Patenting academic invention

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Time was when technological universities restricted themselves to furthering the interests of scientific technology for its own sake. This was a noble task, not to be tarnished by ‘pernicious industry’. These days however, commercialising university knowledge and invention is a core business. Delft University of Technology is on its way to becoming a patenting university.

Just like any industrial enterprise, a university can use a patent as a strategic instrument to improve its standing, or at least to maintain it. Consequently, Delft University of Technology (TU Delft) now follows an unequivocal and consistent patent policy. The university currently has a patent portfolio of over two hundred inventions – making it the leader among Dutch universities – and emphasises the importance of commercially viable inventions to research groups and researchers, while offering royalty arrangements aimed at encouraging them to protect their inventions with patents.

Until about fifteen years ago, the rule was that the company that TU Delft conducted research for, or with, would apply for any patents. Today however the university usually applies for patents itself, while also handling the marketing of its inventions. This enables the university to better protect the freedom of research, publication and education, while also providing an opportunity to generate additional income. Applying for patents for the university’s scientific-technological knowledge is not new, but what is new is that the university actively encourages this and that the government applauds it. Why this reversal in patent policy?

TU Delft has close ties with trade and industry. The university’s predecessor, TH Delft Polytechnic, also had close contacts with the world of commerce. Industry was interested in knowledge, and in return gave the university its support. As an

The Patenting Paradox

The number of patents filed by Delft University of Technology and other universities, businesses, and research institutes, has been growing, in particular since the 1980s. Practical application has been lagging, however. Various European surveys show that currently most patents (up to seventy percent) are not being used effectively. Dr Gasnier, assistant-director of TNO’s patent office, who lectures on patent management at TU Delft and other universities, calls the phenomenon the patenting paradox. In his book, ‘The Patenting Paradox’ (www.patenting-paradox.com), he demonstrates that although institutes recognise the importance of patents, after being granted a patent they fail to follow up on its practical use. ‘Serious gaming’ is an effective solution to help understand and improve a complex system such as patent management. Gasnier has developed a game for the institutes involved, the purpose of which is to help scientists, technology marketers and managers understand how patent management works, and to demonstrate how they can improve the yield of a patent portfolio. The game improves the participants’ awareness of not only the importance of patenting, but also of improved collaboration and a detailed patent-based strategy for technology development.
The curriculum of TU Delft (and formerly TH Delft Polytechnic) includes a range of legal subjects. Prior to 1940, the curriculum included courses in administrative law, trade law, industrial property law, and constitutional law, among other subjects. Some of these subjects were compulsory – trade law and constitutional law were compulsory as late as the 1950s. Industrial property law (taught by Professor Dr Ir. A.R. Veldman LL.M., and others) and patent law were never made part of the set curriculum. From 1977 to 2006, Ir. A. Rijlaarsdam LL.M., lectured on patent law and policy as an elective subject. As of 2006, this subject is taught by P.A.C.E. van der Kooij LL.M., from Leiden University. The purpose of this course is to provide students with sufficient knowledge to enable them to understand the legal ramifications of inventions in a professional context.

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Patent law
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example, the Bataafsche Petroleum Maatschappij (now Royal Dutch Shell), which started research in Delft in 1928, provided Delft Polytechnic with funds in 1951 to construct and outfit two pilot plants for physical and chemical technology on the corner of the Mekelweg and the Prins Bernhardlaan. The common opinion was that the results of technological research should be made generally available at no extra cost through publications and conferences. This is why scientists did not – and still do not – have any interest in patents. They seldom filed for a patent on any of their inventions, and if they did, it was because they had solved an industrial problem and their commercial partner wanted to quickly protect the invention. Since the protection of intellectual property was not an issue, at least not formally, there was no policy to manage the rights and other matters relating to patents. The research conducted at Dutch universities is partially supported by public funds, however, and as research efforts and interest in research grew, the patenting of research results came in for questioning. During the 1970s, a patent application for a new transport system – filed by a professor at Twente Polytechnic at his own expense – led to questions being asked in the Dutch Parliament about who held the rights to an invention. Was it the inventor, or the university? A committee looked into the case and awarded the rights to the inventor, a decision that met with little resistance. During the 1980s, new developments led to the university taking a fresh look at its intellectual property. Government spending cuts resulted in universities gaining autonomy and thus having to find ways of generating part of their income themselves. The university executive board became more business-like, and the government wanted the universities to take on more socially relevant research projects, and to make them pay for it. The university became aware of the fact that its intellectual property was very valuable and needed to be protected. For TU Delft, this meant conducting more contract research for commercial partners, and patenting and marketing more inventions. The university had to market itself and showcase its research facilities to industry in order to entice entrepreneurs into participating in research projects. By transferring the ownership of the university buildings in 1992, the state increased the universities’ autonomy, and with it the pressure to run the research facilities on a commercial basis. The degree of collaboration in contract research between TU Delft and trade and industry varies per faculty. The Faculty of Chemical Engineering has for many years been working closely with chemical processing companies, including Unilever, AKU (later AKZO), Shell, and Hoogovens. The first patent corresponding to this was applied for on behalf of TU Delft by ICI on May 10, 1983. More patents soon followed, in particular as a result of the rise of biotechnology. The Faculty of Applied Physics had its inventions patented by the TF (Technische Fysieke Dienst TNO-THD, 1941), but after its merger in 1996 with Chemical Technology and Material Sciences, it followed its own patent policy. Managing and marketing patents is also a task of STW, the Technological Sciences Foundation. Innovations from TU Delft that were successfully marketed by STW include a suction system to improve the stability of motorcars – currently under development at Actiflow, a TU Delft spin-off company – and a directional hearing aid fitted into a pair of eyeglasses, which Varibel marketed in 2006. Researchers took a while to get used to this more commercial attitude. They were cautioned not to publish too quickly, as well as to first contact a contract manager to see whether an invention could be patented, and whether publication could be postponed until a patent had been granted. One of the first patents sold by TU Delft was for a more efficient and environmentally-friendly method for cleaning ships’ tanks. The system had been developed in 1985 by researcher Ir. Verbeek and was sold to a Danish company. In 1993, a bundle of three patents (together with STW) covering new membrane technology (the separation of xylenes for the production of polyesters) were sold to Exxon for 65 thousand Dutch guilders (approx. 350 thousand euro).

Ownership
In the early 1990s, the Dutch Parliament submitted a proposal for a legal status regulation: the regulation would give a university the patent rights to an invention made by someone employed by the university. The proposal lacked a sound legal basis, however, and was retracted. In trade and industry, such inventions had always become the property of the employer, and the Dutch Association of Universities (VSNU) wanted the same rule to apply to universities, in particular because it foresaw a ready source of income from patents and their commercial exploitation. Earlier, in 1985, a national regulation had been accepted: this regulation stipulated that trainee research assistants must waive any patent claims to the university, a development which considerably eroded the right of an individual to claim patents. When the National Patent Act was being considered in 1995, an amendment was accepted that would grant universities all the rights to inventions. In practice, the employer or university gains ownership only if the invention is connected with the inventor’s position and field of expertise. The law awards the employee-inventor the right to reasonable compensation. The emergence of TU Delft’s patent policy was
a step-by-step process. In 1989, the university introduced its first remuneration policy. Starting from 1992, the net profit went to the faculty (minus 25 percent for the employer-inventor), up to a maximum of one million Dutch guilders (approx. 450 thousand euro). Most of the money went to the central university administration. Many scientists did not claim their share, preferring to allocate it directly to their research group, thus avoiding taxation. In 1994, a strategy plan, “Towards a new involvement” was published, in which TU Delft introduced a points system that included patents as production (output) that generated income for the faculty. During the late 1980s, the management of patents shifted from the faculties to the central university administration. Ten years later the university set up a patent contract bureau for each faculty. Since 1991, TU Delft inventions have been reported to the central university administrative level. Within the university, the Valorisation Centre was established in 2006: the centre is responsible for the valorisation of knowledge and the marketing and application of generated knowledge. Ever since, the inventor, the faculty, and the university each receive one-third of the net profit. In political circles, the patenting university was considered a mainstay of the innovative knowledge economy the Netherlands was to become. Expecting to be able to make its contribution, and profit from it, since 1995 TU Delft has repeatedly increased its budget for patent applications. It is an illusion to think that patents can make a university rich, however, as filing and maintaining patents is a costly business. Only one in ten inventions ever yields a profit, and the chances of hitting the jackpot are much lower. Patenting is an attractive option for other reasons though; it enhances the image of the inventive, innovative university, supports the technological sciences, and makes the university an attractive partner for trade and industry to collaborate with. Moreover, for young graduates, having a patent on their curriculum vitae is an advantage. In 2004, patent policy gained even greater weight when the Minister of Education, Maria Van der Hoeven, designated knowledge valorisation as the third core business of a university, in addition to education and research. This was in reaction to a comment made by the American economist, Michael Porter, who said the Netherlands was much less innovative than the United States because Dutch universities had very few patents to their names. In the US, all inventions made at a university become the university’s property by law, with commercial parties then paying market prices for them. Companies in the Netherlands refused to play ball however, arguing that they didn’t want to pay high taxes for nothing.

**Risk-bearing party**

It is important that a university actually markets every patent it acquires. Licensing is the preferred method, because this is more lucrative than simply selling patents. In addition, the application base can be expanded by allowing several companies to participate in the patented invention. Rather than policing the market for patent infringements and monitoring patent agreements itself, the university prefers to leave these matters wholly to the partnering company, since such activities are in the partnering company’s interest. Commercialising patents is a complicated, time-consuming business that involves considerable risks and costs, as well as opportunities. The main challenge is finding a risk-bearing party willing and able to undertake a development process that could take years. TU Delft stimulates this by making intellectual property available (under certain conditions) to investors and other market parties, and by extending a helping hand in the establishment of companies that will develop an invention into a useful product ready for manufacture. The success of these spin-off activities is mainly due to patent-protected inventions. Most of these companies are currently housed at YESI-Delft, an entrepreneurial incubator. Until a few years ago, patent marketing was left mainly to the employee-researchers themselves, but since they had other duties and responsibilities to attend to, many an invention never became a practical application. The university also leaves patent marketing to external business developers that the Valorisation Centre commissions to scour the market for interested businesses.

In 2000, Delft established a limited liability company that was to manage and market all university patents, and generate income for the university. However, due to overly high ambitions and a fear of alienating the inventor’s commitment, the project was cancelled. Today, the Valorisation Centre manages the marketing of patents, although the earlier limited company is set to be resurrected, charged with formalising and professionalising the handling of patents and other intellectual property. In its new role, the limited liability company will become an extension of the Valorisation Centre. TU Delft will further develop and improve its patent policy in order to not only strengthen its image, but also to be a useful partner to trade and industry and to reinforce the knowledge economy.

**The university realised that its intellectual property was very valuable and needed protection**

In 2004, the Valorisation Centre has ten employees, four of whom work in the patent group. In addition, each faculty has a contract manager and a technology transfer officer, which – together with the patent group and external business developers – play a role in the application and commercialisation process. Over the period of 1991–2000, TU Delft employees reported 274 inventions, with patent applications being made for 148 of these 274 inventions (1996, 1998 and 2000 were the peak years). In recent years the annual number of inventions reported to the Valorisation Centre stands at around 50, of which half result in a patent application. The number of current national patents is about 1,300, based on 204 inventions or patent families.