ORGANIZATIONAL STRUCTURES AND PRACTICES USED IN THE MANAGEMENT OF INTELLECTUAL PROPERTY IN SCIENCE-BASED ORGANIZATIONS WITH GEOGRAPHICALLY SEPARATED RESEARCH CENTRES

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INTRODUCTION

The effective management of intellectual property (IP) is an important aspect of the total technological innovation management process. In order that organizations obtain the maximum benefit from their investment in R&D, they must be diligent in identifying potentially valuable IP when it is developed; evaluating it in order to determine the appropriate form legal protection should take, and, in the case of IP that is to be licensed, identifying suitable licensees and negotiating a mutually acceptable license. The IP originating organization must also be on the alert for other organizations making unauthorized use of their protected IP and be prepared to challenge them, in the courts, if necessary.

The management of IP assets is big business. In 1996, U.S. private and public sector organizations and individuals received $136 billion in revenues from all classes of intellectual property. In the same year, Canada paid U.S. organizations $1.416 billion in license fees and royalty payments, while receiving $192 million in return (Degnan, 1998). Rivette and Kline (2000) report that IBM earns approximately $1 billion per year in license royalties, Lucent earns several hundred million dollars per year and Texas Instruments approximately $800 million per year.

The IP management process is made even more complicated when an organization has many IP generating units across the country or around the world. Does the organization centralize the IP management process in its headquarters, does it leave it to the individual business units, or does it use some managerial process in between total centralization and total decentralization?

The purpose of this study was to determine how a limited number of large public and private sector R&D-based organizations manage the question of centralization vs. decentralization of IP management and the organizational structures and procedures they have established to manage their intellectual property effectively across geographical distances.

METHODOLOGY

Companies and foreign government departments were approached either by telephone or through personal contact during a meeting of the Licensing Executives Society in Kananaskis, Alberta in late June to determine their interest in taking part in this study. If they indicated interest, they were provided with a list of questions that was to form the basis of a one hour telephone interview (See Appendix A). A follow-up phone call was made to determine whether they were still interested in taking part, and if they were, a time was set up for the telephone interview. Of the eleven companies initially approached, four declined to take part. All of the government departments contacted cooperated.

All the companies requested anonymity. All are large multinational science- or technology-based firms, headquartered in either Canada or the U.S., with large IP management operations. The combined annual sales of these seven companies is approximately $240 billion and they employ over 770 thousand people worldwide. Their annual R&D expenditures are estimated to total approximately $19 billion and they have 160 R&D sites around the world. Business lines include consumer and industrial chemicals; household, agricultural, and construction products; computer hardware and software; plastics, office equipment, and telecommunications hardware and software.

The government departments that participated are the National Institutes of Health (NIH), the U.S. Department of Energy (DOE), the U.S. Department of Agriculture (USDA) and the U.K. Department for Environment, Food and Rural Affairs (DEFRA).

LITERATURE REVIEW

> "Intellectual property is the "dark matter" of the corporate universe: unobserved or ignored; undervalued yet full of potential worth" - Bratic, et al, 1998

While there are numerous articles concerned with best practices in the transfer of technology from government laboratories to industry (Clarke, 1996a, b & 1997), the literature on the patenting and licensing activities of organizations is much more limited. A report by the U.S. General Accounting Office (1999) provides some statistics on the licensing practices of six federal agencies (NIH, Army, Navy, Airforce, DOEnergy and NASA). These indicate that 73% of the licenses issued are non-exclusive, 60% go to small businesses and between 1996 to 1998, IP revenues totalled $107,460,998. million. The National Institutes of Health accounted for 95.1% of the total revenues and for 70% of the licenses granted.

A review of IP management organization in Japanese companies in the early 1990s, describes the following ways in which IP activities can be organized (Granstrand, 2000):

- IP activities centralized in headquarters;
- decentralized to individual business units, or foreign subsidiaries;
- IP activities assigned to one business unit with corporate-wide responsibilities;
- organized as an independent IP business unit in the corporation; and
- contracted out to one or more third party organizations that specialize in IP management.

Granstrand notes that organizing the IP operation as a profit centre or business unit was not common practice.

The patent organizations in the large Japanese firms shared the following common features:

- resources assigned to IP activities were generous compared to their Western counterparts;
- a centralized patent department at the corporate level with corporate-wide responsibilities for patent coordination;
- IP department and IP issues were considered a strategic part of the business planning process;
- IP department was an active clearing house for technical information and conducted IP related competitive intelligence activities;
- patenting department and the R&D department worked at having a good relationship;
- patenting people were brought in early in the R&D process (i.e., at the R&D project selection stage);
- patent management was pro-active rather than passively responding to requests from the business units or R&D; and

- there was a patent culture within the organizations.

Granstrand identified the following management factors as supporting the creation of a patent culture. These were:

- top management involvement;
- patenting made a concern of all technical staff;
- patent policies and strategies integrated into business plans;
- having clear patent objectives (e.g., 100 strategic patents per year);
- the existence of clear patenting incentives/rewards to R&D personnel (e.g., cash awards to person who files the most patents);
- fostering behaviours that reinforce the importance of IP such as encouraging technical staff to read patent specifications in addition to journal articles, and aligning the report writing on R&D work to the norms and standards used in patent documents;
- having patent liaison personnel distributed throughout the organization; and
- having patent strategy seminars.

He also noted that several firms had quite elaborate training programs for their technical and IP management staff.

In a benchmarking study of 21 U.S. companies, Ransley and Gaffney (1997) identified certain practices that appeared to add value to the IP management process. They would not go as far as calling these “best practices” as they noted that some firms that did not adopt a particular best practice could be as successful at managing their IP as one that did. Among the “value added” practices identified were:

- explicit consideration of IP in the organization’s business plan;
- using patenting intermediaries who meet with the scientists to assist them in identifying IP and preparing patent disclosures; perform or arrange prior art searches, participate in disclosure evaluation meetings, and train/advise the scientists on IP management issues;

- using patent committees to evaluate and prioritize invention disclosures, and to determine foreign filing and maintenance issues;
- considering IP issues at the R&D project selection stage, and at other stages of the new product development process;
- locating patent agents/attorneys close to the R&D activity;
- reliance on in-house patent attorneys, with outside attorneys being used only as necessary;
- rewarding staff for patent infringement detection;
- existence of a IP reward and/or recognition process; and
- provision of training in IP management to bench level scientific personnel.

They noted that most of the companies interviewed made little use of IP factors in their competitive intelligence activities. This is in contrast to Granstrand's findings in his study of Japanese companies.

Some firms have integrated their strategic planning process with their IP management process and in doing so have tightened the link between R&D program managers and the R&D project selection and evaluation process, and the IP management process. Germeraad and Morrison (1998) describe the way in which Avery Dennison has incorporated the consideration of IP issues into their new product development process.

A review of strategic management of IP, Bratic, Rouse and Vollmar (1998) also argue for IP management to be fully integrated into the business plans of an organization. "To be sustainable and relevant, any IP asset-management system must be integral to all the processes that make up the business".

A recent phenomenon, is the use of the internet to advertise the existence of technology available for licensing. Even large firms that have extensive web-sites of their own are making use of third party licensing exchanges. Some of these web-sites are listed in the short article on technology licensing exchanges, (Bauman, 2000).

In a review of IP management practices of major U.S. companies, Rivette and Kline (2000) note that Xerox has centralized its intellectual property management activities in a "Xerox Intellectual Property Operations" unit which has profit and loss

responsibility for managing the company's patent portfolio. They also note that patent decisions are now taken early in the R&D management process to avoid finding out too late, after considerable funds have been spent, that a competitor holds some key patents that are needed to exploit a line of research. Patents at Xerox are no longer considered the property of the originating business unit, but are regarded as assets of the corporation, as a whole. Xerox has also taken a more aggressive stand against infringers. The authors point out that Lucent has also adopted a similar centralized approach to IP asset management. Nortel Networks also has a centralized IP management process which deals with licensing.

Glenn Tautrims and Don Drinkwater of Price Waterhouse Coopers, in their presentation to the Licensing Executives Society meeting in June of 2001, describe the intellectual property management process model developed by DOW Chemical in 1992/93. Based on six competencies, they believe it was the first model to imply collaboration between business/finance, technology and legal areas of a firm. The competencies are:

- strategy
- competitive assessment
- classification of IP assets
- valuation of IP
- investment
- portfolio management

A new book published in late June, 2001 entitled, "Edison in the Boardroom" by J.L. Davis and Suzanne Harrison (Wiley/Anderson Series on Intellectual Property), provides additional information on DOW Chemical's IP operations.

OVERVIEW OF GOVERNMENT IP MANAGEMENT STRUCTURE

Departmental IP Strategy

In the government departments and agencies, the development of the overall IP strategy is a headquarter's operation, usually in a central IP management office. The USDA and NIH indicated that their laboratories had significant input to the strategy development process.

Competitive Intelligence Activities

None of the government respondents indicated that they conducted any competitive intelligence gathering activities of note.

IP Disclosure and Protection Process

FACTORS	USDA	NIH	DOE**	DEFRA
Central IP Management Office	Office of Technology Transfer handles patenting, marketing and licensing	Office of Technology Transfer handles both patenting and licensing	Yes; handles both patenting and licensing of government-owned IP	Yes, but only deals with IP policy/strategy development, and evaluation of contractor's IP disclosures
On-site Patent Advisor(s)	No; use regionally based advisors	Yes, Technology Development Coordinator office staff	Yes, with support from an attorney located in a field office	Yes, in local business units
Initial Evaluation of Patent Disclosures	Regional Patent Advisor	Institute Patent Review Committee and the OTT review committee	Locally assigned patent attorney	Local patent agent
Decision on Whether to Patent	Patent Review Committee*	Institute Patent Review Committee recommends to Institute management	Locally assigned patent attorney in consultation with local management	Local patent agent
Decision on Type and Breadth of Patent	Regional Patent Advisor and/or Patent Review Committee	Institute Management with input from the OTT	Made in the office of the General Counsel	Local patent agent
Payment of Initial Cost of Patent Protection	Inventor's management unit	Institute	Central office	Local laboratory
Payment of Maintenance Costs	OTT	Institute	Central office	Local laboratory

FACTORS	USDA	NIH	DOE**	DEFRA
Patent Filing Done By:	OTT	Locally hired agents	Central office	Local patent agent
Mainly In-house Patent Lawyers or Agents Used?	Yes; only the OTT can decide to use outside help	No	No, about half of the patents prepared by outside counsel	No
Costs of IP Protection Covered By IP Revenues?	Only 60%	Yes, in some of the Institutes	No	Unknown

* Technically can only recommend to the OTT, however their decision is rarely disputed.
** Information refers to DOE's government owned, government operated laboratories

Government inventors, as a condition of employment, assign their rights in any IP they develop to their employing agency.

The usual first step in the IP process is for the scientist (inventor), usually with some input from a patent advisor or attorney, or a knowledgeable research manager, to prepare an invention disclosure form (IDF) for formal evaluation or assessment. The NIH Institutes and the DOE laboratories have on-site IP/technology transfer staff who can both assist the inventor in preparing the IDF, or identify potentially valuable IP that might have been missed by the scientific staff. Having people on-site was considered to be an important element in the IP disclosure process. One respondent stated that "it is very important that your technology transfer office should not be too separate from the labs". Another respondent commented that walking around and talking to the scientists is "absolutely the number one way to keep the inventors happy and get invention disclosures. You cannot just have a central office a thousand miles away and expect to get the same attention". The USDA and DEFRA have staff located nearby who can be called in as necessary. The USDA patenting staff also visit their assigned laboratories on a regular basis to meet with the scientists.

Without exception, the decision on whether or not to patent a particular IP is made at the local business unit or laboratory level, although in the USDA, the Office of Technology Transfer is the final authority. The USDA and NIH use patent/disclosure review committees. The decision to patent is usually based on both technical and business criteria. The DOE and DEFRA rely more on a locally assigned patent attorney or patent agent.

The preparation and filing of a patent is more complicated. In the USDA, the patent activity is done by the locally assigned patent lawyer who works out of a regional

office. In the NIH the process is a headquarters activity, while in the DOE a local patent official prepares the patent, but headquarters files it. It appears in DEFRA that the patenting activity is a local laboratory responsibility.

The payment of the costs of IP protection is also not straightforward. In the USDA, the originating laboratory pays the initial filing costs, but their OTT pays all other IP expenses; in the NIH, the Institute's Technology Development office pays,(i.e. the money does not come out of the originating laboratory's budget); in the DOE, the central office pays, while in DEFRA it appears to be a research laboratory expense. NIH respondents believed that it was important that the IP patent expenses not be drawn from the laboratories budget. One said, "We wouldn't want to have a situation where a promising technology was not patented because of a lack of budget at the lab level" while another stated, "We never pull it (patent expenses) from the lab budget. That would be a disincentive".

Several respondents noted that their ability to file for foreign patent protection is somewhat limited by their budgets and they try to get a private sector licensee to help out with those expenses.

It appears that the revenues from IP cover the expenses of the IP operations in only some of the Institutes of the NIH. It should be noted, however, that obtaining revenues is not the sole reason for spending money on patent protection. Safe-guarding the tax payers' rights in a technology, even if it is not revenue generating, is a legitimate expense.

IP Marketing and Licensing

	USDA	NIH	DOE**	DEFRA
Licensing Strategy Determined By:	OTT	OTT	Local laboratory management	Laboratory's business unit
Marketing Done By:	OTT	OTT	Local laboratory management	Laboratory's business unit
Costs of Marketing are Responsibility of:	OTT	OTT with a charge back to the Institutes	Local laboratory	Laboratory
Marketing Budget	OTT budget	OTT budget	Laboratory budget	Laboratory budget

The agencies interviewed do not appear to have a common approach to marketing and licensing of their IP. In the USDA and NIH, these activities are handled

centrally, while in the DOE and DEFRA these activities are handled at the local level. DOE headquarters will handle the marketing and licensing activities of any government-owned IP that comes out of their contractor operated laboratories. They will also handle these activities for a DOE laboratory that requests their assistance.

Distribution of IP Revenues

	USDA	NIH	DOE	DEFRA
Revenues Shared With Originating Labs	No	Yes; at least to the originating Institute, if not the lab	Yes	Yes
Revenues Shared With Inventors	Yes, as per government law	Yes, as per government law	Yes, as per government law	Yes, but poorly managed or understood
Other IP Recognition Programs	Yes	Unknown	Yes	Unknown
Decision on IP Revenue Sharing to Inventor(s)	Automatic, if IP revenues earned, awards must be made	Automatic, if IP revenues earned, awards must be made	Automatic, if IP revenues earned, awards must be made	Local laboratory management
IP Revenues Continue to the Estate of Inventor(s) on Their Death	Yes	Yes	Yes	Yes

The USDA is the only US government agency interviewed that does not appear to return any of the IP revenues to the originating laboratory, other than the payment to the inventor.

The DEFRA respondent did not think their reward system for their inventors was adequate but did not provide any details.

U.S. laboratories are under a legal requirement to pay at least the first $2,000 in IP revenues to the inventor, plus 15% of the balance until a ceiling of $150,000 has been reached. The initial $2,000 is usually shared among the inventors in a multi-inventor situation while each of the inventors can receive monies up to legal maximum. The inventor's share is paid out before any expenses are deducted.

In practice, the actual rate used to pay the inventor's portion differs among the organizations. The USDA uses a rate of 25% and the DOE uses 15%. The Institutes of the NIH each has its own formula, which appears to be dependent on how lucrative the IP revenues are. At the National Cancer Institute, after the first $2,000. in IP revenues, the rate is 15% from $2,000 to $50,000. and 25% thereafter. At the NGRI a 15% rate is used after the first $2,000. NIAD which has considerable IP revenues, awards $2,000. to each of the inventors, and 25% after that.

In some of the NIH Institutes, there is an informal process of sharing IP revenues with key contributors who helped in the development of the IP.

One NIH Institute interviewee mentioned the importance of obtaining agreement among multiple inventors on the distribution of any future royalties at the disclosure stage or soon after. Agreement is much more difficult to obtain once IP revenues start being generated, which can be many years later.

A key difference between Canada and the U.S. is that in the U.S., on the death of the inventor, IP revenues continue to the inventor's estate. In Canada, government policy is that the payments to the inventor(s) cease on their death. DEFRA appears to follow the U.S. practice.

A unique aspect of UK government agencies is that they are allowed to take an equity position in lieu of royalty payments. Government scientists can also receive equity. Taking equity is not allowed in the U.S. government agencies studied.

Support For and Monitoring the Licensee

	USDA	NIH	DOE**	DEFRA
Technical Support Available to Licensee	Yes	Some limited support	Some limited support	Yes
Marketing Support Available to Licensee	Yes, but only to confirm validity of the science	No	Unknown	Unknown
Extra Charges for Support?	Yes, but only to cover out-of-pocket travel expenses; cannot charge consulting fees	Yes, but only to cover out-of-pocket travel expenses	Unknown	Unknown

	USDA	NIH	DOE**	DEFRA
Technical Support Available to Licensee	Yes	Some limited support	Some limited support	Yes
Main Monitoring Tool	Person assigned to monitor licensees; Review of exploitation reports	Done by the OTT in a 3-4 person monitoring group Audits by independent consulting firms	License originator reviews exploitation reports provided by the licensee	Review of licensee's report
Level of Monitoring Effort	Approximately 5% of their IP effort	Adequate	Unknown	Low
Use of Special IP Tracking Software	Yes, but looking for better software	Yes	Yes	Yes

Both the USDA and the NIH have people in their offices of technology transfer who monitor their licensees. On occasion, the NIH will hire a consulting firm to do an audit of a licensee's books.

In the DOE, whoever issues the license (e.g., HQ or the laboratory) is responsible for monitoring the license. This also appears to be the policy at DEFRA.

IP Management Training

	USDA	NIH	DOE	DEFRA
Importance of IP Management Conveyed by:	Technology Transfer Coordinators and Patent Advisors provide seminars	Senior management	Educational programs	Part of the laboratory's mission statement
Form of IP Management Training	Workshops Monthly conference calls	TDC personnel put on training sessions Web-based training program	Local patent attorney conducts training sessions	Presentations to staff

	USDA	NIH	DOE	DEFRA
Importance of IP Management Conveyed by:	Technology Transfer Coordinators and Patent Advisors provide seminars	Senior management	Educational programs	Part of the laboratory's mission statement
Responsibility for Training	OTT	Institute's TDC	HQ for the patent attorneys and patent liaison personnel, local lab for their scientists	Local laboratory
Responsibility for Training Expenses	OTT	Institute's TDC	HQ for patenting personnel, local lab for their scientists	Local laboratory

All of the government agencies studied have formal or informal programs in place to educate their staff on the importance of IP management. Local or on-site patent or technology transfer personnel give talks or seminars on IP management. The NIH has just developed an intranet course for their personnel. In the USDA and the NIH, the costs of training come from central or institute funds, not from laboratory funds.

OVERVIEW OF COMPANY IP MANAGEMENT STRUCTURE

All the companies interviewed have operations in North America and Europe, and have extensive IP management operations. As noted earlier, all requested anonymity.

All the firms have a centralized IP management office. With the exception of two companies whose HQ operation only looked after licensing, the central offices of the other firms looked after both patent and licensing activities. In one case, the IP office was located in a separate business unit.

The firms rely mainly on in-house patent attorneys and agents, and only use external attorneys in special circumstances (e.g., specialized area or work overload situation).

IP Strategy

With one exception, respondents stated that corporate IP strategy is developed in a centralized headquarters operation. Many of the business units have the freedom to interpret the strategy in a way that more accurately reflects their line of business.

Competitive Intelligence Activities

Factors	A	B	C	D	E	F
Competitive Intelligence Conducted	Yes	Yes	Yes	Yes	Yes	Yes
Who Does It?	HQ Licensing Group	Bus. units	HQ/Bus. units	HQ/Bus. units	Bus. unit	Bus. units with HQ support
Intelligence Is Used To:	Avoid infringing on other firm's patents; Avoid wasting R&D resources	Identify new product opportunities, barriers to patenting and infringers	Identify new commercial opportunities	Identify new opportunities, market direction and competitor's actions	Identify new opportunities; benchmark their performance against competitor	Plan R&D; Identify new markets

Unlike their government colleagues, all of the firms interviewed conduct competitive intelligence activities. As one interviewee stated, "I can't imagine a business of any size, that intends to remain in business of any size, not doing it". These activities appear to be conducted at two levels: headquarters conducts CI activities of a general interest to the whole organization, while the business units conduct more focussed CI activities of direct interest to them. Even when the business unit took the lead in CI activities, the HQs in many of the firms provide assistance.

The main uses of the intelligence gathered are to direct R&D efforts into less chartered areas (i.e., avoid having to abandon a line of research because of patenting barriers after a considerable resources have been invested), identify new product opportunities or market directions, and detect infringers.

IP Disclosure and Protection Process

Factor	A	B	C	D	E	F	G
Central IP Management Office	Yes	Yes	Yes, but not in HQ	Yes	Yes	Yes, for licensing	Yes, for licensing
On-site Patent Advisors	Yes, and Patent attorney assigned	Yes	Yes	Yes	No	Yes, in one bus. unit	Yes
Initial Evaluation of Patent Disclosures	Local Patent Review Committee	Local Patent Review Team	Local Patent Review Team	Local Patent Review Team	NPD ** business team	Patent attorney	Local manage-ment
Decision on Whether to Patent	HQ, with input from a more senior Patent Review Committee	Local Patent Review Team	Local Patent Review Team	Local Patent Review Team	HQ-assigne d patent attorney	Local Patent Review Team	Local manage-ment*
Decision on Type and Breadth of Patent	Senior Patent Review Committee	Local Patent Review Team	Local Patent Review Team with advice from HQ	Second level patent review team	Bus. unit	Local Patent Review Team	Local manage-ment*
Payment of Initial Cost of Patent Protection	HQ	Bus. unit#	HQ##	Bus. units in U.S, HQ other-wise	Bus. unit	Bus. unit	Local business unit
Payment of Maintenance Costs	HQ	Bus. unit	HQ##	HQ##	Bus. unit	Bus. unit	Local business unit
Patent Filing Done By:	HQ	HQ assigne d patent attorney	HQ assigne d patent attorney	HQ	HQ patent attorney	HQ patent attorney	Local business unit
In-house Patent Lawyers or Agents Used?	Yes	Yes	Yes	Mostly	Mostly	Yes	NA
Costs of IP Protection Covered By IP Revenues?	NA	NA	Not all	Yes	Yes	Yes	NA

* A process is in place to guide the local managers
** The New Product Development Team is responsible for managing the IP throughout the NPD process.
# There are some HQ funds available if business unit unwilling to patent an embryonic technology
Initially HQ pays, but the costs are charged back to the business unit

Company inventors, as a condition of employment, assign their rights to any IP they develop to their employer.

Six of the seven companies stated that they have “patent liaison” type personnel on-site in their business units. This should not be interpreted to mean that they have these people in each of their laboratories. One of the major roles of the patent liaison personnel is to walk around and meet with the bench level people and encourage disclosure, or spot IP that should enter the disclosure system. They are also available to answer questions about the patentability of a technology.

In six of the firms, the decision on whether to patent is made by a special “patent review team” or IP personnel; while in the seventh, the decision is made by a business team assigned to a specific new product project. In one company, as one business unit was not very prolific in generating IP, the decision on patenting is made by a senior technical manager. With one exception, the final decision on what to patent is made at the business unit level. In the case of the exception, a local patent review team makes the initial assessment and then makes recommendations to a HQ patent review team for final determination.

Usually the patent or business review team also decides on the breadth of the patent. In one firm, however, this decision is made by a group of patent management personnel who reported to HQ.

Ultimately, all of the business units pay the costs of IP protection either directly or through a “charge-back” tax system. Four of the companies have their business units pay for their patent protection although one of these pay the patent maintenance costs from a HQ budget. One company pays the IP protection costs for their foreign operations from HQ.

One respondent did voice some concern that the business units will not protect their IP adequately because patent costs must now come out of their operational budgets. He felt that this was an educational issue to make sure their managers understood the importance of protecting IP. Another noted that his firm is being very aggressive about trimming the costs of foreign maintenance fees. Their legal department has developed a set of criteria to help the business units determine the foreign countries in which to file.

While most of the firms have some kind of computer-based data base that generally kept IP personnel around the country/world apprised of IP disclosures and patents, one firm has a special process for avoiding conflicts among its separate business units. This firm has a special "***Central Patent Board***", comprised of representatives of every business unit, whose only purpose was to avoid one business unit undertaking some action that would be deleterious to another. Before a business unit makes any binding legal agreement or files a patent, the local representative would have to post their intended action on an intranet "bulletin board" for all of the members of the Board to see. If a member thought that the intended action would have a deleterious impact on the operations of its business unit, the member would post their objections on the web-site, again for everyone to see. The discussion about the intended action would then continue off-line between the two members (e.g., telephone, visits, etc.). This Board does not make any decisions on whether to patent; that is still a business unit decision. The Board just flags potential conflict problems.

Three of the firms stated that their IP revenues exceeded their costs; three did not comment. One firm stated that they receive much more "revenue" from their donations of IP to universities and other organizations than they do from license revenues.

IP Marketing and Licensing

Factor	A	B	C	D	E	F	G
Licensing Strategy Determined By:	HQ	HQ/Bus. unit	HQ/bus. unit	HQ	HQ service available to bus. units	HQ	HQ
Marketing Done By:	HQ	Bus. unit	HQ/bus. unit	HQ with input from bus. unit	HQ service unit	HQ	HQ
Costs of Marketing are Responsibility of:	HQ	Bus. unit	HQ/bus. unit	HQ	HQ, if they do it	HQ	HQ
Dedicated Marketing Budget	Yes	Yes	Yes	Yes	Yes	Yes	Yes

There was much more uniformity in licensing. All seven firms claimed that the licensing activity is, for the most part, a headquarters function although in several firms the business units could conduct licensing activities if they chose to do so.

One of the centralized marketing and licensing groups provides IP audit services to the business units, as well as IP educational services.

The headquarters licensing group pays the costs of any licensing that it does, otherwise it is a business unit expense.

While several of the firms have systems in place to inform IP personnel in all their geographically separated business units about disclosures and licenses, one firm is much more guarded. The license status of a technology is not shared with either the originating business unit or even the inventor.

Marketing is not as uniform. In one firm marketing IP is a business unit activity. In two others, the decision to use the central marketing services is made by the business unit. If the business unit decides to market the IP itself, then it is responsible for any costs. In another firm the marketing activity and associated costs are the responsibility of the business unit even though licensing is a headquarters activity.

Distribution of IP Revenues

Factor	A	B	C	D	E	F	G
Revenues Shared with Originating Business Unit	No	Some bus. units, not all	Yes	Yes	Yes	No	Yes
Non-Revenue Sharing Recognition Programs	Yes, Cash awards, dinners, patent plaque	Yes, Inventor's lunch; token gifts, patent plaque	None mentioned	Awards on filing and issue of a patent; Lunch	Inventor club Token gifts; patent plaques	None mentioned	Awards on filing and issue; and for multiple patents; plaques
Decision on IP Awards	On patent filing	Bus. unit	Bus. unit	Bus. unit	Bus. unit	NA	HQ on significant awards

None of the companies has a "royalty-based" reward scheme for its inventors.

Most mentioned having some kind of non-monetary reward process such as award dinners or lunches, presentation of a framed patent plaque or membership in a prestigious inventors club (one firm). A few firms give small cash awards. Decisions on awards is a business unit decision.

The number of patents generated by personnel is usually taken into account during their performance appraisal and is used to determine salaries or bonuses. One company has special awards for inventors with multiple patents.

One respondent whose firm does not have any special inventor rewards commented that "to only recognize the inventor leaves out a lot of people". He stated that their reward system tries to identify everyone who has made a significant contribution to the final outcome and reward them through the salary system.

Four of the firms have the bulk of the IP revenues returned to the originating business unit. In another firm, some of the business units have revenues returned, some didn't. Only two firms said the IP revenues stay in headquarters.

One respondent whose firm returns the bulk of the IP revenues to the originating business unit stated, "One of the drivers that we use to encourage the business unit leaders to consider licensing is that the revenue goes back to them".

Support For and Monitoring the Licensee

Factor	A	B	C	D	E	F	G
Technical Support Available to Licensee	NA	Yes, if called for in license	Yes	Yes, if called for in license	Yes, if called for in license	Yes	NA
Marketing Support Available	NA	NA	NA	NA	NA	No	NA
Extra Charges for Support	NA	Yes, if called for in license	Fees for license separate from fee for know-how	NA	Yes	Yes	NA

Factor	A	B	C	D	E	F	G
Main Monitoring Tool	HQ License Group	License e files report; a HQ person reviews	Report, and performa nce require-ments in license; audits	HQ group	Third part firm monitors royalty reports from licensee.	Royalty reports; Monitors progress towards exploit-ation	HQ tracks the performa nce
Level of Monitoring Effort	40-45% of the work of License Group	Less than 5% of total IP effort	NA	NA	NA	NA	NA
Use of Special IP Tracking Software	NA	IP data base	Yes	Yes	NA	IP data base	Yes, some home-grown

In five of the firms, monitoring of the licensee is done by personnel in the central licensing group. One firm, however, had contracted out much of the routine monitoring to a contractor.

Usually the licenses require the licensee to file a “royalty report” with the company on a quarterly or annual basis. One firm mentioned comparing the information in the report with their own investigations that track the performance of the firm. Another firm occasionally hires a consulting firm to audit the licensee and do some “royalty chasing”.

One firm stated that they have become more aggressive in monitoring not only their licensees, but also examining the products of their competitors looking for patent infringement. These monitoring activities took up to 45% of the time of their licensing group.

IP Management Training

Factor	A	B	C	D	E	F	G
Importance of IP Manage-ment Conveyed By:	Local IP people and role models	Yearly training session	Patent attorney	Man-agers & patent attorney	Senior mgmt.	Legal people	NA

Factor	A	B	C	D	E	F	G
Form of IP Management Training	In-formal*	Local talks by IP person	Patent liaison people provide training. Outside courses	Formal courses Tele-confer-ences	Formal work-shops	Short courses	Formal training
Responsibility for Training	Bus. unit	HQ/Bus unit	Bus. unit	Bus. unit in U.S	Bus. unit	Bus. unit	Bus. unit
Responsibility for Training Expenses	HQ and bus. unit	Mostly bus. unit	Mostly bus. unit	Bus. unit in U.S.	Bus. unit	Bus. unit	Bus. unit

* Development of IP is in the culture already

All of the firms interviewed indicated that they provide IP management training to their technical staff. This consists of talks by the patent attorneys or by their patent liaison staff. The central licensing groups are also generally active in providing information and training to the technical staff.

One firm holds yearly training sessions for the bench level people on how to keep good (legally acceptable) lab books, witnessing and archiving of notebooks, and dangers of disclosure.

While training was considered by some respondents as a shared responsibility, in most of the companies, the business units pay for it.

One interviewee stated that they had several levels of IP training available for their staff.

Lessons from Past IP Management Experience

The following are some of the comments from the industrial interviewees on what they have learned from their past experiences in managing the IP process.

When times are lean, there is a temptation to cut back on what some people consider to be unnecessary expenditures such as those associated with reward and recognition systems. Managers should resist the pressure to cut back on inventor

rewards as this can be very demoralizing. The amount of the award is not as important as the recognition.

The lack of solid criteria on which to base a decision to patent is based can result in patent decisions based on whim. Rewarding people for the number of patents they file can result in irrelevant or non-strategic patents being filed just to get a salary increase or promotion.

The lack of solid direction in the IP area from the CEO can result in inadequate measures being put in place to support the IP management activity.

When the revenues from licensing go into the corporate coffers, the incentive for the business units to take a more active role in promoting licensing of their technology is lost. There is more incentive to be proactive in licensing if the revenues go back to the business unit.

SUMMARY

This study has shown that it is possible to effectively manage intellectual property assets that have been generated by geographically separated research centres if an appropriate IP management structure and practices are put in place.

This examination of the organizational structures and practices used in the management of intellectual property assets by U.S. and U.K. science-based government departments, and large technology-based multinational private sector corporations identified common approaches to IP management in both types of organization. Some differences in approach were, however, noted.

The major differences between the public and private sector organizations in their IP management practices were the following:

- government departments indicated that they did not conduct competitive intelligence activities;
- many more private sector firms indicated that they were covering their IP management costs;
- government departments relied to a greater degree on outside patent attorneys; and
- government departments shared IP revenues with government inventors.

While most of the private sector organizations had some form of reward and recognition program in place for their inventors, none shared IP revenues with their employees. It should be kept in mind that in contrast to the public sector, the private sector has many more reward tools, other than IP revenue sharing, at its disposal to recognize the contribution of employee inventors. These include the ability to award large salary increases or promotions, salary bonuses (on-going or one-time), paid holidays with family, recognition dinners, cash awards, scholarships in the name of the inventor, increased laboratory resources, etc. [Firms with German affiliates would, in line with German law, have to share IP royalties with their German employee inventors.]

As was the case in the Ransely and Gaffney (1997) study, it is difficult to identify so-called “best practices”. However, at least three management practices can be considered as falling into the “best practice” category. These are:

- the use of a "central patent board" or intranet bulletin board to keep IP and senior managers advised on forthcoming IP business decisions/actions so as to avoid inter-unit conflict (public and private sector);

- having on-site patent liaison personnel available to identify potentially valuable IP, and to provide advice and assistance to potential inventors (public and private sector);

- obtaining agreement on the distribution of IP revenues among multiple inventors of an invention, prior to the generation of revenues (possibly as early as the IP disclosure stage) so as to avoid legal conflict in the future (public sector); and

- the continuation of IP royalty payments or awards to the estate of the inventor upon his or her death (public and private sector).

This last practice of continuing the IP revenue payments to the estate is common practice in Canadian and U.S. universities. The Canadian government policy of extinguishing the IP revenue payments on the death of the inventor is indefensible.

The following are some of the IP management practices adopted by both the private and public sector organizations examined in this study that are supportive of the IP management process:

- having a central IP management office to develop corporate IP strategy, facilitate coordination between units, but not to necessarily dictate or make all of the IP management decisions;

- leaving the decisions on what to patent and breadth of the patent to the local business unit/research institute management;

- using patent review teams consisting of people with varying backgrounds (e.g., legal, marketing, licensing, technical) to make patent decisions;

- having the business unit or research institute, but not necessarily the R&D budget pay the initial patent filing costs, in order to encourage rigour in the disclosure review decision;

- using in-house patent attorneys/agents who become very familiar with the technology and the potential markets, with freedom to hire outsiders when justified;

- having a centralized marketing and licensing group that can either conduct marketing and licensing activities corporate-wide, or provide assistance to the business units if they wish to market and license their IP on their own;

- returning a substantial portion of the IP revenues to the IP generating business unit/research institute to encourage involvement in the IP process;

- having an reward and recognition program in place to recognize the work of employee inventors;

- using an easily accessible IP management data base to keep geographically separated IP managers/patent liaison personnel up-to-date on patent and license status;

- treating the monitoring of licensees as an integral part of the overall licensing activity; and

- ensuring that the scientific and technical personnel are well educated on their role in the IP management process.

It should be noted that having a centralized marketing and licensing group does not necessarily imply that this activity is operated out of headquarters. A group might be located in one office that handles all of the technologies developed in the organization; however, if the level of IP marketing/licensing activity justifies it, several groups might be established along technology/market lines and each would be responsible for their area of technology developed anywhere in the organization. If marketing and licensing activities are organized along technology lines, then a group might be located near their major source of corporate technology.

This study has confirmed that IP management must be given the same amount of attention from senior management in regard to structure and practices as any other business activity in the organization. It is neither an “add-on” nor a “ad hoc” activity.

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APPENDIX A

ORGANIZATION STRUCTURES AND PRACTICES FOR MANAGING INTELLECTUAL PROPERTY IN HIGH PERFORMING SCIENCE AND TECHNOLOGY-BASED ORGANIZATIONS WITH DECENTRALIZED LABORATORIES OR BUSINESS UNITS

Interview Guide

Study Commissioned by Agriculture and Agri-Food Canada

The following questions will be used as a basis for a telephone interview to be arranged within the next two weeks. As this interview guide is being developed to cover both private and public sector research-based organizations, some of the questions will only apply to either the private sector or the public. Please ignore those that do not apply to you.

The subsequent report will not name individual contributors to this study if anonymity in requested.

A. **IP Strategy - Development for Multi-business unit/lab organizations**

1. Who is responsible for the development of corporate IP strategy - Labs/bus.units or HQ?

2. What input do line managers have in the IP strategy development or are there specialists in a separate group?

3. Does HQ approve, coordinate or direct IP decisions at the lab/business unit level?

B. **Competitive Intelligence/Technology Forecasting**

1. Is it done?

2. Who does it - units/labs or HQ?

3. How is the information incorporated into IP/technology development decision making?

C. **IP Disclosure and Protection**

1. By what means are inventors encouraged to disclose their inventions (e.g., public law, financial incentives, etc.?)

2. Who is involved in the initial and ongoing evaluations of the IP; lab/bus. units or HQ?

3. Are decisions on whether to protect newly disclosed IP centralized in HQ or decentralized?

4. Do you have in-house patent agents/lawyers or are they hired on an "as needed" basis, and by whom, HQ or business unit/lab?

5. Who makes ongoing decisions as to type, timing or geographic breadth of protection (e.g., PCT applications)?

6. Who pays protection costs for initial filing, and/or maintenance; units/labs or HQ? Is there a dedicated annual budget for IP protection at the HQ or lab/bus. unit level?

7. If costs are split between HQ and unit/labs, what formula is used?

8. How is the budget for the IP protection activities arrived at for:

- fees and maintenance
-salaries
- other

9. What is the ratio of overall costs of IP protection and marketing to revenues? (i.e., Are your costs of IP protection and the marketing being covered by the revenues from licensing?)

D. **Licensing of IP**

1. Do the business units/labs or HQ determine the licensing strategies for a particular IP? (e.g., who determines whether a license will be exclusive, limited to a field of application, non-exclusive, etc.?)

2. How are revenues from licensing divided between HQ, research institute, originating lab?

3. Are IP protection expenses deducted from revenues before calculating any rewards to inventors or innovators? (i.e., are awards to inventors based on gross or net revenues)

4. How are inventors/innovators rewarded/compensated or otherwise recognized for their work?

5. Who makes decisions on awards, HQ or business unit/lab?

6. Does the invention award continue to the estate of the inventor upon their death?

E. **Marketing of the IP**

1. Do the business units or the HQ determine the marketing strategy for IP?

2. How are marketing costs apportioned between HQ and the originating unit?

3. Is there a dedicated marketing budget allocated yearly or does marketing expenses come out of normal operating budgets and compete with other financial demands?

F. **Support and Monitoring After Licensing**

1. Do your business units/labs provide ongoing support to the licensee; what form does it take? (e.g., marketing, and/or technical)

2. Do you charge extra for the support to cover your additional costs or are such costs covered within the royalty rate/fees?

3. What means do you employ to monitor the licensee's performance in commercializing your IP?

4. What percentage of your IP management effort goes into monitoring and tracking the performance of your licensee?

5. Do you employ any specific IP management tracking software to assist in the management of the IP? (e.g., IP available for license, status of license negotiations, timing of licensee payments, maintenance payments, etc.)

G. **Training, Learning and Communications**

1. How is the importance of IP management and best IP management practices conveyed to staff?

2. What formal and informal training in technology transfer/IP management is provided to your business development/technology transfer personnel; and your bench level scientific/technical staff?

3. Is training a HQ or business unit/lab responsibility?

4. Who pays for the training, HQ or the individual business units?

H. **Failed Approaches to IP Management**

1. Are there any approaches or activities previously associated with your IP management process that you started out with, but subsequently abandoned or modified because their initial promise of effectiveness/efficiency in the management and organization of your IP management process was not forthcoming or was, in fact, deleterious to the objectives of your technology transfer program.

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