Chapter 6
A Lab-to-Market Ecosystem in an Academic Environment

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ABSTRACT

This chapter will examine the challenges and opportunities confronted in the commercialization of research-based technologies in a university setting. Particular focus will be brought to the identification and creation of a university-based entrepreneurial ecosystem and ways of sustaining it. To provide more detailed context, the authors will cite specific programs and outcomes from these programs, resources and strategies currently utilized and embodied by the Maryland Technology Enterprise Institute, Mtech, at the University of Maryland, College Park (UMD). Particular challenges and obstacles will be discussed including intellectual property issues, conflicts of commitment, and conflicts of interest. Finally, as a way of assisting others in creating a university-based entrepreneurial ecosystem, guidance will be given as to the resources necessary to create and sustain it.

INTRODUCTION

The purpose of this chapter is to introduce the reader to an entrepreneurial ecosystem that was developed within the A. James Clark School of Engineering at the University of Maryland with the expectation that it can be a guide for other universities that might be interested in instituting similar programs and activities. The initial concept for a program to better connect companies with Clark School activities in ways to benefit both came from the Dean of engineering and his advisory board in 1983. After considerable planning, funding was obtained from the state of Maryland to set up a center called the Engineering Research Center (ERC), later renamed the Maryland Technology Enterprise Institute (Mtech). One of the initial programs, begun in 1985, was an on-campus incubator to nurture technology-based startup

companies started by regional entrepreneurs and by University of Maryland faculty. Funding for a second major program, to connect faculty and graduate students with Maryland companies to help the companies to develop new products and services was obtained, and the program was initiated in 1987.

In the late 1990's it was becoming obvious that students were increasingly interested in entrepreneurship, and a living-learning entrepreneurship program was started in 1999. This program was the first program in which students selected for their entrepreneurial spirit lived together in a section of a residence hall, took courses on entrepreneurship topics, started companies, and were mentored to help their companies become successful. This program was followed by a rapid succession of other programs and activities to begin building an entrepreneurial ecosystem (Barbe, 2010).

The success of these programs and activities and the several national awards recognizing them are among the reasons that he authors believe that this chapter might be useful to other universities that are interested in initiating similar activities. Accordingly, this chapter is based on the experience of programs of Mtech and its partners within the University and the region. Ways will be suggested that other universities can start similar activities by defining and addressing the scope, focus, and management of programs necessary to facilitate the successful advancement of technology-based spin-outs in a university environment. This will be done in two phases with the first phase describing programs that are currently in operation, and the second phase describing additional programs and activities that could be instituted to create an even more robust entrepreneurial ecosystem. Although the guidance given is for developing this robust and comprehensive phase two ecosystem, specific programs and activities could be selected to achieve the desired goals. Finally, important obstacles that must be addressed in starting companies in an academic environment, including conflict of commitment, conflicts of interest and intellectual property will be discussed.

BACKGROUND

When considering the contribution of universities to the formation of highly successful entrepreneurial environments in the USA, the influence of Stanford University on the development of Silicon Valley and the influence of the Massachusetts Institute of Technology (MIT) on the Boston area are paramount, and these are the models to be emulated.

Before the end of WWII, a relatively small number of technology startup companies evolved from or were associated with universities. After WWII, scientists and engineers whose work had been devoted to the war effort, were free to begin entrepreneurial endeavors if they were so inclined. Because a significant amount of the war effort took place in the Boston area around Harvard University and the MIT, startup companies sprouted up there, and the roots of many of these companies can be traced to scientists and engineers who worked on the war effort associated with universities in the Boston area. Two of the most influential individuals responsible for the Boston area becoming a hotbed for tech company formation were MIT professor Vannevar Bush who engineered the first manually mechanically operated analog computer, and Harvard Business School professor Georges Doriot who began the nation's first venture capital firm, American Research and Development in 1946.

Frederick Terman is often called the Father of Silicon Valley (Rao, 2013). He was on the engineering faculty at Stanford University when in the early 1940's he was asked by Vannevar Bush to lead a large defense research project at Harvard University to develop radar countermeasures for the war effort. During that period, he learned a great deal about defense research and how to obtain defense research

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