
Ravinder Jain and Michel Rod†
Sprott School of Business, Carleton University, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada

Received 26 October 2012, revised 11 March 2013

Intellectual Property Management encompasses creation, protection, and exploitation of intellectual property rights (IPRs) such as patents that play a critical role in research and development of intensive industries. Patent rights are known to provide significant benefits as they can be sold or licensed and form foundation for making, using, and selling industry-leading products, processes, and services. In order to obtain valid patent rights, however, basic knowledge of certain critical issues is considered essential among stakeholders. The authors assessed the basic knowledge of proper record keeping practices, ownership, and public disclosure among public and private sector organizations of various sizes across Canada in a variety of industries. They found that respondents had good knowledge of proper record keeping practices, assigning ownership of patent rights to the employers, and excellent knowledge of what constitutes a public disclosure. However, they had poor knowledge of what does not constitute a public disclosure and duration of the public disclosure grace period. The authors provided recommendations for implementing organizational processes for further educating stakeholders in obtaining valid patent rights for commercialization.

Keywords: Intellectual property management, intellectual property, patent, record keeping, ownership, public disclosure, grace period

Intellectual Property Management (IPM) encompasses the creation, protection, and exploitation of one or more intellectual properties (IP), which are a result of human intellectual effort, through intellectual property rights (IPRs) such as patents, trademarks, copyrights, industrial designs, integrated topographies and plant breeders’ rights. IPRs play a critical role in the success of research and development of intensive industries, such as pharmaceutical, biotechnology, chemical and information and communications technology. Patents tend to be granted to inventors or their assignee(s) for a limited period, usually 20 years from the filing date of the patent application for a new, inventive and useful invention in exchange for the disclosure of the confidential information to the public. The granting of this limited monopoly right to the inventors or their assignee(s) allows the patent holders to exclude others from making, using, selling, and importing their invention without their permission. It enables them to protect their R&D investments. Patents also encourage the inventor and others to improve upon an invention thereby facilitating continuous development of a technology.

Protection and exploitation of IPRs have provided significant benefits to both private and public sector organizations as they can be sold outright or licensed to a buyer or licensor. They can also be cross-licensed in exchange for other IPRs to a licensor including competitors. The exploitation of IPRs by corporations can add value to their bottom line by enhancing financial performance by establishing proprietary market advantage in terms of developing category-leading products, enhancing market share, and producing high margins leading to greater competitiveness. Recent patent wars between Apple and HTC and between Apple and Samsung on smart-phones and Monsanto and DuPont on transgenic crop traits attest to that. The need to access IPRs is often the reason for established companies to acquire public sector startups.

Various public institutions have been active in creating, protecting, and exploiting their IPRs, partly due to reduced government research funding and increased collaboration with industry. A recent survey of US and Canadian public institutions by the

†Corresponding author: Email: michel_rod@carleton.ca
Association of University Technology Management (AUTM) in 2010 revealed significant contribution by IPRs to the development of innovative commercial products, licensing income, and startups.⁶

More investors evaluate the IP portfolio of a technology as an indication of its future earning potential. In industries such as biotechnology and pharmaceuticals, where product development can take up to 12 years and hundreds of millions of dollars, investors want some assurance on their investments.⁷ Valid IPRs provide them with that assurance. It is thus important for both public and private organizations to obtain valid patent rights for selling, licensing, cross-licensing and/or developing products. This requires an understanding of the appropriate legal issues by stakeholders.

Increased awareness of intellectual property issues in the academic world is recommended in order to promote future research through offering of doctoral level courses in IP.⁸ Courses related to IPM are already being successfully offered.⁹,¹⁰ However, there appears to be paucity of research directed at assessing basic stakeholder knowledge of certain legal issues critical for obtaining valid patents and their commercialization. The authors assessed the basic knowledge of three critical issues: ownership, public disclosure of the invention and grace period, and record keeping practices. They also provide recommendations here based on academic literature, best practices and personal experience for implementing several organizational processes for further educating stakeholders in obtaining valid patent rights for commercialization.

**Ownership of the Invention**

In general, inventors own the patent rights which are usually then assigned to employers under employment agreement or through a deed of assignment.¹¹ The owners can further sell, license, cross-license, or develop products and services derived from this IP. If the inventorship or ownership is incorrect then patent rights can be invalidated in courts by infringers. In exchange for assigning the rights by inventors, employers usually reward them. The ownership and reward issue may become complex if there is more than one researcher involved in the invention. These researchers may be collaborators within or outside the organization, for example, members of R&D, sales, operations, and manufacturing teams, visiting scholars, graduate students, and summer students. Who are the rightful owners and how will they be rewarded should clearly be laid out before they start to collaborate.

**Public Disclosure of the Invention and Grace Period**

Generally, in order to obtain valid patent rights, the subject matter claimed in a patent application must not have been publically disclosed anywhere in the world. Public disclosure is not limited to printed material but extends to verbal and electronic communications as well. Any printed material such as flyers, brochures, scientific abstracts, posters, and electronic publications such as on a website, disclosing the invention to the public in any manner is considered a public disclosure. In this information age, abstracts of research papers are often posted on a conference website which would be considered a public disclosure as of the date of posting. Electronic pre-prints of papers not yet subject to peer review are also public disclosures. The date of publication for a poster would be the date the poster is made available for public viewing. An invention may not be considered disclosed if it remains a ‘black box’ for the public. An invention is not considered disclosed if the information is provided under a confidentiality agreement or when it is communicated to an agent or someone with a fiduciary relationship. The experimental use of an invention by someone is also not considered a public disclosure. Given these complexities, several countries (e.g., Canada, USA) permit a one-year grace period for filing patent applications after disclosure of the invention by the inventor. A patent will be granted, provided other conditions for patentability are met, if a patent application is filed by the inventor within one year of public disclosure. European countries and China, however, do not provide this grace period whereas Japan provides a grace period of only six months.¹²

**Record Keeping of Research Work**

Research work showing complete conception and reduction to practice must be diligently recorded in a bound note book in order for it to meet legal standards. The records must also be signed and dated by the inventor and witnessed by someone who understands the research but will not be named as a co-inventor. These formalities are required to establish the date of conception and practice of the invention as well as the inventorship. A proof of date
of invention is required in ‘first to invent countries’ such as the US (it will be ‘first to file’ soon though) and needed in cases where a dispute arises as to the legitimate first inventor (e.g., in interference proceedings). Proper record keeping is crucial for determining inventorship which is often challenged in validity proceedings.\(^{13}\)

**Research Method**

A self-administered survey containing closed-ended and open-ended questions targeting stakeholders such as researchers, managers, executive managers, and policy makers in various public/private organizations, in a variety of knowledge intensive industries of varying sizes located all across Canada was designed to assess the knowledge of some critical legal issues among stakeholders central in obtaining valid patent rights and their commercialization: proper record keeping practices, assigning ownership of patent rights to the employers, and what constitutes a public disclosure and use of grace period (Appendix 1).

The survey was administered through self-use Free Online Surveys.com website for a nominal fee. The survey was loaded onto the web-site and a survey ID was obtained. A request to participate in the survey with the survey URL and ID was then emailed to 500 potential respondents identified from a conference list, several scientific society membership lists, business offices, and technology transfer offices of several public and private organizations. Email requests were sent out in groups of 100 so as to prevent overloading of the website. A reminder email was sent after a week to encourage participation.

Out of 500 potential participants, 82 responded, thus giving a response rate of 16.4%. The survey data was described by % frequency of each response to a particular question. With respect to questions relating to legal issues, a correct response by 75%, 50%, or less than 50% out of 82 respondents was considered excellent, good, or poor, respectively. Each section had an open-ended question at the end that asked for written input regarding response to the ‘other’ choice or general comments. Respondents’ written responses to open-ended questions were edited for brevity and were included in the results.

**Results and Discussion**

**Respondents’ Profile**

When asked about the nature of their organization, 36% of the respondents belonged to a company, 28% to government, and 23% to a university. Thirty-six percent of the respondents were located in western Canada, 28% in eastern Canada, and 16% in central Canada. Due to confusion between central and eastern Canada, this category was collapsed into one category. Majority of the respondents (57%) belonged to the biotechnology industry, 18% to telecommunications, 11% to medical, and 9% to pharmaceutical industry. The latter two categories were collapsed into one as well. Sixty-one percent of the respondents reported their organization as being more than 15 years old, 12% between 6 to 15 years old, and 20% reported their organizations as being less than 5 years old. Twenty-four percent of the respondents did not disclose their gross sales. Fourteen percent reported gross sales of more than $50 million. Twenty-six percent reported the sales of up to $50 million. Forty-two percent of the respondents had more than 500 employees in their organization, 21% had between 101 to 500 employees, and 28% had up to 100 employees. Respondents’ organizations provided a variety of products and services which are summarized below under industry types.

**Biotechnology:** Genomics databases, agricultural biotechnology, biotech-enabling technology education, teaching, research, training, information/extension services, analytical services, food safety related devices and quantitative standards, seeds, agrochemicals, biotechnology tools.

**Telecommunication:** IT systems, electronic design automation software (CAD) for electrical engineers, software, management services supported by software products that stay with the client within the natural resources industry (forestry, environmental protection, fisheries, etc.), semiconductor products, consumer electronics and telecomm, network storage devices control cards, telephony products and features, telecommunication products, network architects, engineering services, telecom equipment (hardware) and software to manage it, IP telephony solutions.

**Medical:** Health services, education, therapeutics, not for profit industry association, IT development in health field, medicines.

**Pharmaceutical:** Therapeutics for neuro-degenerative diseases licensable drugs, biopharmaceuticals, drugs (cancer, inflammation, antibiotics, others), personal care products drug production platform, cosmeceuticals.
Thirty seven percent of the respondents were scientists, 18% were executive managers, and 12% were managers. Forty-six percent of the respondents had more than 10 years of experience in their profession, 26% had between 6 to 10 years of experience and 23% had between 2 to 5 years of professional experience.

Ownership of the Invention

Intellectual properties such as patents are owned and they can be sold or licensed like any other piece of property. Incorrect ownership could lead to loss of patent rights. Therefore, stakeholders must know who the rightful owner of a patent is. This section contained several questions (Section I, Appendix 1) that were designed to determine the knowledge of ownership and related issues such as familiarity with the term ‘intellectual property’, their involvement in developing or managing IP, owning IP rights, assigning IP rights, and reward schemes for developing or managing IP.

All survey respondents were aware of the expression ‘intellectual property’ and 84% of the respondents were involved in the development or management of IP. However, only 39% said that they either owned or are in the process of owning IP. The remaining 61% of the respondents who did not own IP, might be those whose job is solely to manage IP, such as technology transfer officers or in-house lawyers. More than half (57%) of the respondents, who had IP, had assigned their IP rights to their organization, while 37% had not. Only 6% of the respondents were not sure if they have assigned their rights. Thus, with respect to the issue of assigning IP rights to the employer, IP developers and managers exhibited good knowledge.

Forty percent of the respondents were never rewarded, whereas 15% received royalties and 4% were given promotion. The remainder (40%) of the respondents were rewarded differently. In open-ended questions, a number of responses relating to reward schemes were received. In the past it seems that the development of IP was considered a part of an employee’s regular responsibility. The IP rights were usually assigned to the employer in lieu of token amount ($1), but the employees were usually promoted. Nowadays, in addition to promotions, most employers use other rewards for recognizing the IP contribution of their employees in order to encourage innovation. These rewards include providing a certificate of accomplishments upon filing of a patent application, giving monetary rewards ($1000 - $5000) upon filing for and issuing of patents, providing a royalty if the technology is licensed, and securing tenures. One executive was concerned about designing an appropriate system of reward, which is fair to both, the researchers whose work is patentable and the developers whose work is normally not patentable but is still significant for the company - “...we are still contemplating a reward system for when patents are awarded. Our concern is that our engineers who do great work, but not patentable work (for example, software design work), aren't treated as fairly with respect to compensation.”

Public Disclosure of the Invention and Grace Period

Owners often fail to obtain any IP rights because they disclose their invention publicly too early or incorrectly. Thus, it is important to know what constitutes a public disclosure and grace period and its significance to obtaining patents. Further, not all countries provide a grace period after a public disclosure has been made. This section contained several questions (Section II, Appendix 1) related to the nature of public disclosure and duration of the grace period.

When asked what constituted public disclosure, 94% chose publishing a research paper in a journal while 87% thought presenting a poster at a conference constitutes public disclosure. Interestingly, 78% incorrectly believed posting an abstract at a conference web-site to be a public disclosure, even if the abstract discloses an invention in sufficient detail. Thirty one percent of the respondents incorrectly thought describing an invention to someone in a fiduciary relationship (e.g., a relative or an agent) constituted a public disclosure. Seven percent of the respondents again incorrectly believed that describing an invention to a third party under confidentiality agreement constituted a public disclosure. Thus, knowledge of what constituted a public disclosure was excellent among respondents. However, the knowledge of what did not constitute a public disclosure was poor among respondents.

Thirty percent of the respondents correctly identified a grace period of one year for the US and Canada. However, 34% of the respondents did not know about the duration. The remaining respondents chose other responses, ranging from no grace period to unlimited grace period. That there is no grace period
in Europe was correctly identified by 28% of the respondents. However, almost half (52%) the respondents did not know this. Again, remaining respondents chose other responses, ranging from no grace period to unlimited grace period. Thus, knowledge about the duration of the grace period was poor among respondents.

In the open ended question, only a few responses were received. Most of the respondents felt that the issue of public disclosure is a complex but important one and the information on grace period should be easily accessible. Some indicated a greater need for more training and guidelines on this issue, as well as the need for more resources to protect IP. Some also believed external IP service providers could play a critical role in clarifying the public disclosure issues.

One closely related issue to the public disclosure is the perception of researchers about obtaining patents or publishing their work in a journal. When asked what is best for their career, sixty seven percent of the respondents chose patenting first and then publishing the results. Seventeen percent of the respondents believed that publishing a paper, rather than patenting it, is best for their careers. Only 6% indicated that filing a patent is best for their careers and did not believe in publishing a paper at all. Remaining respondents checked “other” as their response. Among written answers, an executive of a start-up company in telecommunication thought, “papers and patents are merely tools and side effects of pursuit of grander goals. What is best for my career is seeing my IP being used by a customer, either directly or indirectly via a product.” The improper exploitation of IP rights by some has also given ammunition to the critics of IP rights. One participant reflected his sentiments, “…I believe that the patenting process greatly degrades the whole scientific community. This is partly due to the disruption of the free flow of information between scientists and the fostering of a climate of distrust.”

**Record Keeping of Research Work**

In some countries (e.g., the US), date of invention is important in obtaining IP rights. Properly kept records i.e., regularly signed and witnessed records are needed to resolve cases where a conflict arises in terms of establishing timing of an invention or inventorship. This section contained questions (Section III, Appendix 1) relating to signing and witnessing of lab notebooks. Almost half (47%) of the respondents indicated that they do not sign and have their notebooks witnessed. Of those (53%) who did sign and got their notebook witnessed, 27% did it at least once a week, 18% did it at least once a month, and 13% did it less frequently than once a month. Thus, the knowledge of proper record keeping was good among respondents.

In the open-ended question, many respondents wrote that they usually date their lab notebooks but don’t get them witnessed. Several reasons for not getting the lab notebook witnessed were given: increased administrative burden on researchers, non-availability of suitable witnesses on a regular basis who understand the research, and lack of or enforcement of a policy. In one case, the organization had a policy in which researchers witnessed and signed every lab notebook page for a partner researcher. In another case, lab notebooks were dated all the time, but witnessed only when the lab notebook was full or when important notes were taken.

**Conclusion and Recommendations**

The importance of IP, IPRs, and IPM has increased over the years in R&D intensive industries as evidenced by the recent special issue of Business Horizons entitled ‘Protecting your intellectual property right’. A higher level of knowledge of legal issues is needed to successfully create, protect, and exploit IPRs by stakeholders. The knowledge of certain critical legal facets of IPM was assessed: ownership of the invention, public disclosure of the invention and grace period, and record keeping practices. Although the study highlights these issues in only one jurisdiction (Canada), it is believed that they can help to guide practice in other global jurisdictions if the TRIPS Agreement at the World Trade Organization (WTO) from 1994 regarding the governance of IPS becomes less complex and more consistent with the goal to have increasing overlap across more global jurisdictions.

Respondents had a good knowledge of assigning IPRs to their employers. A careful determination of inventorship/ownership early in the process is crucial for obtaining valid patent rights. A related issue to ownership is reward for inventing. Many respondents were never rewarded for assigning their IPRs to their employers. It is essential to institute fair reward policies for all employees to encourage innovation. Some of the common ways of rewarding include: a
respondents to the questions of grace period length found among different target segments of geographic locations and organization sizes were not real. Data are from a sample of Canadian private and public sector managers/researchers and thus it is acknowledged that having responses from a multi-jurisdictional sample would be preferable. This is acknowledged as a limitation of the present study in terms of applicability beyond the Canadian context. It should also be acknowledged that the study did not address the potential for bias associated with non-response or social desirability. This is acknowledged as a weakness of the present study.

Knowledge of certain legal issues, such as correct inventorship/ownership of the inventions, timely public disclosure of the invention (when needed), utilization of grace period and proper record keeping practices are critical to obtaining valid patent rights which are, in turn, crucial for commercializing inventions. Thus, although it is acknowledged that this proposition is not new, it is hoped that in reiterating the received view, the authors illustrate the importance for stakeholders to have basic knowledge of these issues and processes. This paper’s contribution is not a theoretical one, but more appropriately a practical contribution through the illustration of a survey tool that can be employed by various public and private sector organizations to better diagnose as well as better educate their employees about the critical issues surrounding obtaining valid patent rights. The survey questionnaire in this paper can be used in the current, modified or expanded forms by others to assess knowledge in their organizations as well as for designing suitable educational material highlighting these critical legal issues, so that they can obtain valid rights and successfully commercialize their inventions.

References


Appendix 1
Surveys Questionnaire for Assessing Knowledge

Section I: Ownership
Do you know the meaning of the expression intellectual property? 
Yes
No

Have you been involved in developing/managing any intellectual property?
Yes
No
Don’t know

Do you own any intellectual property?
Yes
No
Don’t know

Have you assigned your intellectual property to your organization?
Yes
No
Don’t know

How were you rewarded upon filing, issuing, licensing, or selling of your patent?
Promotion
Given a part of royalties
Never rewarded
Other

Please provide any general comments that you may have on ownership issue.

Section II: Public Disclosure
In your opinion, which one of the following constitutes a public disclosure? (check all that apply)

- Publishing a research paper in a journal
- Presenting a poster at a conference
- Posting an abstract at a conference web-site
- Describing your invention to your mother
- Discussing your invention with a patent agent/lawyer
- Describing your invention to a third party under confidentiality agreement

How long do you have before you have to file a patent application in Canada and the US after you have made the public disclosure?
3 months
6 months
1 year
2 years
No time limit

How long do you have before you have to file a patent application in Europe after you have made the public disclosure?
3 months
6 months
1 year
2 years
No time limit

Which one do you think is best for your career?
- Publish a research paper
File a patent on your results
First patent and then publish your results
Other
Please provide any general comments that you may have on public disclosure issue.

Section III: Record Keeping
Do you witness & date your lab notebooks?
Yes
No
How frequently do you witness & date your lab notebooks?
Never
Once a week or more often
Once a week to once a month
Less frequently than once in month
Other
Please provide any general comments that you may have on record keeping issue.

Section VI: Profile Information
What is the nature of your organization?
Company
Government
University
Other
Where are you located?
Western Canada
Central Canada
Eastern Canada
USA
Europe
Asia
Other
Which industry do you belong to (please choose the closest answer)?
Biotechnology
Telecommunication
Medical
Pharmaceutical
Chemical
Neutraceutical
Other
How many years has your organization been in business?
0-5
6-10
11-15
more than 15
What is the category of gross sale of your organization?
$0-$100,000
$100,001-$1,000,000
$1,000,001-$10,000,000
$10,000,001-$50,000,000
more than $50,000,000
I would rather not disclose.
How many employees does your organization have?
0 to 25
26 to 50
51 to 100
101 to 500
more than 500
What type of products/services does your organization provides?
What is your position?
Summer student
Graduate student
Technician
Post-doctoral fellow
Scientist
Manager
Executive Manager
Other
How many years you have been working in your profession?
Less than 1 year
2-5 years
6-10 years
more than 10 years
Please provide any general comments that you may have on this survey.