

Why and How Do Firms Link With Scientific Research?

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Abstract

In the modern competitive landscape, firms have approach to the scientific research, with the aim to provide a sustainable offer based on specific knowledge. Although, science is elusive and hard to understand, the private sector has begun an intensive effort to link with research activities, incorporating on their new products development. This article describes such relationship and the mixed results obtained.

Key Words: innovation; scientific research management; science commercialisation; intellectual property administration; appropriation; new product development

Introduction

The increasing competitiveness of modern economy has led companies to look for a different approach on their strategies to do business. Many firms have pointed to the scientific field as a possible source to find new and fresh ideas, which can contribute to develop their new products. However, basic research is elusive and hard to understand for commercial firms, encompassing a number of events. Briefly, I can say that basic research is the built knowledge with the aim to discover and understand fundamental principles. Mainly it is the scientist's concern in a problem, in a way to comprehend a phenomenon. Company will only be involved in such activity if science could produce a practical value for them. Nevertheless, the prediction to determine if some basic research could lead to an innovation is extremely difficult; therefore, the interaction between science and business is not that simple to perform for both parties.

Most of innovative firms like as in the pharmaceutical or electronic industries make links with scientific departments on universities, with the aim to discover the cure for cancer or the most efficient way capturing solar energy. Moreover, governments support these initiatives through subsidies, but the process equally presents a series of obstacles.

In the current knowledge based economy, innovation is described as an extraordinary force which can even change the course of a nation. With the risk to be simplistic, I can say that innovation can be started by basic research (though basic research barely helps firms to perform daily activities) on universities. Those main producers of new basic knowledge transfer the intellectual property on publishing, patenting and academic entrepreneurship. At the time this new understanding is spreading, entrepreneurs decode and transform it in the design of useful product.

This connection might never happen, but for firms the positive outcome of eventual results worth the investment of time and resources. It pushes new forms of thinking within the organisation, which may lead to produce revolutionary ideas (Czarnitzki & Thorwarth, 2012). For example, the modern automobile owes a large part of its existence in the pure chemical research. Concisely, those actions from education institutions allow other non-educational organisations, notably firms, to obtain access on the new knowledge and eventually lead to an innovation (Perkmann et al, 2012).

Broadly speaking, academic research and commercial firm neither have the same goals nor timing. Meanwhile, universities and research centres look for a publishing result, a scientific novelty, which can be added to the building of knowledge. Such process easily could take years. On the other hand, companies are heading for instant results on the economic trade-off aspect. Following this situation, there is a strong cultural behaviour among both worlds that makes them even more difficult to connect. In some cases, firms prefer to take the internal approach instead of looking into the university laboratories. The reasons are multiple: previous success on the company product development, slow pace on the scientific research and the fear to share internal secrets that can reduce their position.

The question is why firms still keep connecting with scientific research? In the modern world, the exchange of information has become crucial to tackle new challenges and institutions not able to collaborate and connect with each other will face bigger constrictions. In addition, firms not looking for solutions on the labs will be limited to a few internal alternatives and merely conforming to what *can* do instead of what you *want* to be.

External and internal science

Firm's ability to assimilate and exploit external information is necessarily related to the use of knowledge in the search for innovation. By investing in certain activities, firms can improve their ability to identify value and exploit knowledge that is built-up from an exterior source. At the same time, the ability of companies to link with universities provided them the accessing to public knowledge and the opportunity to transfer to their business.

Why is that important? Because from this action firms can start the understanding of the principals underlying of the scientific knowledge system, hence researchers can avoid costly time on experiments that will end as failures or low-valued outcomes. It is supposed that firms with superior internal research knowledge and connections to external scientists are going to have more benefits.

However, a big problem persists. Basic research is not produced at the same pace as companies would like to commercialise it. Putting in other words, science doesn't have the quickness that market demands. The reason for this paradox is that basic science is financed by the Government and just a few firms have expectations to generate positive cash flow from that; as a result, there is no pressure for science to produce faster for economic purposes. More to the point, conducting a research is always a long and sometimes painful process which could take years. Several analyses and experiments have to be done before the scientist is sure that his research deserves to be public, and afterward face the scrutiny in another extensive period of peer approval.

From the commercial point of view, research science involves an enormous risk, which additionally could be explained in:

- Initial investigation might have zero impact in terms of commercialisation.
- Knowledge could turn out to be accessible to all; and instead of creating innovation, we end up with a commodity available to all competitors.

Adding all the costs to recognise the external knowledge embedded in a specific research.

Martin (2012) claimed that in rare occasions the work and research of universities is translated into the form of new products or services for industrial organisations. Moreover, Geyger (2012) prevents about this situation, saying that probably just the largest firms could afford the basic research for new innovations. Therefore, there is a real danger that soon significant parts of the scientific knowledge will be private property and will be out of the public domain. That is a bad news for the technological progress and a clear contraction of the spirit of science described as “communitarian”.

On the other hand, the patent system is expensive and not really affordable for everyone. The market requires exchanging information in order to improve the product. But information is not always available on the industry, when firms are developing a product which main goal is to beat the competitor. Therefore, competition exacerbates the problem and creates an encapsulation of the knowledge identified and previously translated by the company. What it started as a public common is now converted in a secret.

So the question remains: Why do firms continue to invest in basic research? Principally, research generates indiscriminate benefits among significant parts of the society. Thus, as a primary conclusion I can say the benefits of such discoveries have a great impact and it is the mission of the company to secure future revenues based on knowledge. Firms with bigger portfolios of products are the major beneficiaries from such aspect, because they have more alternatives to use innovations as a new force in a final good or specific industrial problem.

Sixth sense of science in business

Probably it was during World War II when Governments realised about the importance of scientific knowledge to win the war. From then, many thinkers have been argued that the possibilities of science were unlimited and soon it will be used as an economic factor to improve the wealth of societies. Such ideas lead companies to establish their own R&D department; and later, research bodies begun to ask for public help to perform their activities, where most of the privates wanted to participated.

However, we can differ in how to make use and commercialise science. I have the opinion that science is not very useful in terms of finding value when the scientists work with pieces not linked and try to discover the gunpowder. Although it is fair for their career to make a breakthrough discover and get the recognition, it becomes more beneficial when they combine components as well use as transform the public knowledge. As result, the R&D in the firm can exploit the research funded on grants and deliver a beneficial product for the community.

If firms invest in specific activities linked with scientific research, they can improve their judgement to identify value outside of the company. This is particular important when abilities and knowledge are difficult to find and are not available in a traditional market transaction (Fabrizio, 2009).

One external source of knowledge, especially in the high-tech industry, is university, which importance has been growing in the last 20 years. But the firms need a fundamental knowledge of their business and understand what the market requires; there is a tramp, when a prominent group of scientists agree that one discovery is remarkable it wouldn't necessarily have an instant commercial impact.

Remarkable, we found a key aspect of firms understanding science. When companies have the internal R&D capabilities, such unit provides them with a wider comprehend of what is being doing outdoors. At the end of the day, this strategy generates a better collaboration with the science community and supply the firm with a “sixth sense” to identify value on basic research.

The result of all this comes along through the extraordinary effort from the entrepreneurs. Companies must realise that the knowledge which they are absorbing is not completely free and neither easy to exploit by the competition. Hence, it has an astonishing value.

Conclusions: Research capability of the firm

As I have exposed, the relationship between public basic research and economic performance is important. However, the introduction of R&D and innovative product/service/process into the business is complex, hard to interpret and expensive to maintain. In contrast by this point of view, scientific research continues its pace, creating direct and indirect benefits. It won't stop, especially nowadays, when governments are putting more resources to finance it. The national economy depends on science to build their own capabilities and get rid of external influences; hardly true for less developed countries.

Relatively few economists today would support the purely informational approach for scientific research. Nonetheless, science is a public good; organisations are required to perform an investment to understand it. Thus, scientific knowledge is not freely to all, save for those with the right educational background and firms would desire to have their own R&D department engaging in external collaboration in order to acquire information stored in universities.

In high-technology industries, partners provide access to the information needed for creating a product as well as to obtain information from other parties. Consequently, external sources of knowledge and information will benefit the firm upon the motivation and ability to acquire them. It is conceivable for firms to establish a technology alliance with multiple partners over time.

In the context of new product development, the absorption of external knowledge, as we can appreciate, depends on the research capability of the firm. Hence, firms with established research competence have better opportunities to take advantages on opportunities from the new technological knowledge.

When a firm does not have the know-how to develop a component or lacks of the experience, the product will be delayed. Having a potential situation where the competitors can exploit such circumstances. As result, the readiness companies will keep bridges with external resource, in order to maintain permanently their competitive offerings. On the other side, less effective firms on this area would tend to incorporate innovation links and create new forms of knowledge; otherwise, without such adaptive culture, they will perish.

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