

# SUMMARY

At the request of the State Secretary for Education, Culture and Science, the Royal Netherlands Academy of Arts and Sciences, the Association of Universities in the Netherlands (VSNU), the Netherlands Federation of University Medical Centres (NFU), and the Netherlands Organisation for Scientific Research (NWO) have surveyed the utilisation of intellectual property rights, in particular patents, on the results of scientific research conducted at universities and research institutes. The State Secretary asked the research organisations to conduct this survey because of questions raised in the House of Representatives about better utilisation of patents “when launching start-ups and seeking investors”.

The survey was carried out along two tracks. The first track involved a quantitative analysis of the number of patents filed in recent years. This analysis was based mainly on research conducted by the Netherlands Patent Office, the Rathenau Institute, and MERIT. The authors of the present report are indebted to these organisations for making their research data available. The second track was a qualitative analysis of how universities, research institutes and enterprises interact. More than 35 experts were interviewed for this part of the survey. We are very grateful to them as well.

The analyses have produced the following overview:

## ***Purpose of patents***

Dutch universities have three core tasks: education, research, and knowledge valorisation. Research institutes have education as an important secondary task. All three tasks have knowledge circulation as a dominant theme. In education, knowledge circulates thanks to the mobility of highly educated individuals; in research, by making publications as accessible as possible; and in valorisation, by building bridges between science and society. Commercialisation, which is an aspect of valorisation, may require knowledge that is protected by law (intellectual property, and patents in particular).

Using patents filed on the results of scientific research is thus one aspect of valorisation. In other words: valorisation involves much more than the utilisation of patents.

Universities and research institutes are not primarily driven to generate revenue from their patents, according to the research organisations. Expectations concerning their patent-related revenues should therefore not be pitched too high. Before a patent can generate any profits, the relevant enterprise has to invest in it and bear the associated risk. That is not the primary role of universities and research institutes. However, European competition law requires that a competitive price be stipulated for commercial knowledge transfer. Universities worldwide earn only a tiny percentage of their research budgets from licences and royalties and from selling or licensing patents. In practice, they often manage to cover the operational costs of knowledge transfer from such revenues. In a small number of cases, universities earn a significant amount of their income from a patent (more than € 100,000 per patent). Moreover, placing too much emphasis on commercial valorisation could also put scientific independence at risk.

One of the State Secretary's questions concerned the desirability of setting up a national patent fund. We believe that such a fund would disrupt the critical cost assessment needed to decide whether or not to file a patent. In addition, universities and research institutes do not regard the availability of an adequate budget as a huge problem. In the analysis of the research organisations, then, a national patent fund is neither necessary nor desirable. There is enough budget available at institutional level.

#### CONCLUSION 1

Patents are a means of promoting innovative economic activity. This form of commercialisation is merely one aspect of valorisation (utilisation of the scientific knowledge generated at universities and research institutes). Valorisation hence involves much more than filing and managing patents. Any patent-related revenue is usually generated by commercial enterprises. Worldwide, universities only derive a small percentage of their research budget from patents. Only in a very few instances do these revenues exceed € 100,000 per patent.

#### CONCLUSION 2

A national patent fund is neither necessary nor desirable.

#### ***Rising number of patents***

The number of patent applications filed by Dutch knowledge institutions has increased steadily since 1980. Before then, universities and research institutes hardly ever filed patent applications. Five per cent of all patent applications in the Netherlands are filed by knowledge institutions (reference year 2009). The universities filed an annual average of thirty patents each between 2000 and 2010, with major variations between them. This is comparable to the average number of patents filed by other European and US universities. The research institutes belonging to the Royal Academy and NWO

filed a total of 82 patent applications between 2006 and 2012. Plant breeders' rights and copyright related to software played only a marginal role at Dutch knowledge institutions.

Of thirty "university" patents, twenty have been filed in the name of a commercial enterprise. This can be considered a positive sign of patent use, since the patent had already been transferred to the business sector *ex ante*. The other ten were filed in the relevant university's name. Ten percent of these were then licensed, sometimes exclusively, to an enterprise. In addition, spin-offs based on the patents are common; between 2000 and 2010, the universities set up an average of six to seven spin-offs each. Because these figures represent long-term averages with a sharply rising trend, current annual averages are higher than in previous years. In 2009, the average number of patents filed per university came to 37.6.

The number of patents filed or awarded is not a good measure of knowledge utilisation, and should not be an end in itself. It is, moreover, expensive to file and own a patent, especially after the stage in which applicants have to decide whether to extend coverage to many different countries. Universities therefore only file patents if they consider it useful and necessary. That is usually because they have already sold or licensed the patent to an enterprise, or expect to do so. Sometimes they file patents and hold on to them for a while for strategic reasons. That is often because they are building a broader research portfolio that positions them more favourably with industry. In that sense, universities in fact apply the right cost-benefit criteria when filing and managing their patents.

### CONCLUSION 3

The average number of patents filed by Dutch universities each year is comparable to the average figures for other European and US universities. More than two thirds of Dutch patents are sold or licensed to existing or new enterprises. The facts thus disprove the suggestion that many patents are never put to use.

### ***TTOs***

Whether the number of patent applications will continue to rise in the years ahead depends on various factors, including the efforts of Technology Transfer Offices (TTOs). Almost all knowledge institutions have set up TTOs to promote knowledge (and not only "technology") transfer. That goes some way towards explaining the rise in the number of patents. TTOs are a relatively new phenomenon and they are working hard to build their expertise and experience. Initially, they focused mainly on new economic activity, in the shape of start-up firms. They then extended their sphere of activity by joining existing enterprises in research consortiums. At present, they are working to create knowledge ecosystems, i.e. innovation networks of knowledge institutions, enterprises and governments. Science and business can derive the greatest benefits from one another in such systems.

The TTO's job basically comes down to encouraging commercial activity based on scientific knowledge – in other words, business development. Many TTOs also have

additional tasks, for example assisting researchers with funding applications and research contracts. That is not only useful, it is also crucial to building a good relationship between the TTO and the researcher. Researchers have the most praise for TTOs that work closely with them in the laboratory and that feel at home in the relevant fields and allied markets. When TTOs act as close partners to researchers, they can work more efficiently and effectively with them to develop, substantiate and delineate patent claims.

Dutch TTOs differ from one university to the next and they are also in varying stages of development, which amplifies the differences between them .

#### CONCLUSION 4

Dutch TTOs vary significantly in quality. One reason is that the TTOs are undergoing a steep learning curve.

#### RECOMMENDATION 1: PEER-TO-PEER COACHING

To speed up the learning process, VSNU, NFU, NWO and the Academy can organise and encourage the TTOs and TTO staff to engage in peer-to-peer coaching. They can also try to introduce more overall uniformity and transparency in the written and unwritten rules and improve the quality of working methods related to knowledge utilisation at universities and research institutes, for example by focusing on start-ups and investors. This recommendation can be addressed most effectively within consultative bodies for TTOs at VSNU/NFU and the Academy/NWO. Collaboration of such bodies in a single entity would boost the learning effect.

#### *Unused potential*

Just because very few patents actually end up “collecting dust on the shelf” does not mean that all the knowledge developed at Dutch knowledge institutions is being used to best advantage. Unutilised potential is undesirable, given the importance of innovation. The situation requires urgent improvement. Potential is being left untapped in two different ways.

First, there are many ways that knowledge can be used without patents or other forms of intellectual property (such as copyright) playing a role. As stated above, valorisation involves much more than patent use. It also means offering scientific advice, having individual researchers serve as experts, making collections and instruments available, appearing and publishing in popular media, and taking part in the public debate. It goes beyond the remit of the State Secretary’s request to carry out a broad survey of valorisation practices, however.

Second, it is likely that devoting more attention and effort to patents will allow us to identify more patentable inventions or to prepare better patents. The role of the TTOs as mediators is crucial in this respect. Their importance will continue to grow as patent portfolios become ever more complex.

The task of identifying patentable inventions in fact requires TTOs to operate as close to the laboratory as possible and to focus, at least, on the strongest research so as

to encourage better utilisation of patents even in fields that are relatively unexplored.

The good practices of foreign TTOs with long track records offer several signature features and key figures that can help guide young TTOs towards maturity. Dutch TTOs are already adopting such practices. They concern tasks that a TTO should, at the very least, be able to undertake, for example tracking patentable inventions, filing for patents, negotiating with commercial parties, concluding contracts and partnership agreements, drafting business plans, founding commercial enterprises, and so on. This means that a TTO easily requires a staff of some ten FTEs, among them professionals with a suitable level of expertise, who have a solid mandate from the university's board and the ability to talk to both researchers and industrialists. By issuing a mandate of this kind, the board and executive directors also indicate how seriously they take the TTO. The quality of the TTO team is a decisive factor when it comes to utilising intellectual property rights in the results of scientific research. The composition of the team can vary.

The team's quality must become evident in its achievements, which should hence be considered in evaluations. It is therefore advisable for TTOs to publicise their achievements and make them visible to the public, preferably on a national website. That means that all patent utilisation should be arranged through TTOs. This would be in line with efforts to fulfil and monitor the third core task of universities and *research institutes* (alongside education and research), i.e. valorisation. The research organisations can encourage their TTOs to develop in this way by introducing a system of peer-to-peer coaching and evaluation.

In certain specific and strong fields, for example cardiology and oncology, the TTO role could be scaled up to the national level, following the good example of some national TTOs in other countries. Outstanding institutional TTOs are a basic requirement in that respect. In order to identify three to five other fields besides cardiology and oncology that would benefit from a national TTO, STW Technology Foundation can invite tenders.

## CONCLUSION 5

By continuing to improve the quality of the TTOs and raising awareness among researchers, it will be possible to identify more patentable inventions and boost the quality of patents. The number of patents should not be the ultimate target, however. It only makes sense to file a patent if there is a realistic chance that it will be used. There is plenty of opportunity to improve valorisation in other ways; after all, patent utilisation is only a small part of valorisation.

## RECOMMENDATION 2: SOLID MANDATE

University and research institute boards must invest more in the quality of their TTOs. The TTO should have a solid mandate, and it should be able to capitalise on that mandate. That means that it must be capable of attracting employees with a suitable level of expertise.

## RECOMMENDATION 3: TRANSPARENCY

The research organisations must encourage TTOs to clarify, within a period of two years and on a publicly accessible website, what opportunities for patent utilisation the universities and research institutes have exploited, insofar as doing so does not lead to conflicts of interest, and if necessary in anonymised form.

## RECOMMENDATION 4: IDENTIFY PATENTABLE INVENTIONS

In order to identify patentable ideas, researchers must be fully aware of their importance. University and research institute boards must ensure that researchers are convinced of this.

## RECOMMENDATION 5: NATIONAL TTOS

An impetus is needed that can be achieved by focusing on specific combinations of strong research fields and markets on a national scale. A national effort of this kind can be set up experimentally for research in cardiology and oncology and the associated diagnostic tests and treatments. STW Technology Foundation can undertake a tendering procedure for three to five additional national expertise centres.

### ***Principles, rules, working methods and interests***

Universities and research institutes adhere to the same principles with regard to their intellectual property policy, substantiated under the heading *Purpose of patents*. The rules based on these principles are generally similar, but by no means uniform. In addition, the institutions may apply the same rules differently, or follow certain unwritten rules. That is equally true of public-private research consortiums (which are often temporary in nature). Enterprises find this particularly confusing and would like to see more harmonisation. For example, all the universities have arrangements whereby the fee paid for a patent or a licence is based on its current market value, and the inventor or inventors receive fair compensation. Knowledge must be transferred for a “fair deal”, but a definition of “fair” is nowhere to be found. Inevitably, each case will have to be treated on its own merits – and that is precisely what a professional TTO should be fully equipped to do. It is therefore neither feasible nor desirable to pursue uniform rules and implementation, and in actual negotiations enterprises are much more likely to insist on securing their own position first – anyway.

The fact that public and private parties have conflicting interests need not prevent productive cooperation between them. The real art is in doing justice to all the participants’ interests in the knowledge ecosystem while remaining within the statutory

boundaries. Parties are becoming more proficient at this, and by learning from each other as they go through a steep learning curve, TTOs can make improvements on precisely these points. That is already happening to a large extent, but we can promote this even further by having the TTOs of all the knowledge institutions and public-private research consortiums join in this learning process.

## CONCLUSION 6

Although the basic principles are the same, institutions adhere to different rules and working methods in patent utilisation. Enterprises find this confusing and it may impede efficient and effective knowledge transfer. Uniformity in the rules and in implementation is unrealistic, however, because each individual case must be customised. What TTOs can do is attempt to make their working methods as transparent as possible.