
The traditional analysis of innovation has focused on the Schumpeterian hypothesis of a positive link between market power and innovation. This often includes an implicitly linear view of the innovation process, with R & D as a necessary first step. This paper widens the determinant of innovation beyond R & D to include technology transfer and networking effects, thus extending the standard Schumpeterian analysis. When tested on a dataset of c. 1300 UK manufacturing plants, R&D, technology transfer and networking are found to be substitutes in the innovation process, with the two latter intensities especially important in increasing the extent of innovation. There is no evidence that (actual) monopoly power increases the extent of innovation, but there are significant plant and sectoral effects on innovation.


As part of the Uruguay Round of negotiations of the General Agreement on Tariffs and Trade, signatory nations elevate the enforcement of copyright and other intellectual property rights to unprecedented international prominence with the inclusion of the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement. With respect to copyright, the TRIPS agreement added a viable enforcement mechanism — the World Trade Organization (WTO) — to the minimum standards provided in the earlier Berne Convention for the Protection of Literary and Artistic works. However, a new provision of the TRIPS Agreement — Article 13 — appeared to narrow the exceptions to the Berne minimum standards that signatory nations may recognize. In this note, Tyler G Newby examines the potential impact of Article 13 on the American doctrine of fair use of copyrighted work and the Copyright Act's underlying policy of encouraging invention are at the core of the American fair use exception. Next, Newby analyzes the language and history of Article 13 and the recently-drafted World Intellectual Property Organization's copyright treaty, arguing that both are broad enough to encompass the American fair use doctrine. Newby then considers the application of Article 13 to the popular practice of reverse engineering of computer programs, which is judicially rec-
recognized as fair use in some circumstances in the United States, but recognized as non-infringing in only more limited contexts, or not at all, abroad. Newby ultimately argues that because of the important public policy considerations embedded in American fair use doctrine, as well as the evolving nature of the issue of software reverse engineering internationally, the practice should not be subject to the WTO dispute resolution process.


Recent international agreements such as the Convention on Biological Diversity and the Trade-Related Intellectual Property Rights have called for increased mutual transfer of biodiversity and biotechnology between poor and rich countries. These agreements also call for the protection of intellectual property rights (IPR) on biotechnology transfers in the receiving countries. This paper examines the biodiversity conservation implications of providing physical access and IPR protection to foreign consumers of biodiversity. An integrated model of optimal resource extinction and shared resource harvesting game is presented. The model results show that, as foreign and indigenous users compete for the same open-access resources, optimal extinction may occur as a non-cooperative equilibrium under certain bio-economic conditions. Extinction may be prevented by forging successful cooperation between consumers, initiating a joint harvesting process. Depending upon the model parameters, even under cooperation, increased patent protection and physical access either promotes the conservation of biodiversity or enhances its physical exploitation. Patent protection and resource access must, therefore, be developed carefully by diversity-rich countries to successfully balance their domestic conservation and socio-economic goals.


The value of technology and the appropriate form of transfer arrangement are important questions to be resolved when transferring technology between Western manufacturing firms and partners in industrializing and developing countries. This article reports on surveys carried out in the machine tool industries in the UK and China to establish the differences and similarities between owners and acquirers of technology regarding the relative importance of the factors they evaluate, and the assessments they make, when considering a technology transfer. It also outlines the development of a framework for technology valuation. The survey results indicate that the value of product technology is related to superior technical performance, especially on reliability and functionality, and the prospects of premium prices and increased sales of the technology based machine tools. Access to markets is the main objective of UK companies, while Chinese companies are concerned about improving their technological capability. There are significant risks especially related to performance in the market, and while owners and acquirers have benefited in the short term, the long term collaboration required for strategic benefits has been difficult to achieve because of the different priorities of the owners and the acquirers.

In the face of an integrating world economy where significant changes are taking place as a result of rapidly developing science and technology, China's government must attach more importance to technology transfer to improve its economy. This paper analyzes the features of the new environment and discusses the framework of technology transfer based on a review of theory, surveys and studies of Chinese enterprises. In particular, it considers the role of foreign funded enterprises and the importance of creating a positive cycle of technology “transfer-digestion-absorption-dissemination” in China for increasing involvement in international production and trade activities within a global market.


The role of design as a means of differentiating products and services is increasing as it becomes difficult to sustain competitive advantage through technology alone. Yet until recently there has been virtually no quantitative information available relating to the contribution of design to business performance, and there are only a few studies on performance measurement of design.

This paper, which is based on a review of the relevant literature, two case studies and extensive discussions with design managers and consultants, highlights the need for a clear understanding of the pervasiveness of the design activity that is being evaluated and an appreciation of the many disparate roles that it plays from the idea generation stage through to development, packaging, market positioning and promotion. The span of design over a product’s life cycle, encompassing form (appearance), function (performance) and fit (ergonomics), is just one reason why the design function may be located in R&D, manufacturing or marketing; this diffusion of the design activity increases the difficulty of evaluation.

The research identified several factors that influence the balance between quantitative and qualitative measures of design performance. The two projects examined in this study revealed a strong top management preference for ex ante evaluation, and an ex post emphasis on metrics for the performance of the project and the cross-functional team responsible, rather than on single disciplines within the team. The study also suggests that the complexity and dynamics of the competitive environment in many industries requires new conceptual models and a new, less linear, way of thinking about performance measurement, in particular.


The author has re-examined the problem of optimal patent life within a model where the timing of innovations is stochastic. It is assumed that innovations occur according to a Poisson stochastic process where the hazard function is linear in R&D effort. Firms performing R&D have to pay a fixed cost, and there is free entry in the R&D industry. Among the comparative statistics results, the small innovations should be protected more than larger ones. Also, when the patent life is set optimally, there is under-investment in R&D.

The patent system is mainly a renewal system: the patent life is chosen by the patentee in return for fees. Whether such a system can be justified by asymmetric information on costs and benefits of research? In such a model the author has shown that renewal mechanisms (possibly with subsidies) are equivalent to direct revelation mechanisms and therefore cannot be improved on, regardless of the objective function. Under plausible circumstances, patents should have a uniform life, rather than varying in length, as typically occurs under a renewal system.


In a model with moral hazard and asymmetric information, patent lives can be differentiated when firms have different R&D productivities. A uniform patent life provides too much R&D incentive to low-productivity firms and too little to high-productivity ones. The optimally differentiated patent scheme can be implemented through a menu of patent lives (or renewals) and associated fees. The optimal mechanism is characterized and used for simulation analysis to compare it with existing patent renewal systems and to illustrate the potential welfare gains from the optimal policy.


This study surveys the literature and evidence relating to the relationships between technology imports and innovative activities, impact of technology imports and innovative activities on exports, the influence of strategic groups like MNEs and technology licensees on trade, and the role of information technology in the globalization of small and medium firms. Furthermore, it uses the literature survey to discuss the future prospects for Indian firms under the WTO regime.


In this paper, arguments for and against the disclosure of genetic information to the insurance companies are presented. One of the main issues which emerges from these arguments is the question of who should be responsible for the health insurance costs of the individuals who are most likely to be affected by the disclosure of genetic information. The results of a resident opinion survey related to the above question are presented and public policy alternatives related to the survey findings are discussed at the end.


After almost two decades of compulsory licensing of prescription drugs, Canada restored full patent protection in two legislative steps taken in 1987 and 1992. The paper investigates the impact of the strengthening of intellectual property rights on corporate R&D spending in the Canadian pharmaceutical industry. Inter-industry comparisons of R&D spending trends within Canada, inter-country comparisons of R&D
spending trends within the pharmaceutical industry, as well as trends in Canada’s share of foreign R&D spending of US-owned multinationals suggest a statistically significant increase in Canadian pharmaceutical R&D spending after 1987.


Businesses engaged in technology transfer from West to Central and East European nations must decide on the extent to which they will contribute to the marketing of the outputs resulting from the technologies they make available to their foreign partners. This can be problematic in situations where recipient enterprises lack rudimentary marketing skills and/or are located in countries with poor marketing services’ infrastructures. Western firms face a continuum of choice in relation to this matter, ranging from the situation wherein they retain total control over the marketing of final products, through to allowing recipient businesses to assume complete responsibility for the marketing function. This article reports the results of: (1) an application of the transactions cost model to the analysis of decisions concerning the degrees to which Western companies integrate the marketing of end products emerging from West-East collaborative ventures into their internal operational systems; and (2) a test of the transactions cost hypothesis in relation to the engagement of independent distributors in Central and East European states.


Saudi Basic Industries Corporation (SABIC) has been able to convert the natural gas associated with crude oil production into value-added chemicals that form the raw materials for an extensive range of industrial and consumer products. The development of these products depends upon SABIC’s selecting the most effective technologies available to profitably adapt the Kingdom’s industrial potential to the realities of the world market. This article reviews the methodology and criteria used by SABIC to evaluate these technologies.


With uncertain scope of patent protection and imperfect enforcement, the effective strength of patent protection is determined by the legal system. The paper analyzes how the legal system affects the incentives of firms to innovate, taking into account possibilities of strategic licensing and litigation to deter imitation. The legal system that guarantees the patentee’s monopoly power maximizes the R & D intensities. However, the legal system that induces licensing provides incentives to exert R & D effort while preserving ex-post efficiency. The R & D, patent licensing, and litigation behaviour under American and English rules of legal cost allocation are also compared.


The Technology Cycle Time (TCT) indicator is a new measure of technological pro-
gress. The TCT is the median age of the patents cited on the front page of a patent document. The measure assumes that the more recent the age of the cited patents, the more quickly one generation of inventions is replacing another. The main purpose of the study was to evaluate the TCT in a dynamic context to determine how accurately it measures the pace of technological progress. It was found that the trend in TCT changed abruptly from gradually increasing (slowing in cycle time) to steadily decreasing (speeding up in cycle time) following the discovery of high-temperature superconductors. This methodology could potentially be used in assessing the pace of progress for different technologies or different nations in the same technology.


A 1995 survey of 1,257 scientists working in the field of recombinant DNA research indicates wide areas of agreement as well as some noteworthy divisions when it comes to such thorny questions as patenting, germ-line research, food labelling, and biodiversity. In general, the scientists surveyed approval of patenting living organisms that result from rDNA research, but vary significantly on what should be patentable. They advocate human germ-line thereby, yet have reservations about using it for any but serious diseases. They oppose mandatory labelling of biologically engineered food products, but understand that the public has a right to know and advocate openness. Finally, they favour development of genetically modified crops, but recognize potential threats to biodiversity and maintain that publicly funded researchers should be legally obligated to consider the potential environmental effects of their research. Some clear differences arise between scientists working in industry and those in academia and between men and women.


Research universities have it within their power to work with one another and with scholarly societies to transform scholarly communication into a system of electronically mediated publications that will provide enhanced access to scholarly information and relief from the escalating prices of commercial publishers. In this contribution to the debate about the rising cost of scholarly publishing, a task force of academics, librarians, and administrators look at several solutions to this problem, including a reformulation of copyright for academic work and a revision of the standards for publication demanded by tenure committees. Did the academy give away too much when the current model of scholarly publishing was established? How can a modern library reconcile the increasing volume of materials with declining acquisition budgets?


The tension between the internationalization of copyright and the territorial remedies national laws provide is illustrated when the same infringer infringes a copyright in multiple countries. The copyright owner can bring suit in each country separately or at-
tempt to consolidate all claims into one forum. Commentators have identified that in consolidated suits, even if jurisdiction over the foreign claims is proper, the discretionary forum non-convenient doctrine is unpredictable and argues that it is being abused by US federal courts in multiterritorial copyright suits, exacerbating the problem the Internet has caused copyright enforcement. The courts' liberal use of dismissals has forced copyright owners to bring separate claims in multiple fora, effectively terminating the claims due to the enormous costs of litigating in multiple countries. Foreign claim consolidation mitigates the problem of expensive, piecemeal remedies from individual national courts and allows copyright owners a more realistic method of enforcement.


Individual intellectual property right holders in music cannot easily enforce their statutory claims to exclusive usage and remuneration. Since the middle of the 19th century, composers and publishers have responded by creating collective bodies, so-called collecting societies which monitor musical activity in a given territory, and collect and distribute fees accordingly. These societies, first established in Western Europe, operate on two principles: the principle of reciprocity, linking monopolistic national societies and the principle of solidarity, making a collecting service available to all right holders at roughly the same rate. The rise of the global media corpora-

tion combined with new digital production and distribution technologies has seriously undermined these principles. The article reports recent trends drawing on over 30m interviews with executives of the five largest multinational music firms and the major copyright institutions in Germany, Japan, Sweden and the UK, including the European Commission, the World Intellectual Property Organization and national and international trade bodies. It is concluded that the present structure of music copyright is likely to collapse, skewing the distribution of revenues in favour of big corporate players and global musical produces if there is no institutional intervention.


Patent analysis seems to become more difficult in the age of globalization. Starting from microlevel observations, it is evident that multinational enterprises pursue different technological, marketing and strategic aims. In effect, they cover world markets in a distinctly different manner with patent intellectual property. This article, in good economic tradition, starts with consideration of recent microlevel patent behaviour in telecommunications before outlining new macro-economic procedures to measure technical change. The new challenges to patent statistics comprise the assignment of countries to patent documents of multinational firms, the appropriate use of economic 'filters' in comparing patent statistics from various patent offices, the fitting of the new international patent procedures offered by the amended Patent Cooperation Treaty (PCT) to national statistics, the assignment of patent applica-

tions in case of withdrawn country destinations and the estimation of time series if most recent data sets are incomplete. Consistent, workable adjustments to patent statistics that overcome the above-mentioned biases, denoting the 'triad patent model', for measuring technical progress in the proper economic sense are proposed. First applications deal with the assessment of the pace of technical change in major countries up until 1995. In conclusion problems for future research are discussed. The main policy implication is that macroeconomic patent statistics can correct for the effects of global knowledge production, indeed, as these are not disruptive but rather limited and well accountable.

Public research and industrial innovations in Germany, Beise M and Stahl H, Research Policy, 28(4) 1999, 397-422.

This paper deals with the effects of publicly funded research at universities, polytechnics and federal research laboratories on industrial innovations in Germany. The characteristics of companies that benefit from the findings of public research institutions are discussed. In questioning 2300 companies, it was found that less than one-tenth of product- or process-innovating firms introduced innovations between 1993 and 1995 that would not have been developed without public research. These new products amount to approximately 5% of all new product sales. Universities are cited by firms with publicly supported innovations as the most important source, although publicly financed laboratories get many citations. Big science laboratories are almost invisible, suggesting that their technology transfer to industrial firms still lacks effectiveness. Firms also tend to cite research institutions that are located close to the firm.

But contrary to the widely held opinion that proximity to public research institutions does promote collaboration between firms and public research and increase the amount of received knowledge spillovers, it was found that there was no higher probability of publicly supported innovations for firms in Germany that are located near universities or polytechnics. However, the firm's own R&D activities instead support the ability to absorb the findings of public research and turn them into innovations. Additionally, firms with high R&D intensities cite remote public research institutes more frequently than less R&D intensive firms, suggesting that in Germany, high-technology does not depend on co-location of public and private research.


The pervasiveness of software piracy throughout the world is having a profound effect on the software publishing industry and the development of digital intellectual properties and technologies — especially in developing countries, where the piracy rates are extremely high. An economic model is first presented that incorporates the incentive structures for governments, software publishers, and individual consumers. The analytical model provides the economic rationale for the reluctance of a number of governments to aggressively enact and enforce intellectual property rights. An important proposition derived from the analysis states that the government's incentive to enact and enforce copyright laws are closely related to the size of the domestic software industry. The ensuing empirical study provides support for the proposition and further
suggests that this relationship holds regardless of the income levels of the countries. Our analysis reveals that alliances between foreign and domestic software publishers through product relationships can be mutually beneficial and will provide an environment of increased copyright enforcement. These results provide a viable strategy to combat global software piracy. With strong policies on copyright enforcement, and a vigorous promotion of alliances between foreign and domestic publishers, a government can increase the net welfare of the country and help establish a strong domestic software industry. Through product relationships with domestic publishers, a foreign publisher can improve profits and operate in an environment of increased intellectual property protection. A general model of ethical behaviour related to the impact of behavioural and cultural factors on software piracy is presented. The purpose of this model is to examine whether these determinants of piracy behaviour are supranational and transcend cultural and ethical barriers. An empirical study involving US and Indian graduate students suggests that the general model of ethics as related to software piracy is valid in the United States. However, the model results from the Indian sample suggest that additional cross-cultural research with revised models and improved scales is necessary.


Proposed Uniform Commercial Code Article 2B, which would govern transactions in information, would remake the law of intellectual property licensing in a radical way. But federal and state intellectual property laws and policies impose significant limits on the ability of states to change the rules of intellectual property licensing by contract law. One such limit is preemption, but preemption is unlikely to provide significant protection for the established rules of intellectual property law. Several other doctrines will limit the ability of parties to set their terms by contract, even in the Article 2B world. The first is copyright misuse, which has been applied against restrictive licensing provisions. The second set of doctrines provides that a number of licensing rules are decided as questions of federal, not state, law. The third set of doctrines is a number of state public policies that cannot be overridden by contract. Taken together, these doctrines create a patchwork public policy of intellectual property law that Article 2B cannot alter.


One of the specific purposes of proposed UCC Article 2B is to make enforceable a variety of “mass-market licenses,” including both “shrink-wrap licenses” that are typically contained in the packaging of mass-distributed software and their electronic equivalent, “click here” contracts, that govern access to digital information. This comment argues that, unless Article 2B is amended to prohibit, or at least to discourage, the use of mass-market licenses to require users of copyrighted works to waive their federally-created privilege to make fair use of copyrighted works, this new contractual device will be used to secure all the benefits of federal copyright law, with none of its limitations resulting in the “privatiza-
Proposed UCC Article 2B's coverage of trade secrets is welcome in many ways. Article 2B recognizes the special characteristics of intangibles, such as the difficulty of inspecting delivery, monitoring use, and effectively returning information. For trade secrets, which are state-law-based, nationally uniform licensing rules are especially desirable; they will surely lead to a reduction in the risk of disclosure. Article 2B does not, however, fully account for the differences between copyrights and trade secrets. For example, the remedies provisions do not treat losses created by disclosure; the formation provisions do not consider the impact of licensing on the patentability of the technologies licensed. Moreover, reducing the risk of disclosure could conflict in a fundamental way with national innovation policy, which is premised on information leakage. Article 2B stops secrets from reaching the domain of the public, it inhibits creative production.

This Article is in two parts. The first examines how the specific provisions of Article 2B affect trade secrets. The second both analyzes the interaction between Article 2B, intellectual property law, and innovation policy and suggests ways to improve Article 2B.


The belief that "everything" will be freely available to everyone on the Internet, from anywhere, at anytime, is based on unworkable Marxist assumptions about human nature. Copyright "problems" cannot possibly be solved within non-localized cyberspace, which unavoidably entails massive what and wire restrictions regarding what can be digitized to begin with (public domain material) or who can have access if the material is copyrighted. A practical solution outside cyberspace is possible, however. The way to balance the conflicting interests of intellectual property, on the one hand, and of free and equal access, on the other, is to impose a where restriction on access. Real libraries, with inherent locale limitations, constitute the only means our society has for overcoming the what and who restrictions of "virtual libraries," thereby making copyrighted texts freely available. Attempting to create whole digital libraries comparable to real libraries, so that readers will not have to come inside a library's walls, cannot succeed until human nature itself changes and copyright vanishes. There is a need to promote the importance of libraries as destinations in themselves — as places in which readers may freely consult not only copyrighted books and journals, but also site-licensed databases that cannot be tapped into from anywhere, at anytime, by anyone in cyberspace.


Of the two options available to India for meeting its obligations under the TRIPS Agreement - the exclusive marketing rights (EMR) route and bringing forward introduction of the product patent regime from the year 2005 to 2000 — the EMR route, which
is what the government has chosen to adopt in the legislation now before parliament, has significant adverse implications so that it would have been preferable to have opted for the second option of advancing the product patent regime without availing of the transitional period provided under the TRIPS Agreement.


PCR and patents, A federal judge overturns a patent on grounds of "inequitable conduct." In the legal world, that's just another step in a seven-year dispute that promises to go on.