

Intellectual Property in the AAAS Scientific Community:

A descriptive analysis of the results of a pilot survey
on the effects of patenting on science.

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Stephen Hansen
Jana Asher
Amanda Brewster



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Directorate for Science and Policy Programs
American Association for the Advancement of Science
1200 New York Avenue NW
Washington, DC 20005

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Contact Information:

Stephen A. Hansen
Directorate for Science and Policy Programs
American Association for the Advancement of Science
1200 New York Avenue, NW
Washington, DC 20005
Tel: 202 326 6796
Fax: 202 289 4950
Email: shansen@aaas.org
URL: <http://sippi.aaas.org>

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Executive Summary

Historically, academic scientists chose to disseminate basic research findings and inventions through free and open channels such as informal sharing, journal publications or conference presentations. These basic discoveries had little immediate commercial value for the author to appropriate privately, but could prove highly useful for other researchers to build upon. The reward structure of academic science reinforced this practice, awarding prestige and tenure on the basis of discoveries published in journals and provided openly to the scientific community. The patenting of intellectual property generated by research, while pursued by academics in some fields, was primarily reserved for discoveries made in the commercial sector, which could be developed into marketable products and bring monetary rewards to their inventors.

The past two decades have seen an increase in patenting, most notably in the life sciences, by both industry and academic scientists in the U.S. Much concern has been raised that this increase in patenting would create an “anti-commons” effect¹ where basic, non-commercial academic research would be hindered by the imposition of long negotiations and expensive licenses to acquire necessary research inputs from either industry or academia.

In early 2005, the Science & Intellectual Property in the Public Interest (SIPPI) project at the American Association for the Advancement of Science (AAAS) conducted a survey to help determine the effects patenting has had on research conducted by academia, industry, non-profit organizations and government in a range of scientific fields. The survey was conducted on a random, stratified sample of 4,017 drawn from AAAS membership. A total of 1,111 AAAS members responded to the survey, providing a response rate of 28%. Of these respondents, 76% reported that they were actively conducting or managing research or specializing in intellectual property.

This survey allowed us to gain some insight into the way scientists approach their own intellectual property, including their motivations for protecting IP. From the results of this survey, it appears that there are some appreciable differences in the methods by which scientists in different fields and sectors protect and disseminate their IP.

Acquiring Patented Technologies

Overall, 24% of respondents conducting or managing research or specializing in intellectual property reported acquiring a patented technology for use in their research since January 2001. Within almost every scientific field, respondents from industry reported acquiring technology at a higher rate than respondents from academia. The majority of these (79%) reported that the technology originated in their own field. Additionally, 11% of respondents from a field outside the biosciences identified their technology acquisition as originating in a bioscience field.

For those attempting to acquire intellectual property, the greatest overall proportion of respondents reported acquiring their last patented technology through the use of a material transfer agreement (MTA). The use of MTAs was concentrated among

¹ Heller and Eisenberg, 1998.

bioscience respondents and academic bioscience respondents in particular. For industry bioscience, non-exclusive licensing was the most common method used in the acquisition of technologies. In both industry and academia, exclusive licensing was one of the least used methods for technology transfer.

In terms of the time spent in acquiring technologies, non-exclusive licenses accomplished transfers of technology most quickly, with 39% of these transactions completed in less than one month. These were followed by informal transactions and MTAs (27%). The greatest proportion of technologies that took over 6 months to acquire involved exclusive licensing.

A total of 16% of all respondents reported that their work had been affected by difficulties in attempting to obtain patented technologies. A total of 40% of respondents who had acquired patented technologies since 2001 reported difficulties in obtaining that technology. Bioscience respondents working in industry reported the most problems, with 76% of those reporting that their research had been affected by these difficulties. By contrast, only 35% of university-based bioscience respondents reported difficulties that affected their research.

Of the 40% of respondents who reported their work had been affected, 58% said their work was delayed, 50% reported they had to change the research, and 28% reported abandoning their research project. The most common reason respondents reported having to change or abandon their research project was that the acquisition of the necessary technologies involved overly complex licensing negotiations.

Protecting Intellectual Property

Overall, 46% of respondents reported that they had made a discovery or created a technology they considered eligible for some form of intellectual property protection since 2001. Within every scientific field, a higher proportion of respondents from industry reported creating IP than respondents from academia. The scientific fields with the highest proportions of respondents creating IP were math and computer science (77%) and engineering (69%).

Of the methods used to protect IP, patents were used by 55% of those who reported creating IP. Copyright was the second-most common method for protecting IP (21%). Patenting was highest among industry respondents in the fields of chemistry (94%) and biosciences (85%). Among academic respondents, those in the field of engineering reported the highest rate of patenting (68%). Academic respondents in the fields of chemistry (59%) and biosciences (56%) reported relatively high patenting as well.

Of the 55% of respondents who reported using a patent to protect IP, 41% described their most important since 2001 as a research tool – a technology used to conduct research and is not the subject of the research itself. Among university scientists this proportion was even higher, with 50% characterizing their patented technology as a research tool.

Overall, 25% of the respondents who disseminated their technology included a research exemption that allowed the patent holder to continue to conduct research on or with the licensed technology. 32% of respondents who licensed the technology included a research exemption.

Although the survey found that the greatest proportion of respondents who created IP did in fact patent it, 66% of respondents overall, representing both academia and industry, reported publishing as the primary means used to disseminate or share their intellectual property. Sharing informally was the second most frequently reported means of dissemination. An overall total of 85% of respondents said they disseminated their intellectual property through either publication, sharing informally, or both methods.²

For those who had not disseminated their technologies, the most frequently reported reason was that they were developing or commercializing it themselves (65%). The top reason among academic respondents why they did not disseminate their technologies was that they planned to conduct future research with it (40%).

While the survey found that patents were the most common means used to protect IP, especially in the fields of chemistry and biosciences, the licensing of these patented technologies is not the primary means respondents within academia acquire or disseminate technology. And while it may be difficult to demonstrate from this unweighted sample, it appears that academia has been less affected than industry by more restrictive and formal licensing practices in order to acquire necessary patented technologies for research. In fact, difficulties reported by industry respondents in attempting to access patented technologies outnumbered those of academic respondents by a ratio of more than 2:1. This may be due to the fact that industry reported creating and holding more intellectual property than academia, as well as the fact that industry relies more on licensing, which entails more and longer negotiations than other more traditional and informal forms of technology transfer still used within academia.

² A 2003 study by Walsh, Cohen and Arora found that despite numerous patents on upstream technologies, academic researchers experienced little problem in accessing knowledge. In a more recent study Walsh, Cho, and Cohen (2005) found that the major reason that academic researchers themselves denied requests to intellectual property was that they were protecting their ability to publish.