

# FROM RESEARCH TO LIFT-OFF

## THREE EPO CASE STUDIES

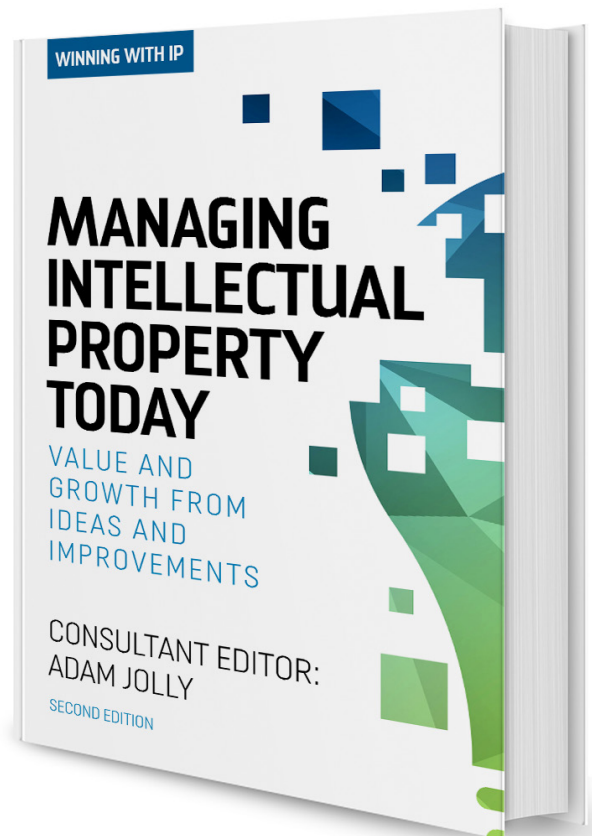
In a book about how today's winners are lining up their IP, three EPO case studies in technology transfer highlight the IP experiences and insights of researchers, innovators and professionals in creating high-growth, high-impact ventures. Thomas Bereuter and Ilya Rudyk at the EPO report.

In April 2021, Nasa's helicopter, Ingenuity, made its maiden flight on Mars. Its promise of a new era in exploration was realised in part using a lightweight, durable fabric of carbon fibre developed and commercialised at the Chalmers University of Technology in Gothenburg. The venture that it inspired first proved itself in Formula 1, before becoming one of Sweden's highest growth companies and taking to the air over Mars.

Impact at scale is being researched at University College Dublin too. There, researchers have re-written the rules for electrical muscle stimulation and have laid the foundation for a USD 45 million venture, Atlantic Therapeutics, to bring relief to the 400 million people who suffer from stress and incontinence, sexual health dysfunctions and other associated disorders.

In retrospect, the potential in both these ventures might seem obvious. In reality, they had to overcome a wave of challenges and self-doubt. For a team of four female inventors at Ege University in Turkey, failure also seemed the most likely outcome time and again. Now their product will soon be on the shelves and they are running their own commercial R&D company, Dermis Pharma.

Each of these ventures has found its way through the complex cycle which every start-up undergoes. Alongside energy and determination, the common denominator for converting research into high growth that investors will fund is the commitment to develop their intellectual



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Drawing on the knowledge and experience of 20 top-level IP performers, including the Innovation Support team at the European Patent Academy, this book reports on how IP is being used post-pandemic to create tech solutions, pick up the latest thinking, take a competitive lead, negotiate the best deals, knock back any challengers and open up a path to breakthrough growth. It gives a series of lessons and insights about how today's winners are lining up their IP to transform early-stage ideas and technologies into assets around which competitive business models can be designed.

Further details: [www.novaropublishing.com/managing-intellectual-property-today](http://www.novaropublishing.com/managing-intellectual-property-today)

property in such a way that the products covered by the resulting protection actually meet the needs of users. In addition, patenting first and publishing later was in line with their own academic commitments.

Early-stage technologies are consistently hard to establish. They are too far from the market for potential partners or funders to back. In each of the three cases here, IP created a foundation to attract feedback and withstand failure, so the idea could move forward to the next stage.

Oxeon, the Swedish creator of carbon-fibre fabrics for Mars, changed and adjusted its business model 24 times in its first year. Atlantic Therapeutics met with unexpected resistance and suspicion when it first launched in the United States. The team at Dermis twice failed to find a licensing partner: rather than give up, they broke with academic tradition and set up their own venture.

In a new series of case studies from the EPO, each venture has highlighted its takeaways on its path to transforming original research into commercial applications for use in real life – or in the discovery of Mars.

### **Oxeon: from the lab to Mars**

Oxeon began life as two patents and a mock-up. Experiments on the use of composites for textiles during the 1990s had led to the novel weaving of carbon fibre as a lightweight and durable fabric. The researcher, Nandon Khokar, only applied for a patent when persuaded to do so by a family friend, who, as a professional investor, saw the potential in his ideas.

The question of how to commercialise it was taken to the school of entrepreneurship programme at Chalmers, where two students chose it as their elective module. They could see its potential for aerospace, but realised it would take time to be adopted in such a regulated industry. So to prove their technology in practical applications, they turned to users more open to experimental technologies in the field of sporting goods in general, and Formula 1 in particular.

Their next question was what business model would suit these users. Originally, their focus was on the core technology. Then they switched to selling machinery under licence, before settling on products close to market. All told, they experimented with 24 business model variations in their first year.

After making their mark in Formula 1, they expanded into other sporting goods and started to build their brand. By 2010, they had proved their concept sufficiently for aerospace and were recognised as a super-gazelle, winning

an award as one of Sweden's highest growth companies.

At each stage of the company's development, senior managers have kept its IP under close review. Today, a strategy committee reviews each disclosure of invention, making one of three decisions: patent it, keep it as a trade secret or give it back to the employee inventors to develop themselves.

Their policy is to patent an application as close to the market as possible. Or they will opt to keep it a trade secret if it cannot be reverse-engineered. Other IP is pursued in close collaboration with suppliers and customers. The discussions are covered by non-disclosure agreements, and trade marks are registered within their customers' domains to strengthen the story for each market.

For Oxeon, the beauty of IP is that it provides a framework that lets them pivot, maybe not as radically as at the beginning, but in a continuous process of adaptation to what customers and partners require. The company's founder is still actively involved, scanning the technology landscape for what might happen next and drafting the next generation of patent applications.

### **Atlantic Therapeutics: USD 45 million for the US and wearables**

The scientific rigour of a patent from University College Dublin (UCD) has created the foundation for a new venture, Atlantic Therapeutics, to raise USD 45 million to open up the US and Asian markets. The technology's range is expanding too. After first building its credibility with medical professionals, it is now appealing more directly to consumers, and new patent applications have been filed for a wearable version.



The research started broadly in electrical muscle stimulation, with the initial focus on back pain. As a technique, electrical muscle stimulation goes back to the 1800s, but was previously limited to the treatment of tissue close to the surface. What if instead of two electrodes, you linked up a pathway to reach deeper muscles?

A PhD student switched the focus to a problem common to the middle-aged: stress urinary incontinence (SUI), suffered by one in three women and one in ten men. Or 400 million people globally. A small test to check how this pathway of electrodes could re-educate the pelvic floor led to marked improvements and glowing reviews. To follow up, a collaboration was formed with medtech company BMR, with one of its employees joining the research team that was being formed.

As it was likely that significant foreground IP was going to be created, a joint ownership agreement was signed. Such agreements can cause complications when permissions are required later, but in this case, the university's knowledge transfer office was able to ensure that all the necessary rights were cleared and in place.

Together, UCD and BMR filed a priority-securing application followed by an international application under the Patent Cooperation Treaty (PCT), giving themselves up to 30 months to decide in which markets to file. In parallel, the university granted BMR an option on an exclusive licence on its relevant IP in the field of SUI. Royalty rates were set against industry benchmarks and the university was freed of any liability. The technology could still be used by the university for research and teaching.

One of the primary potential sources of conflict in such partnerships was thus turned to their advantage. Disclosure through publication can jeopardise the inventive and novel status of an invention. However, scientific credibility was equally important to BMR, particularly in the US in countering me-too offers from competitors. So the principle of patent first and publish later, together with a timetable, was agreed to meet everyone's academic, legal and commercial interests.

Two years later, in 2014, the product was launched with an initial focus on medical professionals in Europe. The IP portfolio continued to evolve as more know-how was accumulated, and in 2017 as well in 2018, two patent applications were filed in which the electrodes were incorporated into wearable shorts.

By then, the product was ready for the next stage of its evolution, which would involve the most intense scrutiny of its IP by investors. Now branded and trademarked as

Innovo, the product was spun out into a new company, Atlantic Therapeutics, with the aim of launching in the US and Asia. So far, a total of USD 45 million in three rounds has been raised to establish Innovo as a mainstream product.

None of these developments has come as a complete surprise to the research team. Within the department, an active IP culture is fostered by holding regular meetings with the knowledge transfer office team and including them in discussions about impact. Such exchanges might seem formal and time-consuming, but the effects are long-lasting. The lead researcher on the programme for electrical muscle stimulation, Professor Brian Caufield, has already embarked on two further ventures.

### **Dermis: IP bounces back until technology ready**

Four female inventors from a Turkish research lab have finally reached the stage where their product is about to go on sale in the shops. To get to this point, they have had to overcome a series of failures and setbacks. Through it all, their IP has given them the foundation they needed to find a way forward.

The four inventors created a Turkish start-up by bringing in their university as an in-kind shareholder in their spin-out. They gained national recognition as entrepreneurs, walking away from a venture capital deal and eventually learning enough about commercialisation to land a deal with a pharma major. On the back of all these experiences, they are now building their own commercial R&D company, Dermis Pharma, while continuing in their posts at the university.



The company's skin patch, Dermalix, helps wounds to heal and then disintegrates when the body's cells form new tissue. It offers hope to those suffering from chronic wounds, such as the 50 million diabetics whose mobility is at risk from foot ulcers.

This all started when the four researchers were encouraged by the technology transfer office at Ege University to submit an invention disclosure. Because of the costs and the complexity, they opted not to pursue it themselves and instead transferred the technology to the university, who used the EPO's IPscore tool to assess it. Based on five criteria - technical, legal, market, strategy and finance - the go-ahead was given to file an international patent application under the PCT.

Two initial options were pursued for attracting investment: under licence or as a research collaboration. Neither led any further at this stage and research grants were now starting to run low.

Support then arrived from an unexpected quarter. An accelerator awarded the inventors a grant to investigate the potential for an option that had previously been considered too risky: a spin-out. They then received a grant from a national acceleration programme to create a venture, Dermis Pharma, which would enable them to increase the level of technology readiness and further build the commercial case.

By now they were reaching the end of the PCT's 30/31-month window for filing internationally. After consulting with industry networks, they selected the 36 most promising territories in which to file. Further clinical trials were funded by a venture capitalist. However, they were reluctant to give up too much autonomy for further investment. Instead, they reached agreement with a Turkish pharma company, Abdi Ibrahim, which was attracted by their strong patent portfolio and the close match of their price-benefit ratio to patients' needs. After two years of negotiation, all patent rights were transferred to Abdi Ibrahim with a view to launching their skin patch, Dermalix, in 2021.

The four inventors continue to have responsibility for ongoing research into skin patches and have remained at their posts at the university. Their company, Dermis Pharma, is also growing steadily as a commercial lab for pharma and cosmetics companies.

### Pointers for IP in action

All of these case studies draw on the insight and experience of multiple actors involved in transforming research into

real-world uses. In combination, they offer a series of IP pointers for the technology transfer journeys that matter on the road to high growth. These insights and lessons are described in full in the individual case studies. Here are some of the highlights:

- Create IP that gives you the power to pivot. At the beginning, you can try out as many business models as you need. Later, you will have a clear structure which will allow you to adapt to insights from your partners and feedback from your customers.
- Make the most of your PhD students. They are a significant source of innovation for investigating likely or alternative uses of technology, whether carbon fibre for textiles or electrical pulses for stress urinary incontinence.
- Take a portfolio approach combining patents, trade secrets, trade marks and other IP rights to give yourself complementary protection and improve your control over the technology and negotiating position.
- Design your IP around the likely evolution of the technology and the demands of its users. Be smart enough to challenge existing beliefs, whether it says that you can't own IP jointly or that spin-outs are too risky. Instead manage the risk when in balance to the created opportunities.
- Investigate all forms of support in commercialising your IP. Experienced technology transfer offices excel in establishing and negotiating your rights. Accelerators can help you investigate the market and speed up your adoption.



- Use the EPO's IPscore tool to systematically assess the state of your technology against the criteria of technical, legal, market, strategy and funding.
- Take a strategic view on what to patent, what part to keep as a trade secret and what inventions to release back to employees. Then ask how close to the market you can make your patent filing and what part you can keep as a trade secret, particularly when it cannot be reverse-engineered.
- Capture receptive niche markets to build sales and brand awareness as a preliminary to entering larger markets with higher barriers to entry.
- Agree the principle of patent first and publish later together with a timetable that delivers benefits to everyone. Publication does not have to clash with patent disclosure.
- Use patents and publications to add scientific credibility, particularly in markets where you can find yourself competing against copy-cats.
- Make maximum use of the 30/31 months that you are given under the PCT to talk to users and investors, before deciding on the markets to which you want to extend your patent protection.
- Be exclusive, but not secretive. IP protection puts you in a strong position, but you should keep talking to your partners and customers. Their feedback will open up more innovation opportunities. Either talk to them under non-disclosure, or discuss the outcome and benefits of your technology without giving away the details of how it works.
- Adopt an IP culture around your research, checking out the options you have informally. You will then have some context when choosing which commercial direction to take or when you are ready to launch your next venture.

*Disclaimer: any opinions expressed in this article are those of the authors or companies and not necessarily those of the European Patent Office.*



For more **EPO case studies** from a broad cross-section of researchers, innovators, professionals and funders involved in turning research into commercial impact, go to <https://www.epo.org/learning/materials/sme/innovation-case-studies/technology-transfer-case-studies.html>.

For details of the **High-Growth Technology Business Initiative**, see <https://www.epo.org/learning/materials/sme/high-growth-technology-businesses.html>. To stay updated, follow the high-growth technology business community on [www.linkedin.com/company/htbcommunity](http://www.linkedin.com/company/htbcommunity).

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### Winning with IP: Managing intellectual property today

Published January 2022, 148 pages, paperback,  
229mm x 152mm, ISBN 978-1-7398640-0-2

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