Survey to Determine the Strategic Intellectual Property Management Framework Used by Science-Based Government Departments and Agencies in Australia, Canada, Germany, the U.K. and the U.S., and their Approach to the Management of Laboratory Research Notebooks for Legal Purposes

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The National Research Council of Canada

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Background

The value of intellectual property as a strategic asset to organizations has been recognized by the private sector for some time. This has resulted in many authors writing about how the private sector, especially in the U.S., have managed their intellectual property. One pair of authors, Julie Davis and Suzanne Harrison recently wrote a book entitled "Edison in the Boardroom" in which they describe how leading U.S. firms realize value from their intellectual assets. In their book they describe a framework approach to the management of intellectual property.

NRC is interested in adopting the framework and associated best practices described in the book, but wanted to know if any government science-based organizations had developed any similar framework approach to their management of their intellectual property. In addition, NRC is interested in learning how government based science organizations are dealing with the issue of encouraging the proper preparation and storage of research laboratory notebooks so that they can be used as legal evidence for the timing and ownership of potentially commercializable intellectual property. NRC also wanted to determine the degree of use of electronic laboratory notebooks and the feasibility of establishing an international IPM/ICM best practices working group this Fall.

Methodology

Senior managers in intellectual property/technology transfer officers in fifteen major government supported research organizations were contacted to determine their interest in taking part in this survey. In addition, some Canadian universities were contacted to determine their policies on laboratory notebooks.

All the government organizations initially contacted by telephone indicated an interest in receiving the short e-mail questionnaire (See Appendix One). Follow up e-mails and phone calls were made to encourage replies. To-date, ten have sent back their responses (Four U.S., three U.K. and three German).

Information contained in this report also draws upon previous research conducted by Stargate Consultants Limited.

As part of the e-mail survey, potential respondents were sent a short description of the IP management framework outlined in the Davis and Harrison book so that they could more accurately respond to the survey questions (Appendix Two).

A list of organizations contacted and a short description of their mandate, and major activities of those that responded is provided in Appendix Three.

RESULTS

The respondents were asked questions around four themes and the results are presented under those themes.

IPM Best Practices Framework

The organizations were asked whether they used any kind of model or framework to guide the improvement of their intellectual property management practices similar to that outlined in the Edison in the Boardroom book.

While several of the respondents could identify which level of the Davis and Harrison model their organization was operating at, none indicated that they were using this or any other model or framework to guide their IP management practices.

One American respondent said that most U.S. federal government agencies were operating at the defensive/cost centre level of the framework. Based on Stargate Consultants Limited's past technology transfer studies, the same could be said of Canadian government laboratories.

Another American respondent said that they draw their best practices from their involvement with the Licensing Executives Society.

IPM Strategy

Respondents were asked whether they had developed an IP management strategy and if so, was its documentation circulated to staff?

In general, most of the respondents said that their organizations did not have any overall corporate strategy governing the management of IP activities, but several mentioned having operational objectives that their IP management practices had to support.

The Lawrence Berkeley National Laboratory (LBNL), for example, states that the purpose of their IP activities are to:

- support the mission of the LBNL by promoting collaborative R&D activities and bringing in sponsored project funding for research;
- moving technology out of the LBNL via the private sector, to the benefit of the public; and
- to obtain a fair (not maximum) return to the laboratory.

The Jet Propulsion Laboratory of NASA managed by CalTech has as operational objectives to work with entrepreneurs, and to aggressively file patents.

The Biotechnology Biological Sciences Research Council (BBSRC) institutes, while not having explicit targets in terms of income received, etc., does try to develop a climate in which the exploitation of IP can be maximized for the benefit of the institutes, the scientists and the U.K. generally.

The Medical Research Council Technology, the licensing arm of the Medical Research Council has as its objectives for technology transfer:

- to work through the mechanism, and with the partner(s) judged most likely to develop MRC technology into products and services useful to society;
- to maximize the contribution to national wealth creation, and U.K. industrial competitiveness; and
- to maximize income to the MRC in the medium- to long-term.

One objective of the Rutherford Appleton Laboratories in the U.K. is for their technology transfer activity to become self-financing.

The objectives of IP management at the German Fraunhofer-Gesellschaft institutes are:

- to protect the leadership of Fraunhofer institutes in specific technological fields;
- exploit the IP in these fields through contract research;
- receive revenues from licenses; and
- establish new spin-off firms based on Fraunhofer IP.

Garching Innovation, the technology transfer arm of the Max Planck Institutes, has as its main objective to create income from either licenses or spin-offs.

In Germany, the Helmholtz-Gemeinschaft follows the regulating guidelines of the German government which has three obligatory principles:

- patents are to be applied for when researchers make a patentable invention;
- give the public financing partner full IP rights to use the research results; and

- provide, on request, a domestic third party the right to use the results on agreed upon conditions.

One would presume that these three guidelines apply to all publicly funded German research institutes.

IP Responsibility and Decision Making Structure

Respondents were asked that if their R&D activities were located in several geographically separated organizational units how were they organized in terms of responsibility and decision-making authority associated with IP management? In other words who made the key decisions on what to patent, who to license, breadth of protection, going after infringers, etc.

Only the Helmholtz-Gemeinschaft (Association) appears to have a decentralized approach to IP decisions and responsibility. The Fraunhofer-Gesellschaft (Society) has a central patent department that provides support (e.g., drafting patents, negotiating and signing license agreements) to their 56 institutes but the major decisions are made at the institute level. This is also the case with the Max Planck Institutes where the Garching Innovation provides advice and administrative support but the final decisions on what to file and where is the Institutes which must pay the costs of such IP protection.

The U.S. organizations while having considerable input from the staff of the research institutes in terms of what to patent (e.g., NIH, NASA, SANDIA), centralize the overall management of their IP.

The BBSRC leaves decisions on IP to their eight institutes unless the financial considerations exceed a pre-set limit (i.e., £250k in license revenue or equity sales) or novel developments that raise new policy issues.

One major difference between European and American publicly funded research organizations is the European's use of wholly owned private companies to manage their IP. The Rutherford Appleton Laboratories uses Central Laboratory Innovation and Knowledge Transfer Limited (CLIK) a wholly owned subsidiary of the Council for the Central Laboratory of the Research Councils; the Medical Research Council uses the MRC Technology and the Max Planck Institutes use the IP services of Garching Innovation GmbH. Some of the BBSRC institutes retain the services of their wholly or partially owned IP management firms to manage their IP. For example, The Babraham Institute uses Babraham Bioscience Technologies Limited, the Institute for Food Research uses IFR Enterprises, and the John Innes Centre uses Plant Bioscience Limited, a for-profit company, which also offers its IP services to research labs around the world.

In Canada, while several universities make use of subsidiary companies to exploit their IP, no Canadian government laboratory does so.

IP Management Performance Measures

Respondents were asked to describe the performance measures they use to track their progress towards their IP objectives.

Most of the respondents stated that they did not have explicit targets set for them in terms of revenues to be made, number of patents to be filed per year, etc. The National Institutes of Health, however, have a target of one patent for every $2 million of internal R&D.

The major IP management performance measures used by the responding organizations were very similar. They are:

- revenues from licenses;
- number of new licenses or material transfer agreements;
- number of spin-off firms established;
- shareholdings in start-ups;
- number of research agreements;
- number of strategic alliances; and
- benefit to the public.

One measure not mentioned by the majority was MRC's and the Max Planck Institutes capturing data on the number of people employed by their spin-off companies.

Research Laboratory Notebooks

Respondents were asked whether their organizations have any explicit policies or guidelines dealing with the preparation or management (control/storage) of their scientists' laboratory notebooks. They were also asked how they enforced or encouraged their research staff to properly record their research results so that the lab books would be a credible document in a patent legal case.

Only three of the organizations, Rutherford Appleton, Fraunhofer-Gesellschaft, and Max Planck indicated that they did not have any explicit guidelines. They basically

relied on the scientists to keep good notes as part of their culture. The Rutherford respondent noted, however, that there was considerable variations in what researchers considered to be a notebook. Canadian government laboratories do not provide their research staff with any explicit written guidelines.

The research laboratory notebook guidelines that are used are generally along the following lines:

- keep bound notebooks and journals with consecutively numbered pages;
- do not tear out any of the pages, draw a line through the page, if the page is to be ignored;
- use permanent ink, make corrections by crossing-out mistakes, do not use white-out;
- date each experiment as they take place;
- define the objective of the experiment to eliminate subsequent speculation as to why you were conducting the experiment;
- record all relevant facts such as type of equipment used, materials, etc.;
- do not make derogatory remarks about the results;
- attach or copy into the notebook equipment generated data or note where such data is stored; and
- have a knowledgeable non-inventor colleague sign and date the record of the experiment.

In addition to the ten respondents to this survey, a representative of the Pacific Northwest National Laboratory stated that they had laboratory notebook guidelines but that they were not always followed by their researchers. This was a common complaint voiced by the other respondents.

Guidance for NIH staff in keeping laboratory records used by the National Cancer Institute can be found at on their intranet site http://ttb.nci.nih.gov/clients/labrec.htm.

The main way that organizations appear to encourage proper laboratory notebook preparation is by making the guidelines readily accessible, educating the scientists and making sure that their internal stores department carry proper laboratory notebooks for the staff.

On June 6, 2002, the U.K. government announced the availability of a specially designed laboratory notebook called the "Innovation Logbook" to help safeguard the creative ideas of U.K. inventors. Information about this lab book can be found at http://www.InnovationLogbook.gov.uk.

The German government has issued guidelines in a publication entitled "Safeguarding Good Scientific Practice" which are used by the Helmholtz Association institutes. The Helmholtz respondent mentioned that if researchers fail to follow the guidelines, they have their funding cut-off.

Several Canadian university technology transfer officers were contacted regarding their laboratory notebook policy. They said that while they had guidelines, the nature of the relationship between the university and the academics was such that they could not enforce their guidelines. This may be particularly the case in those universities where the academics own the IP rights to their inventions.

Electronic Laboratory Notebooks

Respondents were asked whether they had used, or were planning to use electronic laboratory notebooks.

All of the respondents replied that they had not used electronic notebooks. Only the Medical Research Council stated that they were going to look into the use of electronic notebooks.

None of the respondents mentioned having made use of any third-party laboratory storage organization.

In a limited search of the internet, an article entitled, "The Evolving, Fully Loaded, Electronic Laboratory Notebook" by Marc Fitzgerald, was found that stated that the Oakridge National Laboratories (ORNL) in collaboration with researchers at the Lawrence Berkeley National Laboratory and the Pacific Northwest National Laboratory have designed a common notebook architecture [http://pubs.acs.org/hotartcl/ci/00/jan/inet.html]. As noted by one of the developers, the biggest barrier to the use of the Electronic Laboratory Notebook (ELN) is its legal acceptance. This was the major reason given by respondents to their lack of use of ELNs.

The Collaborative Electronic Notebook Systems Association (CENSA), an international industry association, is a major developer and promoter of electronic notebooks [http://www.censa.org].

For an example of a downloadable electronic notebook visit http://www.emsl.pnl.gov:2080 and type in "notebook" in the search engine.

Interest in Joining an International Best Practices Working Group

NRC asked that we determine whether the respondents would be interested in joining a small working group, in the Fall of 2002, to explore the potential benefits of establishing an international IP management/intellectual capital management best practices working group?

All of the respondents indicated an interest in obtaining more information about what the NRC was proposing.

It should be noted that the Licensing Executives Society has a working group dealing with University-Government-Industry Technology Transfer under the chairmanship of Dr. Walter Copan. The BBSRC respondent also commented that there was an IP Awareness Group in the U.K. that promoted best practices.

CONCLUSION

While the ten research organizations surveyed have specific objectives for their IP management activities, none of them made use of any type of framework to guide the management of their IP. In addition, none mentioned having any explicit documented IP strategies in place that was shared with their employees.

All made use of mostly quantitative data to determine the success of their IP transfer activities (e.g., license revenues, equity in spin-offs, number of patents per year, etc.).

All but three of the respondents had some written guidelines to encourage their research staff to keep their laboratory notes in a form that could be used in legal proceedings, but enforcement of these guidelines was soft, relying mainly on education and the availability of properly bound, consecutively page numbered notebooks. Canadian government laboratories do not issue such guidelines. The use of electronic notebooks was non-existent in the organizations surveyed, mainly due to the lack of trust in the electronic notebook's credibility in a court of law.

All of the respondents indicated an interest in learning more about establishing an international IP management best practices working group with the N.R.C.

APPENDIX ONE

INTELLECTUAL PROPERTY FRAMEWORK SURVEY

QUESTIONNAIRE E-MAIL LETTER

[Name and address]

Dear Dr. X:

The purpose of this survey is to provide the National Research Council of Canada, based in Ottawa, with information on strategic best practices associated with government-to-industry intellectual property management, and information on how research organizations encourage/enforce their policies, if they exist, on the writing and record keeping of research laboratory notebooks, in leading government laboratories. The use of electronic notebooks is also being examined.

We would like these questions answered by whomever sets intellectual property strategy for the whole of [organizational name]. If that is not you, could you please forward these questions to the appropriate person, and let me know who to expect an answer from.

In particular the N.R.C. would like to know whether [organization name]:

- uses any kind of model or framework to guide the improvement of your intellectual property management practices, similar to those described in the book, "Edison in the Boardroom". Key elements of this approach are contained in the accompanying attachment?

- has developed an IP management strategy (not just policies) and whether you provide your staff with any documentation that describes that strategy? If such documentation exists, may we have a copy?

As your research organization is decentralized with multiple operating research units, how is it organized in terms of the responsibility and decision-making that is associated with IP management (i.e., who makes the decision about what to patent, where to patent, when to license, when to go after infringers, etc.)?

What explicit objectives is [organization name] trying to accomplish through your management of intellectual property. What measures of performance do you use to track your progress towards attaining those objectives?

Does [organization name] have any explicit policies or guidelines dealing with the preparation and management of their scientist's laboratory notebooks? How do you encourage or enforce compliance with those policies or guidelines. May we have a copy of the guidelines, if they exist?

Does [organization name] use or plan to use electronic laboratory notebooks? How will you deal with the legal ramifications of electronic media in terms of security, integrity, and the witnessing of digital data and information? Are you considering using or have you used, third party lab book security organizations, and what has been your experience?

Would you/[organization name] be interested in joining a small group of leading government R&D organizations in exploring, in the Fall of 2002, the potential benefits of founding an international intellectual property management/intellectual capital management best practices working group?

Any assistance you can given the National Research Council on these issues will be greatly appreciated.

Yours sincerely,

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APPENDIX TWO

INTELLECTUAL PROPERTY FRAMEWORK

PROPOSED BY DAVIS AND HARRISON

The following framework and best practices are taken from the book entitled, "***Edison in the Boardroom: How Leading Companies Realize Value from Their Intellectual Assets***", by Julie L. Davis and Suzanne S. Harrison, John Wiley and Sons, 2001.

VISIONARY
INTEGRATED
PROFIT CENTER
COST CENTER
DEFENSIVE

It is the premis of the authors that as companies become more professional in their management of their intellectual property assets, they move from a Defensive strategy up through Cost Center, Profit Center, Integrated to a Visionary strategy.

At each of these steps or stages, the authors have suggested intellectual property management practices that a firm would undertake to be effective at that level.

Level One Companies - Defensive

According to Davis and Harrison, Level One companies are trying to:

- generate a significant number of patents for their IP portfolio;
- ensure that their core business is adequately protected;
- initiate basic processes to facilitate patent generation and maintenance;
- initiate basic processes for enforcing patents; and
- ensure that their technical people have freedom to innovate.

Defensive Level Practices Associated with Level One Companies

Take stock of what you own.
Obtain IP while ensuring design freedom (e.g., encourage researchers to develop IP)
Maintain your patents (e.g., don't let good ones lapse by accident)
Respect the IP rights of others (e.g., do not knowingly infringe)
Be willing to enforce your IP rights, or don't bother to patent.

Level Two Companies – Cost Center

These companies are trying to:

- reduce costs associated with their IP portfolios; and
- refine and focus the IP that is allowed into their portfolios

Cost Center Practices Associated with Level Two Companies

Relate patent portfolio to business use
Establish an IP committee with cross-functional members
Establish a process and criteria for screening patents
Set detailed guidelines for patent filing and renewal
Regularly/systematically review your patent portfolio to prune patents not worth maintaining.

Level Three Companies – Profit Center

These companies are trying to:

- extract value directly from their IP as quickly and inexpensively as possible; and
- focus on non-core, non-strategic IP that has tactical (as opposed to strategic) value.

Profit Center Practices Associated with Level Three Companies

Obtain management buy-in
Start a proactive licensing organization
Consider IP donations (only allowable in U.S.) and royalty audits
Organize to extract value
Develop advanced screening criteria to find non-core IP.

Level Four Companies - Integrated

Their IP management objectives include:

- extracting strategic value from their IP;
- integrating IP awareness and operations throughout all functions of the company; and
- becoming more sophisticated and innovative in managing and extracting value from the firm's IP.

Integrated Practices Associated with Level Four Companies

Align IP strategy with corporate strategy
Manage IP and intellectual assets across multiple functions
Conduct competitive assessment of competitors
Codify IP knowledge and share with business units
Focus on strategic value extraction

Level Five Companies - Visionary

IP management objectives of companies at this level include:

- staking a claim on the future
- encouraging disruptive technologies; and
- embedding intellectual assets and intellectual asset management into the company culture.

Visionary Practices Associated with Level Five Companies

Patent strategically – identify technology and market trends
Institute a performance measurement and reporting system.

APPENDIX THREE

RESEARCH ORGANIZATIONS CONTACTED

Fifteen major research organizations were contacted and invited to take part in this survey. The following organizations have not yet responded to the e-mail questionnaire:

Atomic Energy of Canada Limited
Commonwealth Scientific and Industrial Research Organisation [Australia]
National Institutes of Health (HQ) [U.S.A.]
National Institutes of Standards and Technology [U.S.A.]
Pacific Northwest National Laboratory [U.S.A.]

The following are profiles of the ten responding research organizations.

AMERICAN RESPONDENTS

Jet Propulsion Laboratory (NASA) [http://www.jpl.nasa.gov/]

The Jet Propulsion Laboratory, managed by the California Institute of Technology, is NASA's lead centre for robotic exploration of the solar system.

Areas of research include:

- deep space navigation and communication;
- digital image processing;
- intelligent automated systems;
- instrument technology;
- automation and robotics; and
- parallel computer processing.

In 2001, JPL employed 5, 175 employees and on-site contractors, and had a budget of $1.3 billion.

Companies interested in accessing JPL technology and expertise can obtain information from their Commercialization Center [http://techtransfer.jpl.nasa.gov/].

Technology transfer activities are conducted out of the Office of Technology Transfer, of the California Institute of Technology. There are two CalTech employees

who work full time on JPL IP management with the support of four employees from NASA.

JPL files approximately 130 patent applications per year, and out of a patent portfolio of approximately 2,400 have 900 active licenses.

Lawrence Berkeley National Laboratory [http://www.lbl.gov]

The Lawrence Berkeley National Laboratory is the smallest of the three Department of Energy national laboratories managed by the University of California.

It consists of 15 divisions operating in the areas of:

- accelerator and fusion research;
- biosciences (life sciences and genomics);
- general science (physics and chemistry);
- nuclear science;
- environmental energy technologies;
- earth sciences;
- advanced light sources;
- material sciences; and
- environment, health and safety.

It has a research budget of approximately $350 million and employs approximately 4,000 people.

Its intellectual property activities are handled by their Technology Transfer Department [www.lbl.gov/Tech-Transfer/org.html which employs 11 people.

Income from LBL licenses was approximately $1.1 million in 2001.

NASA/National Technology Transfer Center

The National Aeronautics and Space Administration is the major research organization focussing on space exploration. Its research is divided into five categories:

- aerospace technology;
- biological and physical research;
- earth sciences;
- space flight; and
- space science.

Among the various research activities are:

- rocket propulsion;
- space communications and data systems;
- Mars exploration;
- solar system exploration;
- bioastronautics research;
- fundamental space biology;
- advanced space transportation;
- gravity probes; and
- the Hubble Space Telescope.

The research budget for NASA is 14.9 billion.

Technology transfer/IP management activities are conducted from each of the NASA laboratories (NASA Field Centers). Each center has approximately 12 people involved in technology transfer, and they are supported by six regional technology transfer centers and the work of the National Technology Transfer Center.

NASA's licensing income is only $1 million per year.

SANDIA National Laboratories [http://sandia.gov]

The Sandia National Laboratories are operated by the Lougheed Martin Corporation for the Department of Energy. Sandia's mission is to meet U.S. needs in four key areas: nuclear weapons, nonproliferation and nuclear materials control, energy and critical infrastructure support, and identification of emerging threats.

Some of the research areas covered by Sandia are:

- advanced manufacturing (e.g., robotics and intelligent systems);
- biosciences (e.g., biological and chemical sensor technologies);
- chemical and earth sciences (e.g., combustion technology, geoscience);
- computer information sciences;
- electronics (e.g., photonic devices);
- materials and process sciences;
- nanotechnology;
- pulsed power sciences; and
- surety sciences (e.g., electronics quality and surety).

Sandia employs 7,700 personnel.

Sandia has 209 license agreements in place on an IP portfolio of over 500 patents and 50+ copyrights. Licensing revenues are approximately $3 million per year on a research base of $510 million. Six people work in their IP department.

BRITISH RESPONDENTS

Biotechnology and Biological Sciences Research Council [http://www.bbsrc.ac.uk]

The BBSRC funds not only university based research but research at its eight institutes. Research areas covered are:

- agri-food;
- animal science;
- biochemistry and cell biology;
- biomolecular science;
- engineering and biological systems;
- genes and developmental biology; and
- plant and microbial sciences.

As noted earlier, each of the institutes is responsible for the administration of its IP.

The BBSRC has a institute portfolio of 211 patents and plant breeders rights, up from 200 in 1997/98; 98 license agreements (62 in 1997/98); and revenues in 2000/2001 of £1,351k up from £998k in 1997/98. The revenues are after patent costs are deducted but not the salaries of involved staff.

Each of the institutes has or shortly will have a business manager. In total there are approximately 22 people involved in IP/technology transfer activities in the HQ and institutes.

Medical Research Council [http://www.mrc.ac.uk]

The Medical Research Council supports a broad biomedical research portfolio that ranges from basic biology to medical practice.

MRC funds studies in:

- people and population studies- health services and the health of the public;

- genetics - molecular structure and dynamics;
- neuroscience and mental health;
- cell biology - development and growth;
- immunology and infection; and
- medical physiology and disease processes.

MRC R&D expenditures in its own research institutes was approximately £180 million in 2001/2002.

The number of staff in the MRCT primarily involved in IP management/exploitation activities is 18 supported by an additional 26 based in the laboratories.

MRCT owns and manages the IP from their 40+ institutes and research units. In 2001/2002 they filed 50 new patent applications and signed 42 license agreements, up from 32 filings and 22 license agreements in 1997/98. They have 379 active licenses at present. Revenues, including that from the sale of shares in start-ups, have increased from £500k in 1990/91 to £7.6 million in 1999/2000.

Revenues were £17.9 million in 2000/2001, but are expected drop back to £11.7 million in 2001/2002.

New employment in 14 of their start-up firms is estimated to be 845 people. This does not include one firm started in 1980 based on MRC technology which now has 2,023 employees.

Rutherford Appleton Laboratory [http://www.cclrc.ac.uk]

The Rutherford Appleton Laboratory is one of two research sites of the Council for the Central Laboratory of the Research Councils. The other is the Daresbury Laboratory.

Among the research areas supported are:

- high-power laser facilities;
- computational science and engineering;
- e-science;
- instrumentation – sensors, detectors and electronic data processing;
- ISIS – pulsed neurtron and muon source;
- particle physics;
- radio communications, radiowave propogation and atmospheric sensing;
- materials science, surface science and nuclear physics; and
- synchrotron radiation studies.

In April of 2002, CCLRC established CLIK Knowledge Transfer Limited, as a wholly owned subsidiary. Employing eight people, CLIK manages a portfolio of 100 licenses and 50 patents, of which 10 generate a revenue of £100k per year.

GERMAN RESPONDENTS

Fraunhofer –Gesellschaft [http://www.fraunhofer.de/]

The Fraunhofer-Gesellschaft (Fraunhofer Society) maintains 56 research establishments throughout Germany. Each is responsible for managing it own IP with the support of a central patent office.

Among the areas supported by the Fraunhofer-Gesellschaft are:

- materials technology, component behaviour;
- production technology, manufacturing engineering;
- information and communications technology;
- microelectronics, microsystems technology;
- sensor systems, testing technology;
- process technology;
- energy and building technology, and
- environmental and health research.

Helmholtz-Gemeinshaft [http://www.helmholtz.de]

The 15 research institutes of the Helmholtz Association pursue longer-term research with its 24,000 employees in areas such as:

- energy;
- earth and environment;
- health;
- material science;
- transport; and
- space.

Approximately 70 people are involved with technology transfer activities in the Helmholtz Association. In smaller institutes, there may be only one part-time person

(e.g., Deutsche Electronen-Synchrotron in Berlin) while in the Aerospace Center in Cologne there are 20.

Their patent portfolio consists of 2,667 patent families which generates approximately 12,167,803 Euros ($18,616,738 Cdn) per year.

Revenue from IP goes into a "Technology Transfer Fund" which then dispurses the money approximately as follows: one-third for the inventor's bonus; one-third for technology transfer costs such as marketing, running the TT office, etc. and the remaining one-third to the institutes.

Max Planck Society [http://www.mpg.de]

The Max Planck Society is a basic research organization that consists of 80 institutes employing 11,000 people. Its budget is $1.2 billion U.S.

The Society supports research in almost every area of science including:

- astronomy;
- astrophysics;
- biochemistry
- biology;
- brain research;
- chemical ecology;
- cell biology;
- molecular genetics;
- gravitational physics;
- limnology;
- meterology;
- plant breeding;
- plasma physics; and
- radiation chemistry.

Exploitation of IP from the Max Planck institutes is handled by Garching Innovation which employs fifteen people.

In 2000, GI had license revenues of 31 million DM. It signed 89 new license agreements in 2000. Since 1990, it has supported the creation of 49 companies employing approximately 2,300 people.