Chapter 1
Case Studies of North American University Performance in Technology Transfer and Commercialization

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ABSTRACT

This chapter reports on case studies of four North American universities engaged in technology transfer and commercialization. The literature and case studies permitted an understanding of the characteristics possessed by universities and university technology transfer offices that appear to be successful in technology transfer and commercialization. Fourteen characteristics, or institutional enablers, are identified and analyzed in order to determine which among these characteristics have greater influence in the success of technology transfer offices. The chapter concludes that universities with superior-performing technology transfer offices possess two factors in common. First, the university President and other executives concerned in commercialization have to believe in it and make a genuine commitment to its success. Second, the technology transfer office has to be led by an individual who possesses several attributes: the ability and willingness to work within the university structure; the ability to be both an entrepreneur and a manager; the ability to see what is happening in technology transfer and commercialization as it evolves and matures; and to be a leader of people and business.

INTRODUCTION

This chapter reports on case studies covering four North American universities (two in the United States and two in Canada) examined by the authors as they developed benchmarks against which to measure university technology transfer and commercialization (TT&C) performance in other countries. While there has been a significant increase in research into university TT&C since around 1990, there remains a need to develop a coherent and

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broad understanding of the factors that define performance in this environment. This is not to say that fine work has not been done in certain metrics – we use some of the work by the likes of the Association of University Technology Managers (AUTM) in our analysis. But we felt that there remained a need to gain a greater understanding of the range of factors: TT&C processes; Technology Transfer Office (TTO) structure; incentives among researchers; the role of venture capital; and many others, to develop a full appreciation of what made TT&C work in some universities and, from this, to begin defining a model.

Our case studies are developed from interviews conducted at the universities and from data about the universities and their environment from a wide range of reliable sources that included interviews with venture capitalists, consultants in the TT&C field, and written data. Our case studies are of the type called 'explanatory' (sometimes also called 'causal'), because they present: "…data bearing on cause-effect relationships – explaining how events happened" (Yin, 2003, p.5)[1].

We have structured this chapter into five further sections. Section 2 provides background to the environment in which universities engage in TT&C and offers some definitions. Section 3 describes the role of universities in national innovation, identifies barriers facing universities participating in TT&C, and develops fourteen environmental factors likely to affect university TT&C performance. Section 4 contains the case descriptions. It discusses the North American environment and then examines the case study universities under the fourteen environmental factors identified in Section 3. Section 5 discusses the challenges facing North American universities, identifies key factors relevant to TT&C performance, and identifies some actions that universities could take to improve TT&C performance. Section 6 draws together the threads of the analysis and offers some conclusions.

BACKGROUND

The Importance of Universities in Technology Innovation

Publicly-funded research, of which universities represent a significant proportion, is a vital and continuing ingredient in innovations introduced by industry and has been for many years. As it concerns the United States, Narin, *et al.* (1997, p.317) opined that "[a]mong both scientists and economists it is widely accepted that public science - scientific research that is performed in academic and governmental research institutions and supported by governmental and charitable agencies - is a driving force behind high technology and economic growth". They concluded (p.340) that "… public science plays an essential role in supporting U.S. industry, across all the science-linked areas of industry, amongst companies large and small, and is a fundamental pillar of the advance of U.S. technology".

There is strong evidence that university research in the U.S. has been important to a number of innovative developments in seven major industries[2] during the period 1986-1994. Mansfield (1998, p.773) reported that: "Innovations that could not have been developed (without substantial delay) in the absence of recent academic research accounted for over 5% of the total sales of all major firms". And, at p.775: "over 10% of the new products and processes introduced in these industries could not have been developed (without substantial delay) in the absence of recent academic research". He also observed that university research has led to cost savings among the same major firms: "Innovations that could not have been developed (without substantial delay) in the absence of recent academic research resulted in cost savings of about 2%". He further noted that, between his two surveys (in 1991 and 1998), in the later one, "… there was a decrease in the average time lag between academic research results and the first