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Strategic Options for Managing Intellectual Asset Flows in the Information Sector*

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The central question in strategic management is how firms develop sustained competitive advantage (Teece *et al.*, 1997). Information and knowledge management are playing an increasingly important role in answering this question (Shapiro and Varian, 1999). "The payoff to managing knowledge has been dramatically amplified, in part because of the phenomena of increasing returns, in part because of new information technology, and in part because of the changing role of intellectual property" (Teece, 1998: 55). This is particularly true for firms involved in the transformation and exchange of information, because advances in technology are a threat to current value appropriation strategies (U.S. Census Bureau, 2001).

Given the increasing strategic importance of information and knowledge (hereafter referred to as intellectual assets or IAs), it should not be surprising that scholarly interest in the topic has also increased. Scholars have recently addressed a number of supply-side issues related to how firms acquire IAs (Boisot and Griffiths, 1999; Jarvenpaa and Staples, 2001; Matusik and Hill, 1998; May, 1998). There is rich literature on knowledge creation and organizational learning (Boisot, 1998; Cohen and Levinthal, 1990; Crossan *et al.*, 1999; Sawhney and Prandelli, 2000). Demand-side issues are also receiving increasing attention, where concern about how to profitably exploit IAs has been addressed from a number of perspectives (D'Aveni, 1995; Lieberman and

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Montgomery, 1988; McGaughey, 2002; Rivette and Klein, 2000; Winter, 2000). Information and knowledge management is particularly critical for information firms. Appropriating economic value from information products is dependent on their scarcity. IAs are not naturally scarce; their scarcity must be socially constructed and managed. The "construction of scarcity in knowledge is one of the chief aims of knowledge entrepreneurs" (May, 1998: 69).

This article contributes to the growing body of management research on intellectual assets in several ways. We review and then demonstrate the applicability of a theoretical framework for examining intellectual asset flows to the specific case of information firms (Boisot, 1995, 1998; McGaughey, 2002). We then propose a framework that facilitates examination of strategic response options. Finally, we identify a number of contingency considerations that make certain strategic responses more appropriate than others in certain contexts—we encapsulate these arguments in a number of specific propositions.

THEORETICAL BACKGROUND

Intellectual assets are an important source of competitive advantage (Leadbeater, 2000; Means and Schneider, 2000; Winter, 2000). The process by which organizations manage information and knowledge has been articulated by Boisot (1995, 1998) and summarized by McGaughey (2002). The value of an information good is derived from its utility and scarcity, which are a function of three characteristics: codification, abstraction and diffusion (Boisot, 1995, 1998). Codification is the process by which data are transformed into information through classification and filtering. The process of abstraction gives information structure by identifying relationships among data. Finally, diffusion refers to the availability of the intellectual assets to interested parties.

Scarcity is fundamental to the development of sustainable competitive advantage (Barney, 1991). If economic rents from IAs are to be maximized, their scarcity must be managed. "Only when a commodity is scarce can it be accorded commodity status, allowing it, most importantly, to command a price" (May, 1998: 69-70). Transparency and replication are two important dimensions of IA scarcity (McGaughey, 2002). Transparency is the degree to which IAs can be identified and acquired. Replication describes the transmission of IAs and their application in contexts in which they may be profitably utilized. Interventions in IA flows may be designed to either reduce transparency or to prevent replication. Transparency may be reduced by either complicating the process of identification or making it more difficult to understand once it has been identified. Replication may be prevented by either complicating information transmission or making application problematic (McGaughey, 2002).

In general, firms intervene in IA flows in order to more effectively appropriate their economic value. In-

formation firms[1] represent an important and unique subset of firms for which the management of IAs is of paramount importance. Information and cultural products exhibit at least four unique characteristics: 1) no fixed tangible qualities or fixed form (e.g., a movie may be shown at a theater, broadcast on network television or sold on a VHS tape or DVD), 2) exchange does not require direct contact between the seller and buyer, 3) value of the product is derived from content not from the physical artifact (or "wrapper") employed in distribution, and 4) the right to reproduce or distribute the product is often restricted (Office of Management and Budget, 1998).

Information firms must manage the scarcity of their products. The need for scarcity management is particularly apparent when the question of strategic intervention in IA flows is considered in the context of recent advances in technology. Recent interest in the issue of copyright law and its application and enforcement in cyberspace is a signal that the appropriation strategies of information firms have become problematic in a number of ways (Boyle, 1996; Lessig, 1999, 2001; Litman, 2001; National Research Council, 2000; Vaidhyanathan, 2001).

The national information infrastructure (NII) is a rubric that describes three technological trends: 1) the proliferation of computers and computer networks, 2) the popularization of the World Wide Web, and 3) the increasing availability of information and cultural products in digital form (National Research Council, 2000). Computers and computer networks give individuals the ability to store, retrieve, process, and distribute large amounts of information at very little cost. Transmission of information within computer networks is unaffected by the traditional constraints of time and geographic distance. The emergence of the NII will require information firms to rethink their rent appropriation strategies.

INFORMATION FIRMS AND STRATEGIC IA MANAGEMENT

Information firms must engage in strategic IA interventions that extend beyond firm boundaries to protect post-exchange product scarcity. Because the strategic interventions of most utility to information firms span organizational boundaries and represent attempts to manage product scarcity after the product is sold or exchanged, firms are forced to maneuver within a socially-constructed context in which multiple stakeholders compete for influence (National Research Council, 2000). If scarcity is to be constructed and enforced it must be backed by convincing institutional accounts (Jepperson, 1991), a persua-

[1] We define information firms as firms classified in the North American Industry Classification System (NAICS) as members of the new Information Sector (Sector 51). This sector groups together industries that produce, distribute or support the distribution of information-based goods and services. Three types of firms are included: 1) firms that produce and/or distribute information and cultural products, 2) firms that provide the means or physical infrastructure to disseminate these products, and 3) firms that process data. The following are included in the Information Sector: newspaper, periodical, book and database publishers, greeting card publishers, software publishers, motion picture and video production firms, record production firms, music publishers, radio and television broadcasting firms, and firms that provide information and data processing services, among others (U.S. Census Bureau, 2001).

sive ideology (Boyle, 1996; May, 1998) and an effective enforcement regime (Goldstein, 1994). While firms may benefit from legal protection (Goldstein, 1999), the existence and enforcement of these laws is tethered to idiosyncratic individual-level experience and the institutional accounts and social norms that emerge from this experience through ongoing social interaction (Giddens, 1984).

Appropriate interventions in IA flows will depend on an understanding of the technological, institutional, and legal environments in which information firms operate (Dacin *et al.*, 1999). We argue that interventions in IA flows can be categorized based on whether the intervention attempts to shape the way in which individuals experience information goods (experiential interventions), alter social norms that govern the use and exchange of such goods (normative interventions), or influence the legal framework that governs information production and distribution (legal interventions).

Intervention Modes

Experiential Interventions. Experiential interventions operate at the individual level and represent attempts to alter the architecture of products in order to change how individuals interact with or experience them. Information products have traditionally been encased or embedded in physical artifacts prior to market introduction. In this form, information products can be exchanged in much the same manner as more tangible products. People take much of their experience with traditional information goods for granted. We do not marvel at the functional characteristics of books for example, although books are still "the best interface for text yet invented—lightweight, portable, high-contrast, and cheap" (Shirky, 2000: 125). It is difficult to think of the physical artifacts in which intellectual goods have traditionally been embedded as mere physical containers or wrappers and to conceive of the ways in which the physical characteristics of these containers have shaped the way in which we interact with and experience information products. Our language reflects our experience—we talk of purchasing CDs or newspapers (physical artifacts) when our real intent is the purchase of audio recordings or news.

Product attributes play a central regulatory role in the management of IA scarcity. In the case of the Internet and the WWW, the supporting hardware and software designs which control information flows play a powerful role in determining and constraining individual behavior (Lessig, 1999). Examples of the power of architecture to regulate behavior abound in the physical word as well as in cyberspace. For example, the character of the French Revolution can be at least partially traced to the architecture of Paris with its small and winding streets that could be easily barricaded, which allowed revolutionaries to exert control over the city to a degree that was disproportionate to their absolute strength. This same principle applies to information goods. If they can be designed so that they are difficult to replicate, scarcity will be enhanced.

Experiential interventions in IA flows, therefore, take the form of manipulating the structure or architecture of information goods to encourage or constrain consumer behavior in ways that enhance IA scarcity and

facilitate rent appropriation. For example, record companies are exploring a number of technologies aimed at complicating the process of "ripping" or making MP3 files from CDs. If these efforts are successful, then extracting audio content from CDs and converting it to a digital format will be more difficult. Another technological solution to the widespread replication and dissemination of MP3 music files is a scheme that permits the replication of "original" music files, but prevents the copying of copies of the original.

Normative Interventions. A norm governing a certain action exists "when the socially defined right to control the action is held not by the actor but by others" (Coleman, 1990: 243). Norms are institutions (Powell and Dimaggio, 1991) which are socially constructed, routine-reproduced programs or rule systems. Norms affect individual behavior by defining the universe of potential options and structuring the incentive context (Scott and Meyer, 1994); they are sustained by shared, taken-for-granted rationales (Jepperson, 1991). Norms serve as powerful constraints on individual behavior and represent either valuable aids or significant obstacles in manipulating the scarcity of information products. If behavioral norms prohibit students from sharing textbooks, for example, publishers will be better able to appropriate their economic value.

The norms that govern the economic exchange of information products have a significant impact on the ability of information firms to manage the scarcity of such products. Strategic interventions in IA flows intended to affect the norms surrounding the exchange and use of information products are generally intended to influence the nature and content of the institutional accounts or explanatory justifications that support such claims (Boyle, 1996; Hughes, 1988; Litman, 2001; National Research Council, 2000; Netanel, 1996). These rationales are chosen carefully to resonate with the target audience. For example, major record labels acting through the Recording Industry Association of America (RIAA) are careful to stress the importance of insuring that artists are properly compensated for their work as a rationale for their opposition to the unauthorized sharing of digital audio files. This argument is designed to be logically compelling and to influence the normative context in which their products are consumed.

The emergence of the NII has changed the normative context in which information firms exchange and manage the scarcity of their products. When the WWW popularized the Internet, it already had a relatively long history with a particular philosophy, a set of behavioral norms and an identifiable culture (Himanen, 2001; Levy, 1984). The public adopted, to a large degree, the historical norms of the Internet. These norms were derived from what can be described as a digital gift culture.

Although information is not naturally scarce, it is not free. Information must be collected, codified, and stored, which is costly. When information is exchanged, however, its intangible nature and non-rivalrous qualities (i.e., it cannot be "used up") make it difficult to value. Gift cultures are "adaptations not to scarcity but to abundance" (Raymond, 2001: 81) and can provide an efficient solution to the problem of information and knowledge exchange. For

example, if an individual has invested considerable time and energy in developing a software solution for a particular problem and another individual, after having encountered the same problem, requests help from the first individual, a gift culture requires that help be provided without any request for monetary compensation. In this instance, the help may consist of simply replicating the software solution at very little cost in either materials, time or energy. Although providing aid in this manner costs the first individual very little, the help may be of considerable value to the second individual, who has now incurred an obligation to provide similar aid to others when the circumstances are reversed. The norms of a gift culture circumvent the valuation problems associated with information goods by promoting free and open exchange. This type of exchange approximates the market ideal of economic exchange at marginal cost (which leads to the maximization of social surplus), given that the marginal cost of replicating information goods is near zero.

Vestiges of a gift culture are visible in existing norms that govern the exchange of information products in numerous different contexts. For example, monetary compensation is discouraged among college student sharing of digital audio files: "I don't know of anybody who ever sold a CD they burned. . . . You have the music for personal use and you don't make any type of profit on it" (Alexander, 2001: 1D). Likewise, a Napster user recently asserted that "Music cannot be stolen. . . . Shops sell things, material things that when sold are no longer there and must be produced in a factory again. . . . MP3s cost nothing to reproduce, hence they should be free. Napster is as much shoplifting as FM radio is shoplifting" (Quinn, 2001: 2).

Norms derived from the early gift culture of the Internet represent an important obstacle for information firms attempting to appropriate the value of their information products. Firms attempting to reshape these norms to facilitate additional control over information products must recognize that the struggle over semantics, conceptual frames, metaphors and justificatory accounts are not peripheral concerns; they are fundamental to the evolution of the normative environment that will determine the scarcity and value of information goods. For example, two different metaphors were employed in the recent debate over a provision in the Digital Millennium Copyright Act of 1998 (DMCA) that outlaws the circumvention of technical protection measures in digital products. Information firms argued that products manufactured to allow consumers to circumvent digital rights management features (e.g., a software program that allows consumers to duplicate copy-protected DVDs) were, in effect, burglar tools. Consumer groups, in contrast, argued that these firms were simply supplying consumers with the equivalent of scissors to cut a passage from a legally purchased book.

Legal Interventions. The unique challenges associated with the production and exchange of information products, particularly the ease with which they can be duplicated and diffused, make the legal environment central to the management of IAs. Copyright represents the primary legal framework for enforcing the scarcity of information products and is designed to protect artistic and ex-

pressive work (Goldstein, 1999). Copyright law is a compromise between two opposing imperatives. Without enforceable property rights it would be impossible for information firms to recoup costs associated with the production of information goods and there would be no economic incentive to continue their production (Besen and Raskind, 1991; Landes, 1989). On the other hand, information goods are non-rivalrous. Once produced, use by an additional individual does not diminish the good or decrease its availability. The marginal cost of producing information goods trends towards zero which implies that the price of information products, in an efficient market, will approach zero. The granting of a legal monopoly prevents such an outcome. "Put succinctly, the dilemma is that without a legal monopoly not enough information will be produced but with the legal monopoly too little of the information will be used" (Cooter and Ulen, 1988: 135). The challenge is in striking and maintaining a balance, offering enough control to motivate authors, inventors, and publishers, but not so much control as to threaten important public policy goals such as broad access to information, promotion of education and scholarship, and the preservation of the cultural heritage of the nation (National Research Council, 2000).

U.S. copyright law carefully addresses these conflicting demands and strikes a delicate balance between control and access. Article I, Section 8 of the U.S. Constitution provides this justification for copyright: "The Congress shall have power . . . [t]o promote the progress of science and the useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries." Legal protection was granted for a "limited time" because the collective body of existing intellectual goods often serves as the raw materials from which new information products are created. Although enhanced property rights might provide increased incentive to produce information goods at a given point in time, such rights may be counter-productive in a dynamic sense by reducing the overall quantity and quality of information goods produced in the future.

Limitations in current copyright law include: 1) fair use exceptions, 2) the first sale doctrine, and 3) the expression-idea dichotomy. The fair use doctrine is established in Section 107 of the U.S. Code, which states that "fair use of a copyrighted work, including such use by reproduction in copies . . . for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright." Several authors have highlighted the importance of the fair use doctrine in preserving the public domain and have argued that fair use is necessary to protect free public discourse and individual free speech rights (Benkler, 1999; Boyle, 1996; Mann, 1998; Netanel, 1996). The "first sale" doctrine prohibits copyright owners from controlling copies of their work once these copies have been sold. Finally, copyright applies to forms of expression, not to their underlying ideas. It is the expression of the idea, rather than the idea *per se* that can be copyrighted. This long-standing dichotomy reflects the notion that "the noblest of human productions—knowledge, truths ascertained, conceptions, and ideas—become, after

voluntary communication to others, free as the air to common use" (Supreme Court of the United States, 1918).

Legal interventions take the form of active participation in both the legislative process and the formulation and implementation of appropriate enforcement mechanisms. Multiple stakeholders with different objectives make the political processes in the area of copyright reform problematic (National Research Council, 2000). Information firms attempting legal interventions in IA flows must take into account the historical character and purpose of existing copyright law. Much of the resistance to changes in copyright law derive from concerns that consumer protections may be undermined (Litman, 2001; Mann, 1998; Vaidhyanathan, 2001).

Intervention Contingencies

Experiential, normative and legal interventions in IA flows allow information firms to construct and manage the scarcity of information products. The relative effectiveness of each of these intervention modes is dependent on important contingency considerations. For example, there may be certain instances in which legal interventions are likely to be resisted by the general public because they challenge deeply-held privacy or free speech expectations. In these instances experiential interventions may be more effective. We highlight two critical contingency factors: the utilization domain of the product and the importance of controlling the distribution or dissemination of the product.

Utilization Domain. The utilization domain is defined here as the context in which an information product is utilized or exchanged. An information product, for example, may be designed to be utilized in the public domain. Software intended for commercial use would represent such a product. In this case the intended consumer is a legal entity that operates in the public sphere and whose actions are assumed to be both public in nature and subject to public scrutiny. Legal interventions in IA flows have generally been conceived of as public interventions: "Every American copyright act since 1790 has clung to the idea that copyright is a law of public places and commercial interests" (Goldstein, 1994: 131). In instances in which product utilization or exchange falls within the public domain, legal interventions are particularly well suited for the management of product scarcity.

On the other hand, the nature of certain information products may be such that utilization takes place primarily within the private domain. We define the private domain as the realm of private behavior and individual-level social interaction that is not considered public or to be subject to open public review or criticism. An individual listening to music within the confines of his or her living room or one individual e-mailing another represent activities that fall within the private domain.

The distinction between the public and private domain is built into current copyright law. Fair use exceptions can be interpreted as important constraints copyright law intended to insure that legal interventions are confined to the public domain (Benkler, 1999; Boyle, 1996; Mann, 1998; Netanel, 1996). Likewise, the first sale doctrine, which prohibits copyright owners from controlling copies of their work once these copies

have been sold, and the expression-idea dichotomy, which stipulates that copyright applies to forms of expression, not to their underlying ideas, serve as additional barriers that confine copyright law to the public sphere. In keeping with the tradition of distinguishing between public and private activity, some scholars have asserted that "non-commercial copying should be presumed to be fair, as most often it is" (National Research Council, 2000: 133).

Assumptions regarding the appropriate application of copyright law are not themselves part of copyright law—they are shared understanding or norms that lack any formal codification. The emergence of the NII has exposed the "taken-for-granted" nature of some of the these assumptions and prompted some legal scholars to engage in significant reflection. For example, it appears that whether private use copying should be considered an affirmative right of the consumer, a type of fair use, acceptable copyright "leakage" or outright violation of copyright law depends on the observer. One copyright scholar has asserted that "the silence of Congress on the issue of private copies has left a black hole in the center of American copyright legislation" (Goldstein, 1994: 132). These comments highlight two important issues. First, the utilization domain is an important consideration because it determines the coherence and effectiveness of legal IA flow interventions. These comments also highlight the important interdependence of normative and legal interventions.

Importance of Control of Dissemination. For some information products, control over dissemination represents the lynchpin of any rent appropriation strategy. If an information product is packaged and exchanged as a complete and independent product, control over dissemination is likely to be a concern. The importance of control over dissemination is also related to the time-sensitivity of the product—the more time-sensitive the product, the less critical control over dissemination becomes. For example, CDs are exchanged as complete, stand-alone products. There is no need to acquire complimentary products or otherwise engage in subsequent exchange with the supplier. Although there is some degree of time-sensitivity, music recordings do not exhibit nearly as steep of a value decay curve as other time-sensitive information products (e.g., news). For music recordings, therefore, control over dissemination is a critical component of the ability of record labels to appropriate the value of their products.

Information products that are not exchanged as stand-alone products are less likely to require appropriation strategies that involve tight control of the dissemination process. For example, some database and directory publishers have adeptly shifted from selling their databases to selling *access* to their databases (Shapiro *et al.*, 1999). Information products with steep time-value decay curves are often similarly immune from the need to control the dissemination process. In the case of newspaper publishers, although the product is self-contained, the time-sensitivity of the information renders tight control of content dissemination unnecessary.

Although information firms can lessen the dependence of their rent appropriation strategies on their ability to control the dissemination process by employing new business models or by manipulating the

characteristics of their information products, historical precedent and established consumer expectations often make this approach risky. The need to control dissemination is not uniform among information firms. Firms that employ rent appropriation strategies—the success of which does not depend on controlling distribution or dissemination of their products—are more likely to favor a different set of IA interventions than firms for which such control is paramount. The necessity of controlling product distribution or dissemination therefore represents a second important contingency consideration.

PROPOSITIONS

We derive a set of propositions by focusing on the joint role of domain utilization and the necessity of controlling distribution in determining the likely effectiveness of different IA intervention modes. We create a two-by-two matrix by crossing the two contingency considerations outlined above and then discuss IA flow intervention strategies for each of the four cells in the matrix (see Table 1).

Cell 1 (Private Domain, Control is Essential)

Information firms that make products consumed in the private domain and for which control of the dissemination process is integral to their profitability face a number of obstacles that make IA flow interventions problematic. Legal interventions are limited by the fact that consumption occurs in the private domain and copyright law has historically been applied in the public domain. Recent legislative efforts (e.g., the Digital Millennium Copyright Act and the No Electronic Theft Act) have successfully extended copyright's reach, but there remain significant unresolved issues with regard to fair use, private use and the doctrine of first sale (Goldstein, 1994). Consumer groups, like www.digitalconsumer.com, have begun to exert some influence in the political process, further complicating attempts to clarify the application of copyright law to the private domain.

Once copyright enters the private domain, it cannot avoid direct confrontation with basic privacy and free speech guarantees. For example, privacy concerns played a pivotal role in the deliberations of the U.S. Supreme Court in *Sony v. Universal* (the Betamax case). Justice John Paul Stevens wrote that "the privacy interests implicated whenever the law seeks to control conduct within the home" was an important value that "argued for a statutory exemption of private copying" (Goldstein, 1999: 150). Others argue that enforcement of copyright laws in the digital realm "requires monitoring of communications, and you cannot be guaranteed free speech if someone is monitoring everything you say. . . . You cannot guarantee freedom of speech *and* enforce copyright law" (Clarke, 2001: 2).

Normative interventions are equally problematic. Existing norms support a distinction between private and commercial activity and serve to prevent encroachment of the latter on the former. For example, attempts by information firms to legitimate the monitoring of private communication for the purpose of enforcing copyright statutes violates a number of strong norms and widely-held beliefs about individual privacy rights. With

TABLE 1

Differentiating Information Firms: Utilization Domain and Control of Dissemination

Control of Dissemination	Utilization Domain: Private	Utilization Domain: Public
Essential	**Cell 1:** NII* is a credible threat to appropriation efforts; experiential interventions are the most appropriate	**Cell 3:** NII is a credible threat to appropriation efforts; normative and legal interventions are the most appropriate
Incidental	**Cell 2:** NII represents an opportunity to increase distribution efficiency; firms likely to utilize the NII	**Cell 4:** NII has little impact on appropriation strategies; firms largely unaffected

* *National Information Infrastructure*

respect to legal and normative interventions, information firms are left with what might be termed "encroachment" strategies. Information firms can attempt to incrementally extend copyright law into the private domain and enforce it through other institutions that are "closer" to the consumer. For example, the Recording Industry Association of America (RIAA) recently mailed letters to most Fortune 500 companies seeking their aid in preventing employees from downloading music files at work.

Experiential interventions offer a number of advantages for information firms in Cell 1. As long as the consumer is informed of product features before the good is exchanged, firms are free to experiment with experiential interventions without confronting legal gray areas or normative roadblocks. Although problems may arise when the characteristics of established products are altered in ways that surprise or disappoint consumers (e.g., when the characteristics of standard music CDs are altered without informing the customer prior to the sale), confronting these issues is preferable to dealing with more problematic normative and legal obstacles. In the long run, experiential interventions may shape behavioral norms and make legal interventions more palatable. This reasoning leads to the following proposition:

Proposition 1: Firms that produce products consumed in the private domain for which rent appropriation is dependent on controlling distribution will be the most likely to employ experiential intervention strategies.

Information firms in Cell 1 (see Table 1) are likely to encounter at least one significant dilemma in their experiential intervention efforts. Fair use constraints built into current copyright law were developed before the emergence of the NII and provide for limited access and use of information products without the explicit consent of the copyright holder. Because information products have historically been relatively difficult and expensive to replicate, there was little danger that fair use exceptions would interfere significantly with appropriation efforts. The NII has altered this situation. If fair use is protected in digital products, one unscrupulous individual may duplicate the product under the guise of fair use and then disseminate it to thousands of other individuals who may pass it on to others. Individuals may also develop tools for circumventing certain security features of different products and then argue that such tools are designed only to facilitate fair use and therefore represent legitimate products. The popularization of such products can have significant detrimental effects on appropriation efforts. Fair use exceptions may therefore serve as infringement gateways and significantly hinder appropriation efforts. Information firms in Cell 1, therefore, will be put in the unfortunate position of challenging fair use exceptions in an attempt to enhance the effectiveness of experiential interventions. This reasoning leads to the following proposition:

Proposition 2: Firms that produce products consumed in the private domain for which rent appropriation is dependent on controlling distribution will be the most likely to challenge institutionalized fair use exceptions in existing copyright law.

Cell 2 (Private Domain, Control Not Essential)

For some information firms, control of the dissemination process is not essential. Newspaper, periodical publishers, and radio stations, for example, incur substantial costs in disseminating their products and would elect, if possible, to allow other parties, including customers, to distribute their products for them. For these firms, distribution of information products often involves numerous transactions with large numbers of individuals and utilization generally occurs in the private domain. The NII represents a window into the private domain that increases these firms' marketing and distribution reach. The NII provides an inexpensive way to tap into existing social interactions and relationships that can be leveraged by information firms to more effectively and efficiently distribute their information products. For these reasons firms in Cell 2 will be the most likely to actively exploit the NII:

Proposition 3: Firms that produce products consumed in the private domain for which rent appropriation is not dependent on controlling distribution will be the most likely to distribute their products via the NII.

Cell 3 (Public Domain, Control is Essential)

Firms in the private domain for which control of the dissemination process is essential (Cell 1) must rely on experiential interventions because of countervailing norms and the lack of legal clarity (see Proposition 1). In

contrast, firms in the public domain for which control of the dissemination process is equally essential (Cell 3) confront a very different normative and legal environment. Corporate entities are generally considered public institutions in the sense that their actions are visible and fall within the public domain. They cannot resort to the same privacy and free speech claims available to individuals in the private sphere. In addition, it is generally viewed as inappropriate for another commercial entity to benefit monetarily from the use of intellectual assets they do not own or have the right to exploit. Furthermore, although complex, the legal regime for protecting IAs in the public domain rests on solid precedent and is readily enforceable (Goldstein, 1999). In short, existing norms and the current legal regime support aggressive protection of intellectual goods in the commercial domain.

Reliance on experiential interventions in the commercial or public domain is often cumbersome and can communicate an unhealthy level of distrust. Anti-copy security measures, for example, were initially used in the early 1980s to prevent firms from copying software without the proper license. Software firms largely abandoned these measures because they prevented the making of legitimate backup copies and otherwise did more harm than good. This leads to the conclusion that firms in Cell 3 will rely principally on normative and legal interventions to manage the scarcity of their products. This reasoning leads to the following proposition:

Proposition 4: Firms that produce products consumed in the public domain for which rent appropriation is dependent on controlling distribution will focus on normative and legal methods of control.

How should information firms that produce products principally consumed in the public domain approach the private domain? For example, should a company that produces high-end software used primarily in the public domain (i.e., by commercial firms) attempt to control dissemination in the private domain? If individuals can download and use commercial software for free, they may, once introduced to the product, insist on using the same software in their place of employment. Given the differences in the normative and legal environment between the private and public domains, firms may be able to pursue "thin" protection in the former domain while simultaneously working aggressively to appropriate economic rent from their products in the latter domain. Zone Labs, which manufactures the Zone Alarm firewall software, has successfully employed this tactic. Zone Alarm is free for individual or personal use, but must be licensed for commercial use. This reasoning lead to the following proposition:

Proposition 5: Firms that produce information products consumed in the public domain for which rent appropriation is dependent on controlling distribution are unlikely to pursue aggressive rent appropriation strategies in the private domain.

Cell 4 (Public Domain, Control Not Essential)

The NII has little effect on firms in Cell 4. Unauthorized distribution in the NII is not a concern because control of dissemination is not integral to value appropriation. Since business-to-business distribution channels are well-defined and more efficient than business-to-consumer channels, Cell 4 firms have little incentive to distribute their products via the NII. Nor-

mative and legal controls can be used effectively because of the public nature of consumption. This reasoning leads to the following proposition:

Proposition 6: Firms that produce products consumed in the public domain for which rent appropriation is not dependent on controlling distribution are the least likely to alter existing rent appropriation strategies.

CONCLUSION

The advent of the NII has altered the rent appropriation environment for information firms and resurfaced critical tensions between the ownership claims of the creators of information goods and the social imperatives of broad public access to information and the promotion of scholarship, education and the arts. It is important to recognize that these tensions are not new. For example, Lord Mansfield summed the problem up nicely in 1785 when he stated:

> We must take care to guard against two extremes equally prejudicial; the one, that men of ability who have employed their time for the service of the community, may not be deprived of their just merits, and the reward of their ingenuity and labour; the other, that the world may not be deprived of improvements, nor the progress of the arts be retarded (Kaplan, 1967: 17).

What has changed is the context in which this balance is being negotiated. Digital intellectual goods represent a quantum shift from traditional methods of packaging or embedding information goods in physical artifacts and this "liberation of content from the medium has unsettling consequences for the protection of IP" (National Research Council, 2000: 33). From the perspective of information firms, these changes require thorough reassessment of existing rent appropriation strategies. Our objective has been to provide a useful framework that will facilitate this reassessment.

Information goods should be viewed as IA flows and as such should be considered subject to intervention strategies designed to improve or enhance the rent appropriation efforts of information firms. We have examined three different types of IA flow interventions—experiential, normative and legal—and have discussed two important contingency considerations—utilization domain and necessity of controlling dissemination. Examination of different intervention modes and contingency considerations has yielded a number of interesting propositions regarding IA flow intervention strategies.

The ongoing controversy surrounding digital audio files (primarily MP3s, although numerous other formats exist) represents a convenient context for briefly illustrating the usefulness of our framework. Because the rent appropriation efforts of major record labels currently depend on controlling product distribution and the majority of music consumption occurs in the private sphere, the NII is a credible threat to profitability (see Cell 1, Table 1). Our framework suggests that the recording industry should focus primarily on experiential intervention strategies. The challenge that recording companies confront is how to shape the consumption experience by altering the characteristics of their products in such a way as to facilitate rent appropriation. This is no easy task, given that such intervention requires a thorough understanding of how digital music is experienced by the consumer.

Perhaps the most obvious strategy is to attempt to endow digital products with the same characteristics and

limitations as embedded information goods. We believe that technology (and its creative application) make this, at best, a short-term option, given that such limitations are not inherent features of the product and can (and will) be circumvented. More imaginative solutions involve relatively unobtrusive attempts to piggyback micro payment systems on existing peer-to-peer networks (Ahrens, 2003) or pursuing aggregate or group-level payment arrangements (Harmon, 2003).

The Recording Industry Association of America (the RIAA), which represents the major record companies, has recently pursued a number of normative and legal intervention strategies. For example, the RIAA was instrumental in shutting down Napster and is actively engaged in legal maneuvers against Kazaa and other similar file-sharing platforms. Because file-sharing networks like Kazaa are quasi-public in nature, we believe that the RIAA may be able to justify such activity and that the benefits of shutting down these systems may outweigh the costs. We believe, however, that attempts to further extend legal interventions into the private domain will do more harm than good. Lawsuits directed at individuals for participating in file-sharing networks, for example, have resulted in significant negative publicity and damaged consumers' overall opinion of the recording industry (Reuters, 2003). Likewise, normative interventions designed to legitimate and strengthen justificatory explanations of record company ownership claims and pricing practices have had no discernible affect on consumer behavior and, in some cases, have produced a hostile backlash (e.g., www.downhillbattle.org).

For major record companies and other information firms, our framework serves to highlight potentially effective appropriation strategies and to call attention to potential pitfalls. Our framework also calls attention to the need for additional research. For example, little attention has been devoted to empirically testing relationships like those suggested in our propositions. There is a need to explore the effectiveness of different IA flow intervention strategies in different environmental and competitive contexts. Until such work is done, firms will have to rely on theoretical implications and anecdotal evidence to guide future decisions. In addition, it is important to note that although our framework facilitates strategic assessment of the opportunities and threats presented by the NII, there is also a need to address important public policy issues related to the protection of intellectual property in general that go beyond the narrow self-interests of individual firms. There are significant societal, philosophical and moral concerns associated with the grant of intellectual property rights that should be examined and debated (Barlow, 1994; Benkler, 1999; Breyer, 1970; Hughes, 1988; Litman, 2001; Mann, 1998; May, 1998). We hope that our work proves useful to both practitioners and scholars grappling with the NII and its implications. We also hope that our work stimulates additional scholarly activity in this important area.

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