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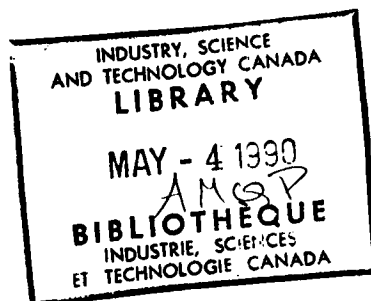
Innovation and Intellectual Property Rights in Canada

Published by the Science Council of Canada in collaboration with
Industry, Science and Technology Canada and
Consumer and Corporate Affairs Canada



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March 1990

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Preface

Issues of intellectual property are receiving growing prominence in many countries. Questions concerning the economic benefits of intellectual property and the duration, type, and degree of protection its developers enjoy have become a significant source of interest and contention, both among creators — such as individual inventors, university researchers, and companies — and between creators and users. Fast-emerging trends toward greater university-industry collaboration in research, the internationalization of research and development, and the formation of industrial R&D consortia, each contribute to heightening attention to these issues.

This report has its origins in concerns about trade-related intellectual property issues and their implications for science and technology-based industrial competitiveness in Canada. The Science Council of Canada (SCC) and two federal government departments — Industry, Science and Technology Canada (ISTC) and Consumer and Corporate Affairs Canada (CCAC) — agreed to cooperate to identify how Canadian firms view intellectual property rights, and to obtain information on the impact of intellectual property rights on the economic and trade performance of specific Canadian industries and on the investment and other business decisions of Canadian companies. With these objectives, the three organizations formed a Steering Committee to help design a major survey of firms and hired Price Waterhouse to undertake the survey. Price Waterhouse conducted the survey in the second half of 1988 and finished their report in the spring of 1989.

The survey revealed interest in, but limited knowledge and understanding of, intellectual property and its implications. In view of this, the Steering Committee recommended publication of the main findings, and the Science Council agreed to work with ISTC and CCAC to publish this discussion paper. It focuses on high-technology firms and places the survey results in the broad context of industrial innovation and trends and issues in intellectual property policy and law, at both the domestic and international levels.

The Steering Committee for this report comprised C. Le (ISTC), D. Ireland (CCAC), and G. Steed (SCC), chairman. P. Tisdall (The Network) was the major author of the report.

The committee is pleased to recognize the excellent editorial assistance provided by J. Jarvis and C. Viel.

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Executive Summary

Today, the creation of wealth in developed economies is a highly knowledge-intensive activity. Everywhere, physical resources and raw industrial might are steadily declining in value and significance, while the importance of knowledge as a source of wealth is rising, spanning and transforming all industries. As a result, science-based innovation has become critical to the competitiveness and prosperity of businesses, industries, and, indeed, national economies.

The increasing economic importance of knowledge and technology has led, in recent years, to a renewed interest in intellectual property rights among businesses and governments worldwide. Intellectual property rights — patents, copyrights, trademarks, and so on — are the means by which ideas and technologies at the cutting edge of progress are protected and further innovation encouraged. The ownership and exploitation of intellectual property is increasingly viewed as a strategic weapon in the international economic battle, especially in high-technology industries.

Intellectual property (IP) policy and legislation are critically important to the international competitiveness of Canadian industry and, thus, to the economic well-being of all Canadians. It is essential that Canadian industries and governments accelerate their efforts to develop IP policies and practices that protect our national interests and enhance the ability of our industries to compete in today's knowledge-intensive, global economy.

Since 1984, the Government of Canada has taken a series of steps to strengthen and modernize Canada's intellectual property system. These include substantive amendments to the Copyright Act and Patent Act and the introduction in late 1989 of a bill to provide intellectual property protection to integrated circuit topographies (semi-conductor chips). In 1988, a study Steering Committee comprised of representatives from Industry, Science and Technology Canada (ISTC), Consumer and Corporate Affairs Canada (CCAC), and the Science Council of Canada (SCC) commissioned a major survey regarding intellectual property rights in Canada. The survey reports on the attitudes and practices of more than 700 Canadian companies with respect to Canada's intellectual

property rights system. CCAC supplemented the company survey with more than 110 interviews with industry associations and research institutes across Canada.

This discussion paper summarizes the findings of the company survey and focuses on the particular situation of advanced-technology companies. It puts the survey findings in the broad context of industrial innovation and intellectual property policy and law, at both the domestic and international levels. Findings of the CCAC association interviews are used to supplement the survey where appropriate.

Both the company survey and the CCAC interviews found that, except among IP practitioners, knowledge and understanding of IP and its implications for Canadian research and development, trade, industrial performance, and competitiveness are limited. As a result, there is a large and growing need for information on IP. This report is intended to help satisfy that need.

Intellectual Property Protection for Canadian Innovations

In Canada, there are four major intellectual property statutes. These deal with patents, copyrights, trademarks, and industrial designs. In addition, Canadian common law provides protection for trade secrets in respect of confidential, commercially valuable information.

The intellectual property rights of Canadian companies in international trade are protected through a series of bilateral and multilateral agreements. The underlying principle of these conventions is that each state must provide the same protection to nationals of the other member states as it gives its own nationals.

Trends and Issues in Intellectual Property

Intellectual Property and International Trade

In recent years, commercial piracy and counterfeiting have become major issues in international economic policy making. Attempts to combat international piracy have proven only marginally successful. Moreover, they have exposed substantial variations among trading

nations in the scope, duration, and enforcement of the IPR protection they accord, as well as the shortcomings of the international conventions in bridging these differences.

The developed countries have been successful in placing questions concerning the trade-related aspects of intellectual property on the agenda for the current Uruguay Round of negotiations under the General Agreement on Tariffs and Trade (GATT). These countries hope to set minimum international IP standards, as well as a code for enforcing the standards.

There is widespread agreement in Canada that effective and non-discriminatory international intellectual property protection, by protecting Canadian exporters and facilitating the access of Canadian companies to foreign technologies, is important to the country's long-term commercial interests.

Intellectual Property as a Competitive Weapon

The last few years have seen increasingly aggressive use of intellectual property rights (IPRs) as a competitive weapon by corporations and nations, both for new sources of revenue and for leverage to secure a better return on expensive research and development.

In the United States, there has been a strengthening in the protection courts accord to intellectual property. Not only have IPRs been upheld, but courts have not hesitated to levy stiff penalties against infringers. However, the rush to litigation is not confined to the United States. Some 45 per cent of the firms in the "top R&D performers" category in Canada reported involvement in an IPR court case in the previous three years.

The Challenge of New Technologies

Many of the new technologies that have emerged in recent years fit awkwardly, if at all, into traditional concepts of intellectual property. These include computer software and biotechnology.

Losses by software firms due to piracy amount to many billions of dollars annually, and the software industry is pressing governments to crack down harder on pirates. The Canadian government has responded by providing explicit protection for computer software in its 1988 revisions to the Copyright Act. Potentially even more challenging and controversial is the ownership of the innovations used to create

successful programs. For example, Apple Computer in the United States is suing other computer firms to prevent them from developing a user interface similar to the one that makes its Macintosh computers so accessible.

It is widely acknowledged that biotechnology will be one of the key transforming technologies of the 21st century. Although the United States grants patents on plants and animals, present practice in both Canada and Europe is to allow patents on unicellular biological material, but not on higher life forms, in particular plant or animal varieties. Canada's biotechnology industry favours broad patenting and would prefer that Canadian law follow the U.S. lead. But the farm and research communities would be very concerned about any restrictions that limited their access to new plant and animal varieties.

Intellectual Property and Open Scientific Communication

A dramatic increase in scientists' ties to commercial enterprises has raised some questions about limitations to open scientific communication and academic freedom. The danger is that closer cooperation between universities and industry may encourage secrecy in pivotal areas of research and that, ultimately, this secrecy may undermine the long-term progress of science and innovation.

However, in Canada these concerns must be weighed against the critical role universities and government laboratories are now being called on to play in technology transfer and economic development.

Recently, the University Directors of Industrial Liaison in the United Kingdom published a report recommending that universities involved in cooperative research with industry use IPRs to safeguard open scientific communication and other academic values and interests. The strategic use of IPRs to protect institutional autonomy and integrity may merit consideration by Canadian universities and government labs.

The Survey of Intellectual Property Rights in Canada

For the *Survey of Intellectual Property Rights in Canada* commissioned by the Steering Committee on Intellectual Property Rights, a sample of 900 firms was broken down into the following groups:

• Top R&D performers	100
• High-technology firms	300
• Medium- and low-technology firms	400
• Major copyright users	100

The survey elicited a high response rate, with 729 of the firms agreeing to answer the questionnaire. Following are survey highlights for the top R&D and high-technology groups.

Top R&D Performers

For the most part, the top R&D performers were large companies: 69 per cent indicated that their sales were above \$100 million in 1987.

Most of these firms reported that they are using Canadian IPRs. In fact, of 93 firms, only 3 indicated that they use none.

Thirty-nine per cent of the firms were satisfied with the protection given by Canadian IPRs, 45 per cent were neither satisfied nor dissatisfied, and 15 per cent were dissatisfied.

Many firms involved in software development, biotechnology, and chemicals and chemical products (pharmaceuticals) indicated that intellectual property protection is not satisfactory in their field in Canada. However, recent legislation provides improved protection for computer software and pharmaceuticals. Also, a plant breeders' rights bill was tabled in Parliament in the spring of 1989.

Forty-five per cent of the firms surveyed had been involved in a court case relating to IPRs. Moreover, of the firms that had not been involved in a court case, 53 per cent had considered launching, or had been threatened with, legal action regarding IPRs.

High-Technology Firms

In comparison with the top R&D performers, the high-technology firms in the survey tended to be fairly small. Over half of the firms reported fewer than 50 employees and sales of \$5 million or less.

Most high-technology firms surveyed (83 per cent) use one or more IPRs to protect their creations or innovations.

A higher percentage of high-technology firms in the sample (30 per cent) are dissatisfied with Canadian intellectual property laws than are satisfied (27 per cent). By sector, the dissatisfied firms were most likely to be in the software

development, biotechnology, and pharmaceutical industries.

High-technology firms with sales under \$5 million are more inclined to be dissatisfied with Canadian IPRs than are firms with sales over \$100 million.

Discussion of Survey Findings

The survey provided strong evidence that intellectual property is important in the day-to-day operations of many Canadian companies. Nearly four-fifths of the respondents had participated in an IP-related activity during the previous three years. The extensive use of IPRs is explained by the important role they play in achieving many key corporate goals, particularly in establishing and maintaining market position.

A recurring theme throughout the company survey was the growing costs of applying and protecting IPRs. Many respondents felt that IP law mainly serves the needs of large corporations. These concerns pose a challenge to policy makers and legislators to ensure the IP system is relevant, fair, and affordable to all client groups.

Respondents also commented on the need for a major public information program to make creators and users of intellectual property, as well as the general public, better aware of intellectual property law and its importance to the Canadian economy.

Conclusion

As Canada builds a knowledge-intensive economy, intellectual property is becoming a more demanding management responsibility within firms and a more challenging issue for government policy makers.

IPRs raise complex political, ethical, and economic questions. Whether Canadian companies profit from their innovations and contribute to economic development depends, to an important degree, on effective Canadian and international IP laws and agreements. At the same time, IP policy and legislation must strike a fair balance among the competing interests of inventors and creators, of large and small enterprises, and of producers, distributors, and consumers.

Intellectual property rights have become an integral part of policies and strategies designed to enhance Canadian competitiveness. Canadian

policy makers and Canadian firms must develop the expertise to address increasingly important and complex national and international intellectual property issues. There is now a broad consensus that Canada can compete internationally only if we leverage our resources and expertise through close cooperation among governments, industry, and the research and development community. Similar collaboration is required for effective IP policies, practices, and legislation. Canadians must learn how to use IPRs to generate wealth and commercial advantage in the best interests of us all.

1. Introduction

More than three centuries ago, English philosopher and essayist Francis Bacon noted that "knowledge is power." Were he around today, Bacon might well extend that observation to reflect the new reality that knowledge is also wealth.

Today, the creation of wealth in developed economies is a highly knowledge-intensive activity. Everywhere, the rise of knowledge as a source of wealth is transforming entire industries, while physical resources and raw industrial might are steadily declining in value and significance.

Key strategic or enabling technologies — information and communications technologies, biotechnology, and advanced industrial materials — are providing the basis for this revolutionary transformation of industry worldwide. The enabling technologies are being used to develop new goods and services, but, even more importantly, they are revolutionizing the methods by which goods and services are produced. Coupled with this is the trend toward the globalization of economic activity. Developments in transportation and communications plus the removal of trade barriers are merging formerly separate national economies into a single, unified global economy.

As a result of these trends, science-based innovation has become critical to the competitiveness and prosperity of businesses, industries and, indeed, national economies. The increasing economic importance of knowledge and technology has led, in recent years, to a renewed interest in intellectual property rights among businesses and governments worldwide.

Since 1984, the Government of Canada has taken a series of steps to strengthen Canada's intellectual property (IP) system, modernize our IP laws and their administration, and bring Canadian IP law closer to international standards. Major amendments to the Patent Act and Copyright Act have been passed into law. The Canada-United States Free Trade Agreement introduced right of payment for retransmission of broadcast signals. Discussion papers, reports, consultations, and draft legislation have been completed on a broad range of IP statutes and issues.

In August 1988, a study Steering Committee comprised of representatives from Industry, Science and Technology Canada (ISTC), Consumer and Corporate Affairs Canada (CCAC), and the Science Council of Canada (SCC) commissioned a Survey of Intellectual Property Rights in Canada.¹ This major survey of more than 700 Canadian companies provides information on industry attitudes, practices, interests, and criticisms with respect to Canada's intellectual property rights system.

CCAC supplemented the company survey with a series of interviews with industry associations and research institutes. More than 110 interviews were conducted across Canada.

The aim of this report of the Steering Committee is to present an overview of intellectual property rights for the use, particularly, of the R&D community and Canadian companies involved in high technology. The findings of the Survey of Intellectual Property Rights in Canada are summarized and situated in the broad context of industrial innovation and intellectual property policy and law at both the domestic and international level. The findings of the CCAC interviews are used to complement the company survey where appropriate.

Both the company survey and the CCAC interviews confirmed a strong interest in intellectual property from a broad cross-section of industries and research groups located throughout Canada. However, except among IP practitioners, knowledge of IP and understanding of its implications for Canadian R&D, trade, industrial performance, and competitiveness are limited, even among some industries that heavily use IP. As a result, there is a large and growing need for information on intellectual property. The aim of this report is to help satisfy that need.

Economic Issues

Canada's success in the emerging knowledge-based, global economy depends on its ability to develop and apply new technologies, both in creating industries and in strengthening traditional ones.

However, over the past few years a broad consensus has emerged that Canada is lagging behind in research and development and, as a result, in its capacity to innovate.² The Science Council's 1989 statement *Enabling Technologies: Springboard for a Competitive Future* pointed out the dual threat the new knowledge-intensive global economy poses to small industrial countries such as Canada.³ On the one hand, because of their high costs and complexity, the newly emerging and technologically dynamic industries are dominated by the industrial superpowers — the United States, Japan, and the European Community. On the other hand, newly industrializing countries, with their relatively low wages, have comparative advantages in industries based on mature technologies.

Knowledge-based innovation provides the best means for smaller industrial countries such as Canada to drive a wedge between the industrial superpowers and the newly industrializing countries. For Canada, innovation is the key to competitive advantage, to delivering higher-value-added products and services with fewer resources and at lower cost. The alternative — lowering our incomes and standard of living to compete with low-wage countries — is not acceptable. To survive and prosper, Canada must concentrate on innovation — on defining, designing, manufacturing, delivering, and supporting new products and services for the global marketplace.

The central issue for Canadian economic development is how to craft and implement policies to encourage innovation and the application of technology to all facets of product development, production, and service.

For Canadian companies, the challenge is to create and protect a competitive lead in their industry. Strategies for keeping imitators and followers at bay include continuous innovation to maintain technological leadership, and the protection of an established lead through intellectual property rights.

Intellectual property rights (IPRs) are the means by which ideas and technologies at the cutting edge of progress are protected and further innovation encouraged. The "rights" in intellectual property rights involve patents, copyrights, and other forms of legal protection governing industrial and artistic creations. To reap the rewards of their innovations and encourage

further innovation, businesses, industries, and nations must ensure the protection of their intellectual property.

The three primary forms of intellectual property rights currently in use are patents, copyrights, and trademarks. Patents protect the idea behind an innovation. Copyrights, by contrast, protect the expression of an idea. Trademarks are signs or symbols that distinguish the goods or services of an enterprise from those of its competitors. Other forms of intellectual property are trade secrets, industrial designs, integrated circuit designs, and plant breeders' rights.

The ownership, protection, and exploitation of intellectual property is increasingly being viewed as a key strategic weapon in the international battle for dominance in high-technology industries. Advanced industrial nations, led by the United States, are pursuing aggressive policies aimed at strengthening the intellectual property protection available to their companies and industries, in both domestic and international markets.

For their part, companies view intellectual property rights as corporate assets to be exploited to the fullest in a fiercely competitive environment. They are focusing more and more on protecting and profiting from their investment in research and development through the use of intellectual property rights and on defending these rights through litigation.

To protect Canada's national interests, foster innovation, and enhance the ability of our industries to compete in today's knowledge-intensive, global economy, it is essential that Canadian industries and governments accelerate their efforts to develop IP policies and practices.

Policy Issues

Protection of intellectual and industrial property has a long history. As early as 500 BC, in the Greek colony of Sybaris, any cook who created a unique dish had exclusive rights to the profits from it for one year. Beginning in the 14th century, European monarchs granted monopoly privileges, called "Letters Patent," to encourage local industry. By the 15th century, copyrights of literary property had appeared as the printing press fostered the widespread distribution of the written word.

Despite this venerable history, controversy over IPRs continues, with the arguments of proponents of IPRs and those of their opponents changing little over the centuries.

Arguments in Favour of IPRs

Two main arguments are advanced for the protection of intellectual property rights: the notion of fairness and the community's need to encourage creative intellectual endeavours.

The first of these principles — the idea that it is fair for those who develop a new idea to reap the rewards — has been consistently disputed by pure free enterprisers and laissez-faire capitalists, as well as by such notables as Benjamin Franklin. In declining the offer of a patent for his stove, Franklin explained that "as we enjoy great Advantages from the Inventions of others, we should be glad of an Opportunity to serve others by any Invention of ours, and this we should do freely and generously."⁴

The second argument in favour of IPRs — the need to encourage creative intellectual endeavours — is based on the idea that both economic incentives and security of financial return are required to encourage creative activity. In the absence of intellectual property protection, it is argued, any enterprising individual could simply obtain a copy of an original work and proceed to manufacture and distribute it to the buying public. Since copiers do not have to incur the costs of inventing the work, they can market it at a lower price than the inventor. Consequently, without IP protection, inventors and investors would have few incentives to dedicate their energies and resources to creative activity.

Benefits to the community flowing from creative endeavours include increases in the variety of goods and services in the economy, and the enhancement of the community's stock of ideas, inventions, and cultural resources. IPRs are an important instrument for promoting technological and cultural development, access, and diffusion.

Champions of IPRs also argue that these rights are fundamental to the international competitiveness of any country, and that their protection takes on special urgency in a world economy increasingly dominated by global trade in high-technology products and services. If adequately protected, intellectual property rights promote investment, transfers of technology, and

international trade. Inadequate IP protection, on the other hand, impedes or distorts trade and, indeed, can result in a proliferation of counterfeit and pirated goods in the international market.

Arguments against IPRs

Opponents of IPRs also have a strong arsenal of arguments on which to draw. They claim that, by granting a monopoly, IPRs restrict competition and lead to economic inefficiencies, and higher costs and prices. Ultimately, it is argued, they impede progress by slowing the spread and adoption of beneficial new inventions, technologies, and ideas.

As the Economic Council of Canada states:

The higher returns provided to knowledge producers and processors and their innovative associates arise from higher prices to the users of the products involved (and, therefore, in smaller sales and output of them) than prevail in other circumstances. Individually, each of the new books, films, and other products will be scarcer and more expensive than it would if some more efficient and less socially costly form of incentive could be brought into play.⁵

Another recurring criticism of IPRs is that they protect the interests of the rich and powerful — who have the resources to pursue expensive litigation — and not the small, individual inventor or creator.

The story of Thomas Edison illustrates this point. Edison received more than a thousand patents in his lifetime, a record unequalled by any other inventor in history. But as Edison's inventions became more and more successful, he found himself increasingly entangled in corporate infighting and numerous nuisance lawsuits over patents. Near the end of his life, a disillusioned Edison described a patent as nothing more than "an invitation to a lawsuit." He claimed that "my electric light inventions have brought me no profits, only forty years of litigation."⁶ Similarly, Alexander Graham Bell lost control of his telephone patent to powerful financiers in less than two years — faster even than Edison.

The Survey of Intellectual Property Rights in Canada suggests that similar problems confront a significant number of small high-technology innovators in Canada today. Overall, Canada's

high-technology firms are less satisfied with the intellectual property system than are firms in the medium- and low-technology sectors.

Furthermore, the high-technology firms with sales under \$5 million are significantly more dissatisfied with Canada's IP system than are large firms with sales over \$100 million. The dissatisfied firms feel that the system offers them little protection and that enforcing their rights is expensive and time-consuming.

IPR Policy: A Balance among Competing Interests

Intellectual property laws, then, provide individuals and firms with incentives to produce new knowledge by giving them exclusive rights to sell or use it. Creation and invention, as well as enhancing the quality of life, create wealth and employment.

On the other hand, an IPR system inhibits new knowledge from being used as widely as it otherwise might be. Monopoly rights restrict natural competition, increase costs and prices, and thus prevent the full benefits of new ideas from being realized. Monopoly rights are also often used to reinforce the position of the already rich and powerful.

In summary, IPRs raise complex political, ethical, and economic questions. IP policy and legislation are critically important to the international competitiveness of Canadian industry and, thus, to the economic well-being of all Canadians. At the same time, IP policy and legislation must strike a fair balance among the competing interests of inventors and creators, of large and small enterprises, and of producers, distributors, and consumers.

2. Intellectual Property Protection for Canadian Innovations

Domestic Protection for Canadian Intellectual Property

In Canada there are four major intellectual property statutes, dealing with:

- patents
- copyrights
- trademarks
- industrial designs

Patents

Patents provide inventors with the opportunity to secure economic benefits from the exclusive exploitation of their inventions for a limited time. In return, the inventor is obliged to disclose details of the invention so that they become available to the public as part of society's stock of knowledge.

A Canadian patent is a document, issued by the government, that describes an innovation and creates a form of legal protection whereby the inventor or patent owner has the right to prevent others from making, using, and selling the invention within Canada for 20 years after the grant of the patent. Patents are granted for articles, machines, chemical compositions, and processes that are deemed novel, useful, and non-obvious.

The first Canadian Patent Act was made law by Parliament in 1869 and, until the passing of Bill C-22 in 1987, had not been substantially amended in over 50 years. The revised Patent Act has two distinct objectives. First, it recognizes that Canadian firms need early access to patent files in order to keep abreast of recent developments. Second, it provides better market protection for patented drugs, encourages pharmaceutical research in Canada, and protects consumers against excessive drug prices.

Patenting is reportedly becoming less relevant to high-technology industries. There are two basic reasons for this. Technologies are changing so quickly that the technology can easily be obsolete by the time a patent is granted (normally three years). Second, many young, start-up companies do not have the financial resources to prosecute,

maintain, and protect a patent. High-technology companies and industries depend to a significant degree on trade secrecy law, non-disclosure agreements with parties they are negotiating with, and staying ahead of the competition through constant technological improvement and product adaptation.⁷

Because of this new business reality, some industry associations recommend the creation of a quick, easy to acquire, short-term form of IP protection. It would provide protection to small inventors and companies when they are negotiating with financial institutions and with larger companies to commercialize their inventions. West Germany, Australia, and several other countries already provide some form of "petty patent" or "utility" protection.

Copyrights

A copyright is a form of protection, provided by a federal statute, given to authors and creators of original works, such as books, records, films, and works of art, against a variety of unauthorized uses, for example, reproduction. It does not prevent others from using or copying ideas embodied in the work. Copyright protection generally lasts for the lifetime of the creator plus 50 years. A work does not need to be registered to be given copyright protection — although there are advantages to registration.

The Canadian Copyright Act was amended on 8 June 1988. The new Act extends copyright protection to computer programs, strengthens the right of artists to control who uses their work, and establishes systems allowing creators to collect copyright fees more easily.

The generation of works protected by copyright is particularly important to the success of Canada's cultural, entertainment, and growing computer software industries. The incorporation of computer programs into Canadian and foreign copyright statutes has transformed copyright law from an instrument used primarily for cultural protection and support to one that encourages both cultural and industrial activities.

Trademarks

A trademark is a visible sign, symbol, word, or picture that serves to distinguish the wares or services of an industrial or commercial enterprise. No one other than the owner of the trademark may use it or any similar mark that would lead to confusion in the mind of the public. The protection for a trademark is generally not limited in time, provided that its use continues. Registration is for a period of 15 years, but may be renewed indefinitely for further 15-year periods.

Trademarks are very important to the consumer products industries and are also used extensively by manufacturers to market their industrial products abroad.

Industrial Designs

The Industrial Design Act gives protection to designers of ornamental aspects of useful articles. The ornamental aspect may be two- or three-dimensional. To be eligible for protection under the Act, industrial designs must be original or novel. Protection means that the innovative aspect may not be copied or imitated without the owner's authorization. The term of protection lasts up to 10 years.

Industrial design protection is most often employed by low- to medium-technology manufacturers in the furniture, metal fabricating, electrical products, and scientific and professional equipment industries.

Trade Secrets

In addition to the four statutory forms of protection (patents, copyrights, trademarks, and industrial designs), Canadian common law provides protection for trade secrets in respect of confidential, commercially valuable information. Obligations of trade secrecy can apply to such things as concepts, ideas, factual information, and so on. Trade secrecy applies to persons who have acquired confidential information, but not to third parties who have no relationship to the person holding the trade secret.

The Survey of Intellectual Property Rights in Canada indicated that many Canadian companies would like trade secrecy law strengthened, with some suggesting that criminal-law remedies should be made available. The 1988 Supreme Court of Canada decision in the case of *Regina versus Stewart* raised questions concerning the application of criminal law to protect confidential,

commercially valuable information. The Court's ruling suggests that the theft of intangible information — possibly even a valuable trade secret — will be unpunished by Canadian criminal law. However, common-law remedies remain in effect.

A difficulty in codifying trade secrecy law is the fact that the provinces, not Parliament, have jurisdiction over property rights in a civil-law context.

Trade secrecy law and the use of confidentiality agreements are particularly relevant to high-technology industries that use rapidly evolving technologies and produce goods and services with a short market life.

Plant Breeders' Rights

Plant breeders' rights legislation (not yet passed in Canada) protects seeds and other propagating material and requires the use of a distinct generic name when selling the propagating material.

The federal government introduced Bill C-107, *Plant Breeders' Rights*, into the House of Commons in 1988, but it was not passed before the November election. A new Bill was introduced into the House in the spring of 1989.

Integrated Circuit Design Protection

Integrated circuit design protection is not yet available in Canada. In November 1984, the United States passed the Semiconductor Chip Protection Act, as a separate chapter of its Copyright Act, to prevent the unauthorized reproduction and distribution of chips. The law requires counterpart Canadian legislation in order for Canadian chip designers and producers to be protected in the United States. The Canadian government tabled legislation in December 1989. Meanwhile, Canadian chip designs are protected in the United States by interim orders issued each year by the U.S. government.

International Protection for Canadian Intellectual Property

The intellectual property rights of Canadian individuals and companies in international trade are protected through a series of bilateral and multilateral agreements. Canada, along with most of the world's major countries, belongs to the main international conventions dealing with intellectual property: the Paris Convention for the Protection of Industrial Property, the Berne

Convention for the Protection of Literary and Artistic Works, and the Universal Copyright Convention.

These intellectual property conventions are administered by the World Intellectual Property Organization (WIPO), a United Nations affiliate. The underlying principle of the conventions is that each state must provide the same protection to nationals of the other member states as it gives its own nationals. Thus, for example, under the Canadian Patent Act, Americans receive the same protection as Canadians if they patent their invention in Canada. Similarly, Canadians who patent their invention in the United States receive the same protection as American citizens.

Canada's major trading partners belong to these international conventions. Canadian inventors and creators benefit from Canada's participation in the agreements by receiving national treatment protection in other countries. On the other hand, since some domestic industries relying on intellectual property protection (for example, pharmaceuticals and films) are dominated by innovations and products created abroad, the national treatment requirements limit to some degree our ability to use IP provisions to stimulate Canadian activity in these industries. In these sectors, the benefits resulting from increased intellectual property protection will accrue mainly to the foreign rights holders; the costs, however, are borne by Canadian users, both industry and consumers. Under these circumstances, the incentives to creative activity provided by IPRs can be complemented by other forms of policy intervention and government encouragement.

3. Trends and Issues in Intellectual Property

Intellectual Property and International Trade

In recent years, commercial piracy and counterfeiting have become major issues in international economic policy making. According to some observers, counterfeiting and piracy are reaching epidemic proportions. *Business Week*, in a 1985 cover story, called counterfeiting "perhaps the world's fastest growing and most profitable business."⁸

Traditionally, victims of counterfeiting and piracy have been concentrated in the consumer goods industries among firms with well-known brand names and large price margins — blue jeans, toys, and audio tapes. Now these firms are being joined in their demands for adequate protection by manufacturers of far more sophisticated products: computer software, pharmaceuticals, agricultural chemicals, electronic products, and automotive and aerospace parts.

Although IP infringement flourishes in all countries, it is the cross-border aspect that has emerged as a critical economic and political problem. Attempts made to date to combat international piracy have proven only marginally successful. Moreover, they have exposed substantial variations among trading nations in the scope, duration, and enforcement of the IPR protection they accord, as well as the shortcomings of the international conventions in bridging these differences.

Piracy refers to the unauthorized manufacture, sale, or other distribution of copyright works. In cases where a near-duplication of the legitimate product (including its label, packaging, artwork, logo, and trademark) takes place, the product is described as counterfeit. However, in common parlance, counterfeiting, piracy, and bootlegging are used imprecisely and interchangeably to refer to any infringement of intellectual property rights.

Before the current round of discussions under the General Agreement on Tariffs and Trade (GATT), all significant international intellectual property negotiations occurred under the auspices of WIPO. But WIPO negotiations essentially ground to a halt due to intractable differences between developed and developing countries.

The United States maintains that the current international IP conventions under the jurisdiction of WIPO have not been effective in stopping extensive losses to industry worldwide due to piracy and counterfeiting. The absence of effective enforcement methods and dispute settlement procedures causes many countries to disregard the domestic protection of intellectual property, giving rise to trade-distorting commercial activities.

There is no doubt that IP infringement can be extremely profitable. For example, whereas it takes an average of 10 years and \$125-180 million to bring a pharmaceutical product based on a new chemical entity to market, a chemist could easily duplicate the product and, if not legally restrained, produce the drug in sufficient quantities to make it effectively unprofitable for legitimate producers. A new family of semiconductor integrated circuits can also cost as much as \$100 million to design. Yet, the same chips can be copied for less than \$1 million. A copy of a popular \$500 U.S. software package can be bought for \$7.50 in some countries with inadequate IP standards and enforcement. Of the two billion records and tapes sold annually in the world, 25 per cent are reportedly counterfeit, with prices in some countries as low as 25 per cent of the price of the genuine product.⁹

According to a survey by the U.S. International Trade Commission (ITC), U.S. businesses suffered worldwide losses of over \$40 billion in 1986 because of IP infringements such as home taping, illegal copying of microchip designs and computer software, and the counterfeiting of consumer products.¹⁰ According to the European Parliament, counterfeit goods valued at several billions of dollars are sold annually within the European Community.¹¹

The developed countries, led by the United States, have been successful in placing questions concerning the trade-related aspects of intellectual property (TRIPs) on the agenda for the current Uruguay Round of negotiations under GATT. The United States hopes to set minimum international standards for protection of patents, trademarks, copyrights, trade secrets, and semiconductor mask works, as well as a code for enforcing these rights.

Developing countries, on the other hand, tend to feel that intellectual property rights give inventors and innovators an undesirable monopoly on advanced technology that can be used to extract unjustifiably high prices and to apply unwarranted restrictions on the application of the technology. In their view, the enforcement of intellectual property rights would hinder their development and prolong the period during which their per capita income fell considerably short of that in the industrialized countries.

A view sometimes expressed in developing countries is that knowledge should be made available at minimal cost to everyone since it is a common property of all. It is also argued that, because the development of the relatively impoverished countries of the world is a goal that benefits everyone, these countries should be given the technology they need at a very low cost. For these reasons, many developing countries have relatively weak laws to protect intellectual property and less than diligent enforcement of the laws that exist.

Obviously, the industrialized countries tend to disagree with these arguments. In their view, intellectual property rights must be respected to provide a fair return to the private investors who take the substantial risks involved in developing and commercializing a new technology. Unless such returns are forthcoming, the incentives for inventive and innovative activity will be impaired, to the detriment of all nations, rich and poor. Industrialized countries argue that, if the developing countries require access to technology at less than market prices, this technology should be secured through development assistance programs, rather than through weak IP laws.

In summary, then, developed countries led by the United States have successfully pushed to have IPRs included as part of the GATT negotiations and are urging a tightening of international IP standards and more effective enforcement. Developing countries are resisting these pressures, arguing that protection is already biased in favour of the industrialized countries. They are asking for special treatment to stimulate development. Because of these fundamental differences, only slow progress is being made in reaching the Uruguay Round's goal of a comprehensive international agreement on IPRs by the end of 1990.

Canada's Position on TRIPs

Canadian industry is generally supportive of the TRIPs negotiations and of more effective IP protection worldwide. Nevertheless, Canadian industry's position on TRIPs differs in some respects from that of the United States and other advanced trading nations.

Canada is a net importer of technology and of goods and services with a significant knowledge and IP component, and our external deficits in both areas are growing. High-technology, R&D-intensive products (encompassing aircraft, electrical, chemical, scientific, and professional equipment; and other industrial machinery and equipment) account for a relatively small proportion of Canada's export trade, and Canadian producers contribute a small share (less than 4 per cent) to world trade in these products. Similarly, Canada is a net importer of most materials that are protected by copyright and has a trade deficit in business service transactions. In short, Canada is in a trade deficit position across the full range of products and services protected by IPRs.

Moreover, in terms of the generation of IPRs worldwide, Canada and Canadians are relatively minor players. Canada grants about 2 per cent of all patent applications throughout the world. Residents account for only about 7 per cent of the patents applied for and granted in Canada. (In other industrialized countries, residents typically account for between 20 and 50 per cent of the patents applied for and granted.) In fact, Canadians apply for more patents in the United States than in Canada. U.S. residents originate about 50 per cent of the patents applied for and granted in Canada, with applications from the European Community and Japan ranking second and third. The United States is also the major foreign source of registrations for industrial designs and trademarks granted in Canada.¹²

Despite Canada's position as a net importer of technology and other material protected by intellectual property rights and our comparatively minor role in the creation of IPRs, effective and non-discriminatory intellectual property protection is important to Canada's export trade and long-term commercial interests. Export sales in the high-technology industries totalled \$13.6 billion in 1987, or 2.5 per cent of Canada's gross domestic product in that year. About three-quarters of these sales are to the American market and are

therefore at risk from trade policy measures of the U.S. government.

Furthermore, continuing access to foreign technologies is essential to maintaining Canadian international competitiveness. Effective intellectual property law in Canada and the source countries is needed to facilitate Canadian access to foreign technologies and other material and equipment that embody IPRs.

Nevertheless, because of our deficit in IP-protected goods and services, Canada's business sector may not be as eager as its U.S. counterpart to see the development of significantly stronger protection for patents, copyrights, and other IPRs. Consistent with this, Canada's intellectual property laws have attempted to strike an appropriate balance between the interests of domestic users and of the owners of intellectual property. In some cases, this was achieved by providing less extensive IP protection, for example in the pharmaceutical field where, in the past, IPR owners argued that they were forced to grant licences to Canadian generic drug companies at royalty rates far below those attainable through arm's-length negotiations.

However, Bill C-22, introduced and passed in November 1987 by the Government of Canada, brings patent protection for pharmaceuticals much closer to international norms. Bill C-22 limits the right to obtain compulsory licences for Canadian pharmaceutical patents and endeavours to stimulate investment, research, and employment in the pharmaceutical industry in Canada. Similarly, 1988 amendments to the Copyright Act bring Canadian law more in line with other jurisdictions by extending copyright protection to computer software.

Under the Free Trade Agreement with the United States, Canada also consented to revise its copyright law regarding the retransmission of television programs. This addresses the long-standing U.S. complaint that Canadian stations are illegally retransmitting copyright works embodied in television signals originating in the United States. Under the Agreement, such unauthorized retransmission would constitute copyright infringement. It appears that the Canadian stations will have to obtain the right to use such television signals from the copyright owners.

Under the Agreement, Canada also agreed to cooperate with the United States in the Uruguay Round of the GATT multilateral trade negotiations and in other international forums to improve protection of intellectual property. This can be interpreted as, in essence, an undertaking by Canada to assist the United States in its efforts to convince other countries, particularly newly industrialized countries and less developed countries, to strengthen their domestic protection of intellectual property.

Intellectual Property Rights as a Competitive Weapon

The inclusion of TRIPs in the Uruguay Round of the GATT negotiations is just one manifestation of an increasingly widespread phenomenon: the aggressive use of IPRs as a competitive weapon by both corporations and nations.

A recent study by the U.S. management consulting company Arthur D. Little found that the importance of intellectual property rights to business declined throughout the 1970s and into the mid-1980s. According to the study, however, business interest in IPRs has soared over the last few years and they are now a top management priority.¹³

Industry in general, but particularly high-technology companies, are more frequently resorting to patent and copyright protection and litigation, both for new sources of revenue and for leverage in securing a better return on expensive research and development. Companies view intellectual property rights as key corporate assets to be exploited to the fullest in an increasingly competitive environment.

For example, Texas Instruments Inc. decided it wasn't receiving enough money from Japanese and Korean chip companies that were using some of its early patents for the production of computer memory chips. After a lengthy legal battle, the Dallas-based chip maker forced nine of the foreign companies to pay royalties that in one year amounted to \$191 million, almost as much as the company's profits from its operations.

Lawsuits are only one manifestation of the rising enthusiasm for intellectual property. Another is that companies are being far more selective in licensing their technology to others. Intel, which produces the line of microprocessors that are the heart of IBM and IBM-compatible

PCs, licensed earlier versions of these microprocessors to numerous other manufacturers but kept the recently introduced 80386 chip to itself. Profits and revenues have reportedly soared.¹⁴

One reason for the more aggressive pursuit of IPRs by firms in the developed countries is the increasingly stiff competition they face from newly industrializing countries. In particular, U.S. industries and the U.S. government are seeing their once-dominant position in the world economy eroded by foreign competitors. They have embraced the idea that strong foreign competition derives in large measure from weak intellectual property protection. As a result, U.S. government policy and judicial interpretation have become far more aggressive in asserting the intellectual property rights of U.S. innovators both at home and abroad.

The competitive threat posed by Japan and the dramatic rise in the number of U.S. patents granted to Japanese corporations have also spurred interest in IPRs among U.S. corporations. In both 1987 and 1988 the company receiving the largest number of U.S. patents was Japanese — in fact, three of the top four companies were Japanese.

The increasing emphasis on IPRs by U.S. companies and the U.S. government has been accompanied by a strengthening of the protection U.S. courts give to intellectual property. In 1982, Congress created the Court of Appeals for the Federal Circuit, to which all patent cases are funnelled on appeal. The consolidation has resulted in more consistent rulings that often favour patent holders. Not only have patents been upheld, but courts have not been hesitant to levy stiff penalties against infringers. Awards, which in the past were based on lost royalty revenues, are now based on lost sales.

All patents are costly to obtain, maintain, and defend, and before 1982 the risks for patent infringers were far less. But the new court is helping to make patents a worthwhile investment and a powerful corporate weapon.

The extreme case is the Polaroid suit against Eastman Kodak for infringement of its instant camera patent. In 1985, Polaroid won an injunction forcing Kodak out of the business. Polaroid is asking \$12 billion (U.S.) in damages

from Kodak, which would be a record award in a patent infringement suit.¹⁵

In order to place further pressure on their foreign competitors, U.S. companies are also making increasing use of Section 337 of the Tariff Act of 1930, which prohibits imports into the United States where there is evidence of "unfair trade practices." In light of the amount of money involved and favourable judgements by American courts, long and costly court actions are now a profitable endeavour for large multinationals.

The rush to litigation is not confined to the United States. According to the Survey of Intellectual Property Rights in Canada, some 45 per cent of the top R&D performers in Canada had been involved in an IPR court case in the previous three years. As well, of the remaining top R&D performers, more than half (53 per cent) had considered legal action over IPRs or been threatened with it. Not surprisingly, IPR litigation is undertaken primarily by large companies, and only 18 per cent of the high-technology firms surveyed had been involved in an IPR lawsuit in the previous three years.

The Challenge of New Technologies

Key strategic or enabling technologies — information and communications technologies, biotechnology, and advanced industrial materials — underpin the revolutionary transformation to a global, knowledge-based economy. Many of the new technologies that have emerged in recent years fit awkwardly, if at all, into the traditional concepts of intellectual property. These include computer software, integrated circuits, and biotechnology.

Computer Software

In the short term, blatant piracy is still the software firms' biggest worry. Selling illicit copies of brand-name programs is illegal just about everywhere. Yet the U.S. government estimates that such piracy costs American firms at least \$2-\$3 billion a year.¹⁶ The software industry is pressing governments to crack down harder on pirates.

The Survey of Intellectual Property Rights in Canada confirms the Canadian software industry's dissatisfaction with IP protection. Software developers were the high-technology sector most dissatisfied with Canadian IP laws. Software firms said that intellectual property protection is

insufficient and incomplete and that existing laws are poorly enforced. It should be noted, however, that the survey took place only a few months after Bill C-60, which provides explicit IP protection to computer software, was passed into law. There may not have been sufficient time for the full effects of Bill C-60 to be understood by Canada's software community.

Potentially even more important than software piracy, in the long term, is the complex task of sorting out the ownership of the technologies and innovations used to create successful programs. For example, Apple Computer claims proprietary rights over the graphics-based user interface that makes its Macintosh computers so accessible. Apple is suing both Microsoft and Hewlett-Packard in the United States to prevent them from developing a similar user interface for IBM-compatible personal computers.

Some countries — the United States, the Federal Republic of Germany, and Canada, for example — use copyright to protect software. But other countries, such as Japan and France, have limited the application of traditional copyright principles to software. Even if all nations agreed that full copyright protection should be granted, it is possible that imitators could still duplicate the essential features of a program if they changed it in minor ways. To guard against this eventuality, many U.S. software firms back up copyright protection with patents, although it is not clear that these patents will stand up to court challenges.¹⁷

Integrated Circuits (Semiconductor Chips)

A myriad of questions has also arisen with regard to the protection of semiconductor chips. There is broad international recognition that existing laws and treaties generally do not work well and that a new form of protection is required. Patents, for example, are regarded as inappropriate because the fundamental technology for making chips is well known. In the United States, Congress rejected the argument that copyright protection should be granted. Instead, the Semiconductor Chip Protection Act of 1984, a separate Chapter of the U.S. Copyright Act, gives creators of mask works exclusive rights concerning the sale, distribution, import, and reproduction of the mask work for 10 years.

Other countries, including Canada, and international bodies, such as WIPO, are drafting laws and conventions to protect the intellectual

property rights of chip designers and manufacturers. However, there is general agreement that protection should be limited to allow reverse engineering which, it is argued, is essential to competitiveness, innovation, and the long-term health of the industry.¹⁸

Biotechnology

It is widely expected that biotechnology will be one of the fundamental transforming technologies of the 21st century. Simply stated, biotechnology is the use of living organisms for practical and industrial purposes. The economic importance of modern biotechnology derives from the control it gives us over the basic processes of life. Like information technology, modern biotechnology is a strategic technology with applications in many different sectors — in agriculture and food processing, industrial chemicals, medicine and pharmaceuticals, mining, forest products, and many more.

Canada is a relative latecomer to the new biotechnology industry. But the industry's enormous potential demands that Canadian businesses and governments take appropriate actions to ensure the country's competitiveness in this sector.

Patenting is an important concern of the biotechnology industry in Canada and other industrialized countries. Yet because many innovations in this field either consist of living matter or rely on natural processes, it has been difficult to fit biotechnology innovations into existing categories of patentable subject matter. The main questions are: Should life forms be eligible for patenting? If so, which types of life forms?

The U.S. law on patentable subject matter in biotechnology is diverging from that of other developed countries, including Canada.¹⁹ Whereas the United States grants patents on plants and animals, present practice in both Canada and Europe is to allow patents on microorganisms and other unicellular biological material, but not on higher life forms, in particular plant or animal varieties.

The 1989 case of Pioneer Hi-Bred Ltd. versus the Commissioner of Patents challenged the current practices of the Canadian Patent Office with regard to the patenting of higher life forms and brought this issue before the Supreme Court of Canada.²⁰ The Patent Office had refused

Pioneer's application to patent a new plant variety on the grounds that it was not patentable subject matter. Pioneer appealed the decision and the Supreme Court ruled in favour of the Commissioner of Patents. However, its decision was based on the technical grounds of inadequate disclosure in the patent application. The Supreme Court has not yet ruled on the principle of the patentability of plants and animals.

In the Survey of Intellectual Property Rights in Canada, biotechnology firms were second only to software developers in their level of dissatisfaction with Canada's IP system. Many of them explained that their problems could be alleviated only by new legislation. Furthermore, more firms from the biotechnology industry than from any other high-technology industry reported that Canada's intellectual property laws discourage them from carrying on research and development in this country. Clearly, the biotechnology industry would like Canada to pass plant breeders' rights legislation and grant patents for higher life forms and biotechnology processes.

However, the CCAC industry association interviews found no unanimity in the Canadian private sector as a whole on the appropriate scope for patenting plants or animals. Although the biotechnology industry favours broad patenting and would prefer that Canadian law follow the U.S. lead, the research and agriculture communities would be very concerned about any new restrictions that limited their access to new plant and animal varieties.

Intellectual Property and Open Scientific Communication

The growing economic importance of innovations protected by intellectual property rights, coupled with dramatic increases over the last decade in university and government scientists' ties to commercial enterprises, has raised some concerns about limitations to open scientific communication and academic freedom. Does university patenting, for instance, increase the likelihood of secrecy or, rather, eliminate the need for it?²¹ Should universities encourage their staff to publish early, in the academic tradition of stimulating scientific progress? Or should universities delay publication in order to patent new discoveries or even take equity in exchange for technology in the hope of maximizing economic returns?

According to the traditional ethic of open scientific publication, reports of discoveries are rushed into scholarly journals so insights can be widely shared, bringing public recognition to the scientists and spurring the work of others. In contrast, when university researchers have commercial partners, scientific information may be withheld from publication for a limited period so the partner can obtain a patent or, less often, never published at all, providing the partner with a trade secret. The industrial payoff in these joint ventures is exclusive scientific information that can be used to make innovative products no rival can match. The primary reward for researchers and research institutions involved in such ventures is money rather than public and professional recognition.

A sizable proportion of university scientists are now involved in industry collaborations. A survey of science and engineering faculty members at the universities of Montreal, Waterloo, and Alberta indicates that 60 per cent did some form of outside consulting in 1983-85.²² Moreover, in a recent U.S. study, one-quarter of those receiving support from biotechnology firms reported they had conducted research at their universities that resulted in findings that became the sponsors' property and that could not be published without the sponsors' consent. And almost one-half (44 per cent) of the scientists with such support believed that these university-industry collaborations undermine intellectual cooperation and exchange.²³ For sponsors in the pharmaceutical industry, confidentiality is particularly important, with delays in academic publication of results driven by the protracted periods required to confirm, test, and obtain government approval for new discoveries.

Government laboratories are also participating in joint research with industry that involves industrial secrecy. Links between government labs and industry are encouraged by governments eager to increase Canadian industrial innovation and productivity.

The importance of all this is plain. Increasingly, industry can claim ownership rights to research carried out in universities and government labs. As a result, scientific communication is, in some cases, less open than it would be if the research were conducted for purely scientific purposes. The danger is that closer ties may encourage secrecy in pivotal areas of research and that, ultimately, this secrecy may

undermine the long-term progress of science and innovation.

However, these concerns must be balanced by the critical role Canadian universities and government laboratories are now being called on to play in technology transfer and economic development.

The Science Council recently dealt at length with the role of universities in Canada's economic renewal in its report *Winning in a World Economy*.²⁴ The result of a three-year study, the report found that almost 25 per cent of total Canadian R&D is performed by universities — a much larger proportion than in many other industrialized countries. At the same time, Canada's industrial R&D sector is weaker than that of most of its competitors. Given the strategic position universities occupy in science and technology in Canada, the Science Council called on universities to improve their collaboration with industry in both research and education.

As the report also pointed out, the concern that industry might use its financial clout to influence university priorities and thereby threaten academic values seems unwarranted given the current low level of industry funding in Canada. Although many academics are involved in outside consultation, institutional links between universities and private firms in Canada are comparatively undeveloped. In fact, it is estimated that the amount of Canadian university R&D in science and technology that is funded by industry is less than the corporate-sponsored research at just one American university, the Massachusetts Institute of Technology.²⁵ Canadian universities are, it seems, far more at risk from a lack of participation by industry than from too much collaboration. Even in the United States, industry remains a very junior partner in the financing of university R&D, accounting for only 6 per cent in 1987.

Nevertheless, as university-industry interactions intensify, university faculty and administrators will need to remain vigilant to safeguard fundamental academic values.

Recently, the University Directors of Industrial Liaison in the United Kingdom examined university intellectual property issues in the light of increasing industry collaboration. Their report makes a series of recommendations on the use of

intellectual property rights to protect university interests and academic values.²⁶

The Industrial Liaison Directors found that intellectual property issues merited a good deal more attention than U.K. universities were currently giving them.²⁷ With regard to sponsored research, they recommended that, whenever possible, contracts "should provide for the university to retain its ownership of arising intellectual property."²⁸ Their recommendation regarding dissemination of research results stated: "Some restrictions on academic publication may be accepted to allow for commercial evaluation and patent protection of arising intellectual property, but this should rarely exceed one year and should only in the most exceptional cases exceed five years."²⁹

The central thrust of these and other recommendations made by the U.K. Directors is that universities should take a strong position with regard to IPRs. They recommend that, rather than viewing intellectual property rights as a threat, universities involved in cooperative research with industry should use these rights to protect open scientific communication and other academic values and interests. The strategic use of IPRs to ensure institutional autonomy and integrity may merit consideration by Canadian universities and government labs. The recent formation of a \$240 million federal program of networks of Centres of Excellence, supporting cooperative research efforts among universities, industry, and government laboratories, highlights the potential for conflict between the network's participants and the need for strategic thinking on the appropriate approach to IPRs.

4. The Survey of Intellectual Property Rights in Canada

In August 1988, the Steering Committee on Intellectual Property Rights, consisting of representatives from Industry, Science and Technology Canada (ISTC), Consumer and Corporate Affairs Canada (CCAC), and the Science Council of Canada (SCC), commissioned a survey that would provide information on Canadian industry attitudes and practices with respect to Canada's intellectual property rights system.

To collect this information, consultants administered a telephone survey to firms in selected sectors of the Canadian economy. The Steering Committee proposed that 900 firms would form a suitable sample and that the 900 be broken down into the following groups:

◦ Top R&D performers	100
◦ High-technology firms	300
◦ Medium- and low-technology firms	400
◦ Major copyright users	100

Of the 900 firms selected for the survey, 729 agreed to answer the questionnaire for a relatively high response rate of 81 per cent.

For the top R&D performers category, a list of the top 100 firms involved in R&D in Canada was compiled using the results of a survey conducted annually by the *Financial Post*, as well as information on the number of personnel involved in R&D as listed in Statistics Canada's *Directory of Industrial Research and Development Facilities in Canada 1986*, and ISTC's *Advanced Industrial Materials 1988 Canadian Sourcebook* and *Canadian Biotechnology Industry Sourcebook*.

The high-technology category included firms that are normally considered as high-technology firms according to Standard Industrial Classification codes (e.g., electrical and electronic products and chemical and chemical products industries), as well as major users and creators of advanced technologies, and major performers of R&D. A sample of 300 high-technology firms was randomly selected from a list of 1850 of these firms. When the list was reviewed, it was determined that 20 firms from the top R&D performers category had been selected. To ensure

a total of 400 high-technology firms, 20 additional firms were randomly selected. The sample of 320 firms of the 1850 firms in the population frame ensures the findings are accurate within two percentage points 99 per cent of the time.

The medium- and low-technology firms were drawn from a sample of firms in sectors of the Canadian economy where IPRs were considered to be of at least some importance. The sectors included were:

- clothing
- food processing
- breweries, wineries, and distilleries
- dairy industry
- furniture
- metal fabrication
- agricultural implements
- motor vehicles and parts
- jewellery manufacturers
- sporting goods and toys

Four hundred firms were surveyed in this category, with a minimum of 30 firms from each sector.

The major copyright users category included firms from the cultural, entertainment, and business services sectors. A sample of 100 — 50 from the cultural and entertainment sectors and 50 from the business services sector — was drawn from a list of 5873 firms.

For the medium- and low-technology and the major copyright users categories the sample size allowed the identification of issues and major trends in particular sectors. However, the sample size was not sufficient to provide statistically significant quantitative information.

In summary, then, the telephone survey provided a comprehensive examination of opinion regarding IPRs in Canada's advanced-technology industries. The random sample of firms from the high-technology category was large enough that the findings could be extrapolated to all high-technology firms in Canada. Survey results also provided an in-depth look at an important subset of high-technology firms — Canada's top R&D performers. These are the firms that

conduct a large percentage of all the industrial R&D in Canada. In addition, the survey affords information on issues and major trends in the medium- and low-technology and major copyright users categories. After the conclusion of the survey, the Steering Committee on Intellectual Property Rights conducted special computer runs of the data to provide more detailed analysis by sector, size of firm, export orientation, and R&D intensity (R&D expenditure as a percentage of sales).

Because the R&D-intensive firms in the top R&D performers and high-technology categories are critical for innovation and Canadian competitiveness, survey results with regard to these two categories are emphasized here. After those results are summarized, the survey results as a whole are discussed.

The Top R&D Performers

Profile of Firms

In the survey of the top R&D performers, 92 firms of the 100 contacted agreed to have a questionnaire administered. One firm completed the questionnaire twice to cover two distinct sectors.

For the most part, the top R&D performers were large firms, with 62 firms (69 per cent) indicating that their sales were above \$100 million in 1987. Only 12 firms (13 per cent) had sales below \$25 million. Consistent with their sales, most of the firms interviewed (77 per cent) had

large payrolls, with more than 500 employees. The average R&D expenditure among the top R&D performers providing this information was approximately \$42 million in 1987 (see Figure 1). Among this group, the industries with the highest representation are semi-refined materials and primary resources (21 respondents), electrical and electronic products (17), aircraft and aircraft parts (12), chemicals and chemical products, including pharmaceuticals (11), and software development (11).

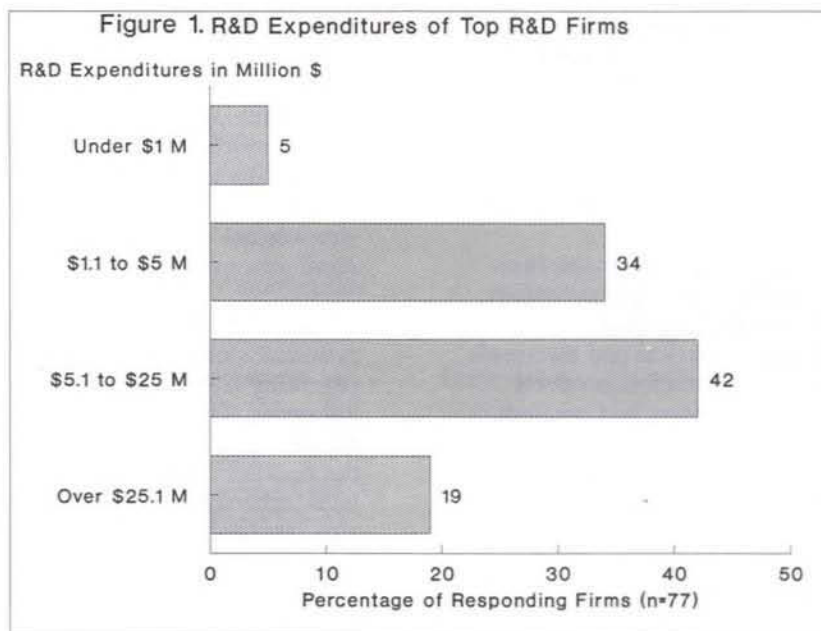
Usage of IPRs

Most of these firms indicated that they are using Canadian IPRs. In fact, 84 per cent of the firms reported that they are using three or more types of IPRs and only three firms indicated that they use none (see Figure 2).

The firms most frequently use trademarks (66 per cent), trade secrets (51 per cent), and patents (43 per cent; see Table 1). By industry, software developers are more likely to use copyrights, trademarks, and trade secrets than other forms of IPRs.

A high proportion of these firms (60 per cent) had licensed other companies to use their IPRs over the previous three years. Also, a large number (79 per cent) reported that they obtain information contained in other firms' IPRs to improve their own products and services.

Three-quarters of the firms for which "acquiring exclusivity in a product or service" was



a corporate goal indicated that Canadian IPRs facilitated the achievement of this goal. Approximately 70 per cent indicated that IPRs encourage in-house innovation and help them acquire domestic technologies from other companies.

Satisfaction

Thirty-nine per cent of the firms were satisfied with the protection given by Canadian IPRs, 45 per cent were neither satisfied nor dissatisfied, and 15 per cent were dissatisfied. Firms in the biotechnology sector were the most dissatisfied (67 per cent), whereas the most satisfied firms were in aircraft and aircraft parts, and semi-refined materials.

Overall, the top R&D performers were the most satisfied with Canadian IPRs of any of the four groups surveyed. Because of their large size, firms in this category seem better able than smaller firms to defend their intellectual property. One survey respondent said that, although other companies encroach on his firm's property rights, "We are so big that we can muscle them around and come out on top."

Those that were generally satisfied with Canadian IPRs indicated that they were particularly satisfied with the term of protection provided. Where these firms reported concerns, they were most dissatisfied with the enforcement of remedies and penalties relating to Canadian IPRs.

The firms that are dissatisfied with Canadian IPRs cited two reasons most frequently for their dissatisfaction: the protection is insufficient or incomplete and it takes too long, costs too much money, or is tedious to acquire. Patents and copyrights are the rights with which firms are the most dissatisfied.

Many firms involved in software development, plant breeders' rights, and chemicals and chemical products (pharmaceuticals) indicated that they would like to use patents, but that this type of intellectual property protection is not available in their field in Canada. It should be noted, however, that recent amendments to the Patent and Copyright acts improve protection for computer software and pharmaceuticals. Also, a bill to protect plant breeders' rights was tabled in Parliament in the spring of 1989.

Several firms involved in the design and manufacture of integrated circuits commented on the need for Canadian IP legislation, similar to the U.S. Semiconductor Chip Protection Act, to protect their designs. One firm reported that its integrated circuit designs are protected through its parent in the United States because such protection is not available in Canada.

Three-quarters of the firms (68) stated that they had obtained a licence from another firm during the previous three years. Royalty payments, by the 46 firms that reported an amount, totalled \$129 million over the previous three years. Over

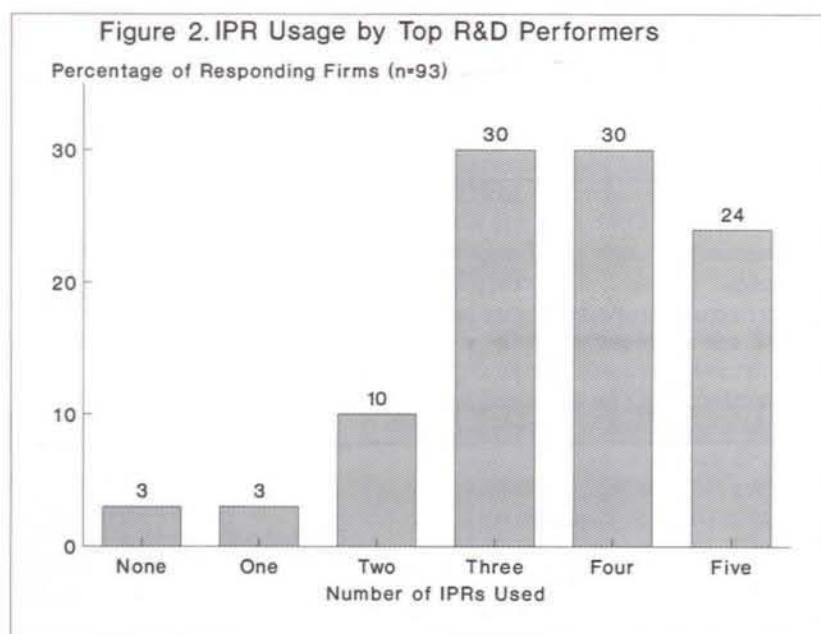


Table 1. Percentage Use of Intellectual Property Rights by the Top R&D Performers, by Sector (n=93)

Sector	Intellectual Property Rights Used				
	Copyrights (n=58)	Patents (n=81)	Industrial Designs (n=36)	Trade Secrets (n=73)	Trademarks (n=79)
Communication and Other Electronic Equipment (n=8)	88	100	71	88	88
Electrical and Electronic Products (n=17)	53	88	29	71	94
Software Development (n=11)	91	55	18	82	90
Chemicals and Chemical Products (n=11)	64	85	73	60	82
Aircraft and Aircraft Parts (n=12)	75	100	17	67	67
Semi-Refined Materials and Primary Resources (n=21)	48	95	29	95	95
Machinery and Fabricated Metals (n=5)	20	80	80	60	60
Other (n=8)	63	88	50	100	88
TOTAL (n=93)	62	87	39	78	85

n = number of responses.

Source: Survey of Intellectual Property Rights in Canada.

90 per cent of the royalty payments were for licensing agreements with firms abroad.

Forty per cent of the top R&D performers said that their IPRs had been infringed upon or violated in Canada in the previous three years. Firms feel that infringements and violations are most serious for patents. Six firms indicated that they lost approximately \$57 million in total domestic revenues in 1987 due to counterfeiting. The industries that reportedly encountered IP infringements most often were communications equipment, software development, chemicals and chemical products (including pharmaceuticals), and semi-refined materials.

Most firms (75 companies, or 91 per cent) exported their products. Indeed, 56 per cent stated that exports accounted for at least half of their sales in 1987, the United States being the largest export market. A large number of firms (73 per cent) hold IPRs abroad.

Of the firms exporting, most (79 per cent) have not encountered problems related to intellectual property protection abroad. However, 17 firms had encountered difficulties, and 11 of these firms reported having lost foreign markets or sales. Most of the firms that reported IP problems outside Canada were in electrical and electronic products or semi-refined materials.

Although infringements in foreign markets do not seem to be widespread, they are serious for the firms concerned. For example, one firm reported that soon after entering the German market it was forced to contend with clones of its product selling at a lower price. The clones were produced by German companies as well as imported from Taiwan.

Approximately 60 per cent of the firms stated that their imports embody IPRs. Most of these firms reported no difficulties in importing, although a few indicated they had been hindered in importing components or materials because of IPRs.

IP litigation is relatively common among the top R&D performers. Forty-five per cent of the firms in this category reported that they had been involved in a court case relating to IPRs during the previous three years, compared with 17 per cent for the survey as a whole. Moreover, of the 49 firms that had not been involved in a court case, 26 firms (53 per cent) had considered

launching, or had been threatened with, legal action regarding IPRs.

For 59 per cent of the firms that had been in a court case concerning IPRs, the most recent case related to patents. Total costs of litigation for the 35 firms who reported their expenses were \$13 million, an average of \$370,000 per case.

High-Technology Firms

Profile of Firms

This section highlights the findings of the survey of 320 high-technology firms. Because random sampling was used on a well-defined population of firms, results are statistically significant and extrapolations can be made to all Canadian high-technology companies.

Of the 320 firms contacted, 269 agreed to answer the survey questions. One firm completed separate questionnaires for two different sectors.

The largest percentage of firms (30 per cent) are in software development, followed by the electrical and electronic products industry (13 per cent), the chemical and chemical products industry (11 per cent), and machinery and fabricated metals (10 per cent).

The top R&D performers discussed in the preceding section are a subset of the larger population of all Canadian high-technology firms. But the average high-technology firm tends to be much smaller. Twenty-nine per cent of the high-technology firms had 1987 sales under \$1 million and 51 per cent had sales of \$5 million or less. Over half of the firms have fewer than 50 employees. Software developers are more likely to have fewer than 50 employees (83 per cent) than firms in other high-technology sectors. Three-quarters of the firms spent under \$1 million on R&D in 1987, and the average R&D expenditure was approximately \$3 million (see Figure 3).

Three-quarters of the firms have more than 50 per cent Canadian ownership; most of the rest are subsidiaries of U.S. companies. Canadian ownership is particularly high in the biotechnology, software development, power generation, and aircraft and parts industries. Approximately three-quarters of the firms export their goods or services. The higher the firm's sales and commitment to R&D, the more likely it is to export a significant portion of its production and

to import components, machinery, and technologies that embody IPRs.

Over half the firms said they have sufficient expertise in IPRs, whereas 22 per cent did not believe they have sufficient expertise or knowledge on the subject. The larger the firm's sales and commitment to R&D, the more likely it is to feel it has sufficient expertise.

Seventy per cent of the respondents indicated that Canadian IPRs have no effect on the amount of R&D performed in Canada. Of the remainder, half felt that IPRs encourage Canadian R&D and the other half felt they discourage it.

Usage of IPRs

Most high-technology firms (83 per cent) use one or more IPRs to protect their creations or innovations. Indeed, more than 40 per cent use three or more (see Figure 4). Software developers are more likely to use copyrights than other forms of protection. Both patents and trade secrets are used by the majority of companies in communications equipment and electric and electronic products, utilities and power generation, chemicals and chemical products (including pharmaceuticals), and aircraft and parts. The more employees a firm has, the more likely it is to use patents.

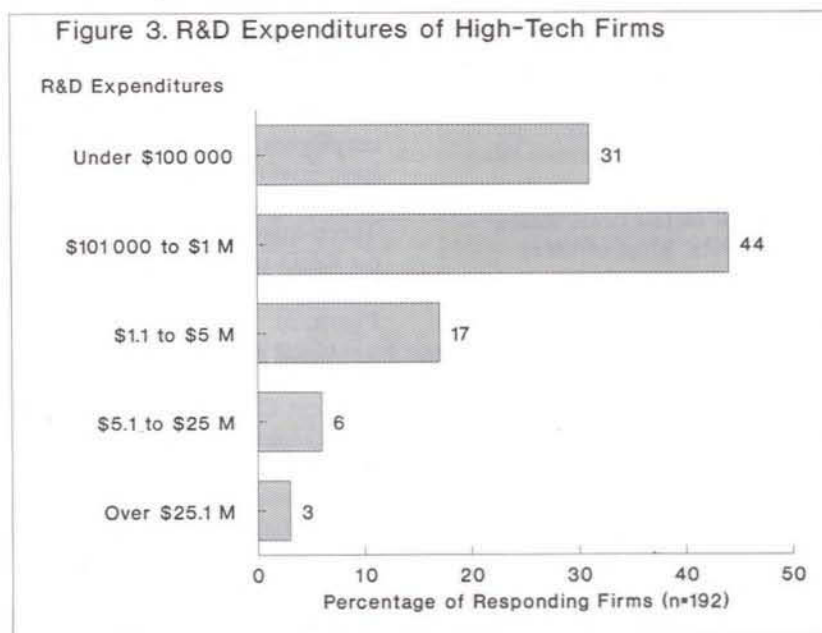
Forty firms reported earning \$71 million over the previous three years by licensing other firms to use their IPRs. More than 50 per cent use IPRs to acquire information. As would be expected, larger firms are more likely than smaller ones to use IPRs to acquire information.

Sixty-five per cent of the firms that considered "acquiring exclusivity in a product or service" as a corporate goal indicated that Canadian IPRs help them achieve this goal. Sixty-four per cent stated that Canadian IPRs help them maintain or increase their domestic market share.

Satisfaction

A higher percentage of firms in the high-technology sample (30 per cent) are dissatisfied with Canadian intellectual property laws than are satisfied (27 per cent). By sector, the dissatisfied firms are most likely to be in the software development (45 per cent), biotechnology (39 per cent), and chemical and chemical products industries (38 per cent). Least dissatisfied are firms in the aircraft and aircraft parts industries (7 per cent) and the primary resource industries (10 per cent).

Smaller firms (sales under \$5 million) are more inclined to be dissatisfied with Canadian IPRs than firms with sales over \$100 million



(39 per cent compared with 15 per cent). Firms are most dissatisfied with patents (34 per cent of total mentions) and copyrights (32 per cent).

A higher percentage of the firms satisfied with Canadian IPRs are satisfied with the terms of protection given and the subject matter than with the remedies, penalties or enforcement of the IPRs.

Among those firms dissatisfied with Canadian IPRs, the major reasons for their dissatisfaction are incomplete or insufficient protection, insufficient enforcement, and the delays and expense involved in acquiring protection. Forty-two per cent of these responses were from software development firms, primarily stating that there is insufficient or incomplete protection and insufficient enforcement of IPRs.

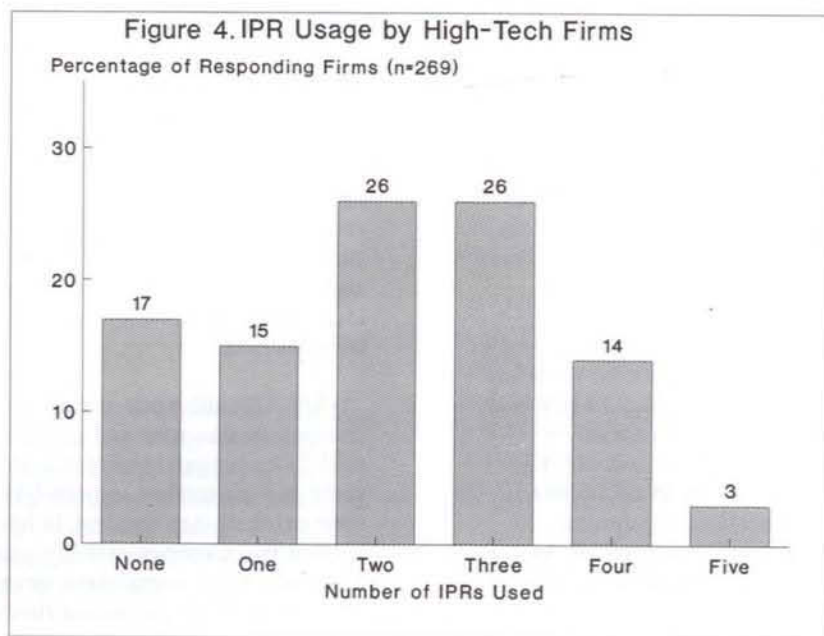
High levels of dissatisfaction were also expressed by biotechnology firms, who are inclined to think that new IP legislation is required. The concerns of the biotechnology industry were summed up by one survey respondent who said: "Canada needs life-form protection. My company might produce a gene that makes a certain plant variety resistant to disease, and the gene could then be used in other plants. At present, anyone can use this gene and

we don't receive anything. We compete with other countries but we don't receive the same protection. This has an impact on foreign investment."

Biotechnology firms were also the most likely to state that Canadian intellectual property laws discourage their Canadian R&D efforts (39 per cent). Firms in this sector indicated that they are severely hindered by the lack of IPR protection for plant breeders and biotechnology research in Canada. One respondent asked: "Why should Canadian firms spend time and money on R&D when the appropriate protection doesn't exist?" Some companies in communications equipment and software development also expressed concern about the effects of Canadian IP laws on their Canadian R&D efforts.

Many firms have concerns about the length of time required to obtain IP protection. A respondent from an electronics firm commented: "In electronics, changes happen so fast that products are obsolete within five years. Therefore, there is no use spending four years and lots of money to patent a product."

Many companies reported resorting to trade secrets and non-disclosure agreements to avoid the time delays and disclosure requirements of



patent applications. But firms were concerned about provincial variations in trade secrecy common law, the degree of protection it offers, and its enforceability. Several firms stated that the best solution would be legislation to impose stringent, national trade secrecy standards.

Forty-five per cent of high-technology firms feel that measures are needed to facilitate freer movement of products protected by IPRs in international trade. Thirty-five per cent feel measures are not needed and 20 per cent do not know.

Forty-six per cent of firms had obtained a licensing agreement from another company over the previous three years. Almost 68 per cent of firms with sales over \$100 million have licensing agreements, compared with 39 per cent of firms with sales under \$1 million. Most licensing agreements dealt with foreign products, services, or technologies and most royalty payments were made outside Canada. Sixty-three per cent of firms with licensing agreements were satisfied with the agreements and 7 per cent were not satisfied.

Thirty-one per cent of the high-technology firms stated that their IPRs had been infringed upon or violated in the previous three years in Canada. The highest level of infringements occurred in communications and other electronic equipment (63 per cent), primary resource industries (50 per cent), software development (40 per cent), and metal manufacturing (40 per cent). Firms in the aircraft and aircraft parts industries reported no infringements. Firms felt that infringements and violations are most serious for their patents and least serious for trademarks.

Sixty-five per cent of the firms that had experienced infringement of their IPRs believe that their domestic sales have decreased because of the violation. Twenty-eight firms reported that counterfeiting had caused losses in revenue totalling approximately \$10 million in 1987.

Approximately 40 per cent of the firms hold IPRs abroad. Of the firms exporting, 17 per cent have encountered problems or disincentives related to intellectual property protection. The industries that were most likely to encounter IP problems were communications equipment, biotechnology, and software development. Losses due to these problems by the eight firms able to

provide numbers were estimated to be over \$12 million in 1987.

Canadian firms are concerned about the protection of their IPRs in a wide range of foreign countries in Europe, Asia, and Latin America. For example, one respondent commented: "A firm would be crazy to register a patent in Mexico. It would be stolen immediately." Another firm reported that "with respect to the Pacific Rim, IPRs are not enforceable. Under most circumstances, the products are pirated immediately and the market tends to be flooded with cheaper products." Several firms stated that the solution is stronger international IP agreements.

Between 35 and 50 per cent of the firms reported that their imports embody IPRs. Most of these firms indicated that the IPR had not hindered or prevented them from importing.

Most firms (82 per cent) had not been involved in a court case concerning IPRs. Large firms, with sales over \$25 million, are more likely to have been involved in a court case than small firms, with sales under \$1 million (34 per cent as opposed to 8 per cent). The industries that appear to be involved in a court case most often are electrical and electronic products (including communications equipment) and chemicals and chemical products (including pharmaceuticals).

Of those firms that had been involved in a court case, the IPR at issue in the most recent case was usually a patent (51 per cent). The total cost of their most recent litigation for all 35 firms able to report costs was \$7 million.

Many firms were unhappy with the costs, complexity, and effectiveness of the legal system in enforcing their IPRs. For example, one survey respondent reported that his firm spent \$25,000 successfully suing a competitor that had copied and was selling his company's processing technology. But the infringing firm was penalized only \$10,000.

The IPR dilemma facing small high-tech companies was summed up by a respondent who said: "The biggest problem is protection. A patent gives you protection in principle, but it discloses your product step by step. It becomes public knowledge. Companies copy your patent, especially large companies, because they know you are powerless to prosecute them. If we were to

sue a large company, we would be in court for the rest of our life."

Another respondent commented that "the largest of the two companies in a dispute, whether they control the IPR or have infringed it, are usually at a tremendous advantage as they have more resources and can drag the case through the courts for a very long period of time. This usually forces the financially weaker firm to back down, and they may even be forced out of business."

Discussion of Survey Findings

IPR Usage

The Survey of Intellectual Property Rights in Canada provides strong evidence that IP plays an important role in the day-to-day operations of many Canadian companies. IP was used to the largest extent by high-tech, R&D-intensive companies, and to a lesser extent by firms in low-to medium-technology industries. As well, IP use is widely distributed across the country. The most obvious regional difference is that companies in Atlantic Canada tend to employ patents and industrial designs much less often than firms elsewhere in Canada. Regional differences in the use of other IPRs are less marked.

Nearly four-fifths of the surveyed companies had registered a patent, industrial design, or trademark or participated in some other specific IP-related activity over the previous three years. Close to one-quarter had granted another company a licence on an IP-protected good, service, or technology over the previous three years. More than a third of the respondents had entered into licensing agreements as the licensee over the same period.

In addition, over two-fifths of the survey respondents had obtained information contained in other firms' IPRs to improve their company's products and services, and over a quarter had been involved in some form of litigation revolving around IPRs, many of them in courts outside Canada.

The extensive use of IPRs is explained by the important role they play in achieving many key corporate goals. Canadian companies reported that IPRs are most critical in establishing and maintaining market position, and are also important to hiring qualified personnel, raising capital, and acquiring technology.

Satisfaction

A recurring theme throughout the Survey of Intellectual Property Rights in Canada and the association interviews conducted by CCAC was the growing costs of applying and enforcing IPRs. Many respondents are concerned that Canadian IP law and the evolving international IP system mainly serve the needs of multinationals and other large corporations and that small businesses and investors are being discouraged from using the intellectual property system.

This was borne out by the results of the company survey. The larger firms among the top R&D performers know more about IPRs, make more extensive use of them, and are more satisfied with the IP system than are the generally smaller firms in the high-tech sample. In fact, the high-tech firms are the most dissatisfied with Canada's IP system of any of the four groups surveyed (see Figure 5).

Satisfaction with the Canadian IP system also appears to have a regional dimension. Respondents in the Atlantic region and Quebec were the most likely (and those in Ontario the least likely) to express dissatisfaction with Canada's IP laws. An additional variable was Canadian ownership. On average, companies with majority Canadian ownership were less satisfied with Canadian IP laws than companies with majority foreign ownership. Foreign-owned companies tend to be larger and have better access to IP expertise, through either the Canadian offices or the foreign parent.

Industry associations interviewed by CCAC were also concerned that the GATT process and the international IP system largely respond to the interests of the multinational corporations based in the United States, Japan, and the European Community. The system, they feel, offers comparatively little and holds some dangers to smaller Canadian-owned businesses.

Respondents to both the company survey and the CCAC association interviews argued that smaller companies and groups do not have the financial resources required to support litigation and that, except for the largest patent infringement suits, the amounts involved generally are too small to justify an expensive civil suit.

Companies were asked about their experience with IP-related litigation. About 120 respondents

— one-sixth of the total sample — had been involved in a court case involving IPRs. About 40 per cent of these companies had been dissatisfied with the experience, for the most part because of the high costs and extensive time required. Respondents with no experience in the courts were asked whether they had considered launching or been threatened with legal action regarding IPRs. About 180 companies answered in the affirmative, with close to a third indicating they did not proceed because of the time and expense that would be involved. Therefore, about two-fifths of the total sample, and over one-half of the companies currently employing IPRs, have been involved with, threatened with, or considered an IP-related legal action.

Respondents to the company survey were also asked why they do not use IPRs to protect their innovations and creations. About one-quarter of the 200 or so people who answered this question indicated that the time and expense of using and enforcing IPRs discouraged them from using the IP protection system more often.

Smaller firms from all sectors indicated difficulty with the registry of IPRs. Common problems mentioned were the cost and time associated with registering and obtaining an intellectual property right. Smaller ventures in the high-tech field cited the growing cost of patenting as a major reason for the more frequent use of trade secrecy.

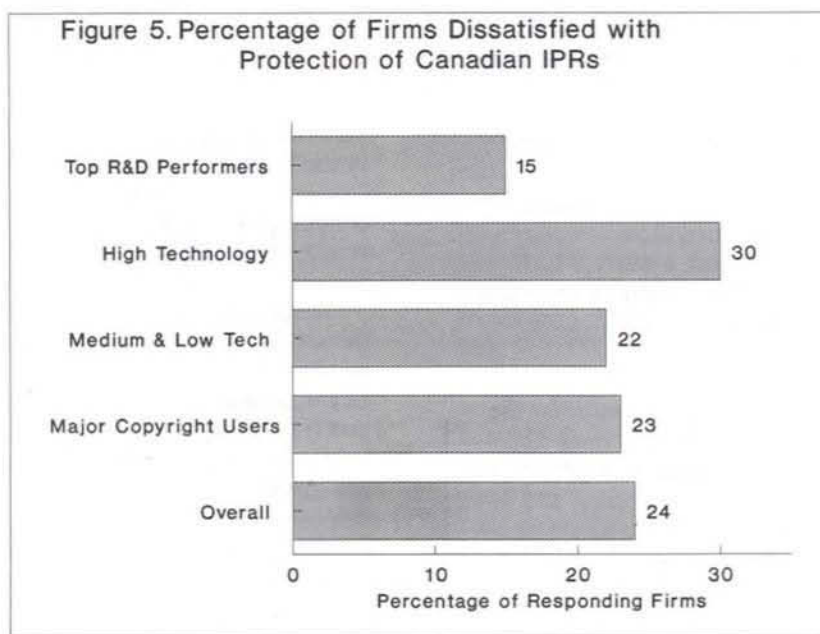
These findings pose a challenge to policy makers and legislators to ensure the IP system is relevant, fair, and affordable to all client groups.

One solution suggested by respondents is to cover commercial counterfeiting, piracy, and copyright infringement in the Criminal Code. This, it is claimed, would send a clear signal to abusers that the intellectual property rights of even small firms will be upheld and infringers will be prosecuted.

IPR Infringements

Many difficulties with IPR infringement were reported. Between 31 and 40 per cent of the firms in the four groups believed their IPRs had been violated or infringed upon in the previous three years. To a large degree, firms attributed the infringements to poor enforcement and a lack of remedies and penalties.

A high proportion of firms in all four groups felt that infringements and violations were quite serious. Among firms in high-technology industries, the generally smaller high-technology firms were significantly more concerned about infringements than were the top R&D performers for all types of IPRs except trademarks (see Figure 6). This is in line with the high-tech group's comparatively high dissatisfaction with the IP system as a whole.



Of the 54 firms able to estimate losses, the total amount reported was \$104 million. In the high-technology category, 30 firms reported total losses of \$10 million in 1987. When extrapolated to the total population, this is estimated to represent losses of between \$45 and \$70 million for all high-technology firms in Canada.

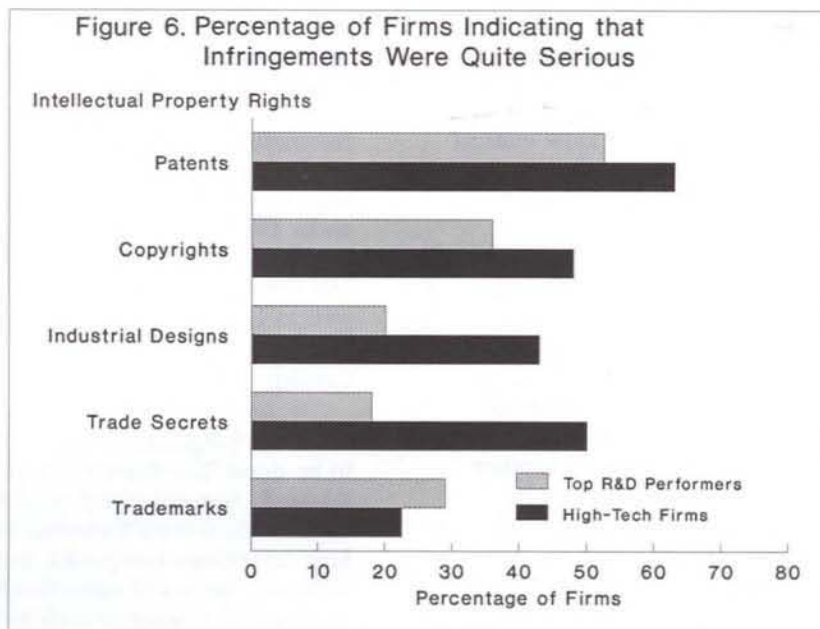
Canadian firms have relatively few difficulties protecting their IPRs in foreign countries. Only 61 of the 424 companies currently exporting (less than 15 per cent) reported problems with infringements of their IPRs in export markets, and only 16 companies (less than 4 per cent) reported losses in revenues because of problems involving their IPRs abroad.

Overall, problems with counterfeiting and piracy seem less widespread in Canada than in many other developed countries, although they are still serious for some Canadian companies. Based on the company survey and its industry association interviews, CCAC estimates that Canadian economic losses from IP infringements in both the domestic and international markets are a small fraction, probably less than 3 per cent, of those reported in the United States. Moreover, only a minor portion of the Canadian losses appear to be trade-related.

Need for More IP Information

Both the Survey of Intellectual Property Rights in Canada and the CCAC interviews confirmed that a broad cross-section of industries, companies, and research groups throughout Canada are highly interested in intellectual property. However, except among IP practitioners, knowledge of IP and understanding of its implications for Canadian R&D, trade, industrial performance, and competitiveness are limited, even among some high-tech industries that heavily use intellectual property. Knowledge of IP appears to be particularly limited outside central Canada.

Lack of awareness can be a significant impediment to effective use of IP statutes. Respondents commented on the need for a major public information program to make creators and users of intellectual property, as well as the general public, better aware of IP law, of the importance of intellectual property to the Canadian economy, of how to prepare licensing and technology transfer agreements, and of other commercial aspects of the IP system.



5. Conclusion

As Canada builds a knowledge-intensive economy, intellectual property is becoming a more demanding management responsibility within firms and a more challenging issue for government policy makers. Expanding exports of high-technology products will make our producers more vulnerable to the intellectual property laws and enforcement measures of competing countries. Canadians must learn how to use IPRs to generate wealth and commercial advantage in the best interests of us all.

Behind the current international jousting over intellectual property is a long history of clashes over fundamental ethical and economic issues. IPR owners have always insisted that protection for their inventions provides the economic incentive to innovate. Their opponents contend that IPRs create monopolies that inhibit competition and raise prices for consumers. No one is certain where the balance should be struck to encourage innovation while making sure that IPRs benefit as many people as possible.

A chief concern, particularly among developing countries, is that the present international movement to strengthen IPRs may cause the intellectual property system to become unbalanced. These countries fear that, rather than spurring innovation by allowing creators to reap the rewards of their creations, IPRs may become a tool to stifle innovation and limit competition. As a small country, highly dependent on trade and imported technologies, Canada has a keen interest in addressing these concerns so that effective and productive international IP agreements can be reached.

On the domestic front, the number of small and medium-sized technology-based firms has grown rapidly.³⁰ These are the firms on which Canada must rely to translate ideas and concepts into new, tradable products and services. Small and medium-sized technology-based firms are often good at innovation but less able to capture the ensuing wealth. Whether these companies profit from their innovations and contribute to Canadian economic development depends, to a significant degree, on effective Canadian IPRs and international IP agreements. When their technology is well protected, firms have a broad

range of choices to develop and market their innovations. They can do it themselves; they can license their technology; or they can enter into strategic partnerships with other firms, usually much larger ones that have complementary assets in such areas as marketing, specialized manufacturing, distribution, and after-sales support.

National IP policy must be formed in close consultation with industry and must reflect emerging industry attitudes and practices. It must balance the interests of importers, consumers, and IP users, who want continued access to inexpensive goods and technologies, with those of Canadian producers and exporters, who require protection from unfair competition.

Substantial progress has been made. For example, in the spring of 1988, the Minister of Consumer and Corporate Affairs Canada established the Intellectual Property Advisory Committee (IPAC). IPAC consists of representatives from key business, legal, university, and consumer groups involved in intellectual property rights. The Committee provides advice to the federal government concerning revisions to Canada's IP statutes and is working closely with the government in developing a Canadian intellectual property strategy. In addition, CCAC's Intellectual Property Directorate is being automated to facilitate access to technological information contained in patents and other IPRs. Internationally, Canada is an active supporter and participant in multilateral discussions and negotiations related to intellectual property held under the auspices of the Organisation for Economic Co-operation and Development and the UN Conference on Trade and Development, as well as GATT and WIPO.

Looking Ahead

Although progress has been made, much remains to be done. The Survey of Intellectual Property Rights in Canada revealed substantial dissatisfaction with Canadian IP laws among high-technology companies, particularly small high-tech firms and those involved in the most advanced technologies such as software development and biotechnology. Many

respondents also felt that a major IP public information campaign is required.

Some of the major policy issues arising from this discussion paper and warranting public debate are:

- Should Canadian industries and the federal government accelerate their efforts to develop IP policies and practices?
- Should the federal government, perhaps jointly through the departments of Industry, Science and Technology and Consumer and Corporate Affairs, mount a major public IP information program? Should better access be provided to the technological information contained in IP information files held by government?
- Should the federal government introduce an easy to acquire, short-term form of IP protection?
- Should the federal government amend the Patent Act or seek alternative forms of IPRs in order to provide full IP protection to biotechnology products and processes (i.e., life forms)?
- Should the federal government and the provinces work together to develop more effective and uniform national trade secrecy standards?
- Under what circumstances, if any, should Canadian universities retain ownership of IP arising from research sponsored by industry?
- Should the federal government actively support and promote the strengthening of international IP agreements?
- Should the federal government adopt stronger measures to restrain commercial counterfeiting, piracy, and copyright infringement?

Intellectual property rights have become an essential part of policies and strategies designed to enhance Canadian competitiveness in the emerging knowledge-based, international economy. Canadian policy makers and Canadian firms must develop the expertise to address increasingly important and complex national and international intellectual property issues. There is now a broad consensus that Canada can compete

internationally only if we leverage our resources and expertise through close cooperation among governments, industry, and the research and development community. Similar collaboration is required for effective IP policies, practices, and legislation.

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