

HOW DO TRADEMARKS AFFECT FIRMS' INCENTIVES TO INNOVATE?

Paper presented to the DIME IPR Conference,
London, 14-15 September 2006

Lee Davis
Department of Industrial Economics and Strategy
Copenhagen Business School
Tel: +45 38 15 25 47, Fax: +45 38 15 25 40,
e-mail: lda.ivs@cbs.dk

Abstract

While trademarks are one of the most important intellectual property rights, along with patents and copyrights, their economic function differs. Patents and copyrights give firms the incentive to invest in innovation by granting them temporary exclusive rights to their inventions, enabling them to appropriate the associated rents. Trademarks also confer temporary exclusive rights (to the use of particular words or symbols) but do not function, explicitly, to stimulate innovation. Trademarks identify the distinctive origin of a product, service or company, guaranteeing quality and good will, reducing consumer search costs. Yet innovating firms make extensive use of trademarks. How, then, do trademarks affect a firm's incentive to innovate? This paper represents an exploratory attempt to answer this question. We suggest that trademarks can positively affect a firm's incentives to innovate in two manners. They provide direct incentives to engage in incremental innovation, particularly product differentiation. And for both basic and incremental innovation, they can be leveraged indirectly to supplement other appropriability strategies. But trademarks may also be exploited to block innovation. Thus the effects of trademarks on innovation can vary considerably. Only for certain kinds of innovations can they be considered important as incentives.

DRAFT: COMMENTS WELCOME, BUT PLEASE DO NOT QUOTE

6 September 2006

HOW DO TRADEMARKS AFFECT FIRMS' INCENTIVES TO INNOVATE?

Lee Davis

1. Introduction

Trademarks are one of the three most important forms of intellectual property rights (IPRs), along with patents and copyrights. Trademarks are especially valuable for goods where status and quality matter, both for mass markets like soft drinks and mobile phones, and for upscale markets like luxury sports cars and fashions (Maskus, 2000). Firms that rely heavily on trademarks to create value include the children's toy manufacturer Lego, the fast food chain McDonalds, the fashion stylist Hermes, and the watch manufacturer Rolex.

A trademark identifies the origin of a product, service or company, distinguishing it from other products, services or companies. This makes trademarks different from other forms of intellectual property rights, such as patents, which protect the underlying invention (like a new drug or a machine), and copyrights, which protect the expression of an idea (like a song or a book). A patent gives the firm the right to exclude others from making, selling or using its invention for a given period, now standardized to twenty years, enabling the firm to appropriate the associated rents. A trademark holder also receives a legal monopoly on the use of the mark for the designated commodity, and is protected against infringement. But the main economic function of the trademark is to signal quality and good will, reducing consumer search costs (Economides, 1997, Landes and Posner, 1987). There is no requirement, as with a patent, that the trademarked good represent a technological advance.

On the face of it, the relationship between trademarks and innovation would appear tenuous. Yet innovating firms make extensive use of trademarks. For example, IBM lists more than 1200 trademarks on its home page.¹ According to the European Union's Third Community Innovation Survey (CIS 3), innovative firms in the EU consistently use more trademarks than non-innovative firms. They also use more trademarks than patents (Mendonca *et al.*, 2004).

¹ These include marks such as Ascendant, Chiphopper, Early Cloud, How e Do You Want to Be?, Magic Wardrobe, Redbeans, and Unlocking The Potential (IBM emphasizes that the list is not comprehensive). (<http://www.ibm.com/legal/copytrade.shtml>).

How, then, do trademarks affect firms' incentives to innovate? This paper represents an exploratory effort to answer this question. While there has been considerable research on the economics of intellectual property rights, the economics of innovation, firm choices of appropriability strategies, and the importance of trademarks for marketing and "branding" strategies (see Section 2), no study, as far as I have been able to determine, has sought to link trademarks with firm motivations to invest in innovation. A few analyses have specifically explored the link between trademarks and innovation (e.g. Nicholson, 2000, Mendonca *et al.*, 2004), but not in relation to the central research question posed here.

Several reasons might be advanced for lack of interest in the literature in exploring the link between trademarks and innovation. First, the purpose of trademarks is not to provide such incentives. Second, both innovative and non-innovative firms use trademarks. Sometimes trademarked products and services are novel, sometimes not. Third, while patents protect individual inventions, trademarks can protect not only individual inventions, but also related groups of inventions, and the firm more generally.² Fourth, the literature on patents focuses explicitly on how patents can help firms appropriate rents that otherwise might be realized by their competitors or other market participants (e.g. Teece, 1986). Trademarks, by contrast, are seen as signals of quality to consumers, not other firms. Thus, it can be difficult to pin down the incentive effects of trademarks.

The importance of trademarks as incentives to innovate, we maintain, is based on their key role in the firm's marketing strategy. No matter how technically superior a new product or service may be, or how well protected through patents, if the firm cannot sell the innovation, it cannot appropriate the rents. Trademarks provide incentives to innovation in two interrelated manners. First, they motivate firms to engage in incremental innovation, particularly in the form of product differentiation. Second, for both basic and incremental innovation, firms can leverage trademarks indirectly to supplement other strategies of appropriability like patents, secrecy and lead time. But trademarks may also block

² An example is the cola manufacturer Pepsi, which has both trademarked the company's name, product groups like "FritoLay" (snack foods), and individual snacks within the Frito-Lay group such as Cheetos and Cracker Jack (<http://www.fritolay.com>). The name "Pepsi" may be featured together with these commodities, or may not.

innovation, as when firms leverage their trademarks as entry barriers to prevent more innovative firms from entering the market.

The effects of trademarks on innovation – both positive and negative – should not be overdrawn. They can never have as powerful effects as a patent, as they cannot confer the same broad monopoly rents. Trademarks can supplement patents and other appropriability strategies, but without providing the primary incentive effect. They are in a sense like “lead time,” which may or may not involve innovation. They are arguably particularly valuable for inventions where firms cannot effectively appropriate the rents, as in design-based industries or the service sectors, and for certain types of inventions like Open Source Software, where traditional methods of appropriability are not employed.

The paper starts by placing its arguments in the context of the existing literature, and discussing the economic function of trademarks. Section 3 explores how trademarks can serve as incentives to innovation, and Section 4 considers how they can block it. Section 5 analyzes the importance of the effects of trademarks on innovation. Section 6 concludes.

2. Literature review

2.1. Theoretical and empirical background

Trademarks have been analyzed by scholars from several disciplines. First, there have been a number of general studies on economics of intellectual property rights (e.g. Maskus, 2000, Besen and Raskind, 1991, Landes and Posner, 2003). They demonstrate how patents, copyrights, and various forms of *sui generis* protection can provide incentives to firms to engage in R&D, and how they differ from trademarks. Many legal scholars have also examined IPRs generally, and trademarks in particular (e.g. Loosley *et al.*, 2004).

Trademark economists have investigated how trademarks, by denoting consistent quality, function to assure would-be customers that the attributes of the brand they are about to purchase are the same as those of the brand they purchased earlier. People buy Omega’s Seamaster watch, for example, not because they know about the technical construction of the watch, but because it is made by Omega, whose trademark carries a quality guarantee.

Trademarks give firms the incentive to produce goods with desirable qualities, even if consumers cannot observe these qualities before purchase due to asymmetric information (Economides, 1997). Moreover, according to Landes and Posner (1989), trademarks have a “self-enforcing” feature, since a firm’s incentives to invest resources in developing and maintaining a strong mark also depend on its ability to maintain consistent product quality. De Alessi and Staaf (1994) contend that trademarks also assure specific performance, guaranteeing the fulfillment of the specific terms of the contract.

In the industrial organization literature, scholars have analyzed how incumbent firms may use product differentiation to erect barriers to entry (e.g. Schmalensee, 1978, Shaked and Sutton, 1982). This can protect the firm from competition from existing rivals and raise the costs of new firms seeking to enter the market. But they do not explore the role of trademarks in particular in this regard. Lemley (1999), in a critical review of the trademark system, asserts that trademarks are increasingly being seen as valuable in and of themselves, rather than for the good will they embody.

Another stream of literature analyzes the role of trademarks as a marketing tool and for “branding” strategies (e.g. Emmer and Henshall, 2002, Farquhar, 1994, Hernandez, 2004), though again without relating this to innovation. To create a strong, recognizable trademark, the firm must invest heavily in design, marketing, customer satisfaction, and quality control. For the trademark to be an effective signal, the firm needs to be aware of factors such as how to protect the distinctive appearance of the product, what colors to use to complement the trademark, and the like. A trademark strategy should incorporate considerations of “trade dress,” which might include factors such as layout and décor, the use of characteristic features such as menu boards, even the special way employees handle the product (Hernandez, 2004).

Finally, scholars have explored two further forms of intellectual property, Internet domain names (e.g. Brousseau, 2004, Mueller, 2000) and geographic indications (e.g. Primo Braga, 1995, Maskus, 2000), that are based on the trademark system. For reasons of space we will not include these in the main body of this paper, but will return to them briefly in the Conclusion. But none of the above-cited studies have been concerned with relationship between trademarks and innovation.

As regards the drivers of innovation, economists (e.g. Antonelli, 2003, Scotchmer, 2004) have comprehensively discussed the incentive effects of patents and other institutional arrangements – but not trademarks. Studies of firm innovation strategies (e.g. Lieberman and Montgomery, 1988, Teece, 1986) focus mainly on patents – occasionally mentioning the role of trademarks, but never in any depth. Lieberman and Montgomery (1988), for example, point out that there can be large switching costs associated with changing to another brand. But they see switching costs as a source of first mover advantages, not an incentive to innovate. Other scholars investigate how firms create competitive advantage from “intangible” resources (Granstrand, 2000, Teece, 2000), firm choices of strategies of appropriability (e.g. Cohen *et al.*, 2000, Levin *et al.*, 1987), and the strategic use of patents (e.g. Davis, 2004, Rivette & Kline, 2000a,b). Trademarks may be mentioned in these analyses, but without analytical rigor.

A few studies explicitly consider the relationship between trademarks and innovation. Nicholson (2000) analyzes the problem of trademark infringement in a dynamic, general equilibrium setting, arguing that an increase in the strength of trademark protection increases the rate of innovation in an economy.³ But he does not explore how a trademark might provide an incentive to the individual firm. There is also a literature on trademarks as indicators of innovative and economic activity (e.g. Greenhalgh and Longland, 2005, Martin and Irvine, 1983, Velling, 2002, Schmooch, 2003, Graham, 2004, Mendonca *et al.*, 2004). Mendonca *et al.* (2004), for example, briefly discuss what trademarks can tell us about a firm’s innovative performance. But these scholars are mainly interested in how trademarks can complement existing performance measures like patents and R&D investment figures, not how they provide innovation incentives.

2.2. The economic function of trademarks

A trademark may consist of words, symbols, letters, numbers, the shape of a good, or its packaging, along with musical or vocal sounds, and distinguishing fragrances, colors and

³ This is because when firms innovate to a new level of quality, they must signal the value of this increased quality to consumers. Obtaining a trademark enables the firm to differentiate its new products from previous innovations, signaling the quality of the new product. Consumers are thus willing to pay a premium which covers both the value of the good and the firm’s reputation for quality.

holograms. To receive a trademark, the applicant must demonstrate that the mark is distinguishable from existing marks in the same market. A trademark application may only be turned down if the mark is deemed to be confusing or misleading to consumers. Thus a would-be imitator can appropriate value from an existing trademark by adopting a mark that is only slightly different from an existing mark. By contrast, to receive a patent, an invention must be novel, non-obvious, and industrially useful (in Europe it must also have a technical effect).

The patent system, unlike the trademark system, implies a social contract. Firms can appropriate rents from their R&D investments in return for publishing the details of the invention in the patent application, so that others can learn from and build on it. After the patent expires, the invention can freely be used by others. There is no reciprocal requirement to publish the details of the trademarked good.

Further, trademarks are registered according to classes. As a result, identical marks can co-exist, as long as the products or services covered are in different markets. For example, the trademark “CBS” designates both the Copenhagen Business School, and the American TV broadcasting network Columbia Broadcasting System. “SAS” is used both by the software services firm and the Scandinavian airline. Patented inventions must be unique. The application costs for a trademark are considerably lower than those for a patent (see <http://www.uspto.gov>). But unlike a patent, a trademark may be renewed indefinitely.⁴

The trademark decreases consumer search costs by enabling firms to differentiate their products and services. At the same time, the mark emphasizes the association between the firm and a particular good being marketed, like the Toyota Avensis or McDonald’s Chicken McNuggets. As a result, trademarks can link the firm’s reputation for high quality to many of its products, typically generating increasing returns to scope. But firms may not wish to use the same mark for all their goods, typically differentiating between mass-produced and luxury goods (Economides, 1997).

⁴ An exception occurs if the trademark becomes generic. For example, the terms “car” and “microwave oven” cannot be trademarked, since the name has come to be associated with the type of product concerned, not its distinctiveness.

The more credible the brand, the lower the customer's perceived risk (Farquhar, 1994). But while the trademark can help the firm to prevent imitation of the brand, it cannot in itself ensure that the value of the brand is maximized. The power of a brand can be attributed not only to strong trademark protection, but also to its universal availability, and universal awareness. The brand creates an emotional bond between the customer and the good, and its value increases with the strength of this emotional connection (Emmer and Henshall, 2002). If consumers believe the trademark is a reliable indicator of the desired characteristics, they will be willing to pay a premium for the good, compensating the firm for the costs of developing and advertising the trademark. Such costs might otherwise not be recoverable. If the mark is not distinctive, it could create confusion and increase litigation costs in society without lowering consumer search costs.

Because trademarks signal quality, firms have the incentive to maintain or improve the quality of their own products and services over time so as not to reduce the reputational value of their marks. This generally raises the average quality of the products that are on the market, and stimulates future product differentiation. It also induces new firms with their own distinctive marks to enter the market (Landes & Posner, 1987). Trademarks protect consumers against fraud with regard to the origin of a good or service. Of central importance is the prevention of dilution, the unauthorized use of a mark. Dilution can damage trademark effectiveness, confusing consumers by blurring the distinctive character of the mark, possibly besmirching it.

A company seeking to commercialize its line of services abroad, that does not wish to enter the market itself, can sign a trademark contract with a local firm. Trademarks are particularly important for franchise agreements, as illustrated by the global franchise networks of companies like Seven Eleven. Trademarks thereby enable the growth of complex organizations spread over wide geographic areas (Lemley, 1999).

A key difference between trademarks and patents concerns the uncertainties associated with the product development process. The value of a patented invention is difficult to assess because the market might not be as large as originally envisaged, the technology might become outdated, a rival product would prove superior, and so forth. But these uncertainties are largely related to market characteristics and competitive relationships.

Trademarked goods (like patented goods) are not only vulnerable to competitive assaults, they are also highly sensitive to consumer actions.

Coca Cola, for example, through a century of advertising and promotion, has seared its trademark into the hearts and minds of generations of consumers. Everyone knows that a Cola Light bought in Nairobi is the same as a Cola Light bought in New York. But if one bottle of Cola Light, anywhere in the world, contains impurities so as to cause the death of a consumer, and if this incident is publicized, it might precipitate a huge drop in the sales of all Coke products, since buyers would be more reluctant to buy Coke anywhere. If the problem is not solved immediately, and the solution is not communicated widely to consumers, the damage might take years to repair.

In recent years, the study of the economics of intellectual property rights has been enriched by work analyzing how patents can perform other roles beyond the “conventional” role of securing monopoly rents. Of special relevance for this paper is the work on patent signaling (e.g. Cohen *et al.*, 2000, Davis, 2006, Hall and Ham, 2001, Rivette & Kline, 2000 a,b). When a firm applies for a patent, the title is posted by the Patent and Trademark Office. After eighteen months, the contents of the application itself are published. If the patent is granted, this news is also published.⁵ This enables patent applicants to reduce information asymmetry as regards the individual invention, and by extension, the firm’s portfolio of inventions and wider strategic intentions. The reason might be to “warn off” competitors possibly planning to patent in the same area. Or the firm might seek to attract the attention of potential licensees or joint venture partners.

This work on patent signaling can help to expand our understanding of the strategic role of trademarks. All existing work on trademarks, as far as I have been able to determine, explores how trademarks function as signals to consumers. Here, we suggest, trademarks also function to reduce information asymmetry (and search costs) in relation to other *firms*. Clearly, the two effects are related. If a firm cannot use its trademark to deter potential rivals, it cannot provide an effective quality guarantee to consumers. And if the trademark does not denote quality, it would not be effective as a deterrent. By informing other market

⁵ Patentholders can also signal information to potential market entrants by the renewal decision, which may act as a barrier to entry. According to Langinier (2004), patents are renewed more frequently in the presence of asymmetric information.

players that the good is protected by a trademark, the trademark holder guarantees that no other company or invention (in the same class) can bear the same distinguishing mark. In other words, the “territory” covered by the trademark is occupied.

As with patents, this signal can both deter would-be imitators, and/or attract the attention of potential licensees or joint venture partners. A strong trademark position, like a strong patent position, can be vital to efforts to attract external capital, raise stock market value, and enhance firm value in relation to cooperative ventures and mergers. Would-be investors will *ceteris paribus* be more willing to invest in a firm that does not risk a future infringement lawsuit. Thus even though the monopoly power conferred by the trademark is limited, the monopoly effects of the trademark may be considerably enhanced when combined with the effects of signaling.

3. How are trademarks linked to innovation?

3.1. Trademarks as direct incentives to incremental innovation

In their discussion of trademarks as performance indicators, Mendonca *et al.* (2004) and Martin and Irvine (1983) argue that trademarks are best seen as a “partial” indicator of innovative performance, since innovation is a dynamic process with complex feedback loops. Because trademark data only concerns two specific events (filing and registration), it can say nothing about innovative interactions, inputs, outcomes or differential impacts. In this paper, however, we argue that the term “innovation” should be defined more broadly, as is done in the innovation literature more generally.

For example, according to Tidd *et al.* (1997), innovation can range from being incremental, radical, or transformational, depending on the perceived extent of change (the degree of novelty involved). The most basic forms of research are highly costly and risky, but with the highest potential payoffs. Here, the innovating firm finds it difficult, if not impossible, to foresee whether or not a new idea will prove technically feasible, whether it will be superior to other products already on the market, whether it will quickly become outdated, what the price will be, whether consumers will buy it, and the like. But innovation need not be science-based. Most firms, in practice, specialize in more incremental forms of

innovation, carrying out improvements on existing products and processes, making them better and/or cheaper. Here, there is less uncertainty about the outcome, and a greater chance of commercial success.

These distinctions in the nature of innovation are important for the purposes of this paper. It means that innovation can comprise the kinds of product differentiation analyzed by trademark scholars like Landes and Posner (1987) – even though they do not specifically employ this term. Clearly, since the value of investments in basic research may not be known for many years, it is meaningless to link the trademark to the quality of the possible results. It is for such types of innovation that the patent can provide an important incentive, since it “buys the firm time” to investigate the technical and commercial potential of the invention. But trademarks can tell us a great deal about the quality of a firm’s incremental innovations. If each improvement is given its own new mark, trademarks also can be used to chart the course of product differentiation.

An illustration of how even very small firms can leverage trademarks for incremental innovation is Cold Stone Creamery, founded in Tempe, Arizona by Donald and Susan Sutherland. They shared a passion for ice cream that was “smooth and creamy,” not the traditional hard-packed or soft-serve varieties. In 1988, they trademarked the company’s name. Since then, they have trademarked a variety of ice creams: “Cake Batter Ice Cream” (which tastes like cake batter from a bowl), “Cold Stone Original” (which combines ice cream and mix-ins like nuts, fruit, chocolate and other goodies), Creation (which combines ice cream with mix-ins customized for each customer), and “Red Pan” (a new flavor) These marks demonstrate how their ice cream has been improved in relation to past versions, and tailored to changing consumer needs. In 2005, the company’s success was marked by the opening of its 1,000th store in Columbus, Ohio (<http://www.coldstonecreamery.com>).

Trademarks are suitable for incremental innovations because it is much easier and cheaper for a firm to obtain a new trademark (or series of trademarks) to protect the fruits of its product differentiation strategy, than to obtain a new patent. Most incremental innovations represent only very small changes over existing goods, or new combinations of existing goods, neither of which represent the kind of “inventive step” necessary to qualify for patent protection.

Yet these products can effectively be marketed as new and innovative in the eyes of the consumer. Consider the story of the watch manufacturer Hublot, which introduced a black rubber strap for its watches, based on its concept of “fusion.” What was new was not the strap itself, but the juxtaposition of the strap and the watch, an innovation that watch entrepreneur Jean-Claude Biver was convinced would captivate and delight his customers:

Fusion is when you take two elements that can never come together, and you fuse them...One comes from a tree in Malaysia: natural rubber. The other comes from under the earth in South Africa: gold. Only through a big bang can those two elements come together... That is fusion!

And he was right. The watches caught on and became trendy, buoying the company’s profits (Thompson, 2006).

To take another example, trademarks protect the Omega firm name, and different categories of watches such as the Omega Constellation. The Constellation has existed for fifty years, but new models are continuously introduced (The Case, The Claws, The Bezel, The Half Moons, The Medallion, The Bracelet). There are variations for “gents” and “ladies.” In all of these layers, Omega signals quality and luxury, backed by the firm’s reputation (http://www.watchesplanet.com/omega_constellation.php). These are not path-breaking technological advances. But they might never have been made had the firm lacked the ability to trademark them.

3.2. Trademarks as supplements to other strategies of appropriability

Maskus (2000) has described how the different forms of intellectual property rights can vary in importance according to industry. The “patents complex” comprises industries like pharmaceuticals and biotechnology; the “copyrights complex” comprises software and Internet communications systems; and the “trademarks complex” comprises mass-market and luxury goods. What Maskus’ categorization fails to make clear, however, is that goods in both the patents and copyright complexes are typically heavily trademarked as well – even if trademarks are not seen as the main source of appropriability. The same logic does not apply to the trademark complex, where inventions are less likely to be either patented or copyrighted. Even if the trademark *per se* does not provide a direct incentive to innovate, the firm might wish to invest in them anyway.

This brings us to the second way in which trademarks can function as innovation incentives: by supplementing other strategies of appropriability like patents, lead time, secrecy, and leveraging complementary assets (e.g. Cohen *et al.*, 2000). These are briefly explored below.

Trademarks and patents. By supplementing the patent with a trademark (or series of trademarks), the firm can enhance the protection conferred by the patent. For one thing, while the patent lasts only for twenty years, the trademark can be renewed indefinitely. In some industries, such as the pharmaceutical industry, the limited patent term creates special problems, due to the long drug development times. At the start of the development process, as soon as the firm believes its idea for a new drug is commercially feasible, it typically applies for a patent. But the time lag between the application and the actual commercialization of the drug can be eight to ten years, due to the need for extensive clinical testing and trials, and government approval of the drug. This leaves an effective patent protection after marketing lasting as little as ten years.

One result is that the drug companies have made frequent use of trademarks. Trademark-based advertising can help the firm market its drugs aggressively to hospitals, doctors, and directly to patients. The goal is to convince patients (and doctors) to continue to prefer their drug after the patent expires even though its price is higher than generic copies. Trademarks on existing products can be leveraged to attract consumer attention to new products. The trademarked name of the company itself, if associated with quality, can induce consumers to buy its new drugs – even if consumers have no direct experience with the new drug.

Another illustration of the value of trademarks for products on which the patent has expired is illustrated by the trademark strategy of the Danish toy manufacturer Lego. Its core product, the colorful plastic brick, has been a favorite of successive generations of children for over half a century. The simple bricks appeal because they can be combined in a myriad different ways, are virtually indestructible, and relatively easy keep clean (Rohwedder, 1994). But they are also easy to imitate, since Lego's initial patents on the key functional features of its plastic bricks have expired. The company has continually been plagued by the sales of pirate copies, particularly by companies in the Far East, which can be sold at a lower price, due both to lower production costs and because the imitators have not had to

invest in the quality of the trademark. To combat copying, Lego has invested substantial resources in tracking down and prosecuting infringements of their trademark.

Trademarks and lead time. Trademarks can complement the strategy of lead time by creating a legal barrier to entry, helping the firm stay ahead of would-be competitors. Otherwise, a firm that chooses lead time has no means of preventing its rivals from copying its innovation. In addition, to the degree that the firm can leverage its trademark to attract the early interest of consumers by aggressive brand-name advertising, it can increase the speed of bringing the product to market. Third, trademarks can be utilized (again through aggressive advertising) if the firm begins to lose its position to a “fast second.”

Trademarks can be especially important in markets where rival firms are fighting to establish a new standard. Reputation and brand name matter greatly to influence consumer expectations (Shapiro and Varian, 1999). What counts in the end is not, necessarily, that the product is technically superior, but that it can *win*. To capture the minds of consumers and exploit network externalities, firms can leverage trademarks as central elements in strategies of pre-emption and penetration pricing. Later, after the product has become a standard, the trademark can be crucial in helping the firm to maintain its position – protecting upgrades, service offers, and related extensions of the original technology – thereby making it more difficult for other firms to enter the market.

Trademarks and secrecy. Trademarks enable firms effectively to market products whose details are not disclosed to the public. Coca Cola, for example, has maintained the secrecy of its soft drink formula for nearly a century. Via its trademark and advertising, the company convinced consumers to buy its product. Had Coca Cola patented (thereby disclosing) the formula, it might never have achieved its current market position.

4. To what extent do trademarks block innovation?

Trademarks constitute an essential part of competition in differentiated oligopoly markets. Yet they do not necessarily generate more innovation. For one thing, strong trademark protection might lead a firm to devote comparatively many resources to incremental improvements in existing products, rather than to more “experimental” forms of

innovation. Rolex, for example, might tend to direct its R&D investments towards determining how existing watches can function better (such as being more resistant to shocks), instead of developing a new watch concept.

Since firms can use their trademarks to erect barriers to entry, a relatively non-innovative market incumbent with strong trademark protection might successfully prevent a more innovative company from entering. Small firms, in particular, might be excluded by the large firms' use of trademarks as barriers to entry. Mendonca *et al.* (2004) have argued that since trademarks are cheaper to obtain than patents, with no need for a technological breakthrough, it is likely that a much larger group of small and medium-sized enterprises (SMEs) will be involved in applying for trademarks than in applying for patents. But if the SME must compete against an incumbent with a strong trademark, it may not be in a position to exploit this advantage. To establish effective trademark protection, a firm must make massive investments in marketing and advertising. Building up brand value can be extremely costly. Thus for some firms, obtaining effective trademark protection may serve as an insurmountable barrier.

Many economists have increasingly criticized the patent system, arguing that it is not at all clear whether the prospect *ex ante* of patent protection, together with its *ex post* presence, stimulates or interferes with innovation (Mazzoleni and Nelson, 1998). The trademark creates its own form of entry barrier, over and above that represented by the patent. Since trademarks and patents serve divergent purposes, as described in the previous section, firms will often invest in both. Nevertheless, if the patent is used to block innovation, this effect will be strengthened by the trademark.

But what is the difference between erecting barriers to entry to block others' innovation, and seeking to protect one's own innovation? Consider Lego's running dispute with the Canadian firm Mega Blocks, which makes oversize colorful plastic bricks for young children. For years, Lego had accused Mega Blocks of appropriating some of the value of its products by manufacturing bricks that resembled the "look" of Lego's bricks – but cost less. In Canada, Lego laid suit against Mega Block, contending that its toys represented an attempt at "passing off" its products as Legos, confusing customers into thinking they are buying Lego products, and thereby violating Canadian trademark law. The Canadian Federal Court of Appeal dismissed the claim in July, 2004, concluding that the design of

the bricks was essentially functional, and thus not covered by trademark protection. Lego announced it would probably appeal to the Supreme Court. This was only one of several legal conflicts between the two firms (Zullig, 2003, Periera and Chipello, 2004). Both argue that the other had been using trademarks to restrict its own activities.

In industries where R&D is important to competition, the costs and risks of investing in R&D will be a key element of the costs of entry. Such firms would logically devote more resources to the development of new products in markets characterized by product differentiation. This might particularly be the case for industries specializing in durable consumer goods and investment goods. On the other hand, in industries where the costs of entry are already high – due, for example, to the importance of economies of scale or high absolute capital requirements for efficient production – firms might allocate fewer resources to R&D (Martin, 1994). Arguably, in markets characterized by incremental innovation, the incentive effects from product differentiation would *ceteris paribus* tend to be less important (since the costs and risks of R&D are less). The blocking effects would depend on the height of the other entry barriers. For mass-produced consumer goods, for example, where trademarks are endemic, economies of scale are critical to competitive advantage.

An important dimension here concerns whether an industry is “emerging” or “mature.” Firms in emerging industries, by definition, are more innovative than firms in mature industries. Whether trademarks provide an incentive to innovate might not be particularly relevant to firms in emerging industries, since they would be making these investments anyway, and where the main incentive effect would be the patent. In a mature industry, trademarks *per se* would be more important. This could reduce innovation to the degree that a strong patent position, like a strong trademark position, might lead the firm to focus more resources on enforcement of existing rights, and less on investing in new products and processes.

Ironically, the very effectiveness of a trademark strategy can create problems over the longer term. This might explain why a firm like Lego, which enjoyed considerable success in enforcing its trademarks for existing products, delayed entering an emerging industry (software-based toys), which would have required an earlier reallocation of resources from trademark enforcement to R&D.

Lemley (1999) contends that there has been a gradual shift in trademark law in the United States, with courts increasingly viewing trademarks as things valuable in themselves, rather than for the goodwill they imply. Interesting sounding words and phrases are being “grabbed” by entrepreneurs, not to identify the source of the goods, but to prevent anyone else from using them.⁶ Trademark owners are being protected against users that earlier would not even have been seen as infringements. For example, the courts have expanded the dilution doctrine to protect trademark holders from not only non-competing but also non-identical marks (as occurred when “Toys ‘R’ Us” sued “Adults ‘R’ Us”). Companies have successfully won the right to use trademarks on product configurations in cases including the shape of a faucet handle and the design of personal organizers (Lemley, 1999: 1699-1700). To the degree that firms devote resources so this kind of “strategic” behavior instead of investing in R&D, innovation will be diminished.

5. How important are the effects of trademarks on innovation?

We have demonstrated that trademarks can both motivate and block innovation, but how strong are these effects in practice? Arguably, they are limited, for several reasons. First, as we have emphasized, patents stimulate firms to invest in R&D by giving them temporary exclusive rights to their inventions, enabling them to appropriate the associated rents. But the trademark provides only limited monopoly power, since consumers dissatisfied with the quality of the goods sold can switch to other brands (Landes and Posner, 1987). Thus their effects on innovation will be less, since they do not provide the same monopoly power.

In a sense, trademarks are like “lead time,” an appropriability strategy that involves coming first on a market so as to dominate it. In practice, lead time may or may not involve innovation, even if we typically “assume” that it does. For example, a company might develop a clever non-patentable product with little if any innovative content. All it needs to do is to make the good identifiable to the customer, to ensure that there is a demand for it, and that the producer can recoup its costs by being first on the market.

⁶ Examples include an entrepreneur who registered the phrase “Class of 2000” as a trademark, claiming the right to prevent anyone else from selling merchandise where this phrase is featured. Another registered the yellow smiley-face and collected money from people who used it. See Lemley (1999):1696-1697.

Second, trademark-based licensing and franchise contracts *per se* do not involve innovation (Lemley, 1999). Such contracts stipulate the conditions of use of the trademark, including provisions that the agent must do nothing to undermine the quality of the mark or tarnish the reputation of the trademark holder. But their purpose is to set the terms of cooperation and earn royalties. When the rights to a trademarked good are licensed to another firm, what is protected is the quality of the mark, not the individual product or service. The licensee receives no information from the trademark *per se* as to the degree of innovativeness of the products covered, and must use other channels to obtain this information (such as whether or not the good is patented). Unless otherwise specified, there is no “built-in” opportunity, as with a patent-based license agreement, to create the legal basis for more complex forms of cooperation like cross-licensing agreements.

We have generally assumed, in this paper, that firms are able to leverage trademarks effectively, and that consumers (and other firms) will understand the relationship between trademarks and innovation. But this is not necessarily the case. An important issue concerns the degree to which trademarks can possibly mislead consumers (and investors). For example, a firm may emphasize in its advertising that it is a strong innovator. Its trademark could be used to help build up this image in the eyes of consumers and other firms, reducing their search costs involved in determining which firms are innovative. Yet even if certain of a firm’s products are innovative, the trademark carries no guarantee that all of its products are innovative, or that any given product is innovative.

If consumers link a firm’s trademark with a particularly innovative good, and then see the trademark associated with a good they do not know about, they may assume that the unknown product is innovative as well, even though it may not be. If such consumers later purchase one of these products and find that it is not especially novel, this would diminish the signaling value of the trademark to them. It might even lead them to doubt the innovativeness of the firm’s other goods and services. Moreover, a firm must be careful to continue to revise its trademark strategy, since the original product will eventually itself be perceived as not particularly innovative.

The same logic can be applied to the analysis of how trademarks as signals can reduce the search costs of potential investors or cooperative partners. To the degree that would-be

investors value the innovativeness of the firm, and to the degree that this value is considered to be reflected in the trademark, the trademark could serve as an incentive to the firm to maintain its innovative capabilities. Yet the firm must be careful not to mislead would-be investors (either deliberately or unintentionally), since the effects of this deception may well last well into the future, considerably damaging the firm's reputation and the value of its trademark as a guarantee of quality.

It should also be remembered that a trademark can be used to indicate inferior quality. People who buy a Skoda realize that they are not buying a Rolls Royce. The price reflects this perception of the relative quality of the two choices. Thus firms that signal lower quality via their trademarks would not be expected, either by consumers or other firms, to be especially "innovative."

Arguably, trademarks are most important to innovation in the case of new products and processes that cannot effectively be appropriated by other means, as illustrated by our story of Hublot's black strap (Section 3.1). In the watch industry, firms compete heavily by creating innovative designs. All watches perform the same function: telling time. But the watch face can be square, round, oval, elongated, and so forth, the numerals can be Arabic or Roman, different colors can be used, some can be diamond studded, and so forth. In such instances, even where there is no real technical advance, the firm may invest considerable resources in creating a range of stylistic improvements. Trademarks notably encourage this kind of design-based product differentiation.

Similarly, trademarks can be quite useful in the service sector, where a group of service functions/ products are identifiable as being innovative, but do not fulfill the criteria of patentability. Four-star hotels and international airlines, for example, must constantly renew their services to their guests, to avoid being perceived as outdated. Even so, they tend to offer the same kinds of services. Few (if any) of these can be patented. Trademarks can help them to appropriate the returns from these service investments.

To take another example, McDonalds fast-food chain is totally dependent on customers' perceptions of the consistent quality of its products and services. Since innovations like the introduction of salad bars and other healthier food choices cannot be patented, the company relies on trademark-based advertising to differentiate itself in the minds of its customers.

This also explains why McDonalds so vigorously protects and defends its mark.⁷

According to sources, the company has registered most other names beginning with “Mc” as its own trademarks, not with the intent to use them, but to prevent others from setting up a restaurant incorporating “Mc” in its name.

Finally, trademarks can be highly valuable in areas where other strategies of appropriability have not used, or been considered important. Open Source Software (OSS), for example, was spawned by the collective activities of a community of programmers who communicated and coordinated their work over the Internet. Inventors were not motivated by the prospect of patent protection (though many patents were later issued on elements of these innovations). Trademarks have been important in subsequent efforts to “protect” open access to this software, both as signals of the quality of the OSS programs concerned, and for branding purposes (O’Mahony, 2003).

Moreover, trademarks have proved essential to firms that incorporate OSS into their commercial operations. Red Hat, Inc., for example, has developed a successful business model fully founded on OSS applications. The company gets the Linux source code free, tests and improves the software, and customizes OSS applications to individual customer needs. It earns profits by offering its customers round-the-clock service and support in areas such as packaging, consultancy, quality verification, maintenance, updating and training.⁸ Key to attracting new customers, and maintaining existing ones, is its characteristic trademark, which enables appropriability while keeping OSS open.

6. Concluding remarks

⁷ A well-known case in Denmark concerned a hot dog kiosk called “McAllen,” which McDonalds feared would confuse consumers as to the quality of its own service, and sued for trademark infringement (but lost).

⁸ In doing so, the company must also reveal its source code, including any new features its software engineers have added. As a result, its innovations are quickly copied. For example, the company launched a new threading system where multiple functions could occur at the same time on a single processor. Within a week, Novell had copied the system for its Linux OS Suse (Murphy, 2004). But this is not a concern to this company, whose business model is based on “commoditizing” its innovations rather than protecting them. It should be noted that trademarks are the only reason for Red Hat’s success. For one thing, the “copyleft” license agreements ensure that Red Hat continues to maintain access to OSS and the various improvements made elsewhere. It also means that the company does not itself constantly have to make improvements, but can benefit from improvements made by other contributors.

This paper has explored, in a preliminary manner, the relationship between trademark protection and a firm's incentive to innovate, addressing a gap in the existing literature. Several implications of our arguments might be mentioned. First, if Landes and Posner (1987) are right, then the stronger the trademark, the more it reduces consumer search costs, and the greater the firm's incentive to create a stronger trademark. But as we noted, trademark protection does not necessarily lead to more investments in innovative activities. This might mean that strong trademark production induces the firm to allocate more resources to strengthening the trademark *per se* – and thus fewer to investments in innovation – than otherwise would be the case. Moreover, since trademarks are more valuable for incremental than basic innovation, they might induce firms to invest too much in improving existing technologies than in new and untried ones. This could provide a rich agenda for future research.

The relationship between Internet domain names and innovation (which we deliberately left out of this analysis) also deserves further attention. Firms have extensively employed trademarks to advertise their wares on the Internet. A consumer considering buying a new watch, for example, can search the web for suitable brands. If she enters Rolex's home page, she will know that the individual brands featured, while different, all reflect the quality of the Rolex name. Thus a choice to buy a Rolex Tudor covers a demand for a Rolex product that otherwise might not arise, had the consumer gone to a retail watch outlet. These portals to firms' home pages – Internet domain names – which are based on the trademark system, have been crucial to the rapid development of the World Wide Web.⁹ The domain name reduces the characteristics of a trademark to a web address. No longer is the consumer search process influenced by a specific shape or color – it involves simply typing out a few letters. This makes it difficult for the holders of domain names to prevent illegitimate use, because these names are so easy to confuse. While a firm can use its domain name to send a signal of quality and goodwill, dissatisfied consumers can also use the domain name to subvert it.¹⁰ How does this affect firms' motivations to invest in innovation?

⁹ Domain names are global in scope, and unique. Only one name can be registered under each top-level domain (.com, .org, .net, and so forth). The costs of applying for and maintaining a domain name are not high (existing names can be bought for as low as \$5-10 dollars over the Internet).

¹⁰ An example of this form of unauthorized appropriation concerns Barbie, made by Mattel Inc. The company has filed suits against a number of websites whose domain names incorporate the Barbie name, including *barbienet.com*, and *barbiedirect.com*. (Coombe & Herman, 2001, Reuters, 1999). The Barbie icon has also been used by various pornographic sites, which not only build off the image of the 40 year old cultural icon,

Other relevant issues are raised by geographic indications (GIs), which identify a good as originating in a particular location, where a distinguishing characteristic of the good may be attributable to its physical location.¹¹ Like trademarks, GIs provide a means to certify quality, lowering consumer search costs, signaling good will, and protecting against fraud as regards the origin of the good. How do GIs affect firms' incentives to innovate? On the one hand, one can argue that the traditional producers should have the "right" to particular GIs, since it was they who earlier developed the product. The GI provides them with an incentive to continue to produce a quality good. The firms behind GI products have acquired valuable reputations, which must be protected against imitation and fraud. On the other hand, it can be contended that countries and their domestic companies, beneath all the rhetoric about quality, are simply trying to shield their own products for opportunistic reasons. GIs enable them to protect inefficient production methods, preserving jobs and local economic activity. A market characterized by strong existing GIs can make it difficult for new producers to enter (see Davis, 2005). These issues deserve further research.

Finally, our arguments have implications for small and medium-sized enterprises. For example, one might point out that trademarks are of little value as an incentive to innovation for those SMEs that engage in business-to-business marketing, without direct contact to the consumer. A case in point concerns the small biotech firms that specialize in the supply of intellectual property in the "market for ideas" (Arora *et al.*, 2001). They focus on the invention and patenting of promising new drugs, typically further develop and test them up to Clinical Trials Stage III, where testing becomes prohibitively expensive, and then license the rights to a larger firm. Trademarks matter little to these firms since their buyers have other ways of determining the quality of their products, including the extensive exchange of knowledge characteristic the license negotiation process.

The usual reason given for the increasing tendency for large pharmaceutical firms to buy or license the rights of inventions patented by smaller firms is the advantages of

but may also be visited by children. A person who visits the Barbie website and orders a doll can be as sure of the quality of the doll as a consumer who buys the doll in a store. But if consumers come into sites with very similar names, not least pornographic sites, the good will associated with the trademark may be irreparably harmed. Such problems do not arise for consumers who visit toy stores to make their purchases.

¹¹ These include soil conditions and climate, or traditional methods of making the good. Thus the term "champagne" can only be used for wine produced in the Champagne area of France. GIs are important for products such as wine and spirits (such as cognac) and foodstuffs (such as Roquefort cheese).

specialization. This paper suggests an additional reason: the costs of IPR enforcement. Small biotech firms have no choice but to pay the costs of patenting, since this forms the legal basis of transferring the rights to a larger firm. But when such firms sell or license the patent rights to a larger corporation, they also pass on the costs of the enforcement of the associated IPRs, once the product comes onto the market. These include not only the costs of patent enforcement, but also the costs of enforcing the associated trademarks. Such a strategy might constitute a way for small firms – not only in biotechnology, but in other industries where they can function as specialized suppliers to larger firms – to circumvent trademark-supported barriers to entry in its industry. If it became more common, it could lead to a more general reallocation of innovative activity, enabling smaller firms in business-to-business markets to focus on innovation, and their larger, corporate customers to focus on commercialization, where trademark protection is vital.

REFERENCES

- Antonelli, C. (2003). *The Economics of Innovation, New Technologies and Structural Change* (London and New York: Routledge).
- Arora, A., Fosfuri, A. and Gambiaradella, A. (2001). "Markets for technology and their implications for corporate strategy," *Industrial and Corporate Change*, 10 (2), pp. 419-451.
- Besen, S. and Raskind, L (1991). An Introduction to the Law and Economics of Intellectual Property, *Journal of Economic Perspectives*, Vol.5, No.1, 3-27.
- Brousseau, E. (2004). "Property rights on the Internet: Is a specific institutional framework needed?" *Economics of Innovation and New Technology* 13 (5), July, pp. 489-507.
- Cohen, Wesley M., Richard R. Nelson, and John P. Walsh (2000). *Protecting their Intellectual Assets: Appropriability Conditions and why U.S. Manufacturing Firms Patent (or Not)*. National Bureau of Economic Research Working Paper (Cambridge, Mass). 50 pages.
- Coombe, R.J. and Herman, A. (2001). "Defending toy dolls and maneuvering to soldiers: trademarks, consumer politics, and corporate accountability on the World Wide Web," Paper delivered to the *MIT Communications Forum: Trademark Wars – Corporations and the Publics on the Web*, 17 April (available at <http://web.mit.edu/comm-forum/papers/coombherman/coombeherman.html>, accessed 11 November 2004).
- Davis, L. (2006), "Why do small high-tech firms take out patents, and why not?" in Andersen, B., ed. *Intellectual Property Rights: Innovation, Governance and the Institutional Environment* (London: Edward Elgar).
- Davis, L. (2005). "The strategic use of patents," Paper presented to the 5th EPIP Conference, Copenhagen, 10-11 March.
- Davis, L. (2004). "Intellectual property rights, strategy and policy," *Economics of Innovation and New Technology* 13 (5), July, pp. 399-415.
- De Alessi, L., Staaf, R.J. (1994). "What does reputation really assure? The relationship of trademarks to expectations and legal remedies," *Economic Inquiry*, 3, pp. 477-485.
- Economides, Nicholas (1997). "Trademarks," *The New Palgrave Dictionary of Economics and the Law* (Peter Newman, ed.), May.
- Emmer, M and Henshall, J. (2002). "Building and maintaining brand value," *International Tax Review*, p. 41 ff. (available in text format at <http://proquest.umi.com>.)
- Farquhar, P.H. (1994). "Strategic challenges for branding," *Marketing Management* 3 (2), pp. 8ff. (available in text format at <http://proquest.umi.com>.)
- Fink, C., Smarzynska, B.K. and Spatareanu (2003). *Income-related biases in international trade: What do trademark registration data tell us?* World Bank Policy Research Working Paper 3150.
- Graham, S.(2004). "Complementary use of patents, copyrights and trademarks by software firms: evidence from litigation," Paper presented to the DRUID Summer Conference on Industrial dynamics, Innovation and Development, Copenhagen, Denmark, June 14-16.
- Granstrand, O. (2000): 'The shift towards intellectual capitalism – the role of infocom technologies,' *Research Policy* vol. 29, pp. 1061-1080.
- Greenhalgh, C. and Longland, M. (2005). "Running to stand still? – The value of R&D, patents and trademarks in innovating manufacturing firms," *International Journal of the Economics of Business* 12 (3), November, pp. 307-.

Hall, B.H. and Ham, R.M. (2001). "The patent paradox revisited: an empirical study of patenting in the U.S. semiconductor Industry, 1979-1995," *The Rand Journal of Economics*, 32 (1), Spring, pp. 101-128.

Hernandez, R. (2004). "Businesses depend on trademark laws for protection," *The Business Journal*, 6 February, 24 (20), pp. 21ff (available in text format at <http://proquest.umi.com>.)

Landes, W. and Posner, R. (2003). *The Economic Structure of Intellectual Property Law* (Cambridge, Mass. and London, England: The Belknap Press of Harvard University Press).

Landes, W.M. and Posner, R., (1989), "An Economic Analysis of Copyright Law", *Journal of Legal Studies*, vol XVIII, June.

Langinier, C. (2004). "Are patents strategic barriers to entry?" *Journal of Economics and Business* 56 (5), September-October, pp. 349-361.

Lemley, Mark A. (1999). "The modern Lanham Act and the death of common sense," *The Yale Law Journal*, May, 108 (7), s. 1687-1715.

Levin, T.C, A.K. Klevorick, R.R. Nelson, and S.G. Winter (1987): 'Appropriating the Returns from Industrial Research and Development,' *Brookings Papers on Economic Activity*, vol. 3, pp. 783- 820.

Lieberman, M.B. and Montgomery, D.B. (1988). "First-mover advantages," *Strategic Management Journal*, Vol. 9, pp. 41-58.

Loosley, R., Richards, and Gregory, J. (2004). "The effect on brand management when a business migrates onto the internet: a legal perspective: part 1; Advertising, trade marks and direct marketing," *Journal of Brand Management*, February, 11 (3), pp. 183-196.

Mangani, R. and Luini, L. (2005). "Export specialization and product differentiation," Paper presented to the 5th EPIP Conference, Copenhagen, 10-11 March.

Martin, B., and Irvine, J. (1983). "Assessing basic research: some partial indicators of scientific progress in radioastronomy," *Research Policy* 12, pp. 61-90.

Martin, S. (1994). *Industrial Economics: Economic Analysis and Public Policy*. 2nd ed. (Upper Saddle River, NJ, Pearson Education, Prentice-Hall, Inc.)

Maskus, K.E. (2000). *Intellectual Property Rights in the Global Economy* (Washington, D.C., Institute for International Economics).

Mazzoleni, R. and Nelson, R.R. (1998). "Economic theories about the benefits and costs of patents," *Journal of Economic Issues*, 32 (4), pp. 1031-1052.

Mendonca, Sandro & Pereira, Tiago Santos & Godinho, Manuel Mira (2004). "Trademarks as an indicator of innovation and industrial change," *Research Policy*, vol. 33(9), pp. 1385-1404.

Mueller, M. (2000). "Internet domain names: property rights and institutional innovation," in Gary D. Libecap, *Entrepreneurship and Economic Growth in the American Economy* (Amsterdam, JAI, Elsevier Science), pp. 93-131.

Nicholson, M.S. (2002). *Protecting trade secrets and trademarks in a global marketplace*. Washington, D.C. Bureau of Economics, Federal Trade Commission, August.

O'Mahony, S.O. (2003). "Guarding the commons: how community managed software projects protect their work," *Research Policy* 32, pp. 1179-1198.

Periera, J. and Chipello, C.J. (2004). "Battle of the block makers; Industry leader Lego hopes new products can counter gains by upstart contender," *Wall Street Journal*, February 4, p. B1.

Primo Braga, C.A. (1995). "Trade-related intellectual property issues: the Uruguay Round Agreement and its economic implications," in Martin, W. and Winters, L.A., eds., *The Uruguay Round and the Developing Economies* (World Bank Discussion Papers, Washington, D.C., World Bank), pp. 381-411.

Reuters (1999). "A Domain Name is not a Toy," February 22. (available at <http://www.wired.com/news/politics/>, accessed 17 May 2004).

Rivette, K.G and Kline, D. (2000a): 'Discovering New Value in Intellectual Property, ' *Harvard Business Review*, January-February 2000, pp. 54-66.

Rivette, K.G and Kline, D (2000b): *Rembrandts in the Attic: Unlocking the Hidden Value of Patents* (Boston, Mass: Harvard University Press).

Rohwedder, C. (1994). "Lego interlocks toy bricks, theme parks – Company hopes to build on blocks' foundation," *Wall Street Journal*, December 27, p. B2.

Schmalensee, R. (1978). "Entry deterrence in the ready-to-eat breakfast cereal industry." *Bell Journal of Economics*, 9 (Autumn), pp. 305-327.

Schmooch, U. (2003). "Service marks as a novel innovation indicator," *Research Evaluation* 12 (2), pp. 149-156,

Scotchmer, S. (2004). *Innovation and Incentives* (Cambridge, Mass. And London, England, The MIT Press).

Shaked, A. and Sutton, J. (1982). "Relaxing price competition through product differentiation", *Review of Economic Studies*, 49, pp. 3-13.

Shapiro, C. and Varian, H.R. (1999). *Information Rules* (Cambridge, Harvard Business School Press).

Teece, D.J. (2000). *Managing Intellectual Capital* (Oxford, Oxford University Press).

Teece, D.J. (1986): Profiting from technological innovation: implications for integration, collaboration, licensing and public policy, *Research Policy*, Vol. 15, No. 6. Reprinted in D.A. Teece, ed (1987), pp. 185-219.

Thompson, J. (2006). "Why Hublot?" *Watch Time*, February, pp. 94-104.

Tidd, Joe, Bessant, John and Pavitt, Keith (1997). *Managing Innovation* (Chichester: John Wiley and Sons).

Velling, J., ed. (2002). "2001 Germany's technological Performance, Bundesministerium für Bildung und Forschung. Available at http://www.bmbf.de/pub/germanys_technological_performance_2001.pdf

Zullig, L. (2003). "Lego-bricks: No protection as a Three-Dimensional trademark," *Swiss IP & Competition Briefing*, Marcy, pp. 2-3.

Internet reports, news sites

<http://www.ibm.com/legal/copytrade.shtml> - accessed 6 September 2006

<http://www.fritolay.com> – accessed 6 September 2006.

<http://www.uspto.gov> – accessed 6 September 2006

http://www.watchesplanet.com/omega_constellation.php – accessed 6 September 2006 2006.