The Pre-Internet Downloading Controversy:
The Evolution of Use Rights for Digital Intellectual and Cultural Works[i]

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ABSTRACT:

This paper describes and explains the shift in the database industry's treatment of downloading as an unwanted byproduct of new technology to a product feature in terms of shifts in "use-regimes," or changes to market practices, legal rules, user expectations and technology-based tools that shape the use of intellectual and cultural property. In the early 1980s citation database users did not have the right to "download," or save, citations from bibliographic databases. Yet by the early 1990s citation database publishers had partnered with bibliographic citation software developers (e.g., ProCite) to make easy downloading of citations a product feature. In this paper we both tell the lost story of the pre-Internet downloading controversy and how and why the meaning of downloading changed over a twenty year period. In doing so, we present a theoretical framework that is useful for analyzing changes in use rights for a variety of types of intellectual and cultural goods. Finally, we compare lessons from this historical case study to contemporary use right debates in the intellectual and cultural property literature.

KEYWORDS: digital intellectual property; downloading; electronic publishing; electronic publishing industry; bibliographic citations; electronic publishing; sociotechnical ensemble

I. Introduction

The change that information technology has brought to systems of access, distribution, and use of information and cultural goods has generated much normative debate, with many authors expressing concern that new technologies, combined with legal and political moves by the content industries, have reduced what users can do with intellectual and cultural works (for examples see Boyle, 2006; Lessig, 2004, 2006; Patry, 2009; Vaidhyanathan, 2002). Concerned by the apparent shrinking of "use rights" in the digital realm, many media use rights studies begin with a problematic use right and trace how it developed; others assess impacts of problematic use rights on creativity and innovation, resistance to reduced use rights, or the likely future of industries based on new technologies or user resistance (e.g., Burkart & McCourt, 2006; Fox 2005; McLeod 2005; Postigo, 2008). This paper also analyzes use rights debate and change in a content industry, but it takes a different approach. We take a largely taken-for-granted use right and trace how it came to be non-problematic. In this approach, borrowed from infrastructure studies, we start with a seemingly non-problematic use right and work backwards to uncover the forgotten troubles (Bowker, 2006; Bowker & Star, 1999; Edwards, 2010; Star, 1999).

To find a taken-for-granted use right for digital information and cultural goods, we moved away from the common focus on popular media and entertainment technology to explore another realm in which information goods have been commercially digitally distributed since the 1970s: machine-readable bibliographic citations in commercial online databases. In this paper, we tell the story of a historic debate over the access, sale, and use of bibliographic citations collected in online databases (e.g., Web of Knowledge, Communication Abstracts). [ii]

Our historical analysis reveals how an "acceptable use" is a social construct that changes over time: What is just "use" today may be "piracy" tomorrow, or vice versa (Johns 2010). Current legal, social or contractual understandings of acceptable uses are not pre-ordained – they come from past conflicts and historical sets of decisions (Bowker 2006; Burkhart & McCourt, 2006; Downey 2008; Fisher, 2004; Gillespie, 2007; Wirten, 2008). As social constructions, various social groups create, and seek to change dominant understandings of what is an acceptable use (Johns 2010). Today, digital media use rights are hotly disputed, but often presented as ahistorical unpleasantries. Understanding the long term instability, and contingent social nature of any given use right gives us a new perspective on contemporary conflicts. Moreover, examination of past debates allows us to see patterns of change that might not be apparent in a shorter time frame.

In this paper we do three things. First, we tell the story of the information industry's "downloading controversy" of the 1980s and 1990s. The controversy focused on the legitimacy of "downloading" bibliographic citations from online databases. Like most sociotechnical phenomena, the controversy was a lengthy, dynamic process: it involved a complex array of interrelated technological innovations, legal rules, cultural expectations, business processes and practices, and a whole host of actors. In telling our story, we describe how "downloading" began as an unplanned byproduct of new technologies, but was leveraged as a product feature that in turn created the opportunity for further product synergies – namely, the development of citation management software products and services such as citation alerts or tracking. Second, we explain the observed change by introducing the idea of "use-regimes" which provides a structure for mapping out and understanding changes in the use rights for creative and intellectual works over time. Finally, we draw out the implications of this particular case study for inquiry into use rights in other information goods. As we come to rely more on digital platforms and media in order to make use of educational materials, business information and entertainment sources, understanding the origins of our use rights becomes more important.

1a. The novelty of "downloading"

As with the consumer media industries, the infrastructure that disseminates bibliographic citations has been a site of dramatic technological transformation and intense debate over use rights for the last quarter century. In the early 1980s, the introduction of the personal computer (PC), inexpensive dot-matrix printers, transportable data storage devices such as floppy disk drives and CD-ROMs, and database management systems

to store and edit bibliographic citations (e.g., RefWorks, Zotero) all raised the question of whether users ought to be able to "download" their citation database search results and store them in "private databases" using local memory devices. Professional searchers (the "users" of the day) quickly adopted downloading as a standard practice. The citation database industry however, saw downloading as a threat, claiming it was a violation of copyright and a form of piracy (Klagsbrun, 1983)   As the program for a 1981 information industry conference explained, "producers claim they should be compensated for reuse of their information. In contrast, consumers feel this reuse should be free." (Hawkins, 1981). The resulting "downloading controversy" (Gray, 1985; Hemmings, 1985) predates most consumer media use rights debates by 20 years. But like contemporary conflicts over MP3s, DVDs, and e-books the citation downloading debate was emotional and polarized, with one author even likening it to the American Civil War (Elias, 1982).

From today's perspective, it seems silly to define downloading; however, this was a completely new phenomenon in the early 1980s, and the need to define it for audiences of the day highlights the fact that downloading facilitated completely novel uses of citations. Downloading was "a method for capturing information sent to a computer by another computer, as opposed to letting it disappear as it scrolls off the screen" or "an alternative to online printing." (Maxwell & Nardi, 1985; Ralph, 1985). Professional journals of the day taught searchers how to download (e.g., "Downloading and Data Conversion: Doing it Yourself" (Ralph, 1985)), and claimed downloading was an information *service* that professional searchers could provide to their clients (e.g., "Downloading: A Solution for Providing Technical Information in a Corporation." (Maxwell & Nardi, 1985)

Today, many users take the ability to download and store bibliographic search results for granted, and many citations are available from free Web sources (e.g., Google Scholar). However, researchers seeking citations in 1981 had a remarkably different experience. Today's researcher can access citation databases from her laptop via her web browser while sitting in a Wi-Fi enabled coffee shop. She saves results to her hard drive or networked server account using citation management software (CMS) and at no direct cost to herself. She enjoys broad use rights for citations she saves: to be able to revisit, reformat and reuse them at any point in the future. In contrast, a 1981 bibliographic citation search was mediated, difficult, and expensive -- producing outputs that were difficult to use, much less reuse. A 1981 researcher could not have done the searching herself, because she would have had little experience with computers or with the specialized command-line languages required to use citation databases. Moreover, the librarians she worked with likely would not have allowed her to conduct the search herself out of concern that she would inadvertently generate high search fees (Brenner, 1986). Our researcher would have worked with a specially trained search professional (often a librarian), who would have submitted her searches on specialized terminals located in a library/information center. Her search may have entailed direct costs through institutional charge-back mechanisms. Search charges based on "connect-time" accrued the entire period that a searcher was "on line," including time spent entering terms,

reviewing results, and printing. Search training and planning was therefore essential to minimizing costs, and authors described the "sweaty palms syndrome" of anxiety created by time-cost pressures (Hemmings, 1985).

Most important for this paper, in most cases the only way our 1981 researcher could save her search output was to print it out as hardcopy, since the terminals of the time had no storage capacity. She might request an "online print": her output would be transmitted over slow telecommunications lines, fed to a local printer, and printed (all the while incurring connect-time fees). Alternatively, she might request an "offline print": results were printed by the database service and mailed or faxed to her (at additional time and expense). Either way, the search results came to her on paper in formats described as "… unintelligible or poorly formatted," (Burnam, 1981) and "low quality, unattractive to read and handle." (Hemmings, 1985) Our researcher would have had to rekey the citations later in order to use them in papers or combine them with other citations into a larger bibliography.

1b. Theoretical Framework

We see the downloading crisis of the 1980s as an important case of historical change in use rights. To structure our historical analysis, we introduce the concept of "use-regimes," which we define as *temporary stabilizations of use rights for intellectual or cultural goods in a given environment.*" Use-regimes provide an analytical structure to understand changes in use rights over time and across different contexts. The framework draws out links between use rights, changes in use rights and broader sociotechnical constraints and developments. While we demonstrate the use-regimes framework through the historical case of bibliographic citation databases, the framework should be useful in analyzing the development of use rights for a variety of intellectual and cultural goods.

As shown in Figure 1, the sociotechnical ensemble underlying use-regimes can be thought of as having four interrelated dimensions:

"Markets" refers to the economic, symbolic or practical value of information goods or services, their packaging and pricing models, the relationships between entities that facilitate the transfer or distribution of information goods or services, and the transaction costs inherent in those arrangements. In this story, the information economics concept of versioning is important (Shaprio & Varian, 1999; Kahin & Varian, 2000). Versioning refers to publishers' variation of information characteristics (e.g., update rates, coverage) to create different versions of the same information at different price points that appeal to different sets of customers. We show how varying use rights for bibliographical citations become a way to version: More liberal use terms increased the value of information, allowing a higher price. The idea of "indirect appropriation" is also important. Indirect appropriation is the notion that publishers might actually benefit from unauthorized copying if they can charge a higher price for the original sale to capture the value of future copying (Liebowitz, 1985). We explain how shifts from output based pricing to indirect appropriation eased information industry concerns
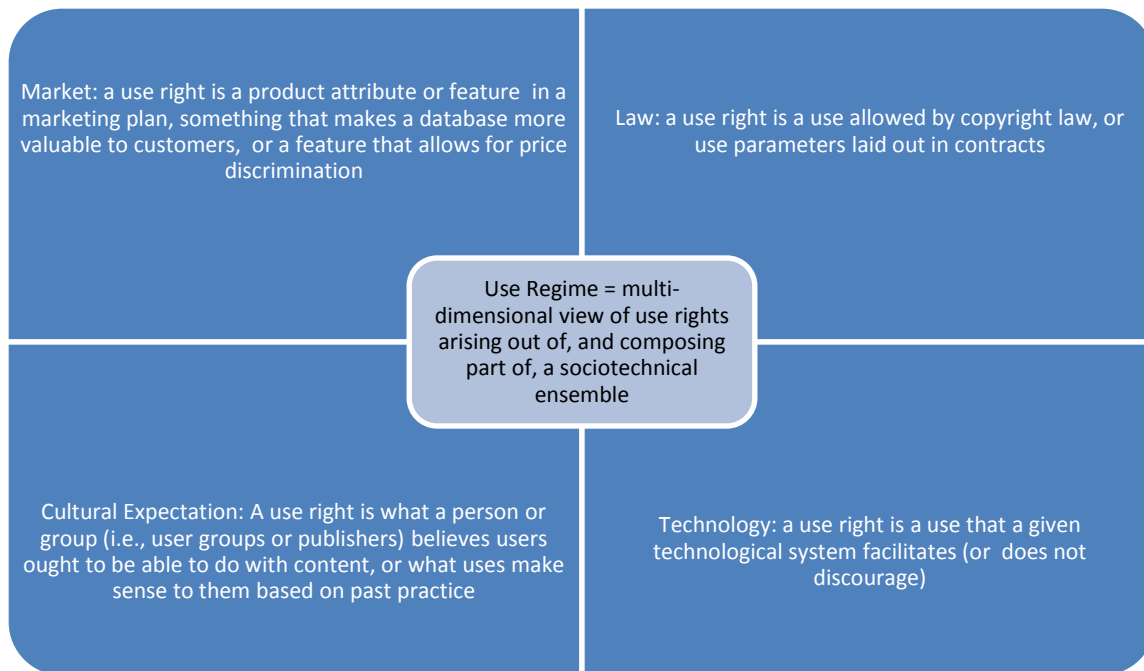
about downloading citations. Moreover, pricing innovation brought on by technological change were also key (Farjoun, 2002)

"Law" refers to legally or culturally recognized rights, including those provided by statute (e.g., the Copyright Act), judicial case law or regulation, or those specified in a contract or license.   As we detail below, the *lack of clarity* in the law was central to our story. Throughout our timeline, it was unclear whether copyright law permitted some downloading, and this ambiguity created space in which the different interpretations of downloading as "piracy" and "business practice" could both flourish as use right claims. Also key to this story is the growing reliance on licensing as an alternative means of controlling the use of intellectual goods.

"Cultural expectations" refers to the hopes or expectations that a particular set of users might have with regard to information use and/or information technology given their day-to-day work or recreational needs and based on commonly shared understandings within a workgroup or culture. Social pressure and norms enforcement, outside the boundaries of law or contract enforcement, are key to understanding patterns in citation downloading behaviors (Ellickson,1991; Macaulay, 1963). Also central to our story is Lamb and Kling's (2003, 2003a) idea that users' information system use is driven by professional affiliations, expectations and work patterns. We illustrate how shifts in citation downloading expectations were tied to shifts in primary user groups from professional searchers to end users.

Changes in "technology" figure prominently in our analysis as well. At the component level we describe the appearance of computers, networks, storage and software technologies and how these new technologies facilitated downloading. But our focus is less on the development of these technologies and more on the types of uses that these citation distribution systems facilitated or prohibited, whether by design or unintentionally, and the importance of those uses within the context of the social and professional relationships of our information users. In our story, technologies exerted agency in that they enabled or constrained certain social or cognitive processes – shaping users' expectations about what they could do with the system (Gillespie, 2007); but, users also exerted agency, reconfiguring and resisting technologies through misuse and disuse, eventually leading to large scale systems reconfigurations (Akrich, 1992; Oudshoorn & Pinch,2005).

Figure 1: Use-regimes Framework

Market: a use right is a product attribute or feature in a marketing plan, something that makes a database more valuable to customers, or a feature that allows for price discrimination

Law: a use right is a use allowed by copyright law, or use parameters laid out in contracts

Use Regime = multi-dimensional view of use rights arising out of, and composing part of, a sociotechnical ensemble

Cultural Expectation: A use right is what a person or group (i.e., user groups or publishers) believes users ought to be able to do with content, or what uses make sense to them based on past practice

Technology: a use right is a use that a given technological system facilitates (or does not discourage)

Drawing on theory from science and technology studies, we assume that this combination of four perspectives of use rights compromising a particular use-regime should be understood as a "sociotechnical ensemble." The term "sociotechnical," refers to the idea that technology, rather than standing apart from society, is inextricably bound up with social practice: The development, deployment, adoption and use of technologies are always shaped by a wide variety of social processes. (Bijker, Hughes, & Pinch, 1999; Bijker, 1995; Bijker & Law, 1992; Kline & Pinch, 1999; Winner, 1988) The term "ensemble" refers to the notion that development, use and changes in technological systems (like citation databases) can only be explained with reference to a messy, contingent web of sociotechnical elements (both human and nonhuman); and further, that the arrangement of these elements is contingent and unstable, and that actors who benefit from a particular ensemble must work to create and maintain that ensemble over time, otherwise the ensemble might destabilize or be actively undermined by others. (Bijker & Law, 1992; Bijker, Hughes & Pinch, 1999). Social and technological phenomena that must be continually re-aligned and re-assembled to maintain a particular use-regime continue to "work" for any particular party.

Our use of the term "use-regime" to describe the analytic structure for analyzing changes in use rights is based on work that maps out changes in scholarly communications infrastructures such as Hilgartner's communication regime (1995), and Kling's sociotechnical interaction network (STIN) (2004). Hilgartner and Kling use the term "regime" to refer to networks of stable relationships that institutionalize certain patterns of actions. In doing so, these networks both enable action (i.e., facilitating distribution of citations) and constrain it (by making consideration of alternatives more difficult).[iii] Both emphasize the obdurate, but malleable nature

of regimes. Regimes always exist in competition with alternative regimes that may replace them (Hilgartner, 1995).

While the concept of a use-regime draws on communications regime and the STIN, it differs from these frameworks in focus: previous work included use rights as a regime element, but not as the focus of analysis.[iv] Our analysis places use rights at the center of the analysis. But like the above approaches, ours tracks the interconnections in the sociotechnical network, and it seeks to track and explain change over time. Our use-regime analysis is also similar in spirit to rich historical studies of changes in cultural and intellectual property and information systems (e.g., Bourne & Bellardo-Hahn, 2003; Bowker, 2006; Burkart & McCourt, 2006; Downey, 2008; Edwards, 2010; Johns, 2010) however, our analysis employs more structure. Some may see this as a feature, and others as a bug.

1c. Historical actors

To understand the use-regime built around the citation database market in the 1980s, we must consider five major categories of actors: (1) database publishers; (2) online vendors; (3) search professionals; (4) software developers; and (5) end users.

(1) Database publishers produced print and electronic databases, of both text and numerical data.[v] This paper focuses on publishers that produced databases that indexed bibliographical citations of journal articles (citation databases). Citation databases represented 57% of the overall database market in 1985 (Williams, 1991). In the early 1980s, most citation database publishers still heavily relied on sales of paper citation indexes, electronic publishing was seen as a not yet profitable risky venture. Publishers complained throughout the 1970s and 1980s that they were losing revenue as customers cancelled profitable print subscriptions in favor of not-yet-profitable online materials (Hayes, 1970; Williams,1981).

(2) Online vendors provided the link between search professionals and database publishers. Online vendors provided server space to host databases, software to run queries, and the telecommunications lines needed to connect to databases (Bourne & Bellardo-Hahn, 2003; Tenopir & King, 2000).[vi] The relationship between publishers and vendors was ambivalent: vendors paid royalties to publishers to host publishers' databases, feared that publishers might bypass them to sell databases directly to end users through nascent videodisk technology (Hearty & Polansky, 1987; Nelson, 1995; NFAIS, 1988a).

In the 1980s, database prices were based on a combination of "connect-time" and "hit fees" (Bourne & Bellardo-Hahn, 2003; Farjoun, 2002; Hawkins, 1989). End users paid connect-time charges for access to the vendor's online system and the query processing. Hit fees paid for the extraction of each bit of database content -- although use was limited to reading on screen or printing of results (Garman, 1990). Importantly, payment of hit fees did *not* give users downloading use rights.

(3) Search professionals were trained personnel (often librarians) who provided expert search services for end users. Search professionals were needed for two reasons: searching was difficult, requiring knowledge of both specialized equipment (data-entry terminals, line printers, data connections) and specialized search interfaces (command-line languages and data formats); and searching was expensive - unsupervised use could generate uncontrollable costs under the connect-time pricing model.

(4) Software developers created and marketed products and services this paper refers to as "citation management systems" (CMSs). Many CMSs aimed to reduce the connect-time needed to run a search, and – most importantly for this paper – many CMSs facilitated the downloading and saving of citations (Feeney & Miller, 1984). The relationship between software developers and database publishers — mediated through CMS products and services — became increasingly intertwined from the 1980s to today.[vii] Two publishers stand out as examples: the Institute for Scientific Information or ISI (now owned by Thomson-Reuters) developed and marketed Sci-Mate, an early CMS, in addition to marketing numerous citation databases (Trolley & O'Neill, 1999). Cambridge Information Group (CIG), another contemporary publisher, developed RefWorks in the late 1990s, after it had acquired numerous citation databases (Cambridge Information Group, 2010)

 (5) Finally, **end users** such as faculty, students, commercial researchers or business managers, typically did not run their own searches, but were reliant on professional searchers to fulfill their information requests. They did, however, bear the direct costs of searching in both time and money.

As our historical analysis will demonstrate, all of these actors had important roles in helping to build, maintain, and undermine the use-regime around bibliographic citation data in the 1980s. They acted together — but not always in service of the same goals — taking action within a sociotechnical ensemble of market arrangements, legal limits and uncertainties, cultural meanings and expectations, and technological tools and constraints throughout the 1980s.

1d. Primary Sources

Although there is a small secondary history of the development of online database services and systems, there is no focus in this literature on the downloading crisis (Bourne & Bellardo-Hahn, 2003; Kaser & Kaser, 2001; Tenopir & King, 2000). To understand the changing use-regime for bibliographic citations over time, we therefore examined a wide variety of primary sources. We drew heavily on the journals and conference proceedings that publishers and information professionals of the time would have read, [viii] and the newsletters and handbooks generated by three professional associations involved in the debate: the *Association of Information Dissemination Centers* (ASIDIC), the *National Federation of Abstracting and Information Services* (NFAIS), and the *Information Industry Association* (IIA). We also examined available standard licenses and

licensing handbooks of the era.[ix] Finally, preliminary explanations were refined during semi-structured phone interviews with four database publishers and one CMS developer of the period.

II. The Story of the Pre-Internet Downloading Controversy

We tell the story of the bibliographic citation downloading controversy in four parts, each part highlights an ensemble element important across the story. Part 1 emphasizes cultural meanings of downloading in light of new technology, existing work practices and legal uncertainty. Part 2 draws out concurrent stabilization and destabilization actions by elements of the sociotechnical ensemble.   Part 3 focuses on the roles of technology successes (CD-ROMs) and failures (metering) within the shifting ensemble. Part 4 highlights the importance in shifts in market ensemble elements to changing use rights.

Part 1:The Emergence of Conflicting Claims about Downloading

The emergence of downloading began rhetorical battle about what downloading represented: searchers argued downloading was a valued work practice, while database industry argued downloading was piracy. Downloading was important to searchers work – it allowed customization and reformatting of search results, removal of duplicate hits, merging of related results sets, and annotation of obscure acronyms: online and offline print services of the time did not accommodate these tasks without rekeying. In framing downloading as a legitimate business practice, searcher drew on and contributed to key elements of the underlying ensemble: a recognition of the new technological feasibility of downloading, a set of meanings and value drawn from existing print-era work practices, and arguments about new revenue based on understandings of the elasticity of demand for citations in organizations. Searchers framed downloading as equivalent to paper practices taught by publishers in training classes: save search outputs on paper or index cards, file them, and reuse them (Hearty & Polansky, 1987; Snyder, 1986). Searchers represented downloading as a professional activity, as one trade press article explained, downloading was "an important auxiliary technique in both data processing and online information searching" (Mortensen, 1984). Searchers argued that downloading "increase[es] the library's worth to the organization."(Hawkins, 1989). Further, drawing on their professional understanding of the elasticity of demand for citations among different types of users, searchers argued that downloading could increase the overall demand for online information, ultimately raising publisher and online provider revenues (Maxwell & Nardi, 1985). "With food comes an appetite" (Snyder, 1986). They argued that by maintaining digital copies of citations for reuse, they could nurture a secondary market for lower cost, slightly staler information that the current services did not satisfy (ASIDIC, 1980; Fischer, 1982b).

Database publishers and online vendors saw downloading differently, characterizing it as an illegitimate activity that violated copyright and threatened the viability of the industry (Cuadra Associates, 1983). In making

this claim, publishers also drew on and contributed to key elements of the underlying ensemble including technological threats to traditional pricing and billing structures, and uncertainty about how copyright law ought to apply to citations.

Technological change undermined the market aspects of use rights by making it possible for users to re-use citations without paying additional connect-time charges to obtain additional copies. Searchers who downloaded citations were able to create "private libraries" for later reuse "without going back online to the original files" thereby reducing revenues generated by connect-time and hit charges (NFAIS, 1980). The database industry's pricing structures were largely dominated by connect-time charges at the time (Farjoun, 2002) so this undermining would seriously destabilize publisher and vendor interests. Some argued that losses in revenue would force price increases (Hearty & Polansky, 1987; Tenopir, 1995; Williams, 1983). Others suggested charged that the activity of downloading was a threat to the viability of the industry itself and could undermine development and availability of quality information products (Gray, 1985). "[D]ata distribution will dry up" argued one lawyer from the database industry (Klagsbrun, 1983). At a minimum, commentators of the time agreed that reduction in fees would have a "sizable impact on revenues" (Cuadra, 1980).

Technological change also undermined legal aspects of the use-regime for citations by re-opening debates about what the law said users could do with citations. Throughout the downloading crisis of the 1980s, it was unclear to all actors to what degree, if any, copyright law permitted this new practice of downloading. Given this lack of clarity in the law, publishers and vendors made arguments for legal interpretations that would most benefit their interests. Publishers used rhetorical strategies still common today: characterizing downloading, or "[r]emoving online information in any form," as a violation of copyright law and/or a breach of contract. (NFAIS, 1980) Lawyers from the information industry carefully constructed arguments to make downloading seem wrong — often drawing on the parallel technological threat of photocopying. "Suppose I were to make a photocopy of Saul Bellow's latest novel," suggested one. "That's downloading, the making of a copy as defined in §101 [of the Copyright Act]." (Klagsbrun, 1983) The lawyer went on to group several information use activities together with the terms "downloading" and "copying" in order to cast downloading and copying as equivalent: "If I key punch it into the disk in my little Osborne computer, that's downloading, copying." (Klagsbrun, 1983).

Despite the rhetorically strategies of publishers, the law itself was unclear, and there were no specific cases about downloading. To bring a successful lawsuit, a database publisher would have to show three things: (1) the database was copyrightable; (2) the downloading was a violation of the publisher's so-called exclusive right of reproduction; and (3) the downloading was not otherwise permitted by the "fair use" doctrine. The law was unclear on all three.

Prior to 1991, whether databases could be copyrighted, and under what circumstances, was an open question. One of the basic principles of copyright law is that "facts" are in the public domain and are thus not

copyrightable.[x] A single bibliographic entry would certainly be viewed as an unprotected fact as it resulted directly from the existence of the source — journal article, book, etc. — that it described.

It was also not clear whether citation databases, as a whole, could be protected. Publishers interviewed for the project confirmed that the perceived lack of protection against wholesale copying of databases of facts was a major concern at the time. Contemporary copyright law does protect *compilations* of facts and can thus protect databases, but prior to an important United States Supreme Court case in 1991, known as the *Feist* case,[xi] the courts were inconsistent on whether compilation copyright protection could be based on the author's "industriousness" (i.e., hard work) or instead had to be based solely on the author's "creativity." This seemingly esoteric distinction matters because databases are often organized in straightforward, obvious ways -- indeed, that is what makes them useful. Thus, if the rationale for protection requires some "creativity," as the Supreme Court held in the 1991 *Feist* case, many databases would be ineligible for copyright protection. Moreover, even if the database were protected, the *Feist* case made clear that its protection would extend only to the "selection, coordination, or arrangement" of the data, not the data themselves

But at the time of the downloading controversy, the rationale for protection of compilations was not yet clear. In the off-line world, the so-called "sweat of the brow" theory – whereby copyright protection was based on the author's labor or hard work – had been part of copyright for decades.[xii] But not all agreed; some pre-1991 cases treated the "sweat of the brow" theory harshly (Eckes v. Card Prices Update), and one prominent scholar, anticipating the *Feist* case, strenuously argued that it was unconstitutional to grant copyright protection based solely on industriousness, criticizing the court cases that relied on that theory (Patry, 1984; Patry, 1986; Patterson & Craig, 1989). In sum during the period of our study -- publishers' rhetoric notwithstanding -- the very first thing a database publisher would need to prove, the copyrightability of bibliographic databases, was in question. One thing was clear though: individual bibliographic citations had no protection.

Assuming that a citation database was eligible for copyright, the second question was whether and when downloading of citations would constitute a violation of the so-called "reproduction" right. The simple answer was, it depended on how much one downloaded. Most commentators at the time agreed about the two extremes: downloading a single or very small number of citations would not constitute infringement, but downloading an entire database would. (Beard, 1985; National Commission on New Technological Uses of Copyrighted Works (CONTU), 1978; Warrick, 1984) The first result follows from the fact that an individual datum within a database (i.e., individual citation) is not protected by copyright law even if the database as a whole is protected. The second follows from the assumption that the database as a whole is protected. There is, however, an obvious tension between these two points: Somewhere in between the downloading of a single citation and the downloading of the entire database was a line between infringing and noninfringing activity, but no one knew where that line was.

Even assuming the downloading of citations amounted to an infringement, one final question remained: whether the downloading could be excused under the "fair use" doctrine (US Code, Title 17, § 107.). Many commentators of the time conflated the initial infringement question (whether there was a violation of the reproduction right, discussed above) with the "fair use" question (see for example Beard, 1985; Klagsbrun, 1983; National Commission on New Technological Uses of Copyrighted Works (CONTU), 1978). But the distinction between the two is important. The downloading of a single bibliographic citation is not infringing, not because of the "fair use" doctrine, but rather because the individual citations are in the public domain and are unprotected by copyright law. A "fair use" analysis, in contrast, is only relevant after a determination that the content is protected, and requires consideration of multiple factors including amount of use, nature of the data, the purpose of the downloading, and the effect, if any, the downloading had on the copyright owner's market.[xiii] There was no firm answer to the "fair use" issue. Uncertainty reigned and stakeholders advanced competing arguments.

This section emphasized disputed cultural meaning of downloading and how stakeholders drew on ensemble elements to push different interpretations of downloading. Legal ambiguity left a space for both interpretations to exist at the same time. Searchers pointed to similarities between new technological affordances and old paper practices in framing downloading as a business practice. The database industry's concerns about weakening revenue models and long term industry health led them to portray downloading as piracy. The next section details publisher and vendors moves to solidify their interpretation.

PART 2. Accommodating and Resisting

Given the attention paid to downloading, publishers and online vendors moved swiftly to shape cultural interpretations of downloading to accommodate their interests. By leveraging cultural expectations stemming from long term professional relationships and shared understandings with searchers, publishers and vendors sought to shape changing regime elements to their advantage. But at the same time, other stakeholders (including searchers) resisted publishers and vendors interpretation of downloading. Regimes always exist in flux, as forces of maintenance and destabilization occur at the same time (Hilgartner, 1995)

Publishers, vendors and searchers regularly physically met in professional conferences and training sessions. Important to this story, a special series of ASICID workshops in 1980, 1981, and 1982. As an organization, ASIDIC brought professional searchers together with publishers to discuss mutual challenges and needs (ASIDIC). The early 1980s conferences focused on downloading and aimed to develop a shared understanding of downloading between stakeholders. Arguably these new understandings, while throwing a

bone to searchers' immediate business practice needs, maintained publishers and vendors' advantages, and deferred larger regime changes.

Importantly, this regime maintenance likely could not have happened without the shared understandings and interests between searchers and the database industry : they belonged to the same professional organizations (e.g. ASICID) they read many of the same trade journals like *Online* and *Searcher*, and online providers offered training sessions for searchers during which providers had the opportunity to teach "acceptable" uses of their product. Moreover, publishers, vendors and searchers had common interests in the current regime: keep the search industry and the demand for search services within organizations strong. From the searchers' perspective, change that destabilized the industry would have risked these shared interests, so many were willing to compromise with vendors and publishers. Social norms and relationship maintenance, or what Ellickson calls "informal controls," were therefore key to the regulation of citation downloading among searchers. Informal control can only occur within professional communities with strong shared expectations (Lamb & Kling 2003; Lamb & Kling 2003a). This may have made searchers more accepting of the industries concerns and more interested in cooperating in order to maintain good relationships.

At the ASICID meetings, three aspects of reuse emerged as important: type of use, degree to which permission was required, and fees for reuse. Participants distinguished between *"temporary storage"* of search results for reformatting and editing before printing or transmission to end users; the creation of *"private databases"* which allowed new searches to be run without reconnecting to an online service.[xiv] Stakeholders also distinguished between reuses that required asking publisher permission or payment fees, and reuses that would not require permission or fees.

According to meeting reports, many stakeholders agreed that the *temporary storage* of search results for editing and retransmission should not require permission or fees as it was "probably fair use." (Hawkins, 1981) But this was an easy use right for publishers to accommodate because it would have little effect on connect-time revenues or other market aspect of the existing use-regime. But even this conservative view of use rights was not universal; some publishers feared any shift in the law aspect of use-regimes and argued that any reuse without permission "beyond printout of one copy of search output or temporary display on a CRT [screen] is clearly infringement" (Bremner, 1994). But reports of the day (and Table 1 later in the paper) show that most, but not all, publishers' policies came to include blanket permission for free downloading for temporary storage (Garman, 1986).

Issues of creating *private databases* were more contested as it would undermine the market aspects of the existing regime. Individual downloading would reduce connect-time and hit fee revenue for online providers and publishers; moreover, private databases might be shared via newly developed local area networks, further reducing revenue. Not surprisingly, publishers and vendors sought to shore up the existing regime (limit the effect on connect-time and hit charge revenues) by requiring permissions and creating new fees.

Importantly, many searchers conceded to these new fees and the new representations of acceptable downloading. According to conference reports, participants tentatively agreed that private databases could be permissible given permission and a fee based on type of reuse and length of retention (Fischer, 1982a). One group imagined a search interface that would tell the user the price of the download based on how the information would be used. "At the conclusion of each search, before the print command, the vendor would supply the user with a menu of options, and the user would state the purpose of the search [e.g., personal immediate use, personal database, multiple uses, resale] ..Pricing would be automatic after that" (Fischer, 1982a).

Beginning in 1983, publishers began to announce new downloading policies that reflected these new shared understandings about downloading (see for example Chemical Abstracts Service, 1983; Database 1985). Many began to allow free temporary downloading for editing, and some publishers began to allow private database downloading with special permission and payment of a new "downloading fee." Downloading fees were in addition to the traditional hit fees that gave users the right to view or print citations, and payment of downloading fees gave users the additional right to download and reuse citations for a set period. A 1983 survey found 15-20% of responding publishers had downloading fees, and a 1986 survey found that 44% of responding publishers had such fees (Cuadra Associates, 1983; Garman, 1986). Publishers' adoption of downloading fees represented a form of versioning of information: From the publishers' perspective, more liberal use terms increased the value of information, justifying the downloading fee. They created two product options: a cheaper option with no downloading rights, and a more expensive option with downloading rights. (Shaprio & Varian, 1999; Kahin & Varian, 2000)

Downloading fee structures and rules varied across vendors: BIOSIS, INSPEC and EMBASE charged per record downloaded (INSPEC's price was 32 cents per record); Chemical Abstracts charged a $300 fee for up to 1,000 downloads per year (INSPEC re-use policy,1985; Benson & Weinberg, 1985). Rules also varied in terms of how long a record could be kept, the number of records a customer could download per calendar year, whom the records could be distributed to (in house only vs. shared), and if records could be resold. [xv]

Publishers and vendors second strategic move to shape ensemble changes to their benefit was adoption of licenses as a means to control downloading and other changes that threatened revenue. Licenses — written contracts usually drafted by the database publisher and/or online provider and formally agreed to by licensing institutions — defined acceptable uses of the database (i.e., permissible types of downloading) without needing to rely on the uncertainties of copyright. One industry lawyer advised, "[D]on't rely on copyright or vague concepts of proprietary rights. Tell users where they stand — by contract" (Klagsbrun, 1983). Importantly, a license could prohibit uses that would arguably fall under fair use such as unauthorized copying for scholarly inquiry. Publishers eagerly adopted licensing to define acceptable uses and avoid fair use claims. For example, the 1987 NFAIS licensing handbook encouraged publishers to "take advantage of the opportunity to create their

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own definition of fair use" through licenses. It went on to advise, "a subscriber's license agreement…should prevent the user from claiming fair use." (Bremner, 1994)

From a law use right perspective, the adoption of licensing increased certainty and eased enforcement for publishers. In general, terms in a contract will be enforced as written, based on a theory that both parties have consented to the contract's terms (Macaulay, Kidwell, & Whitford, 2003). So, if a contract forbade downloading, there were good reasons to think a court would enforce it as written. But there remained the possibility that a court might be unwilling to enforce it if only a few citations were downloaded for research purposes.[xvi] Regardless of the uncertainties, licenses were seen as the preferred medium for enforcement of terms because the database publishers could bring a breach of contract lawsuit against, and terminate service for, users who did not comply with the license terms. So, license terms forbidding or regulating downloading acted as a deterrent to subscribing organizations that wished to avoid legal action and retain their access to the database.

The move to licenses to govern use was bemoaned in the information community: information institutions became "tenants" renting information under certain terms and conditions instead of owning information whose use was governed by copyright law (Lowry, 1993) Many library critics feared that database publishers would use licenses to restrict practices that normally would be protected under fair use (Lowry, 1993; Ogburn, 2001; Okerson, 1999; Warro, 1994). But at an institutional level, many libraries accepted publishers' downloading rules in order to comply with license terms and maintain good relationships with publishers and vendors. Further, under the use-regime of the time, downloading did not benefit libraries: Uninhibited downloading would increase library costs if users racked up connect charges, hit fees and downloading fees. A 1989 collection of library user policies instructs database users that they "must follow" downloading restrictions applicable to each database (Association of Research Libraries, 1989). Some libraries required downloaders to sign a "downloading agreement" stating that the user had received permission for any downloading, and that the user "will erase the file upon completion of the project..." (Association of Research Libraries, 1989)

But some stakeholders actively resisted publishers' fees and permissions. Publishers themselves were not certain about the new downloading rules: sales units were more liberal about terms than legal departments due to their greater focus on users (MacCaulay, 1963). For example, in a 1987 presentation titled "ACS Chemical Journals Online: Is it Being Downloaded, Do We Care?" a copyright manager and marketing manager from the American Chemical Society described ACS's difficulties balancing goals of IP protection and making users "feel comfortable with the online environment" (Hearty & Polansky, 1987). Reports of the day testify that publishers were more liberal about downloading than their licenses suggested (Garman, 1986). For example, although a license might limit downloading to temporary use, a phone call to the publisher might easily yield

permission for a professor to keep citations indefinitely (Duggan, 1991). Interviews with publishers for this project also suggest that downloading fees were never a significant revenue source during this period.

Surveys of searchers at the time suggest that they were not overly influenced by publishers' copyright claims, and that lack of technology was the main perceived impediment to downloading (Cuadra, 1983). About 20% of respondents reported downloading data for longer term retention in private databases and 3/4 of those downloaders did not seek permission to do so. (Cuadra Associates, 1983; Wanger, 1983a; Wanger, 1983b) As seen in many contemporary cultural goods use conflicts, many downloaders assumed that they could freely download as long as it was not for commercial purposes (Hearty & Polansky, 1987).

Existing business practices encouraged perceptions of private database downloading as acceptable. Searchers' felt that their unauthorized downloading was justified by their payment of hit fees. Although hit charges were not originally designed to pay for downloading uses (remember the separate downloading fee), payment of the hit fee created a "reuse expectation" among users (Garman, 1986; Hearty & Polansky, 1987). A publishers' rights specialist lamented, "Users still feel that once they pay for something [hit fees], they ought to be able to keep it."(Hearty & Polansky, 1987).

Other large changes in the sociotechnical ensemble also undermined publishers conceptualizations of downloading as requiring permissions and fees. While commercial database vendors were busy establishing downloading fees and rules, government funded databases like the National Library of Medicine's MEDLINE and the Department of Education's ERIC were working to establish low or no cost downloading (Bourne & Bellardo-Hahn, 2003). By 1985 MEDLINE allowed free downloading for "personal use," without permission.[xvii] Interviews suggest that government databases' increasingly liberal downloading policies pressured commercial publishers and vendors to liberalize their downloading policies – directly challenging the publishers' conceptualization of acceptable private database downloading as something that involved permissions and fees.

This section of our story highlighted the role of shared social norms stemming from long-term relationships in regulating behavior – leading some searchers to accept publishers' permissions and fees. It also highlighted concurrent tensions between stabilization and destabilization in an ensemble: Publishers and vendors adopted strategies to stabilize or shape changes to their advantage including creation of downloading fees, leveraging of social connections with searchers, and adoption of licensing. But at the same time other ensemble elements, like the development of free government databases and reuse expectations created by hit fees, destabilized the existing regime and suggested an alternative conceptualization of acceptable citation downloading.

Part 3: Technology Success and Failure within the Ensemble

We now shift forward in time five years to the mid 1990s to examine how use rights changed with the entrance of a second new technology -- the CD-ROM. By the mid 1990s, CD-ROM drives were widely available for desktop computers, and CD-ROMs were a real alternative to connection time based online services (Database, 1989). As one newsletter explained, "CD-ROMs move in.. and online interactive searching drops" (NFAIS, 1988b). In this section we show how availability of new CD-ROM distribution technology triggered important changes in the ensemble surrounding citation use rights including changes in the user, changes in pricing, and diversification of citation database vendors businesses to include downloading tools. Technology was also important in that key failures in technology (CD-ROM metering) undermined efforts at regime stabilization.

CD-ROMs changed who was searching citation databases, and the new users had different cultural expectations about what they ought to be able to do with citations. Previously, search professionals mediated the consumption of online information services, running queries, editing results, and passing them to lay users. But CD-ROMs allowed users to run their own searches. Importantly, CD-ROMs employed "flat-rate" or "all you can eat" subscription pricing. In this pricing model end users could search without time pressure created by time-based pricing.

The shift from professional searcher to end users radically changed the sets of cultural expectations about downloading brought to bear on citations. Unlike professional searchers, end users had no shared understandings or common culture with the information industry. They had little knowledge of, or interest in, the license terms governing database use (Duggan, 1991; Hearty & Polansky, 1987). Given direct access to the CD-ROM, they might pay no attention to any posted downloading rules. They "simply use the system without worrying about the terms specified in user contracts." lamented one database copyright manager (Hearty & Polansky, 1987). This shift in user expectations represents an important shift in the ensemble that publishers were unable to control.

The second major ensemble change that CD-ROMs brought was a move toward subscription pricing. Pricing options had been diversifying away from reliance on connection time throughout the late 1980s and early 1990s, and by the mid 1990s flat rate or "all you can eat" subscription pricing had become the new standard in the industry (Farjoun, 2002).[xviii] Subscription pricing removes the danger that lay users might run up expensive bills (Elias, 1991). One of our publisher interviewees explained that subscription pricing encouraged downloading by reducing its indirect costs: Downloading required connect-time for the computer to process the request, transmit it, wait for results, receive it and then save it – and all that time cost money. In contrast, under a subscription model, this time was free. The shift in pricing now encouraged library advocacy

for liberalization of downloading. As our interviewee explained – downloading [now] didn't increase library costs; in fact, downloading was now a means of reducing library printing costs.

But publishers did not necessarily permit downloading from their CD-ROM products (Foulds & Foulds, 1990). A 1986 survey of disk publisher licenses showed that about half restricted downloading (Garman, 1986). A 1991 examination of 12 CD-ROM licenses showed a range of downloading rights, the most restrictive prohibiting "all copying or printing of any part of the database no matter how small or for what purpose." (Jensen, 1991) In 1990, DIALOG OnDisc and PsychLit on Disc only permitted temporary downloading for editing purposes (Marx, 1990). Others allowed downloading of "very small portions," or limited retention of records. The most generous allowed "substantial" copying as long as it was for non-commercial purposes (Jensen, 1991). Technical reports of the day note experimentation with a variety of methods to discourage downloading from CD-ROMs including disabling use of floppy drives on search workstations, limiting the number of records displayed, and requiring searchers to establish personal accounts (Ropiequet, Einberger, & Zoellick, 1987).

One method of controlling downloading that never caught on was CD-ROM metering that could recreate the downloading charge in the CD-ROM environment (Information Today, 1996). Several companies developed and marketed CD metering software. One product marketed by "CD-Max" encrypted contents until metering began. Usage data were stored locally and transmitted once a month to a central billing facility via modem link (Nathans, 1996). But, metering had significant technical and marketing complications. Metering systems depended on the correct local installation and maintenance of equipment for monitoring and billing (Bezold, 1986). Metering was also complicated by decisions about what to charge for and to give away for free.[xix] Critics warned that CD meters would invariably count "uses" that were trivial and not representative of the value of the information to users, that metering systems would not allow for fair use, and that downloading fees would discourage demand, encourage cheating, and be impossible to enforce (Buchanan, 1997; Lynch, 1997; Snyder, 1986). Perhaps most importantly, metering added substantially to the cost of a CD-ROM, making it impractical for mass distribution of low-cost products (Bremner, 1987). After the mid-1990s, mention of CD-ROM metering in the literature petered out[xx].

The story of change in the third section highlights the importance of both successful and failed technologies. CD-ROMs brought about a new set of users with different expectations that made downloading restrictions even more difficult to enforce. The physical format of CD-ROMs encouraged movement to subscription pricing which reduced the costs – and as we explain later the risks -- of downloading. Failed technologies are equally important in this story: The failure of the information industry to build a successful technological protection measure to control day-to-day private database downloading is key in either the online or the CD-ROM environment made it possible for users to continue downloading, encouraged creation of CMS, and kept the debate about downloading in play.

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Part 4: Citation Downloading as Product Feature

In this last section we highlight the role of market ensemble elements in shifting the use rights for citations. We argue that changes in the nature of the product, changes in relationships among industry partners, and changes in pricing systems all played a part in shifting database industry perceptions of downloading from a threat to a business opportunity.

During the pre-Web Internet period (approximately 1990-1996) database publishers faced massive technological change and uncertainty about the feasibility of the Internet as a distribution medium. [xxi] [xxii] Publishers continued to employ existing channels including CD-ROMs, locally mounted tape leases, and commercial wide area network dial-up access, but some began to contract with early Internet hosting services offered by expanding CD-ROM vendors (e.g., Silverplatter and Ovid) (Information Today, 1997; Information Today, 2001; Tenopir, 1997; Tenopir & King, 2000). Finally, some began to develop their own TELNET and GOPHER based Internet hosting systems.

This period saw the continuation on regime destabilizing trends introduced in earlier sections. For example, internet distribution vastly increased the number of end users using citation databases, making control of downloading became even more difficult. As one information industry author reflected, "Though the industry was already adapting to the growing end-user market that was being delivered via computer local area networks (LANs), it was simply overwhelmed by the sheer velocity at which the Internet swept 80 million new information users in the door." (Miller,1998). Moreover, the database industry experienced ongoing pressure to make their products more "user friendly" given free government competition like MEDLINE and ERIC (Kaser & Kaser, 2001), and also new low-budget "generalist" database products. The generalist databases covered a wider variety of topic areas in a less comprehensive fashion, but were less expensive and had liberal downloading rules (Information Today, 1993a, 1994; Kaser & Kaser, 2001). Continued pressure from users was also important, as one interviewee described, users of the period were "yelling about what they wanted to do with personal use." In many areas of work, including research, downloading was "well on the way to being an accepted part of research life." (Duggan, 1991). Critics called for publishers to "lighten up," given the already widespread nature of downloading for personal use (Broering, 1992).

In addition the period saw new ensemble changes including important changes to the nature of the citation databases, new relationships among commercial stakeholders, and the growing popularity of flat-rate subscription pricing models.   First with the advent of Internet distribution, databases developed features and services like scheduled searches, alert services, hyper linking between results and tools for analyzing results. From an economics perspective, with these new features, downloading citations could not substitute for

subscription to the database, because the database product was a bundle of content (citations) and search and analysis services.

New relationships between stakeholders also encouraged a shift in database industry perceptions of downloading as "piracy" toward perceptions of downloading as "product feature." First, relationships between database publishers and third party distributors encouraged acceptance of downloading as a product feature. In one example, third-party distributors (i.e., CD-ROM vendors or online providers) typically created default license terms for downloading. Publishers could submit their own license terms to override the default, but it required extra work (Pooley, 1990). The default terms became more liberal over time, and this liberalizing default arguably had some influence in setting norms among publishers. For example, in the case of DIALOG, its default license terms said nothing about downloading rights in 1984, but by 1988 allowed downloading for reformatting, and then by 1994 allowed downloading for personal use (Benson & Weinberg, 1985; Marx, 1988; Marx, 1995). In another example, increased linkages between database publishers and CMS developers created by industry consolidations may have facilitated the liberalization of downloading rules. CMS encouraged downloading by reducing the amount of technical know-how needed to download. Not surprisingly, CMS developers supported downloading liberalization; for example, Victor Rosenberg of Personal Bibliographic Software Inc. (PBS), maker of ProCite citation management software, charged in 1991 that restrictions on downloading now seemed "unreasonable" (Rosenberg, 1991). Interviewees confirmed that database publishers felt pressure to increase compatibility with CMS, and this pressure encouraged shifts in attitudes about downloading.

Other mergers within the industry may also have facilitated acceptance of downloading. Mergers and take-overs were common during this period due to the need for cash to upgrade aging publishing infrastructures and the "eat-least-you-be-eaten" publishing acquisitions-mania at that time (Asser, 1989; Tomezsko, 2006). Mergers may have spread a new perception of downloading as a product feature. One publisher interviewee recounted educating new post-merger partners about the opportunities created by facilitating downloading to CMS. Many database publishers also found themselves in relationship with CMS, either because they directly acquired CMS or because they became parts of a larger companies with sister divisions that developed and marketed CMS. For example, the database publisher ISI (publishers of today's Web of Knowledge) created its own CMS Sci-Mate, and directly acquired several other CMS including Personal Bibliographic Software's ProCite, Reference Manager and EndNote (Information Today, 1993b; Information Today, 1999). Not surprisingly, ISI began to allow personal downloading in the late 1980s (Marx, 1988; Marx, 1990). Other publishers also came to find themselves in partnered with CMS developers in larger corporations. For example, Cambridge Information Group (CIG), a large international corporation, acquired numerous previously independent citation and databases including Cambridge Scientific Abstracts and Sociological Abstracts. In the early 2000s CIG funded the creation of RefWorks, a CMS (Cambridge Information Group).

To cope with change and uncertainty, publishers experimented with a variety of pricing models, and downloading had different consequences for revenue under each model. First, under a "pay per download" model, users purchased sets of citations along with rights to download and reuse the citation. This model was the most closest to the citation distribution system envisioned in the ASIDIC meetings in the early 1980s.[xxiii] But now, permissions and fee process could be automated and instant - a vast improvement over the paper-based permissions process (Fischer, 1982a). DIALOG 1994 "ERA" system was one of the first in which subscribers could purchase rights to download citations during their online transaction (Basch, 1994b; Bjorner, 1994; Rogers, 1994).

Under the increasingly popular "flat-rate" subscription, user downloading was less important. From a publisher's perspective, flat-rate subscription models employed indirect appropriation – publishers charged customers a higher price in advance for all uses instead of charging them explicitly on extent of use or connection time. Because indirect appropriation gathered revenue up front, private database downloading mattered less. Instead, generating annual institutional subscriptions with libraries and other organizations became most important. In this light, pleasing users by making private database downloading easier could increase the number of subscriptions signed. Downloading thus became a product feature through which publishers could make their databases, and the flat rate subscription model, attractive to customers.

While users therefore came to enjoy more liberal downloading rights under flat-rate subscription models, not all downloading was acceptable to publishers. For example, publishers continued to prohibit activities that discouraged new subscriptions (Odlyzko 1999). For example, licenses might prohibit sharing citations across institutional boundaries, or limit general public use, because both could discourage new subscriptions (O'Leary, 1991; Zhu & Eschenfelder, 2010).[xxiv]

Moreover, in certain subscriptions models known as "metered use," or "token" models, downloading still mattered because downloading affected publisher revenues. In metered use, subscribers pay an annual subscription, but their previous years' usage determines the following years' price (Tenopir, 1994). In the token variation, the subscriber pays one price for a set amount of use (e.g., 200 documents), and after that amount is used, publishers cut off access until further payment. In either case, downloading and reuse of materials via can reduce usage measures dampening the following year's potential price and publisher revenue.

Change in Use Norms as Expressed in Licenses

The shift in the database industries attitude about publishing is reflected in the license language it used to permit or prohibit downloading. Table 1 summarizes changes in downloading policies for several major citation databases. Each row tracks the changes in downloading license language for a given database, while

each column represents a point in time. Reading across the rows, one can see changes in the types of downloading that publishers allowed from early 1980 to 1995.

Four downloading use conditions are depicted in the cells:

- **Permission/fee**: No downloading rights granted without permission from publisher and or payment of downloading fees.
- **Reformat**: Users could download for temporary reformatting without permission and for no extra fee.
- **Personal Use**: Users could create personal private databases without permission and for no extra fee. Personal use includes the right to download for reformatting purposes.
- **No replace**: The license did not permit any uses that "would replace the database."
- Blank = No information available.

Table 1: Change in Citation Database License Language Regarding Downloading

Database name and database publisher in early 1980s	Source of License Language						Current publisher of the database
	Initial announcements in trade press	1984: DIALOG Terms and Conditions Statements contained in Benson & Weinberg 1985	1985: Benson and Weinberg	1988: Marx Contracts in the Information Industry I	1990: Marx Contracts in the Information Industry II	1995: Marx Contracts in the Information Industry III	Current publisher of the database
	Citation Downloading Terms Laid Out in License						
ISI: SciSearch, SocialSciSearch		Permission/Fee	Permission/fee	Permission/fee	Personal use	Personal use	Thomson Reuters
BIOSIS: BIOSIS	Permission/fee	Permission/fee	Permission/fee	Permission/fee	Permission/fee	Permission/fee	Thomson Reuters
Chem Abstracts: Chemical Abstracts Service/American Chemical Society	Reformat			Reformat	Personal use	Personal use	Chemical Abstracts Service/American Chemical Society
Compendex:		No replace	No replace	No replace	No replace	No replace	Elsevier
INSPEC: Engineering Information	Reformat		Reformat (Retain up to 4 weeks)	Reformat	Reformat	DIALOG: No replace	Elsevier
PsycINFO: American Psychological Association		No replace	Personal use	No replace	Reformat	DIALOG: Reformat Other: personal use [xxv]	American Psychological Association
Embase – Excerpta Medica: Elsevier Science	Permission/fee		Personal use (retain for up to 3 weeks)			Personal use	Elsevier
MEDLINE: National Library of Medicine	Plan to distribute subsets through contractual arrangements with flat fee		Personal use	Personal use	Personal use		National Library of Medicine

	1983.						

Table 1 shows that by 1995 many publishers permitted downloading for personal private database use without permission or fees. But some publishers like BIOSIS still required permissions. Further, license language for some databases such as PsycINFO, Compendex and Ei Compendex Plus ambiguously disallowed any use that "replaces the database." This phrase should be interpreted in light of the type of pricing model employed: Under a connect-time pricing model, downloading would replace repeat searches for a given citation, but under a flat-fee subscription model, arguably it would not.

In this section of our story, we emphasized the importance of changes in market ensemble elements in shifting use rights. From a market perspective, downloading became less of a threat because citation copies were not an adequate substitute for subscription to the database product (Shapiro & Varian, 1999). Moreover, all you can eat subscription pricing's separation of revenue from use also made downloading less of an economic threat. Finally, industry consolidations arguably encouraged spread of new views about downloading as a potential product feature. The changed meaning of citation downloading to database publishers is reflected in the liberalization of licensing language over time.

III. Discussion: Explaining the shift in use rights for bibliographic citations

How did the use-regime for bibliographic citations change? How did the citation downloading controversy of the mid 1980s became a largely taken-for-granted aspect of scholarly infrastructures just a decade and a half later?[xxvi] To structure our story of how the citation use rights debate was resolved (if only for a time), we introduced the *use-regimes* framework. We defined use-regimes as temporary stabilizations of use rights for intellectual or cultural goods in a given environment. A particular use-regime should be understood as a *sociotechnical ensemble,* where each element is tied in a complex web with other elements.
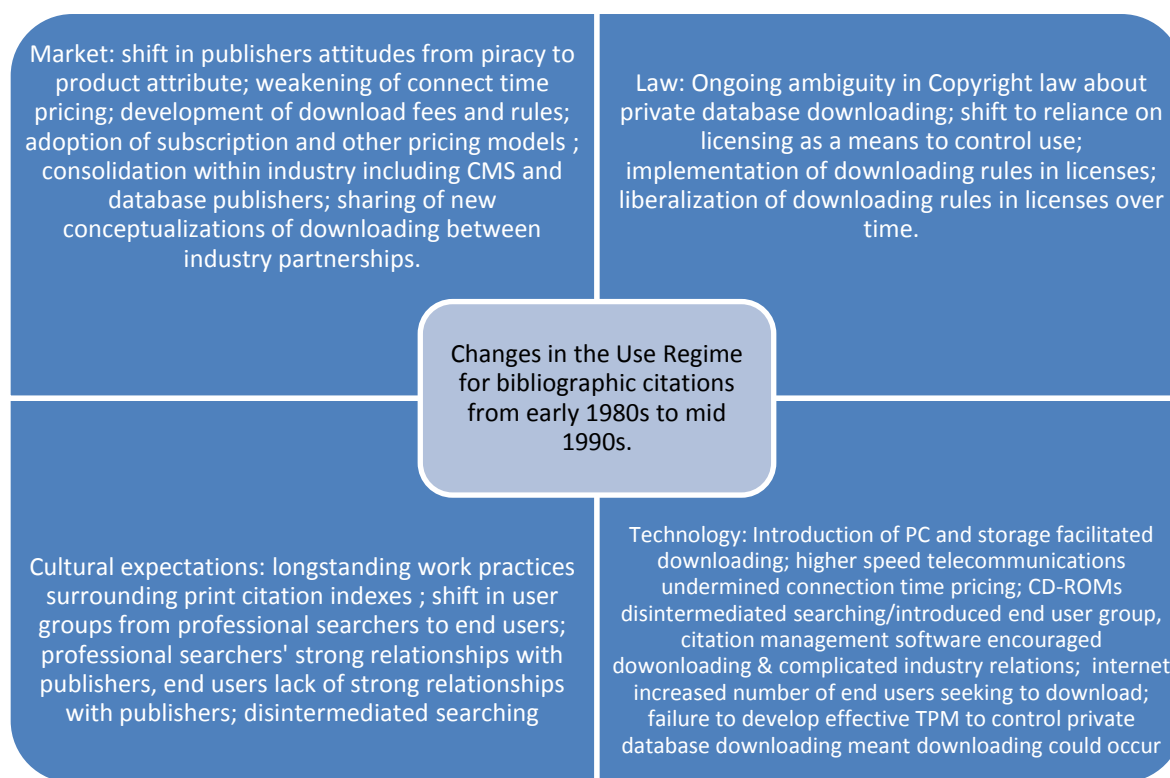
The sociotechnical ensemble comprising the use-regime for bibliographic citation downloading in the 1980s and 1990s has four interrelated dimensions:

- *Technology*: use rights depend on what a given technological system facilitates (or does not discourage)
- *Market*: use rights depend upon product attributes or features in a marketing plan, something that makes a database more valuable to customers, or a feature that allows for price discrimination
- *Law*: use rights depend upon what is allowed by copyright law, or what parameters are laid out in contracts
- *Cultural Expectation*: use rights depend upon what a person or group (i.e., user groups or publishers) believes users ought to be able to do with content, or what uses make sense to them based on past practice

Our purpose in generating use-regimes was to create a set of analytical tools that would aid in the investigation of a broad range of media use rights questions, over time and across different contexts. A use-regime is a framework for investigation and generation of findings. A use-regime is not a set of generalizable findings, nor is it a falsifiable theory. We fully expect that in different cases (e.g., disputes over cartographic data use rights, questions about public domain image use rights in art museums, etc.), different ensemble elements within the four areas of technology, law, markets, and cultural expectations might emerge as important. But as a framework, the notion of use rights should be productive for investigating and developing findings about a range of media forms and practices.

Figure 2 summarizes the major elements of change important to the bibliographic citation downloading case within each of the four dimensions of the use-regime.

Figure 2: Summary of Bibliographic Citation Use-regime Changes

Market: shift in publishers attitudes from piracy to product attribute; weakening of connect time pricing; development of download fees and rules; adoption of subscription and other pricing models ; consolidation within industry including CMS and database publishers; sharing of new conceptualizations of downloading between industry partnerships.

Law: Ongoing ambiguity in Copyright law about private database downloading; shift to reliance on licensing as a means to control use; implementation of downloading rules in licenses; liberalization of downloading rules in licenses over time.

Changes in the Use Regime for bibliographic citations from early 1980s to mid 1990s.

Cultural expectations: longstanding work practices surrounding print citation indexes ; shift in user groups from professional searchers to end users; professional searchers' strong relationships with publishers, end users lack of strong relationships with publishers; disintermediated searching

Technology: Introduction of PC and storage facilitated downloading; higher speed telecommunications undermined connection time pricing; CD-ROMs disintermediated searching/introduced end user group, citation management software encouraged dowonloading & complicated industry relations; internet increased number of end users seeking to download; failure to develop effective TPM to control private database downloading meant downloading could occur

In telling our story, we intertwined market, technological, law and cultural explanations at each stage. We argue that analysis focusing on just one element — for example, analysis of just contracts or business practices within the "market" quadrant — cannot provide as complete an explanation of how or why change occurred. The following four examples, walking through each quadrant of the use-regime, illustrate this argument -- explanations emphasizing one aspect invariably end of referring to the other aspects.

First, consider the technology. Thinking about use rights as *those uses that a given technological system facilitates or discourages*, one could tell a story about how changing citation downloading technologies forced changes in the publishing marketplace. But these explanations become more complex if questions why those technologies were "successful" in that marketplace. STS scholars have long argued that technologies are not inherently successful, but rather are successful, or "work," within a specific larger social, cultural, legal and economic environment (Bijker 1995; Pinch & Bijker 1984). Our story demonstrates how the success of downloading and its associated tools stemmed from downloading's importance within the work practices of citation database user groups (Lamb and Kling 2003, 2003a). Further, techno-determinist stories may overlook the role of technological failures: The lack of "curb-high" technological protection measures like meters to discourage most downloading mean that it was a technical possibility throughout the period of the study. This, combined with lack of legal action against citation downloaders, allowed downloading to become practice, allowed the debate about downloading to continue, and encouraged CMS software development.

Alternatively, focusing on use rights as *product attributes or features in a marketing plan,* one could write an e-commerce downloading story focusing on the versioning of database content, industry consolidation and pricing model innovations. But while economics ideas and market analyses are important, they only make sense in light of a broader understandings including: how new technologies undermined long-standing pricing models (Farjoun, 2002), how new end user populations lack of shared values with publishers made downloading rules less effective, or how use of licenses facilitated pricing innovations.

Third, like other studies of intellectual and cultural property debates, our story tracks citation downloading in terms of uses permitted by *copyright law or parameters in contracts*. But law itself rarely provides a full explanation for complex social change: Scholars like Lessig (2006) have explained how law interacts with other technical, social and business elements in influencing how users interact with digital media – and those elements may increase or decrease the influence of the law. Moreover, our story is in many ways a story of lack of clear law or legal action: The ambiguity in copyright law left open the debate about downloading as legitimate practice vs. copyright violation. Moreover, during the period of time in our story, publishers did not bring legal action against end user/downloaders like we have seen in contemporary music downloading debates. This lack of legal decisions about downloading in general, as well as lack of legal action against individual downloaders, allowed the cultural meaning of private database downloading to remain flexible during the study period.

The fourth regime element in our study tracks changes in use that are pinned to *cultural expectations about downloading and what one ought to be able to do with a information or cultural work.* We showed how downloading became a controversy precisely because it fit within professional searchers cultural expectations about how they ought to be able to acquire and use paper-based database output. Moreover, we showed how the amount of control over downloading that publishers could exert through training and informal norms fell

because of the lack of shared cultural understanding between the database industry and the new end users introduced in the CD-ROM era.

Lessons for Studies of Other Media Use Rights Controversies

Our paper takes a new approach to studies of digital use rights borrowed from infrastructure studies: start with a non-problematic/taken-for-granted use right and work backwards to uncover the forgotten troubles (Bowker, 2006; Bowker & Star, 1999; Edwards, 2010; Star, 1999). Motivated by concerns about the shrinking of rights in a digital realm, most media scholars begin with a problematic use right and trace how it came to be or plot its impact on the world. For example, studies of technological protection measures (TPM) like DVD or CD copy controls typically begin with a problem (e.g., TPM block some use, TPM shape user expectations in inappropriate ways), and either trace how the TPM came to be developed, attempt to assess its effects, or document user resistance to use right restrictions (e.g., Eschenfelder, 2008; Gillespie, 2007; Postigo, 2008; Samuelson, 2003). In contrast, this paper takes a largely taken-for-granted use right and traces how it came to be non-problematic. Drawing from technology studies' tradition of analyzing how technological systems come to embed taken-for-granted norms (Winner 1988; Wyatt, 2008), we went back in time to unearth the past debates about downloading.

This historical approach highlights how "acceptable use" is a social construct that changes over time as stakeholders and their interests change (Johns 2010). In the 1980s and 1990s downloading restrictions and fees were created by the database industry based on the ensemble arrangement of the time: uncertainties about the profitability of electronic products, falling connect-time revenues but lack of clear alternative pricing structures, assumptions about users and their willingness to follow downloading rules, hopes about developing distribution technology such as meters that would facilitate capture of downloading fees. We've shown how publishers treatment of downloading changed as the other ensemble elements changed. Publishers' shifting views on downloading as an acceptable use of citations illustrates the STS idea that technologies are not inherently successful – but rather they "work" or "don't work" within a specific larger social, cultural, legal and economic contexts (Bijker 1995; Pinch & Bijker 1984). Publishers' initial narrow claims about acceptable uses of citations "made sense" in an early 1980s context; but as that context changed, publishers shifted their thinking about what was acceptable. As Johns' (2010) explains, what is just "use" today may be "piracy" tomorrow; but the opposite may also be true -- what publishers claimed was piracy in 1982, they deemed acceptable by 2000. Analysis of use rights disputes need to keep in mind the long term instability, and contingent social nature, of any given use rights claim.

In our historical work we have avoided making claims about the impact of licensing on fair use of citations because we believe it is difficult, if not impossible, to make a solid claim. Recall that "fair use" is a limitation on the right of authors to control reproductions of their works. Many commentators expressed

concern that the combination of digitization and licensing would erode "fair use." Concerned discussion of the move from "ownership to leasing" is common in the database literature of the 1990s and 2000s (e.g., Lowry, 1993; Ogburn, 2001; Okerson, 1999; Warro, 1994). The basic argument is that by controlling distribution of a digital work through licensing, the copyright owner can impose contract terms that prevent the user from engaging in what might otherwise be a deemed fair use by a court.

The historical concerns about digitization and licensing are clearly valid in many ways. Database use is now generally regulated by contract (license) rather than copyright law (Okerson, 2004; Farb, 2006). Further, license studies suggest that only a small portion of publisher standard licenses explicitly recognize fair use (Farb, 2006). Moreover, rights granted in licenses are tenuous: publishers may grant generous rights upon signing and seek to seek to revoke them at the next license renewal. Finally, the loss of first-sale rights via licensing precludes a "used" market that might put downward pressure on ever escalating electronic database prices.

But assessing the overall impact of digitization and licensing on fair use is difficult for several reasons, and arguments about changing use rights must be careful not to engage in "fair use nostalgia" – extending arguments based on particular court decisions from the pre-digital era to a completely new situation. The concept of "fair use," like "acceptable use," is a sociotechnical construct intertwined with changing technologies, adapting business models and shifting social mores (Bracha, 2005). Arguments that licensing and technology together threaten fair use may overlook the fact that changes in the socio-technological ensemble both facilitated new uses and at the same time rendered certain earlier market practices unsustainable. Fair use rulings are contextual, and lack of contemporary court rulings makes it difficult to extrapolate to how courts might interpret "effect on market" and other key fair use criteria given widespread changes in uses and market practices. In our case, as digitization led to the reduction in paper-based sales, and as increasing telecommunication speeds undercut connection time pricing, the nature of the citation market changed and the use of licensing grew. At the same time, digitization afforded a variety of new uses not previously possible in a paper or dumb-terminal environment (i.e., downloading). Given these changes in the marketplace and possible uses, there is little reason to think the concept of "fair use" in the new digital world would perfectly match its nominally identical predecessor in the paper world. Socio-economic and technological changes have expanded the range of ways to access and use citations so dramatically that any meaningful comparison with the pre-digital world is next to impossible. Studies of use rights, especially those that make claims about impacts on fair use, need to account for the fact that fair use is itself a changing concept.

Further, it is difficult to claim that digitization and licensing have decreased use rights when compared to the situation in a paper-based world because we lack of systematic empirical data about commercial database licenses. Publishers typically insist on the confidentiality of their signed licenses although they may make generic and unedited licenses available. Moreover, most licensing studies focus on institutional-level rights

(like preservation, interlibrary loan or electronic reserves) rather than individual users' rights in a digital environment (e.g., Davis & Feather 2008; Barribeau & Stemper 2006, Farb 2006). This means that there is little data available about individual use right restrictions. The first author is currently conducting a content analysis of a larger cross-institutional sample of licenses from the period 2000-2008 focusing on use rights. Even these data, however, are available only for state university library licenses and only because of state open records laws (Bergstrom et al. 2009). Database vendor terms-of-use statements are publicly accessible, but surprisingly little cross-product analysis has been done (Eschenfelder, 2008).

A casual review of terms of use statements for several of the citation databases included in this history found that most allow downloading for "personal use" or permit downloading "reasonable amounts" into private databases (e.g., a researcher's private citation database). But some have interesting restrictions that could arguably conflict with some fair use claims. For example, SciFinder Scholar (Chem Abstracts) limits permission to 5,000 records and requires that users delete stored records when no longer needed for the relevant research project or after the completion of a degree program. [xxvii] Some licenses do not allow sharing of paper or electronic copies, requiring instead that each user download their own copy so as to add to the hit count.

Another important lesson for media use rights scholars is the lack of real closure in our case. Taking an infrastructural studies approach, we chose what we assumed was a "resolved" example of conflict where use rights were now taken-for-granted. We have found that while our dispute at first appeared concluded, and use rights seem taken-for-granted by many, in reality conflicts about use of citations continues just below the radar. Hilgartner (1995) reminds us that while regimes stabilize for periods of time, they are always subject to competition with new alternative regimes; thus the regime element changes that seemed to resolve our case were only temporary. One example of the lack of closure of our "concluded" case is the resurrection of a "failed" technology. We argued that the failure to develop and implement technological protection measures like CD-ROM meters allowed downloading to become embedded as a practice. But the database industry later adopted a range of other technological protection tools including: IP range restrictions, proxy servers, authentication and authorization systems, server choking systems that cut off very large downloads, and arrangements with licensees to police offending end users (Zhu & Eschenfelder, 2010; Eschenfelder, 2008). These systems control uses that threaten subscription-pricing business models, yet most users are unaware of them. From an STS perspective, the new TPM "work" because the controlled uses fit better with typical user expectations and library-publisher business relationships. That being said, these TPM could cease to work as underlying ensemble elements change.

In a second example of lack of closure in our "concluded" case, the shift to subscription pricing – which we argued was a key ensemble element in the citation use-regime change – may be changing again. Recently some have begun to question the need for expensive subscription access for many search needs (Chen, 2010). The recent budget crisis may make subscription database licenses untenable for some libraries: surveys of

library managers suggests that databases are "fairly vulnerable" to budget cuts (CIBER, 2009; Oder, 2009).[xxviii] Libraries, especially public or corporate libraries, may move from subscription access to "user driven" pay-per-use access to reduce costs (CIBER, 2009). In these pay-per-use situations, citation use rights may be more restricted.

It is also unclear how the continued development of free citation sources could affect use rights for commercial databases. Survey data suggest that free alternatives are an important draw in difficult budget times, especially for non-US libraries (CIBER 2009; Oder, 2009). Many free alternatives have developed in recent years -- Government sponsored free databases like ERIC and MEDLINE still exist, and other new sources have developed as government agencies around the world build specialized citation databases based on publicly available information (Chen, 2010), Google Scholar is also a major new player. Free sources develop their content in different ways: Some are drawn from journals website table of contents via spidering, and many (but not all) full text publishers permit Google Scholar or other tools to crawl their content to extract citation information (Jacso 2008, 2009). The availability of these free and easy alternatives, despite their many documented flaws (Jacso 2008, 2010), could weaken some demand for expensive citation database subscription licenses in some circumstances. It is not clear how weakening demand for all-you-can eat subscriptions might affect use rights, but the fact that subscription pricing was not an "ultimate" answer is particularly relevant given the current interest in tying digital streaming music services to mobile device subscriptions as a means of generating new music revenues (Edgecliffe-Johnson, 2010; Electronic Frontier Foundation, 2008).

In a final example of lack of closure, continued technological innovations have changed what it means for us to "download." In using RefWorks to create this paper, we did not "download" any citations in the 1980s sense of the term. RefWorks now stores our selected citations to a central RefWorks/ProQuest server, as part of a licensed service subscribed to by our university, rather than to a local memory device. The use-regime for bibliographic citations continues to evolve.

Conclusion

As we come to increasingly rely more on digital platforms and media, the question of where the use rights we experience came from becomes more important. In this paper we told the story of the information industry's "downloading controversy" of the 1980s and 1990s. We explained the observed change in use rights for bibliographic citations by introducing the idea of "use-regimes"—a four part sociotechnical analytic framework which provides a structure for mapping out and understanding changes in the use rights for creative and intellectual works over time. Foregrounding the social constructed nature of "acceptable use," we demonstrate how users and publishers pushed for conceptualizations of citation downloading as either "legitimate business practice" or "piracy," and how publishers came to change their conceptualization of

downloading over time due to other changes in the legal, market, cultural and technical environment encompassing citation databases.

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[ii] By "bibliographic citations" we refer to information about a journal article such as author(s), title, year, volume/issue, page numbers. In this paper we do not address the issue of abstracts. This period saw a separate debate about copyrights associated with abstracts and compensation of primary publishers for secondary publishers' use of abstracts. Readers interested in this debate should see (Koch, 1987)

[iii] For a helpful comparison of Hilgartner and Kling's use of regimes, see Meyer 2005.

[iv] For example, Hilgartner defined scholarly communications regimes as consisting of producers and consumers, distribution systems, incentives, funding structures and copyright rules (Hilgartner, 1995). Kling analyzed six elements of a STIN: gatekeepers, business models, speed of information sharing, mobilization and motivation of authors, and the communication infrastructure (paper vs email) and copyright ownership (Kling, Spector & Fortuna 2004).

[v] This description simplifies differences between primary and secondary publishers.

[vi] Later in the 1980s vendors like CompuServe (1980), AOL, and Prodigy (1985) entered the market to offer online services including access to some databases (Levinson, 1995).

[vii] Early CMS included ISI's Sci-Mate (released in 1983), Personal Bibliographic Software (PBS) developed by Victor Rosenberg of the University of Michigan (released in 1982), the Cuadra STAR system (introduced in 1980), Reference Manager by Research Information Systems of LaJolla CA, and End Note, developed by Niles and Associates. Numerous other commercial and in-house systems were also developed; we limit our discussion to those most important to our story.

[viii] Journal sources include *Against the Grain, CD-ROM Professional, Database, Information Services and Use, Information Today, Journal of the American Society for Information Science, Learned Publishing, Library Journal, Publishers Weekly, Publishing Research Quarterly, Online, Searcher, Serials, Serials Librarian, and Serials Review.* Conference proceedings include *Annual Meeting of the American Society for Information Science*, the *Online* conferences*,* and the *International Online Information Meeting.*

[ix] Handbooks include: *So You Want to be a Profitable Database Publisher* (Rosenau & Chase, 1983), *Guide to Database Distribution* (Bremner, 1994), and *Contracts in the Information Industry I, II, and III* (Marx, 1988; Marx, 1990; Marx, 1995).

[x] Copyright protection requires that a work be "original" to an "author." "Original" in this context means that the work owes its "origins" to the "author" and that the work possesses a minimal level of creativity. (Harper & Row Publishers, Inc. v. Nation Enterprises, 1985; United States Code, Title 17, § 102(b))

[xi] The *Feist* decision in 1991, during the midst of the online industry's expansion, "rocked the database world" (Bramson, 1991). The *Feist* ruling was the first to require originality in the arrangement of information in order for a database to qualify for copyright protection. The originality ruling was troublesome to an industry whose products were often organized information in straightforward (or user friendly) ways. As one industry lawyer described, "an entire class of valuable and desirable information products is now devoid of any substantial copyright protection… it will become open season on directories and database that lack the requisite originality"(Husick, 1992)

[xii] Courts had held that compilations such as street directories, telephone books and railroad timetables were copyrightable before the Second World War. (Triangle Publ., Inc. v. New England Newspaper Pub. Co.,1942) Similarly, the National Commission on New Technological Uses of Copyrighted Work (known colloquially by its acronym "CONTU"), established by the 1976 Copyright Act, concluded that databases were protected, but did so without any indication that some databases might not be protected because of a lack of originality (CONTU, 1978, at 38).

[xiii] As we described above, there was much debate about what constituted the database publisher's legitimate "market," because access was usually charged based on "connect-time" and so anything that might reduce "connect-time" could arguably be viewed as impacting the publisher's "market" (Beard, 1985).

[xiv] Publishers were also extremely concerned about downloading to create competing information products (e.g., Hearty & Polansky, 1987). We leave this aspect of reuse aside however because this aspect of use rights has not changed – users still are not permitted to download large numbers of citations to create competing products.

[xv] While we focus on bibliographic citation databases, it is important to note that downloading policies also varied by type of information contained in the database. Numerical database vendors, who aimed their products primarily at business markets, encouraged downloading by providing manipulation and display software. Their content – stock quotes, business reports – lost value quickly and so long term reuse was not a concern (Hearty & Polansky, 1987). On the other hand, citation databases publishers tended to want to control downloading as citations could be reused for some time prior to losing value. (J. Bremner, 1994; Hemmings, 1985).

[xvi] Today, such arguments would be harder to make, since subsequent cases have enforced a contract not to copy commercially published data (ProCD, Inc. v. Zeidenberg, 86 F.3d 1447 (7th Cir. 1996)) and a contract forgoing one's "fair use" rights (Bowers v. Baystate Techs., Inc., 320 F.3d 1317 (Fed. Cir. 2003)). Those cases however were well in the future, and it was by no means certain at the time that a contract prohibiting certain types of downloading would be enforced.

[xvii] Because MEDLINE included citations from other publishers' material, it warned users that they might download some material "on which claims of copyright have been made"(Benson & Weinberg, 1985).

^{xviii} Farjoun's 1971-1994 analysis of pricing structures of leading online vendors shows a drift away from reliance on connect-time pricing models. By 1994, the flat rate had become the new dominant model, and flat rate was *at least* an option for most vendors. Farjoun argues that the drift of pricing models away from connect-time resulted from technical innovations in telecommunications which reduced the amount of time one needed to be connected in order to run a search. Further, publishers and online vendors also believed that flat rate pricing was the best way to break into a wider consumer end user market for information services. Past experiments had shown that these new end users would not sign up for consumer online services that employed connect-time pricing or high upfront subscription costs (A.W. Elias, 1990; O'Connor, 1995; O'Leary, 1991; O'Leary, 1996).

^{xix} Some users need to see descriptive information (such as bibliographic citations) before deciding whether or not to "use" the information and charging for descriptive information might alienate these users. But for other customers, descriptors are the information product, and giving them away to these customers would mean giving away potential revenue (Hawkins, 1996).

^{xx} Searches of the literature found the following examples of metered CD-ROM products: automotive repair manuals, a financial debt and equity reporter, Harvard Business School Publishing, a Harvard Medical Library project to use metered CD-ROMs in a to provide developing nation hospitals access to the medical literature (Information Today, 1996; Hawkins, 1996; Nathans, 1996).

^{xxi} The Mosaic browser was released in 1993 and the world wide Web was "presented" to the 1993 Online Publishing Conference(http://www.w3.org/History.html)

^{xxii} Commercial use of the internet was still controversial and some argued that it should not be allowed (Hart, Reed, & Bar, 1992). In the early 1990s many publishers and online providers were confused about the early NSF rules restricting commercial use of those portions of the Internet funded by NSF. Some feared that it meant that customers on NSF funded connections could not access their services or conduct commercial transactions (Cronin, 1994).

^{xxiii} The conference report envisioned a distribution system which would reduce the transaction costs associated with downloading. The system would automatically generate a price for the download would based on how the information would be used.

^{xxiv} This is more of an issue for databases that serve commercial industries with significant research and development functions that may seek to avoid database subscriptions and instead conduct searches through occasional visits to a local university library.

^{xxv} The DIALOG PsycINFO terms of use did not allow any duplication in machine readable form without written authorization (Marx, 1995) But, a separate PsycINFO Permissions Policy included in the Marx collection of licenses, allows that "search output ..may be stored in a personal database for personal use only, including the storage and/or use solely for internal purposes." (Marx, 1995)

^{xxvi} Scholars conducting data mining or other types of research that requires access to large sets of citations may consider the use rights question unresolved in that they must still ask for special permission to gain access to and use the citations they need.

^{xxvii} SciFinder Scholar Terms and Conditions Statement End User License Agreement, 2008.

^{xxviii} A simple Google search of "database cancellations budget cuts" produces a large number of recent library announcements of cancelled database resources in addition to extensive journal title cancellations.