

The Suppression of Technology As a Strategy for Controlling Resource Dependence

Richard Dunford
*Kuring-gai College of
Advanced Education*

The resource dependence approach to organization-environment relations concerns in part the strategy and tactics whereby organizations seek to control aspects of their environment. This study utilizes and extends the resource dependence perspective and establishes the existence of a strategy that the corporate strategy literature ignores. Data from United States antitrust law is used here to sustain the argument that suppression of technology is one strategy used to control resource dependence. Specific tactics and their characteristics are identified, along with their objectives and the processes whereby these may be achieved. The paper shows that the selection of specific tactics is likely to depend on both the particular objective sought and the current judicial interpretation of these areas of law. Recent changes in the latter are producing a situation conducive to the utilization of patent-based tactics.*

The argument that technology is a key influence on organizational performance is part of the received wisdom of strategic management. An organization's technology strategy is treated as a key component of its overall competitive strategy because of the potential of technological change to influence industry structure and competitive advantage (Porter, 1985). Technology strategy thus operates as a mediating force between an organization and its environment (Mintzberg, 1983: 13). The precise nature of this mediation is a matter of some debate.

In the resource dependence perspective (Pfeffer and Salancik, 1978), organizations are viewed as dependent for their survival on environmental resources, this dependence being a source of vulnerability that they seek to minimize. While adaptation is one option, another is to act so as to change the nature of the dependence by changing the environment. Organizational actors are thus portrayed as active agents in the construction of their environment, rather than as responders, albeit active, to some concrete external reality that imposes itself on them. From this perspective, organizational strategies are reconceptualized as means whereby organizations seek to minimize their dependence or increase the dependence of others on them.

One means of developing this perspective is by categorizing strategies such that they are seen as belonging to certain generic types. This is the approach of Pfeffer and Salancik (1978) and Kotter (1979). Their largely compatible typologies can be summarized as follows: (1) absorption of dependence through relocating in an environmental niche in which external dependence is reduced or through expanding domains through vertical integration, horizontal integration, diversification, merger, or acquisition; (2) negotiation of dependence by establishing cooperative relations through arrangements such as cartels, joint ventures, and interlocking directorates or by influencing perceptions of the organization through public relations tactics; and (3) utilization of governmental and judicial channels, such as using existing legislation as the basis of legal action against competitors or pressing for the introduction of tariffs, subsidies, or other forms of industry regulation.

A second means of developing this perspective is through the investigation of specific strategies from the perspective of their contribution to the management of external dependence. In the arena of technology strategy, the suppression of technology constitutes a particularly challenging focus for investigation, because in the strategic management literature there is no acknowledgment of its existence. Suppression of technology refers to the nonutilization and nondiffusion of a developed technology by those with control over the technology. Within the strategic management literature the central concern with technological leadership and followership does not a priori exclude suppression as an option, it is simply that suppression does not appear on the agenda. Porter (1985), for example, provided a detailed list of factors that should influence the leadership/followership decision without ever acknowledging that one form of technological leadership might actually be to suppress the technology. Monopolization for use is a recognized strategy, monopolization for nonuse is not. This omission is not unusual. Even in the organizational literature, as broadly defined, the suppression of technology has received only the most fleeting reference (Pennings, 1981: 444, 448).

The central task of the research upon which this paper is based was to investigate the validity of the proposition that the suppression of technology does exist and that it can be seen to be a strategy that has been used to manage external dependence.

METHODOLOGY

Investigating the suppression of technology as a strategy entails two related problems. First, what constitutes a strategy? Intentionality may be a sufficient condition, but is it also a necessary one? Following Mintzberg and McHugh (1985), strategy in this research refers to the existence of either intentionality or a pattern of activity that emerges from organizational action. That is, "observed consistency of action" (Mintzberg and McHugh, 1985:161) is treated as an acceptable basis for utilizing the label "strategy." Second, establishing the existence of strategy in either of these senses is problematic. Strategy is easily open to misinterpretation, as Pascale (1984) has clearly illustrated in his reanalysis of Honda's entry into the United States motorcycle market. To the extent that the suppression of technology is a strategy that may involve clandestine elements, the problem of misinterpretation is likely to be even greater.

However, there is a methodological approach that can significantly resolve this analytical problem. Cases in patent law and antitrust law are rich with information on organizational practices that would otherwise receive little exposure. They provide detail on the practices, legal and illegal, that organizations have used in their efforts to control technological aspects of their environment. Many also involve attention to the establishment of intentionality, albeit as a legal assessment of events.

Every new patent is "a grant of monopoly power by the state" (Neale and Goyder, 1980: 288). It gives the patent holder the right to prevent others from making, using, or

selling the patented item for seventeen years. The patent is intended to provide this monopoly as a means of encouraging invention. However, suppression of patented technology per se is not illegal. Patent law does not require, as a condition of the granting of the patent, that the invention be used. The classic case supporting this is *Continental Paper Bag v. Eastern Paper Bag Co.* (1908) in which it was argued that the Court should refuse to protect a patented invention that had not been put to use (Frost, 1946). The Court, however, argued that "[t]he inventor is one who has discovered something of value. It is his absolute property. He may withhold a knowledge of it from the public. . . . it is the privilege of any owner of property to use or not use it without question of motive" (Areeda, 1981: 576). The small number of subsequent cases centered on the nonuse issue have resulted in essentially the same decision. The paucity of such cases is indicated by the claim by Neale and Goyder (1980: 324) that there have been "no modern cases in which the Supreme Court has squarely faced the question of non-use."

Similarly, while antitrust law seeks to promote competition through the prevention of unreasonable restraint of trade, it does not directly seek to increase the utilization of technology. If nonuse is deemed to be based on reasonable commercial grounds such as lack of available capital for its development or fixed investment in existing technology or lack of a viable market, then antitrust provisions do not apply. Suppression of technology can be perfectly legal (Kintner, 1973; Miller, 1974; Neale and Goyder, 1980). However, antitrust legislation is by no means a toothless tiger. Suppression can be deemed to have occurred for anticompetitive reasons and can therefore be the focus of successful antitrust action.

The primary source of data for this study was seven texts on patent law and antitrust law (Areeda, 1981; Areeda and Turner, 1978; Kintner, 1973; Miller, 1974; Neale and Goyder, 1980; Sullivan, 1977; Vaughan, 1956). The selection of the texts was based on the recommendations of four legal academics with expertise in these areas of law. To remove the possibility of institutional bias, these informants were selected from diverse and geographically distributed universities. This provided a core of several hundred cases, with the additional virtue that the common citation of cases in more than one text provided a basis for cross-checking interpretations of case materials. When there appeared to be any inconsistency in interpretation or when further detail was required, the original law reports were consulted or the relevant corporate histories, if available, were investigated. In some cases (Bright, 1949; Danielian, 1939; Reich, 1977) this revealed other suppression practices that never entered the legal arena and hence did not appear in the primary sources. The various sources were used to develop a typology of tactics whereby the suppression of technology is achieved or sought.

TECHNOLOGY SUPPRESSION TACTICS

The typology of suppression tactics developed on the basis of this data is shown in Table 1. Specific tactics were identified along with their objectives and associated processes. These tactics are explained and illustrated, below, utilizing a sample

Suppression of Technology

Table 1

Tactics for the Suppression of Technology		
Tactic	Objective	Process
Patent consolidation	To control the rate of development of the technology.	Gain control of key patents through research and development and/or buying these patents.
Patent blitzkrieg	To block the path of would-be competitors by increasing the specter of infringement.	Take out a mass of patents.
Patent pool	To control common markets by preventing new competition from outside the group.	Share key patents.
Qualified licensing	To suppress the use of a technology in a particular market.	License for use in a limited market.
Trade secret	To protect the organization's monopoly on information without placing it on public record.	Keep information within the organization.
Takeover	To gain control over the development of a new technology.	Acquire the developer organization.
Manipulation of information	To dampen interest in the new technology.	Publicize the "limitations" of the new technology.

of selected examples from the data (see Appendix). The sample is a purposive one in the sense that individual examples were selected for the clarity with which they illustrate a particular tactic. Although the number of examples used to illustrate a particular tactic varies, this is in no way intended to signify the relative frequency with which each tactic was used.

Patent Consolidation

A major tactic for attempting to control the development of technology is the practice of patent consolidation. This requires gaining control of key patents through research and development and/or buying up of such patents. The difference between these two approaches is significant, because antitrust action for suppression of competition cannot take place with respect to patents based entirely on a company's own research (Sullivan, 1977: 511).

AT&T was the first company to organize a coordinated research effort aimed at producing a quality system of radio ("wireless telephony") transmission and reception, but it entered radio research as a defensive measure because of the claims being made about the potential of radio which, if true, could have had a serious impact on AT&T's investment in wire communications (Danielian, 1939: 107). AT&T secured for itself a central position in the development of both radio and telephone through securing the patents on a few specific

inventions: Michael Lupin's loading coils, the Cooper-Hewitt mercury-arc repeater, and Lee De Forest's three-element vacuum tube.

Since the beginning of the Bell system in 1875 it had been company policy to consolidate patents to maintain its telephone monopoly. Such patent consolidation becomes self-reinforcing, because the more a company holds key patents, the more it becomes the obvious and perhaps only market for further, related patents. More than just providing a monopoly, patent consolidation can delay the introduction of new technology. AT&T held back the combined handset and dial system for 20 years because of its investment in the existing technology and the associated emphasis on cost-saving through standardization. Some had been market-tested and had met with an enthusiastic response but were quickly recalled. AT&T's chief engineer, in a letter in 1907 to an associated company, stated that "we should avoid taking the slightest step which might precipitate a general demand for these instruments" (quoted in Danielian, 1939: 102). Similarly, AT&T delayed the general introduction of the automatic telephone for 20 years (Kaempffert, 1923).

General Electric came to control the production of incandescent lighting through a strategy of buying companies and patents (Vaughan, 1956). Then when fluorescent lighting was developed, its introduction was suppressed because the company wished to saturate the incandescent market before releasing the new technology. This action was also the result of pressure from electric utility companies, whose managers believed that the increased efficiency of fluorescent lighting would mean a reduced demand for electricity and hence be a threat to their profitability. Fluorescent lights were eventually released onto the market in a big way by Westinghouse and General Electric, because a smaller competitor—Sylvania—began to do so successfully, and suppression was no longer in the manufacturer's interests.

There have been expressions of concern about similar suppression in the development of solar energy technology. One of the results of the "energy crisis" of the early-to-mid-1970s was the increased involvement of many large oil corporations in the area of solar energy research. These included Mobil, Shell, Atlantic Richfield, Exxon, and Standard Oil of Indiana. Critics have interpreted the activities of the companies as "token commitment to solar development beyond patent acquisition" (Fellmeth, 1981: 206). The argument is that control over key patents will give these companies significant influence over the development of a technology that competes with those technologies to which they have an entrenched commitment (Fellmeth, 1981; Etzkowitz, 1984).

Patent Blitzkrieg

A technique for control that is closely related to patent consolidation involves the taking out of a large number of patents with the specific intention of blocking the path of would-be competitors. In the Hartford-Empire case (*United States v. Hartford-Empire Co.*, 1942), it was revealed that the company took out such patents to cover the machines that it was putting out and prevent duplication of them, to block the development of machines that might be constructed by others for

Suppression of Technology

the same purpose as its machines, and to secure patents on possible improvements of competing machines so as to "fence in" those and prevent them reaching an improved stage (Vaughan, 1956: 240). The effect of this blocking strategy is that if some other parties wish to take out a patent in the same or a closely related area, they will need to find out about and avoid perhaps hundreds of patents on related ideas (Vaughan, 1956: 262). This practice, sometimes called "patent blitzkrieg," can effectively suppress competition through the use of, or threat of, patent-infringement suits. Banks, for example, are extremely unlikely to lend money for the development of a technology when infringement suits are threatened. This blitzkrieg is facilitated by the use of "umbrella patents" (patents that are so broad as to prevent the development of similar products), "accordian patents" (patents that begin with the single invention but expand to include products and processes used in association with it), and "bottleneck patents" (patents that control the use of inventions without which the industry cannot operate) (Stern, 1943: 100–101).

An investigation into the Bell Telephone Co. in the 1920s found that to prevent competition it had suppressed 3,400 patents, a strategy that had involved it in acquiring patents covering devices for which it had no need but to which it wished to deny potential competitors access (Stern, 1937: 19). Later, in its new form as AT&T, the company used the same strategy in an effort to control the development of radio. When Du Pont invented nylon, the company investigated the full range of molecular structures with similar properties, "blanketing their findings with hundreds of patent applications to prevent other firms from developing an effective substitute" (Scherer, 1970: 391).

An antitrust case also revealed the practices of Kobe Incorporated, manufacturer of hydraulic pumps, which for years had maintained the practice of buying up patents that might affect its business (*Kobe Inc. v. Dempsey Pump Co.*, 1952). In 1947 an inventor named Dempsey developed a competing pump. Kobe claimed that this infringed its patents, began litigation, and informed the major industry customers of this move. Subsequently Dempsey's business virtually dried up, and he initiated legal action. As a result of this, the court found that Kobe's activities were based on the intention to suppress competition. Included in the case had been evidence to the effect that Kobe had not even seen specifications of the new pump, yet it had still begun litigation (Neale and Goyder, 1980: 305–306). In another antitrust case it was found that a company had accumulated more than 2,000 patents that were found by the Court to go beyond legitimate purposes (*United States v. United Shoe Machinery Corp.*, 1953).

Patent Pool

Companies sometimes find themselves in a situation in which they require the use of technologies protected by the patents of each other. This may in fact have been the specific intent behind the patenting activity of one of the companies, so as to prevent the other from independently developing a technology. One response to this situation is to form a patent pool whereby the parties to the agreement have access to each

other's patented technologies without fear of patent-infringement suits. As a member of the pool, a company has control over the development of the technologies.

Patent pools can be perfectly legal. An example is provided by the development of cracking processes—which use high pressure and heat to separate the components in crude oil—for gasoline production. Each of four corporations, including Standard Oil (Indiana), held patents on the processes. Because of conflicts over infringements and associated litigation, the companies pooled the patents and the individual companies were allowed to issue licenses to other companies, i.e., those outside the pool (*Standard Oil Co. Indiana v. United States*, 1931). By 1890 General Electric and Westinghouse each monopolized major sectors of the electrical manufacturing industry on the basis of patent control, but they were increasingly involved in expensive and time-consuming patent suits between themselves (Noble, 1977: 10). An agreement to pool their patents mutually enhanced their ability to undertake controlled technological development. In the radio field, AT&T, Westinghouse, General Electric, Western Electric, Radio Corporation of America, and others formed a patent pool because the intensive development and acquisition of patents covering the development of radio had led to a stalemate created by mutual patent interferences (Danielian, 1939: 109).

Rarely is the pool aimed purely at removing barriers to the development of technology, however; it is also a basis for attempting to control the members' common markets by eliminating new competition from outside the group. The pooling arrangement enables the pool to buy patents at low prices because, by holding the basic patents, it can refuse others permission to use any improvements upon the master processes. Also, the pool is probably the only possible buyer of auxiliary inventions. These factors make it possible for the purchase and suppression of patents to occur (Merton, 1935: 455–466). During the early years of the motion picture industry, ten companies sought to dominate by using a patent pool. Competition was virtually eliminated; hence, those in the industry were compelled to use all or none of the machines and films of the monopoly (*United States v. Motion Picture Patents Co.*, 1915). Similarly, glass blowing became an automatic process through the application of advances made by a number of glassware manufacturers who then pooled over 600 patents. This pooling was used to exclude new entrants from the industry and to control supply and prices (*Hartford-Empire Co. v. United States*, 1945).

When the operation of patent pools involves collusion to suppress the development of technology, then such activity violates antitrust law. Precisely this happened in the case of the development of radio. The patent pool was drawn up so that each party would remain in control of its primary fields of activity without threat from the other members and so that collectively they were protected from would-be competitors. In 1934 three manufacturers of the variable condensers used as tuners in radios formed General Instrument Corporation, to which they assigned their patents and from which they received licenses. The corporation's functions were to expand its patent holding, sue for alleged infringements, and grant li-

censes, but only if pool members unanimously agreed. In this case, antitrust action was successfully taken. It was found that the companies had colluded with the intention of dominating the market. The decision of the court was that the corporation be dissolved and that the patents be compulsorily licensed at reasonable prices (*United States v. General Instrument Corp.*, 1953, noted in Vaughan, 1956: 52). In another case, the four major U.S. automobile manufacturers were accused of conspiring to prevent or retard the development of pollution-control technology through a pooling technique that guaranteed that no manufacturer would proceed more rapidly than the slowest of them (Miller, 1974: 31). The decision went against the manufacturers (*United States v. Automobile Manufacturers Association et al.*, 1969). The defendants were required to cease the pooling activity and to grant royalty-free licenses for any of the patents in the pool. The weight of authoritative opinion was that the pollution-control technology existed but that the industry worked at least as hard at having standards relaxed as at implementing the technology (Miller, 1974: 32).

In the early 1970s antitrust action was taken against United Aircraft Corporation, alleging that it had colluded with T.R.W. Inc. with the intention of suppressing competition in the development of fuel cells, which use a chemical reaction to produce electricity. The resulting decree required that United Aircraft not enter into confidential agreements concerning fuel-cell technology, nor use or threaten to use its economic power to prevent others from engaging in fuel-cell research, nor acquire a significant interest in any other company involved in fuel-cell technology (Miller, 1974: 29). It was required to grant a royalty-free license to anyone wishing access to its patented technology (*United States v. United Aircraft Corp.*, 1973). Similarly, when General Cable Corporation and three other manufacturers of high-tension cable pooled their patents, refused to license other manufacturers, and fixed prices and terms of sale, the Court cancelled these agreements and ordered licensing at reasonable royalty rates (*United States v. General Cable Corp.*, 1948).

Qualified Licensing

When a patent holder licenses some other organization or individual to use the technology, this licensing does not represent the loss of control over the technology. The licensing agreement can include qualifications covering such factors as the field in which it can be employed (the "field-of-use" limitation), the price at which a patented product may be sold, and the quantity of the patented product produced (though not the number of products produced using a patented product). A patent may have a range of applications in varying fields, the concept "field" referring to either market (e.g., consumer or industrial) or geographic location. Licensing may only authorize the licensee to apply the application in a specific and confined field, which involves selective suppression. A patent holder may also grant licenses for fields that it does not exploit even though it may not use the technology in the field that it does not exploit. It need not act on the technology in its own field if it so chooses (Sullivan, 1977: 559–560). The key factor from the legal point of view is whether or not there is intent to suppress competition.

Geographic licensing is intended to allow price discrimination and thus maximize the patent holder's profit. However, it can also be a means by which a group of possible or actual competitors form a cartel to avoid competition (Sullivan, 1977: 555). During World War II it was discovered that the U.S. war effort was being seriously limited by international patent cartels involving U.S. and German companies (Stern, 1943; Vaughan, 1956). Companies such as Standard Oil, General Electric, Aluminum Corporation of America, and Du Pont were all enforcing cartel agreements with German companies. The agreements covered commodities such as magnesium, zinc, rubber, aviation fuel, electrical equipment, plastics, and dyestuffs. A result of this practice was the restricted production in the United States of supplies vital to the war effort, which in some cases caused severe shortages. Standard Oil gave full technical information on butyl, used in synthetic rubber, to the German company I.G. Farbenindustrie, yet it consistently refused to provide it to manufacturers in the United States (Stern, 1943: 102). The New Jersey Zinc Company used its patents on processes for producing high-grade zinc to limit the production of such zinc in the United States while licensing such production in Germany, despite the fact that "... the unlimited production of high grade zinc by its licensees in Germany helped to build the war machine in that country ..." (Vaughan, 1956: 237).

Trade Secret

A trade secret is information of value to its owner that is not protected by patent and is kept within the organization. If secrecy is preserved, a trade secret can be legally protected and action taken if details are obtained by others through unfair means or breach of confidence. For example, as part of a counterclaim in an antitrust case, I.B.M. claimed that certain practices of Telex Corporation constituted illegitimate means of obtaining trade practices (*Telex Corp. v. I.B.M.*, 1973). The Telex strategy involved hiring people who could provide information on I.B.M.'s detailed financial and marketing data and innovation plans. Engineers from I.B.M. were also hired to provide technical details on proposed I.B.M. products. The court found that the Telex practices were designed to benefit from the acquisition of data that it knew to be trade secrets. I.B.M. was awarded damages (Miller, 1974: 39-42). However, as with patents, there is no law that requires that the information covered by the trade secret be "worked" by the organization that holds the trade secret. Nonuse is perfectly legal.

Takeover

If one company acquires another while the latter is in control of the development of a new technology, the former is placed in a position to suppress the development of that technology. A recent case in which purchase of a company became associated with accusations of suppression involved the development of an electronic pain-killing device. In 1971 three men founded a business called Stimulation Technology Incorporated (Stimtech) to produce the device. In 1974 Johnson & Johnson purchased the company. The founders were paid \$1.3 million, were promised up to \$7 million in future profits, and were made Johnson & Johnson executives. The com-

pany said that the device would be marketed worldwide, would be given the Johnson & Johnson label, and that substantial research and development funding would be provided. However, within six months the company imposed a number of restrictive requirements. These included a prohibition on expansion of markets, refusal to accept large purchase orders, refusal to allow development of an improved device, prohibition of use of the Johnson & Johnson name, and limitations on advertising. The founders offered to buy Stimtech back, but Johnson & Johnson refused. In 1979 the former charged the company with fraud, breach of contract, and suppressing the use of the device because of the competition that it could constitute to Johnson & Johnson's established drug business (*McDonald et al. v. Johnson & Johnson*, 1984). The Court of Appeal found that there was sufficient evidence to sustain a finding that Johnson & Johnson's actions were motivated by an anticompetitive intent. In conclusion they stated: "... we cannot permit a company that is dominant in a relevant market to acquire a smaller company that has perfected a competing product with an intent to suppress that product and then carry out that intent (*McDonald v. Johnson & Johnson*, 1984: 1388).

Manipulation of Information

Information may be manipulated in order to dampen interest in the new technology. During the time that AT&T was developing the automatic telephone, its chief engineer presented a paper to the American Institute of Electrical Engineers on "the fundamental fallacy of automatic telephony" (Kaempfert, 1923: 2118). Similarly, at the time AT&T was busy securing the key patents to enable them to control the development of radio, they publicized the limitations of radio, in an attempt to suppress any inconvenient enthusiasm for the new technology. According to Lloyd Espenschied, the AT&T engineer,

[T]he company was fearful that its own success [would] lead the public [to] believe that wires were about to be supplemented by radio, whereby they might sell their telephone stock! So credit was given to no-one, save a blanket commendation of its own workers and the company began to preach the limitations of radio—the words spread all over creation, were no secret, were subject to interference, only a limited number of stations could operate in a common medium. (quoted in Reich, 1977: 214).

In the case of the development of the fluorescent light, General Electric did not publicize the ability of fluorescent lighting to reduce lighting costs, so that its existing investment in incandescent lighting would not suffer (Bright, 1949: 404). The development of solar energy technology has seen a similar practice. Mobil, Shell, and Exxon have taken out a series of advertisements in major newspapers to argue the limitations of solar energy technologies, while at the same time actively increasing their involvement in such research (Reece, 1979; Etzkowitz, 1984).

DISCUSSION

Any consideration of the significance of the suppression of technology as an organizational strategy is predicated upon the existence of some evidence that such a practice does in fact exist. Thus the primary task of this paper was to allow

the debate to transcend the apocryphal level by presenting data from a systematic attempt to research the problem. Through the utilization of patent law and antitrust law as core sources of information it has been possible to establish the existence of a range of tactics that can form the basis for the suppression of technology. Suppression seems to act as a means of achieving or seeking to achieve one or more of a range of outcomes. These include the saturation of a market with an existing technology before the new one is released, prevention of the development of new technology by competitors, maintenance of standardization, and maintenance of cartel arrangements.

Tactics and Generic Strategies

In terms of the generic strategies developed by Pfeffer and Salancik (1978) and Kotter (1979), the various suppression tactics indicate the need to recognize that a given tactic need not be exclusively located within one strategy. For example, patent pools may involve an organization's tactical utilization of the patent system, which constitutes a form of utilization of government or judicial channels. They also involve an agreement between competitors that influences the conditions of competition, a form of negotiation of dependence. Finally, as pooling is a tactic that influences the development and availability of new products, it can be seen as an absorption of dependence strategy. Thus, it can be argued that patent pooling is a tactic that has claims for inclusion within all three generic strategies in the typology. Patent blitzkrieg provides a similar case, except that the form of negotiation of dependence is the construction of a climate of concern over possible infringement of patents rather than the use of agreement among competitors. Qualified licensing has the use of the patent system plus cartels, with absorption of dependence occurring in the form of selective suppression by field-of-use. Table 2 provides a representation of the interconnection between suppression tactics and generic strategies. While there may be some debate over the precise characterization of each tactic, the essential point is that individual suppression strategies do not necessarily fit into just one generic strategy.

Institutional Environment and the Selection of Tactics

The attraction of patent-based methods as tactics for suppression is likely to be dependent on the extent to which organizations believe they can successfully prosecute infringement by others or escape legal censure for their own methods. Central to both these aspects is the interpretation of antitrust law with respect to the end of patents. From the end of World War II until the early 1980s, antitrust policy focused on preserving competitive market structures by preventing oligopoly (Weston, 1984). This resulted in a low rate of successful patent infringement suits because of a concern that patenting could function as an anticompetitive tactic. Some federal circuit courts were so renowned for their disinclination to support patents that companies intending to use a method similar to an already patented one would locate their activities in a geographic area within a "favorable" circuit court. Perry, (1986: 76) argued that this "forum shopping" became the norm, with patent attorneys taking their clients to

Table 2

The Relationship between Suppression Tactics and Generic Strategies for Managing Dependence

Suppression tactic	Generic Strategy		
	Absorption of dependence	Negotiation of dependence	Utilization of government and judicial channels
Patent consolidation	X		X
Patent blitzkrieg	X	X	X
Patent pool	X	X	X
Qualified licensing	X	X	X
Trade secret	X		X
Takeover	X		
Manipulation of information		X	

circuit courts known to be least inclined to support patents. Courts so often held claims invalid or imposed such minor costs for infringement that infringement could prosper as a strategy. In this context, organizations would often not bother to take out patents, relying instead on trade secrets (Perry, 1986: 80).

In the early 1980s, however, this situation began to change. From within both government and industry there were growing expressions of concern with what was seen as the declining international competitiveness of American industry. This concern soon became articulated as the need to do more to encourage innovation (Perry, 1986). Within the judicial sphere, the Court of Appeals for the Federal Circuit (CAFC) was created in 1982 as part of a push to encourage innovation through strengthening the patent system. An "antitrust backlash" failed to eventuate, because the ruling interpretation of antitrust law had itself undergone change. The actions of the key antitrust enforcement agencies were increasingly being informed by the view that many antitrust actions including attacks on patents, were unnecessary interventions into the working of the market because market forces would ensure the demise of inefficient practices (Weston, 1984).

While the official presentation of the role of the CAFC was that it was to foster uniformity and predictability in rulings on patents, it soon came to develop a "pro-patent" image, and companies began to see infringement as a less acceptable strategic alternative. The risks now associated with infringement were made particularly clear in 1986 by the success of Polaroid in its infringement suit against Kodak. In the 1970s Kodak's development committee had issued an internal directive that development of an instant camera should *not* be constrained by concern about potential patent infringement (Perry, 1986: 73). This may be seen as a comment on the perception of the relative ineffectiveness of patents at that time. However, when Kodak entered the instant camera market, Polaroid sued. In January 1986 Kodak was found guilty of infringing seven patents and as a consequence, may face up to \$1 billion in damages. The increased success of infringement suits and the size of damages have led to a resurgence in respect for the power of patents and a renewed interest in their strategic importance (Perry, 1986). Under these circumstances patent-based methods for suppressing technology are likely to increase in significance.

CONCLUSION

This research has focused on establishing the existence of the suppression of technology as a strategy for the management of external dependence. To this end, attention has been given to individual organizations to the extent that they provide an illustration of a particular tactic. A useful alternative to pursue now would be to use a case study approach to investigate in some detail the process of strategy formation within individual organizations. This could reveal more detailed information on the process whereby specific strategies are formulated and tactical selections made. In doing this, more information could also be produced on the significance of intentionality and the process whereby events come to be labelled environmental and worthy of attention (Smircich and Stubbart, 1985). The recent apparent changes in the perceived power of patents could make this a particularly useful time to be undertaking such research.

A second direction in which this research on suppression could be developed would be to develop linkages with the literature on organizational illegality (Staw and Sz wajkowski, 1975; Sz wajkowski, 1985). In their search for greater control of the terms of competition, organizations have resorted to practices with regard to the suppression of technology that have often been deemed by the courts to be illegal. Similarly, organizations seeking to utilize a technology patented by another organization seem prepared to infringe, as a matter of policy, when the likelihood of heavy damages seems remote. Cost, not legality appears to become the key concern.

It is not clear just how much changes in the interpretation and enforcement of patent laws have been influenced by the dependence-management activities of organizations, but the likelihood of some action of this kind should not be discounted. Hirsch (1975) has already documented how patent law with regard to certain drugs was altered as a result of pressure from the pharmaceutical industry. While Hirsch's example is of a more limited change than that being discussed in this paper, the general point is worth making. The patent system should not be assumed to be beyond the dependence-management activities of organizations. It would be inconsistent with the resource dependence perspective to assume a priori that the patent system constitutes a resource to be strategically used by organizations without recognizing that the system itself can be changed by that strategic action.

REFERENCES

- | | |
|---|--|
| Areeda, Phillip E.
1981 <i>Antitrust Analysis: Problems, Texts and Cases</i> . Boston: Little, Brown. | Etzkowitz, Henry
1984 "Solar versus nuclear energy: Autonomous or dependent technology?" <i>Social Problems</i> , 31: 417-434. |
| Areeda, Phillip E., and Donald F. Turner
1978 <i>Antitrust Law</i> , vol. 3. Boston: Little, Brown. | Fellmeth, Robert C.
1981 "Suppression and other antitrust concerns." In John H. Lawrence and William H. Lawrence (eds.), <i>Legal Aspects of Solar Technology</i> : 197-216. Lexington, MA: Lexington Books. |
| Bright, A. A.
1949 <i>The Electric Lamp Industry</i> . New York: Macmillan. | |
| Danielian, N. R.
1939 <i>AT&T</i> . New York: Vanguard. | |

Suppression of Technology

- Frost, George E.**
1946 "Legal incidents of non-use of patented inventions reconsidered." *George Washington Law Review*, 14: 273-311, 435-459.
- Hirsch, Paul M.**
1975 "Organizational effectiveness and the institutional environment." *Administrative Science Quarterly*, 20: 327-344.
- Kaempffert, Waldemar**
1923 "Invention by wholesale." *Forum*, 52: 2112-2116.
- Kintner, Earl W.**
1973 *An Antitrust Primer*, 2d ed. New York: Macmillan.
- Kotter, John P.**
1979 "Managing external dependence." *Academy of Management Review*, 4: 87-92.
- Merton, R. K.**
1935 "Fluctuations in the rate of industrial invention." *Quarterly Journal of Economics*, 49: 454-474.
- Miller, Richard I.**
1974 *Legal Aspects of Technology Utilization*. Lexington, MA: Lexington Books.
- Mintzberg, Henry**
1983 *Structure in Fives*. Englewood Cliffs, NJ: Prentice-Hall.
- Mintzberg, Henry, and Alexandra McHugh**
1985 "Strategy formation in an adhocracy." *Administrative Science Quarterly*, 30: 160-197.
- Neale, A. D., and D. G. Goyder**
1980 *The Antitrust Laws of the United States of America*. Cambridge: Cambridge University Press.
- Noble, D. F.**
1977 *America by Design*. New York: Knopf.
- Pascale, Richard T.**
1984 "Perspectives on strategy: The real story behind Honda's success." *California Management Review*, 26: 47-72.
- Pennings, Johannes M.**
1981 "Strategically interdependent organizations." In Paul C. Nystrom and William H. Starbuck (eds.), *Handbook of Organization Design*, 1: 433-455. Oxford: Oxford University Press.
- Perry, Nancy J.**
1986 "The surprising new power of patents." *Fortune*, 113, June 23: 73-81.
- Pfeffer, Jeffrey, and Gerald R. Salancik**
1978 *The External Control of Organizations: A Resource Dependence Perspective*. New York: Harper & Row.
- Porter, Michael E.**
1985 *Competitive Advantage*. New York: Free Press.
- Reece, Ray**
1979 *The Sun Betrayed*. Boston: South End Press.
- Reich, Leonard S.**
1977 "Research, patents and the struggle to control radio: A study of big business and the uses of industrial research." *Business History Review*, 51: 208-235.
- Scherer, Frederic M.**
1970 *Industrial Market Structure and Economic Performance*. Chicago: Rand McNally.
- Smircich, Linda, and Charles Stubbart**
1985 "Strategic management in an enacted world." *Academy of Management Review*, 10: 724-736.
- Staw, Barry M., and Eugene W. Sz wajkowski**
1975 "The scarcity-munificence component of organizational environments and the commission of illegal acts." *Administrative Science Quarterly*, 20: 345-354.
- Stern, Bernhard J.**
1937 "The frustration of technology." *Science and Society*, 2: 3-28.
1943 "Science and war production." *Science and Society*, 7: 97-114.
- Sullivan, Lawrence A.**
1977 *Handbook of the Law of Antitrust*. St. Paul, MN: West Publishing.
- Szwajkowski, Eugene**
1985 "Organizational illegality: Theoretical integration and illustrative application." *Academy of Management Review*, 10: 558-567.
- Vaughan, F. L.**
1956 *The United States Patent System: Legal and Economic Conflicts in American Patent History*. Norman, OK: University of Oklahoma Press.
- Weston, Glen E.**
1984 "New trends in the U.S. anti-trust law: The patent-antitrust interface as an example." *International Review of Industrial Property and Copyright Law*, 15: 269-292.

APPENDIX: Illustrative Legal Cases

- Continental Paper Bag Co. v. Eastern Paper Bag Co.*, 210 U.S. 405 (1908).
- Hartford-Empire Co. v. United States*, 323 U.S. 386 (1945).
- Kobe Inc. v. Dempsey Pump Co.*, 198 F. 2d 416 (10 Cir. 1952).
- McDonald et al. v. Johnson & Johnson*, Federal Report 722 F. 2d (8 Cir. 1984) 1370-1390.
- Standard Oil Co. Indiana v. United States*, 283 U.S. 163 (1931).
- Telex Corp. v. I.B.M.*, F. 2d 894 (10 Cir. 1975).
- United States v. Automobile Manufacturers Association et al.*, 307 F. Supp. 617 (C.D. Cal. 1969).
- United States v. General Cable Corp.*, CCH 1948-49, Trade Cases 62,300 (S.D.N.Y., 1948).
- United States v. General Instrument Corp.*, 115 F. Supp. 582 (D.N.J., 1953).
- United States v. Hartford-Empire Co.*, 46 F. Supp. 541, 618 (N.D. Ohio, 1942).
- United States v. Motion Picture Patents Co.*, 225 F. 800, 811 (E.D. Pa., 1915).
- United States v. United Aircraft Corp.*, 80 F. Supp. 52 (D. Conn., 1973).
- United States v. United Shoe Machinery Corp.*, 110 F. Supp. 295 (D. Mass., 1953).