Chapter 62
Collaboration, Innovation, and Funding as Survival Factors for Canadian Biotechnology SMEs

Catherine Beaudry
Polytechnique Montreal, Canada

Joël Levasseur
Polytechnique Montreal, Canada

ABSTRACT

This chapter aims to determine the factors, such as collaboration, research and development, intellectual property, product management and financing, that influence the survival of biotechnology firms in Canada. The research uses data from four biannual surveys on the use and development of biotechnology collected by Statistics Canada between 1999 and 2005, and follows these firms in the official business register of the organisation up to 2009, to build a Cox proportional hazard model of firm survival. The research finds that firms that collaborate for exploration purposes have better chances of survival than others. Results also suggest that a larger number of patents decreases the probability of survival. Investigation of the product development process shows that because of the vast resources necessary for clinical research, firms enter the production and commercialisation stage in a weak position, which may then result in firm exit.

INTRODUCTION

Understanding the reasons that explain firm survival, is an important motivation in industrial organization and in technology management, especially in the context of high technology and of the knowledge economy. A great deal of research has examined this question in light of the contribution of alliances, partnerships and collaboration in general (a classic example is Oliver, 2001, which suggests that biotechnology firms with fewer alliances face higher exit rates). Unsuccessful alliances can have a devastating

DOI: 10.4018/978-1-5225-8903-7.ch062

effect on firm survival (Alvarez & Barney, 2001). Other scholars have focused on the size and age of the firm (Evans, 1987) as possible causes of premature exit. Being small and young has often been associated with the 'liability of newness' (Brüderl & Schussler, 1990; Freeman et al., 1983; Singh et al., 1986; Stinchcombe, 1965), i.e. the risk of new firm exit. Baum et al. (2000) however showed that firms reduce their 'liability of newness' by entering into alliances with well-established firms.

Following Schumpeter's (1942) thesis, another strand of the literature focuses on innovation as a factor of firm survival. Baumol (2002) even argues that innovative activity has become a matter of 'life-and-death' for firms. A significant body of research argues that competitive advantage brought by innovation is crucial for firm survival (Brüderl et al., 1992; Cefis & Marsili, 2005; Helmers & Rogers, 2010). Innovation or innovative activities are considered in a relatively broad manner throughout the literature: from research and development (Hall, 1987; Esteve-Perez et al., 2004) to patents (Christensen, 1998; Banbury & Mitchell, 1995) and to new products and processes (Audretsch, 1991; Schoonhoven et al., 1990). Not only the firm itself has to be innovative, but also its environment, as Audretsch (1995) shows that firms in innovative clusters survive longer.

In parallel to the intellectual property aspect, Thumm (2003) suggested that patents are an incentive to R&D in biotech, serve as an argument for alliances between firms, and are necessary to obtain venture capital. This brings the funding of firms and projects to the forefront of firm survival. The lack of financial resources in the early stages of development may be the most important problem that high technology firms face (Storey & Tether, 1998). Firms may then turn to business angels (Lerner, 1998), venture capitalists (Gompers & Lerner, 2001), banks and other debt financing providers (Bozkaya & Van Pottelsberghe De La Potterie, 2008), or to the government (Ebersberger, 2011; Girma et al., 2007; Jarmin, 1999) in order to fund their innovation activities. A number of studies show that a lack of funding increases the probability of exit (Carpenter & Petersen, 2002; Becchetti & Trovato, 2002). Audrescht and Lehmann (2004) further added that in a market only composed of traditional bank funding, high tech firms will suffer lower performance than those with access to venture capital. Other studies (Cressy, 2000; Hurst & Lusardi, 2004) suggest that the lack of funding is in fact the symptom of a deeper problem that is the lack of innovation or collaboration.

Building on both the literature on firm survival and on innovation, this chapter aims to determine the factors that influence the survival of biotechnology firms in Canada. Characteristics such as employment, status, contracts, intellectual property (IP), collaboration, financing, products, tax credits, and so on, are examined. Using a proportional hazard model, we determine the factors that contribute to the survival of biotechnology firms in Canada. The novelty of this chapter certainly lies in the richness of the data used; collected by Statistics Canada with its four Biotechnology Uses and Development (BUD) surveys, it is considered as a census (as opposed to a sample) of all biotechnology enterprises in Canada, from small to large firms and in all the different sectors of biotechnology. Our study hence goes beyond examining small samples of dedicated biotech firms (DBF) or purely human health firms (HH) to follow a more global view of biotechnology.

Once we account for a number of survival factors such as collaboration, product development and employment categories, the importance of age and size disappears as contributing factors to firm exit, hence ignoring the so called 'liability of newness'. Our results generally support the importance of collaboration on firm survival, but highlight interesting puzzles concerning the influence of innovation, new products and venture capital.