Needs for inclusion of technology transfer skills in curricula

Chet I.

in

Romagosa I. (ed.), Navarro M. (ed.), Heath S. (ed.), López-Francos A. (ed.). Agricultural higher education in the 21st century : a global challenge in knowledge transfer to meet world demands for food security and sustainability

Zaragoza : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 113

2015
pages 117-120

Needs for inclusion of technology transfer skills in curricula[1]

I. Chet

Union for the Mediterranean (UfM)
Calle Pere Duran Farell, 11,
08034 Barcelona (Spain)

I – Introduction

In 2010 I began working at the UfM in Barcelona as the DSG in charge of the Higher Education and Research division.

As you know Israel is a small country, we are less than 8 million habitants; however, on NASDAQ, Israel is classified as number 2 after the USA. This year, we are number 3 after the USA and Canada, before all European countries. I believe it will be interesting for you to learn how Israel was able to achieve this and I would like to point out that I am not saying that this is the best way but at least I will be able to give you an indication about innovation and our practices. As for myself, I was an academic for many many years in university and one day a friend told me to look up the meaning of academic in the dictionary. It states: "theoretical or speculative without practical purpose or intention; having no practical meaning or usefulness"; so I moved to the UfM.

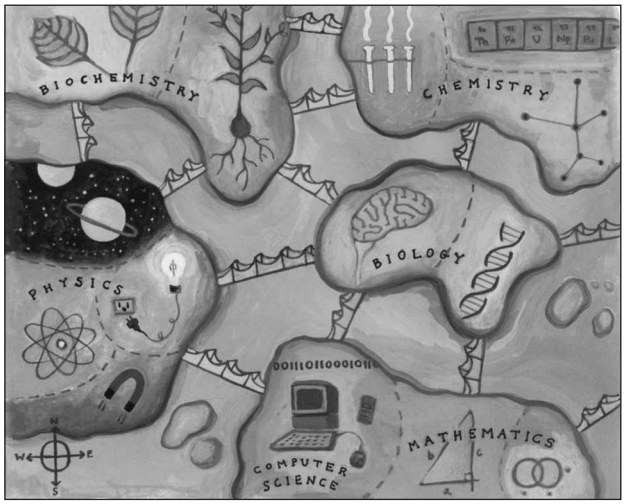

Fig. 1. Interdisciplinary Science.

[1] Illustrated transcription of the speech given by the author at the International Conference on "Agricultural Higher Education in the 21st Century. A global challenge in knowledge transfer to meet world demands for food security and sustainability" (Zaragoza, Spain, 15-17 June 2015, http://www.iamz.ciheam.org/educagri 2015/). The figures have been taken from the author's presentation at the Conference.

As you know science is becoming more and more complicated and today we often talk about interdisciplinary science. We combine biology and chemistry and it becomes biochemistry and the same with physics. So technology is more and more complicated.

I'd like to talk to you about the connection between academia and the industry because this link will bring us new inventions and new start-ups. University researchers come up with an idea, the research involved then leads to a publication. On one hand they receive public grants and contracts from companies on the other. The result of the research if it's applied research, are the patents. Companies apply research strategy and develop R&D through these patents. They have university scientists who support the industry in developing new inventions and often lead to new products. Universities benefit by receiving royalties or stock from these companies.

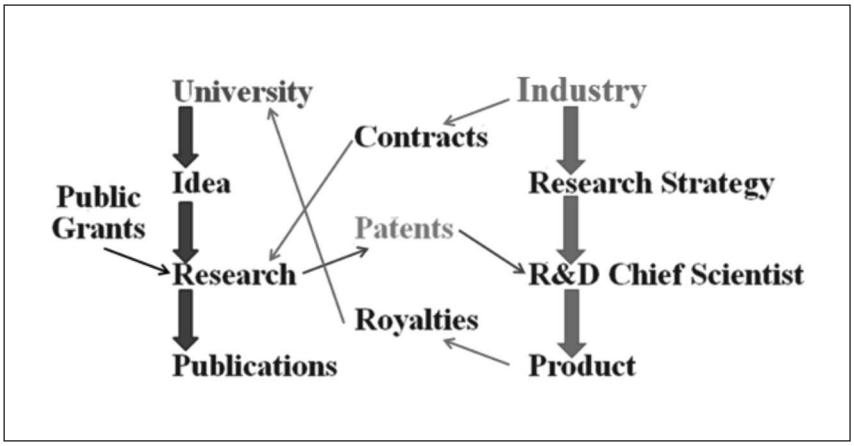

Fig. 2. Academia-Industry relationship.

If we look at the actual situation in most countries, we have university research institutes and laboratories. Companies are always searching for new inventions and products. The link between them is through what we call the Death Valley. It is a gap that we have to bridge between the unfinished product researched by the university and the product the company is looking to create. We most definitely need governmental support which is important and essential for the end results.

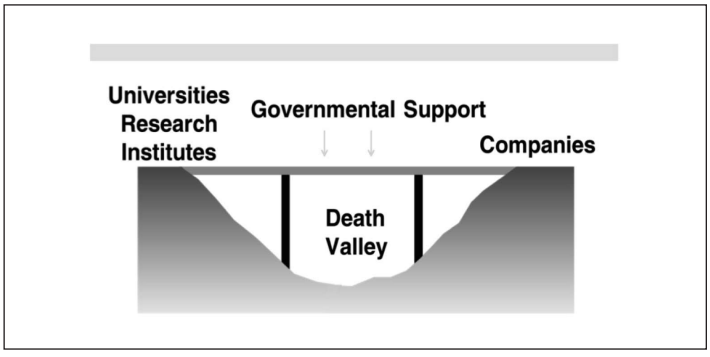

Fig. 3. Bridging the "Death Valley" gap between research community and companies.

Now, a lot of people talk about innovation and say how important it is to stimulate innovation, but innovation cannot be taught. We need to nurture it in the right atmosphere so that people will be stimulated to go towards innovation, and for this we need to give incentives to researchers in innovation. I will give you two examples of innovation in agriculture. There is a variety of tomatoes developed in Israel called 'Daniela'. They are very famous because of their long shelf-life. They can survive outside of the refrigerator for up to 3 weeks. There is also another new development which is a plastic cover that is placed around the base of a tree. The wave like shape allows it to have a large surface area. It collects the dew and rain. Moreover water evaporates from the soil, rises to the top and then returns to the soil. It can save up to 50% in water.

Fig. 4. Left: the Tal-Ya Tray: A simple, scalable solution to some of the world's biggest problems. Right: lemon trees planted simultaneously, after 3 years of identical care and drip irrigated; tree on left uses Tal-Ya Tray, tree on right does not.

Quoting Eleanor Roosevelt, she once said that *"the future belongs to those who believe in the beauty of their dreams"* and always an inventor has to be a dreamer.

So let's now discuss technology transfer. Universities in Israel are semi-public universities and are therefore not allowed to do business directly with companies. They own companies and the companies deal with technology transfer and bring these findings to the marketplace. The company protects the university inventions and inventors and licenses them out through their team of professionals. It is very important that the inventor is protected by the university. Typical departments in technology transfer companies are; intellectual property dep., legal dep., business development dep., finance dep. etc.

I'll give you an example of Harvard and as a top university in technology transfer. They disclose approximately 300 inventions a year, 133 new patents applications, 38 US patents issued, 37 licences to companies and 7 start-up companies are created. This is a typical successful university. Now let's see an example of what universities can do with their inventions. The most successful one is from the Weizmann Institute in Israel which makes around 150 million dollars a year. Other examples are MIT: 76, Stanford University: 62, California University: 57 and the Hebrew University: 50.

This is not common in Europe. What I learned from visiting a university in Europe is that in Europe the tradition is that professors are less involved in invention and in the money aspect and there is a kind of reluctance to partake. I think first of all that this is not healthy and in my view is even immoral in a way because public universities are taking money from the tax-payer towards innovation and then when they have an invention, instead of receiving a substantial contribution towards their budget, they receive very little or nothing in return. Many good European universities don't take

advantages of their inventions and they give them away actually for free. As for the patents, in our system the researcher is always the inventor registered on the patent. However the university always owns the patent and never sells the patent but gives an exclusive license to the company, investor, venture capitalist etc. The intellectual property income is divided between the university and the researcher. If you remember I told you about the incentive you have to give to researchers – In our country we give the researcher 40% out of the royalties or stock because sometimes the start-ups don't have money so they give part of the stocks to the university and the researcher. This is a win-win scenario for everybody because the researcher doesn't have to hide his invention, it can be recognised by the university, the university receives a contribution from the company and the researcher is protected by the university and gets his/her share and an incentive to develop it. In Europe it is mainly being developed in the UK and Switzerland after the basic model in the USA.

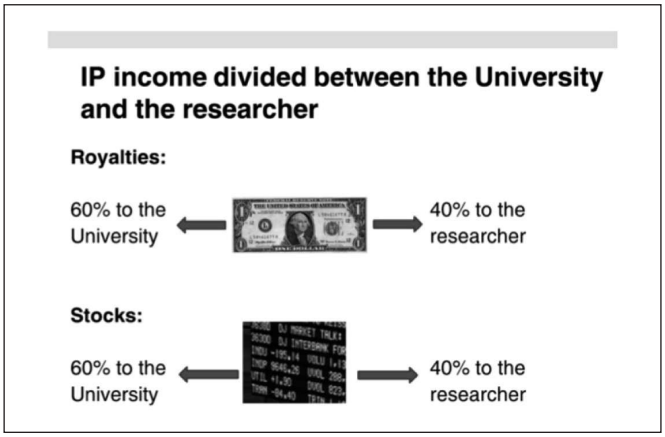

Fig. 5. Share of intellectual property generated incomes in Israel.

The anticipated time for a research application is between 2 and 7 years but you cannot expect to have a product after 2 years. The most successful product developed from the Weizmann Institute and made approx. 150 million for the university is a drug for multiple sclerosis makes over 3 billion each year in sales. It took almost 18 years to develop, so it takes a lot of time and a lot of patience is required.

When I was young I thought that inventions were the most exciting and the most important things. Over the years I have learned that marketing is not the most important tool but it can be just as important as the invention. Marketing products from universities can be problematic. First of all, marketing sometimes is not aggressive enough. There are difficulties in negotiating good contracts and many companies are exploiting universities. The contracts that are signed are weak in litigation. In many cases, companies do not believe that universities will sue them if problems arise.

On the other hand, to a scientist's advantage, he/she will receive a consultation bonus by the company. The patent is registered under the scientist's name. In many universities today patents account for the success and promotion of the professor. Occasionally there is scientific recognition, royalties or company stocks shares, and a strong chance of developing the product further.

I have to emphasize that we do not allow the researcher to be involved in the company itself, he/she can act as a consultant but never in a presidency or official duty. This may lead to a conflict of interest. As a whole, the 5 stages of a project are: excitement and euphoria, disenchantment, search for the guilty, punishment of the innocent and distinction for the uninvolved.