

The Triple Helix Interaction: University-Industry-Government Relations

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Innovation in science is increasingly dependant upon the interaction between the government, industry and academia, represented by the universities. This interaction, labeled “the Triple Helix,” has developed as a fluid exchange of ideas and technologies, with fewer barriers between academia and industry for information flow [1]. This is aided by government initiatives that encourage the involvement of universities in technology transfer. In the UK, this includes Knowledge Transfer Partnerships and Knowledge Transfer Networks, which provide financial

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support for collaborative projects encouraging research, technology transfer and the commercial exploitation of science and technology [2]. The Royal Society itself offers an Industry Fellowships scheme.

It seems that, since the founding of modern biotechnology in the early 1980s, industry has been regarded as somewhat taboo by the academic world, which steers away from capitalists only interested in gaining a profit. The news that large pharmaceutical companies spend more money on advertising than research and development do nothing to alleviate this image [3]. However, there are examples to the contrary: Amgen, a large American pharmaceutical company, actually loses money with its drug Nplate (Romiplostin), as it was formulated to treat thrombocytopenia (a lack of blood platelets) in patients with chronic immune (idiopathic) thrombocytopenic purpura (ITP), a rare disease with an incidence of about 5 in 100,000 children [4]. Profits made from drugs that can be more widely used, such as anti-cancer medications, are ploughed back into the development of drugs such as this that can make a huge difference to people's lives but are not needed in vast quantities.

Universities are increasingly becoming closer to industry by providing a “natural incubator” for the development of new companies [5]. This allows the university to fulfil a third mission outside of teaching and research – economic and

social development [5]. An example of this is Solexa. It was set up by Professor David Klenerman and Professor Shankar Balasubramanian of Cambridge University in the late 90s to develop Solexa sequencing, a new way of sequencing DNA that was several orders of magnitude faster than any other technology available at the time. The company was built over a period of about ten years, in which time both founders continued working in academia at Cambridge University. The University supported the venture and thus became a small shareholder in the company, becoming a prime example of the way in which universities can foster innovation in science and technology.

In the current economic climate, with decreasing monetary support from the government, it could be advantageous to try to increase funding from industry. This is a difficult area, as many funding schemes from industry only cover short periods of time and are allocated toward very specific areas of research [6]. Industries may frown upon the changes in research direction that so often happen within the lab. The withholding of data until a patent can be achieved is also an issue in many collaborations between industry and academia [6]. However, patents have only been found to be 10% of all knowledge transfer activities between universities and industry – much can be gained besides them alone [7]. The advantages that come from access to new ideas, knowledge and potential future researchers are often perceived as much greater than patents.

In the future, academia and industry may become even more tightly interwoven as companies recognise the academic capacity to generate and exploit intellectual property rights by coming up with new ideas that may be profitable. Policies supported by the government that initiate the move towards researchers that are also involved in companies, or set up their own alongside academic work, may provide a chance to make the world of academics more self-sufficient, leading to a more innovative future. Bi-directional knowledge flow, if supported, could be advantageous both for those in the lab and in the boardroom. ■

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