
How Does Intellectual Property Law Affect the Value Creation Process and Strategies of Database Companies ?

by Eyun-Jung Ki and Byenghee Chang, University of Florida, U.S.A.

Introduction

We are entering the age of information economy (Petit 2001). Today, the focus of our economy is changing from the making of goods to the production of knowledge as a form of commodity (Baron 2001). Increasingly, information is beginning to be regarded as an economic commodity, a category of items that are traded for a price (Currie 2000).

The value of information as an asset has become especially significant in corporations. Information in a corporate context is not limited to a secondary function. That is, not only is information pertinent for efficient decision-making, but information itself can be traded as a commodity (Hayek 1945). Thus, the incentive for protecting information as an asset is becoming stronger.

Intellectual property law has traditionally been the primary means by which intangibles have been made into a commodity. Intellectual property law permits the conversion of certain types of information into legally recognized property (Hirshleifer 1971). The corporate use of intellectual property as a strategy for gaining competitive advantage has been expanding.

This paper adopts the position that changes in intellectual property law have effects on the value-creation process of information as a commodity, and that in turn determines the corre-

sponding strategies that are used in the database industry. In particular, this paper proposes that:

- (1) information has particular economic characteristics different from other economic commodities;
- (2) these characteristics are closely related to the value-creation process of information and corresponding strategies; and

- (3) changes in the intellectual property law defining the scope of information as economic property affects the value creation process and strategies.

This paper focuses on the concept of the database as a type of information. Database refers to a compilation of non-creative works, which include only facts, not ideas. Among the reasons for focusing on the database are that the database industry is now a highly recognized area of the information industry and that database itself has particular economic characteristics that result in controversial legal issues. In addition, the economic and managerial issues of the database related to the intellectual property law have not been adequately addressed by the academic community, despite their importance.

Abstract

This study demonstrates how changes in intellectual property law have effects on the value-creation process of information commodity and related strategies. To explain these effects, three unique economic characteristics of databases as information are focused on: public good, information good, and aggregate good. And, different strategies such as versioning, technical strategies, and limiting the number of consumers and data mingling have been suggested for each characteristic. To examine the value-creation process of databases, a three-step process has shown: data gathering, selection/arrangement, and presentation.

In the legal process, two main rationales, 'sweat of the brow doctrine' and 'originality doctrine' have suggested protecting database compilations. The 'sweat of the brow doctrine' stresses the effort and investment of the compiler. On the contrary, the 'originality doctrine' emphasizes the judgment and creativity in the selection and arrangement of the materials comprising the compilation.

Eyun-Jung Ki

(lilian76@yahoo.com)

is Graduate Student, College of Journalism and Communications at the University of Florida, Gainesville, U.S.A. Her research focuses on crisis communications and strategies in public relations.

Byenghee Chang

(changbye@ufl.edu)

is Doctoral Student, Mass Communication Program, College of Journalism and Communications at the University of Florida, Gainesville in U.S.A. His research focuses on media strategic management and media law.

Table 1: Comparison of Public Good, Information Good and Aggregate Good

	Characteristics & Examples	Strategy
Public Good	<ul style="list-style-type: none"> ■ Non-rivalry in consumption: one person's consumption does not reduce the quantity to other people (e.g. television program) 	<ul style="list-style-type: none"> ■ Versioning
	<ul style="list-style-type: none"> ■ Non-excludability: hard to exclude non-paying consumers (e.g. television program) 	<ul style="list-style-type: none"> ■ Technical strategies such as security system ■ Contracting ■ Inserting artificial data
Information Good	A consumer's utility is closely related to a different consumer's consumption of the same good	<ul style="list-style-type: none"> ■ Limit the number of consumers
Aggregate Good	The value of the coherent collection of individual data is bigger than the arithmetic sum (e.g. 10 collected items vs. one missed item)	<ul style="list-style-type: none"> ■ Connecting several data in one source (A+B) ■ Creating new database with collected different data (A+B = C) ■ Data updates ■ Abstracts ■ Data mingling

Part two of this paper provides background information. First, the researcher explains the economic characteristics of databases and shows how the value of information, especially the database, is created or increased through the process of transforming raw material into final economic commodities. Second, database-related legal doctrines and legal cases are explained. Part three examines in detail how the database-related doctrines and cases influence the value-creation process and strategies of databases. In part four, the researcher explores the implications the database protection bills that have been proposed in the U.S. Congress will have on the relationship discussed in part three. Most related laws and cases used in this paper are based on the US situation. It is difficult to deal with different countries' intellectual property laws because they adopt different legal systems.

Databases as economic commodities and the value-creation process of databases

As a kind of information, a database has unique economic characteristics. Among these, this section focuses on three economic characteristics related

to the value-creation process: public good, information good, and aggregate good.

Public good

Generally, a database has commonly been explained as an example of a public good. Public good is defined as a good whose cost of production is independent of the number of people who consume it (Samuelson 1954). The cost of extending the service to an additional person is zero (Samuelson & Nordhaus 1995). This means that one person's consumption of such a "product" does not reduce the quantity available to other people. This is called non-rivalry of consumption. A television program is a typical example of a public good: a viewer watching a program does not prevent another viewer from watching the same program (Owen & Wildman 1992).

In addition, with public good, it is difficult to exclude other non-paying consumers from consuming the product (non-excludability). For example, everyone who has a television set can watch a program. It is not only impractical but not cost-efficient to keep a certain viewer from watching the pro-

gram. This characteristic demands that sellers of public goods devise a kind of protection system.

The non-rivalry characteristic of information or databases makes it difficult for database companies to set a price. Therefore, such companies should find a different standard for setting the price of their databases because the cost of production is nearly useless in this case. As an alternative means, companies can use consumers' willingness-to-pay or expected satisfaction (utility) from consuming the database. Strategically, companies can publish different versions. According to Shapiro and Varian (1999), versioning refers to offering an information product in different versions for different market segments. For instance, if a corporation offers a product line with one product targeted for professional users and one product for amateur users, the corporation can see how the market splits (Shapiro & Varian 1999).

The non-excludability characteristic of databases demands protection systems. Free-rider problems can occur due to non-excludability. In order to avoid this, companies use technological strategies, such as a security system. For example,

only the person who has a password can approach the database. In addition, companies can make a contract with customers against unauthorized uses. Inserting artificial data can be used as another strategy.

Information good

Public good characteristics, however, cannot explain all the facets of databases as economic commodities. For example, public good characteristics do not explain consumers' satisfaction. This paper adopts a new concept, 'information good,' to fill in the gap by explaining how satisfaction occurs. In the case of information goods, a consumer's utility that is obtained from consuming an information good is closely related to a different consumer's consumption of the same good. For example, in a game situation, suppose that there is an important piece of information the game player needs in order to win the game. The player will try to buy that information by paying for it, but coupled with an important condition. The player will demand that the seller not sell the information to the other game player. If both players obtain the information, it will be worthless.

Strategically, unlike the case of public good, the producers of information goods will be inclined to limit the number of consumers of their products. That is, considering the slope of the demand curve, the producers determine the number of consumers needed to maximize their revenue (number of products sold * willingness-to-pay), in contrast to a public good where producers try to maximize the quantity of products sold.

Aggregate good

The other economic characteristic that this paper adopts regarding databases is that the coherent collection of individual data is bigger than the value of the arithmetic sum of individual data. Let's suppose that a database consists of

10 individual items (data). If we compare the value or willingness-to-pay between the 10-item database and the 9-item database in which one individual item is missing, we cannot say that the price (value) of the latter one is 9/10 of the complete database. Based on this characteristic, there are several strategies corporations can employ. First, corporations can employ a 'portal service,' which compiles several different data and permits people to access these data in one source. Second, corporations can collect several kinds of data and create a new database. Third, frequent updates can also be used. Inserting an abstract will be another good strategy. Finally, corporations can mingle data making it difficult to separate data.

Value-creation process of databases

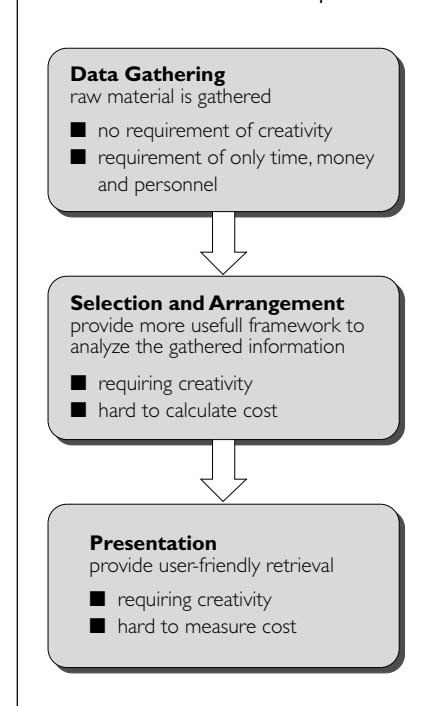
The value of databases arises from the entire process of the database business, as well as from the stage of data gathering. Generally, the process of a database production is composed of four parts: (1) selection of the contents; (2) the coordination of the internal contents; (3) the arrangement of all elements of the database; and (4) the contents itself (Kutten 1987). The process can be classified into three steps: data gathering, selection/arrangement, and presentation.

In the first stage of data gathering, raw material (data) for a database is gathered. This stage does not demand creativity; it only requires time, money and personnel. The costs can be calculated. Selection/arrangement is conducted to provide a more useful framework to analyze the information gathered. Usually, the criteria for selection/arrangement are decided before data gathering. This stage demands creativity, and it is difficult to calculate the magnitude of cost because we cannot measure the quantity of input for creativity. Third is the presentation stage, which reveals the database to the pub-

lic. With the speedy development of computer networks, the importance of the presentation stage is growing. Compared with data on paper, data contained in computers can be presented more effectively. Several query or retrieval functions can be used. This stage also demands creativity, making it difficult to measure the cost of any piece of creativity.

In brief, a database as an economic commodity has its own generic characteristics such as public good, information good, and aggregate good. Based on these characteristics, database owners can use several strategies. These strategies, however, are directly related to value creation process of databases: data gathering, selection/arrangement, and presentation because the value of databases increases through these stages, and these stages can confine the scope and strength of the strategies which database owners can adopt. Intellectual property laws regarding databases do not directly affect the strategies or change the economic characteristics of databases. They directly affect the value creation process. Intellectual property laws specify the scope or

Table 2: Value Creation Process of Databases



stages of the stages that they protect. Through this direct effect on value creation process, intellectual property laws can result in strategic changes of database owners indirectly.

Database-related doctrines and legal cases

The debate over the appropriate level of legal protection for the collection of information has taken place virtually since the inception of copyright law. This debate, however, assumed new urgency and importance in the 1990s as a result of the Feist Publication, Inc. v. Rural Telephone Service decision (1991), the European Union Directive on databases (1996), and the proposed World Intellectual Property Organization (WIPO) Database Treaty. The Feist case is important in that it resulted in dramatic changes in legal protection of databases in the U.S., rejecting the previous sweat of the brow doctrine. The EU Directive is a result of European countries' efforts to stimulate investment in databases and thereby increase the European share of the database market which is important to the economic development of the EU (Bastian 1999). This EU Directive is affecting other non-EU countries' legislative process regarding database protection.

Copyright law defines a database as a 'compilation.' A compilation is 'a work formed by the collection and assembling of preexisting materials or of data that are selected, coordinated, or arranged in such a way that the resulting work as a whole constitutes an original work of authorship' (17 U.S.C. § 101).

Over the course of the nineteenth century, two rationales have developed for protecting compilations under copyright law. One rationale ('sweat of the brow doctrine') emphasized the effort and investment of the compiler, while the other ('originality doctrine') focused on the compiler's judgment and creativity in the selection and arrange-

ment of the materials comprising the compilation (U.S. Copyright Office 1997).

'Sweat of The Brow'

Prior to the enactment of the Copyright Act of 1976, cases decided under the Copyright Act of 1909 held that fact compilations were generally protected material. The theory under which they received protection came to be known as the 'sweat of the brow' doctrine.

The standard for the sweat of the brow protection was suggested in *Jeweler's Circular Publishing Co. v. Keystone Publishing Co.* (1922).

The man who goes through the streets of a town and puts down the names of each of the inhabitants, with their occupations and their street number, acquires material of which he is the author. He produces by his labor a meritorious composition, in which he may obtain a copyright, and thus obtain the exclusive right of multiplying copies of his work.

In *Schroder v. William Morrow Co.* (1977), a case which relied upon sweat of the brow rationale, the plaintiff compiled a gardening directory, listing the names and addresses of various seed and plant suppliers, and obtained for it a valid copyright. In an effort to save time, the defendant copied the names and addresses without expending any independent effort or research. In that case, the U.S. Court of Appeals for the Seventh Circuit held that 'an original compilation of names and addresses is copyrightable even though the individual names and addresses are in the public domain and not copyrightable.' It reasoned that copyright law protected the compilation itself as a product of the plaintiff's industry or 'sweat of the brow.'

These cases were decided under the Copyright Act of 1909, which expressly included compilations among protected works of authorship. In 1976, a new Copyright Act was passed which

eliminated databases from the list of enumerated protected works. After the 1976 Act became effective in 1978, courts still held that certain compilations of facts were protectable under the 'sweat of the brow' doctrine.

Originality doctrine and Feist case

In 1991, the U.S. Supreme Court decided *Feist Publications, Inc. v. Rural Telephone Service Co.* Rural Telephone Service Co. was a local phone company that published a white pages phone book for the area it served. Feist publications published a directory covering Rural's service area in addition to several other areas. After being refused a license to use Rural's directory, Feist copied Rural's directory without its permission. Even though both the federal district court and the Court of Appeals found Feist liable for copyright infringement, the Supreme Court reversed the decision.

The Supreme Court rejected the 'sweat of the brow doctrine,' determining that protection is only possible if the collection involves independent creation and originality in its compilation. The Supreme Court commented that facts are not created, but only discovered; therefore, copyright protection was not obtainable. In other words, copyright protection of factual compilation is quite thin: for a compilation of facts to receive copyright protection, the database creator must use a minimum degree of originality and creativity when selecting and arranging the data.

The Feist decision made it clear that although originality is the constitutionally and statutorily mandated standard for a work to receive copyright protection, the standard is not strict. Since the decision in Feist, therefore, uncertainty has occurred with respect to precisely how much copyright protection should be afforded for the selection and arrangement of facts in any database (Barr 1998).

Table 3: Key Provisions of Failed U.S. Database Bills

Suggested Bills	Key Contents
1996 HR 3531 (Moorhead) The Intellectual Property Antipiracy Act	<ul style="list-style-type: none"> ■ 25 year term of protection ■ criminal penalties ■ no fair use exceptions ■ no exception for government data
1997 HR 2652 (Coble) The Collections of Information Antipiracy Act	<ul style="list-style-type: none"> ■ 15 year term of protection ■ no criminal penalties to non-profits ■ exception for non-profit science unless harm to potential markets ■ exception for government data unless overridden by contact or collected by public-private partnership
1999 HR 354 (Coble) The Collections of Information Antipiracy Act	<ul style="list-style-type: none"> ■ 15 year term of protection ■ impose liability ■ creating a property right in raw information in all but name ■ prohibits extraction of information from a database, both for reuse and dissemination
1999 HR 1858 (Bliley) The Consumer and Investor Access to Information Act	<ul style="list-style-type: none"> ■ not preventing re-use of information in innovative databases ■ attempts to remain within the confines of unfair competition ■ prohibits duplication, without adding value

The Feist case implies that cost of production for a database cannot be a justification for granting a property right in a database. The Court in Feist focused on the economic values created from the selection/arrangement and presentation of the process while the courts that adopted the 'sweat of the brow doctrine' focused on the data-gathering process.

Cases after Feist, however, show that it is difficult to deal with the stages of selection/arrangement and presentation. First, since the cost for creativity in selection/arrangement and presentation is intangible, it is nearly impossible to measure the cost correctly. Second, the concept of creativity is too slippery to provide a consistent criterion.

Effects of intellectual property laws on the value-creation process and strategies

The Feist decision can also be interpreted in terms of economic and managerial considerations. The Feist decision resulted in narrowly construing the

scope of legal protection for databases. Thus, Feist has necessitated changes in strategies whereby the database industry protects its information and maximizes its profits.

Effects on the value chain of databases

As explained earlier, the process whereby new values of databases are added is divided into three parts: data gathering, selection/arrangement, and presentation. In other words, these three parts comprise the area of copyright ownership of databases. Basically, the difference between the 'sweat of the brow' and 'originality doctrines' is whether the cost for producing a database should be a criterion for awarding copyright protection of the database. Based on this difference, the 'sweat of the brow doctrine' secures a broader area of ownership than the 'originality doctrine'. The most fundamental effect of the Feist decision is that the scope of a legally protected database became narrower because the Supreme Court adopted the originality doctrine.

According to the sweat of the brow doctrine, all stages of the database value chain are protected. Particularly, the process of data gathering is legally protected. But the Feist decision held that the sweat of the brow cannot be a criterion for copyright protection, resulting in the elimination of legal protection for the data-gathering process. After the Feist decision, only two stages of the three can be legally protected.

Effects on strategies

The effects on the value chain of a database are converted into the strategies. As a result of the Feist decision, the database industry lost its method of controlling gathered data and related strategies for protecting them. For example, the Rural Telephone Service in Feist employed tricks to detect use of their database by its competitors. Such tactics were broadly used. However, the Feist decision rendered such tactics useless by denying legal protection of the database against copying by competitors.

Versioning was discussed as a suggested strategy. Providing different versions can be a pervasive strategy for selling information (Shapiro & Varian 1999). Corporations can provide versions tailored to the needs of different customers. This strategy will maximize the value of information that corporations provide.

Current re-regulation efforts and the possibility of changes

After the Feist decision, the U.S. Congress began to consider proposals for a new form of protection for databases. These include the Database Investment and Intellectual Property Antipiracy Act. H.R. 3531 104th Cong. (1996); The Collections of Information Antipiracy Act. H.R. 2652. 105th Cong. (1997); The Collections of Information Antipiracy Act. H.R. 354. 106th Cong. (1999); and The Consumer and Investor Access to Information Act. H.R. 1858. 106th Cong. (1999).

Table 4: Value Chain of Databases and Applied Doctrines

Stages	Data Gathering	Selection/Arrangement	Presentation
Applied Doctrine	Sweat of the brow	Originality	Originality
Cost Measurement	Easy	Difficult	Difficult
Legal Protection	No	Yes	Yes

Until now, consensus over these issues has not occurred. These bills, however, attempt to adopt the 'sweat of the brow' doctrine in that they protect the data gathering process.

Conclusion

This study has demonstrated how changes in intellectual property law have effects on the value-creation process of information commodity and related strategies. To explain these effects, this study focuses on three unique economic characteristics of databases as information: the public good, information good, and aggregate good. These characteristics are related to the value-creation process. Different strategies have been suggested for each characteristic. Making a different version can be a strategy in non-rivalrous public good characteristics. Technological strategies (security system), contracts, and artificial data have been provided as strategies of non-excludability in public goods. Limiting the number of consumers is suggested as a strategy for information goods. In aggregate goods, portal service, data updates, abstracts and data mingling are suggested as strategies.

To examine the value-creation process of databases, a three-step process has been shown: data gathering, selection/arrangement, and presentation. In the legal process, changes in intellectual property law have influenced this value-creation process. Two main rationales, 'sweat of the brow doctrine' and 'originality doctrine' have been developed for protecting database compilations. 'Sweat of the brow doctrine' emphasizes the effort and investment of

the compiler. The *Schroder v. William Morrow Co.* case is application of sweat of the brow doctrine. This doctrine protects all three stages of the database value chain process. The first stage is more focused in this doctrine. On the other hand, the 'originality doctrine' focuses on the judgment and creativity in the selection/arrangement of the materials comprising the compilation. The *Feist* case is an application of the originality doctrine. After the *Feist* case, two stages are legally protected. Data gathering is not legally protected. As a result of this case, the database industry should find a new method of controlling gathered data and corresponding strategies to protect them. The strategies suggested above can be used to protect gathered data.

In the age of new technologies such as the Internet and the World Wide Web, database environment and technologies have changed. Databases can be easily copied so that corporations save money and time. In addition, rearrangement and presentation are also quite simple and easy. Should the 'sweat of the brow' doctrine remain the same in this age? We should think about the future of copyright law and investigate how 'sweat of the brow doctrine' can be applied to this new environment.

References

Baron, P. 2001, 'Databases and the Commodification of Information,' *Journal of the Copyright Society of the U.S.A.* vol. 49, pp. 131-63.

Barr, L. 1998, 'Legislative Update: Database Protection Bill,' *Journal of Art*

and Entertainment Law, vol. 8, pp. 371-90.

Bastian, M. J. 1999, 'Note: protection of "noncreative" databases: harmonization of United States, foreign and international law,' *Boston College International & Comparative Law Review*, vol. 22, pp. 425-63.

Currie, W. 2000, *The Global Information Society*, John Wiley & Sons, Chichester.

Hayek, F. A. 1945, 'The use of knowledge in society,' *American Economic Review*, vol. 35, pp. 519-30.

Hirshleifer, J. 1971, 'The private and social value of information and the reward to inventive activity,' *American Economic Review*, vol. 61, pp. 561-74.

Kutten, L. 1987, *Computer Software: protection, liability, law, forms*, Clark Boardman Callaghan, Deerfield.

Owen, B. M. & Wildman, S. S. 1992, *Video Economics*, Harvard University Press, Cambridge.

Petit, P. (ed.) 2001, *Economics and Information*, Kluwer Academic Publishers, Dordrecht.

Samuelson, P. A. 1954, 'The pure theory of public expenditure,' *The Review of Economics and Statistics*, vol. 36, pp. 387-89.

Samuelson, P. A. & Nordhaus, W. D. 1995, *Economics*, McGraw-Hill, Boston.

Shapiro, C. & Varian, H. R. 1999, *Information Rules: A Strategic Guide To The Network Economy*, Harvard Business School Press, Boston.

U.S. Copyright Office. 1997, *Report On Legal Protection For Database*.