

# Chapter 11

## What Influences the Growth of Canadian Biotechnology Firms?

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### **ABSTRACT**

*This chapter examines the influence of firm characteristics on the growth of all Canadian biotechnology firms. Data collected by Statistics Canada from four Biotechnology Uses and Development Surveys (1999, 2001, 2003 and 2005) characterise the size, origin, contracts, IP, collaboration, financing, product development stage, tax credits of Canadian biotechnology firms, while employment data from the Business Register of the organisation provides the size of firms beyond 2005. Results show the importance of collaboration for exploration (knowledge) purposes, the importance of alliances for exploitation (commercialization) purposes for firms with rapid growth. Furthermore, a good product development process that brings products through regulation towards commercialization has a positive impact on firm growth and so does R&D expenses.*

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## **INTRODUCTION**

The Organisation for Economic Co-operation and Development (OECD) conducted a workshop in January 2009 on the biotech industry. The organization highlighted the crucial role of biotech in domains such as human health, food processing, environment, textile and energy. The OECD (2009) also suggested that after the recent crisis, economic growth will be supported by ‘green growth’ and more specifically by green innovation, where biotech should have a significant impact via techniques and products. Biotechnology is a relatively recent technology, and as such there remain some uncertainties about how firms grow and what attributes influence the growth of firms. If biotech is to play the role foreseen by the OECD, it is imperative to understand how these firms grow to ensure their future impact on the economy.

Different studies on growth in the Canadian biotech industry have generally focused on startups (Baum, Calabrese & Silverman, 2000), on dedicated biotech firms (DBFs) (Baum, Brian & Silverman, 2004) or on firms experiencing rapid growth or gazelles (Niosi, 2003). For instance, Niosi (2003) showed the importance of exportations to extend the market and increase the returns for Canadian biotechnology gazelles. The author also highlighted the importance of venture capital for its financial and managerial contributions. Baum, Calabrese and Silverman (2000) found that collaboration plays a crucial role in the growth of DBFs in Canada by allowing knowledge transfer between firms.

The OECD defines biotechnology as “The application of science and technology to living organisms, as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services” (OECD, 2005, p. 8). The complexity of knowledge and the need for regulation, due to its impact on the living, makes biotech firms different. Hence, economic concepts generally accepted for other industries need to be validated for biotech.

Using traditional growth models, this chapter studies the influence of firm characteristics on the growth of small and medium Canadian biotechnology firms during the period of 1999 to 2005 and their growth in the short, medium and medium-long terms. An analysis of firms with rapid growth is also included to differentiate their growth factors from those of other firms, if differences exist. Characteristics such as their collaborative behaviour, research and development (R&D) expenditures, intellectual property (IP) protection, products development process, human resources and financial aspects are examined. Different types of collaboration, exploration and exploitation (Rothaermel & Deeds, 2004), are analyzed in addition to the influence of the stage of product development on growth. Finally, the chapter also examines the impact of many of the funding sources that are involved in the different phases of the development of the firms, including venture capital.

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