding - if the transaction-generated information is recorded and sold to a commercial enterprise - may unleash an avalanche of unwanted information which we don't seem able to control.

Eventually the maturing of an information economy and greater control over the technology may offer more personal options and freedom of choice. Thus each of us will be able to mix and match public and private information according to our own desires and needs. And we will be able to exercise more individual choice and control over information about ourselves and how it enters the marketplace. In other words, information is not inherently global. Some of it is and should be uniquely personal and private.

If you read between the lines of the Clinton administration's efforts to define a national information infrastructure (NII), although there is an admonition to the private sector to link schools, libraries and hospitals to the information superhighway and to offer lifeline services to the needy, the primary purpose of the NII is to assure the United States of a global competitive advantage. In other words, the dividing line between private and public domains of information is what we make it through our votes, our donations and

our entrepreneurial activities.

If we wish to expand the public domain of information we, as citizens, must vote with our tax dollars or donate with our charitable dollars to the public institutions of learning and archived knowledge. Otherwise we will continue to rely, as we seem to be doing, upon our choices as consumers in the shopping malls of the global information marketplace.

In summary, information is not free. It is not inherently global. Some is uniquely personal and private. The legal line between public and private domains is not fixed. Information is a valuable asset, a treasured resource and archive of knowledge. What use we make of it is up to us to decide.

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