

Corporate funding of research at universities

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September 29, 2004

1 Introduction

Modern research requires an ever increasing amount of money. While a couple of centuries ago one could still invent light bulbs and steam engines in the backyard, most of today's research requires big investments for laboratories, supercomputers and other expensive equipment. In these economical dim times, governmental organisations are less keen to invest in research. Private companies can come to help: they can invest in research projects they find interesting, or, financially rewarding. However, this comes at high costs.

In this paper I will address some issues when companies fund research projects at universities.

2 Research

2.1 Companies

Companies have to do keep up with their competitors, so they have to innovate new products. Especially in modern areas research is important: big companies in the chip industry have to come up with increasingly faster circuits, or they won't be able to keep up with their competitors. Research and innovation are also important in the pharmaceutical world: it takes years to put a medicine on the market. When the patents expire, the product is often offered by other producers at a lower cost, thereby cutting the income of the inventing company. Pharmaceutical firms have to research new medicines all the time for them to have an income.

In these markets, the figures spent on R&D¹ are huge: both Intel and Akzo Nobel spent 15% of their revenue on research, accounting for as much as USD 4 billion for Intel in 2002. Research and development is a business

¹Research and development

of its own, and every university could use some of the money that is going around in this field.

2.2 Universities

Researching is expensive nowadays, and universities know that as well. In fact, it is getting more and more expensive. One can not inspect DNA with a magnifying glass, nor research distributed computing with one computer.

However, research needs to be done at universities. A university has the resources for in-depth research: not only the material, but also the people. A university is a catalyst to researchers, enabling them to better communicate with each other and use and share resources and material.

Not only could universities use some funding, it would also be cheaper and easier for a company to outsource research. Therefore it could be of both interest if major companies pay for research, done for them by universities.

2.3 The drive for research

Research is done for the greater good. People as a whole have both the ethical motivation as the obligation to leave the world a bit better than that they found it. Some people have the, somewhat naive, urge to research to make this world a better place.

Other people research out of curiosity. They think they can understand the world better with the outcome of their research, or maybe that they become a better person of it.

Companies, however, research only for economic profit. One may argue that this is the only valid reason in this capitalist world, and that the above two arguments are just reasons for an individual to become a researcher, whether that is for a company or a university. Even if that were so, the question remains whether these two forms of motivation, ethical and economical, are compatible and interexchangeable with each other. Only if that is true, a blending between corporate and academic research is possible.

3 Disadvantages

The main advantage is clear: universities get more money from corporate sponsors. There are, however, some disadvantages.

3.1 Biased research

When a company funds a particular research, it probably expects results which can be economically profitable for the company, either now or in the future. The company may explicitly say that the researches do not get their money if the results are not satisfactory, or impose pressure on the scientists.

Even if that is not the case, the researchers know that they are funded by a corporate sponsor. They probably can figure out for themselves that if they don't provide some beneficial results to the sponsoring company, they will probably not get the money next time they need it for a research project.

Therefore, the researchers are under pressure to deliver results, which automatically influences the results, whether it is consciously or not.

3.2 Innovation instead of research

Research is something different than innovation. Innovation is the development of something of which one knows that it can exist. Innovation is the making of a prototype of something that is technologically possible. The point of innovation is that there may be one or more obstacles along the way of production, which cannot be foreseen but can be discovered during the process of innovation.

Research is much more fundamental. With research one hopes to discover something new. In research one can not know the results. A scientist may research a particular object or field of which not everything is known, in the hope to discover something about it. As Einstein put it: "If we knew what it was we were doing, it would not be called research, would it?"

According to Stahl, 'for some, technology is "applied science".' It is true that science sometimes leads to useful things. It also often leads to nothing. One does not know whether one is going to get something useful out of it, but when a science project has results, these are a real addition to the knowledge of mankind. This is not the case with innovation, which only leads to information of how to build a certain product, and only for a certain company.

Ellul on the other hand, is in strong disagreement with Stahl: "This traditional view is radically false. It takes into account only a single category of science and only a short period of time: it is true only for the physical sciences and for the nineteenth century."

I would argue that it was not even true during that time: what was then called science was actually trying things till something useful came out. Nobel heated nitroglycerin in a pan above open fire. Nobody who has a scientific explanation of what this chemical substance does would have tried that. Ellul: "The sequence of inventions and improvements of Solomon De Caus, Christiaan Huygens, Denes Papin, Thomas Savery, and so on, rest on practical trial and error. The scientific explanation of the various phenomena involved was to come much later."

Innovation delivers quick and predefined results. Therefore, innovation is much more attractive to companies, which want to make and sell products as much and quickly as possible. Companies will give more money to innovating projects, thereby putting research projects on the background.

3.3 Lack of coincident results

In 1895, Mr. Roentgen was playing with vacuum tubes under current, when suddenly a screen on the other side of the room lit up. He couldn't believe his eyes when he held his hand in between: he had discovered X-rays.

In 1928, Alexander Flemming forgot to wash his petri dishes when he went on a vacation. Some mould had grown on the culture plates. When Flemming came back, he discovered that the bacteria did not grow near the mould because of some substance coming from the mould. He named the substance penicillin.

As should be clear from these stories, a researcher does not always discover what he was looking for. In the process of researching one may well stumble upon something not known before.

Assume someone is researching something on field A. He is getting corporate funding for that research, because the company is interested in everything that happens in field A. When the researcher now discovers something, possibly by accident, in field B, he is less likely to investigate that further, because he more or less has the obligation to keep working in field A. He can not continue his research in field B, because the company would stop his funding. Thus a possibly good discovery is neglected.

3.4 Lack of guaranteed results

When the researcher *does* research further on field B, the company will pay for something they are not interested in. Companies should think this through before they pay for a research project. In fact, they are not hiring this person do to what they tell them to, so they can not impose much restrictions on the researcher. Companies may make a big mistake investing in a research project with the expectations to get reasonable results.

3.5 Lack of freedom

Companies are not just that friendly that they want to give money to research projects. They expect something in return. Therefore, new findings are not released until patents are filed. When scientists want to get some information, they first have to sign non-disclosure agreements and other contracts, to make sure the company is the only one that can make a profit on this discovery.

This slows down the research process. It is possible that one group can put the findings of another group to a very good use in their research project, only had it been made available at time. Patents, contracts and company rules inhibit the free information flow and does damage to researching.

William Stahl refers to the Challenger disaster. NASA had become a bureaucratic company, a science business. Therefore, mistakes were bound

to happen sometime.

3.6 Decreasing quantity of research

If, somewhere in the future, companies are funding universities, it is likely that the government will cut back their expenses on this field. It would be nice if they kept spending as much on universities, but this is not likely. Companies, instead, cut on their own R&D department. In the end, less money goes to research. In fact, company research is moved to universities, and university research disappears. Instead of helping the universities, it changes universities to a common R&D lab of major companies.

4 Possible solutions

4.1 Selective investments

As stated before, it is tempting for a company to only invest in innovation. The disadvantage of that is that it pulls away the scientists from the real research. Some university departments are not really doing any fundamental research, but are only innovating. This could be the case in mathematics, for example, where surprises during research are less likely than in biology. A company could invest in these departments, so that they minimise the effect of limiting research.

This is of course no solution to the other problems described above. Furthermore, it could be possible that researchers “talk” their projects into the field where the funding is. For example, a biology research project could get some funding from the computer science faculty, if they do some research on bioinformatics.

4.2 Total freedom

Companies could allow researchers total freedom. They do not impose limits on the researchers, nor do they limit the distribution of the results. This would of course be a good thing. Most of the above disadvantages of corporate funding have to do with companies taking away freedom from the scientists. However, companies are not filantropic institutions and are not likely to give money away for free.

4.3 Investing institutions

There could be a institution, which decides where money from companies should go. Researchers could sell their findings to this institution, where after companies can buy specific results. This would have the advantage that companies get what they are interested in. It will still have many of the

above problems, but now the institution can be more objective on which research projects to select. One can argue that the Nobel Foundation is such an institution.

5 Conclusion

There are a number of disadvantages to corporate funding:

- biased research
- innovation instead of research
- lack of coincident results
- lack of guaranteed results
- lack of freedom
- decreasing quantity of research

There is only one advantage, which is money. This single advantage may be a greater motivation than all the above limiting factors together.

If there is really a shortage on money, a university could go to a company for funding. They should be very careful about this, for there may not be a chance for them to change their minds. It would be ideal if this money comes *on top* of other sources of income, but I find this highly unlikely.

In the words of Canada's Nobel prize winner, Dr. John Polanyi, "The purpose of research . . . is to uncover the truth. If this is to stand a chance of succeeding, it must be pursued openly . . . and be seen to be free from commercial and political influence."

6 Sources

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