Chapter 4

An Integrative Model for Technology-Driven Innovation and External Technology Commercialization

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ABSTRACT

This chapter proposes an integrative model for internal and external commercialization of technology-driven innovation. It particularly addresses how firms can practically use external technology commercialization, which is a type of open innovation that is not yet fully understood by academics and managers alike. The chapter first reviews dominant literature and frameworks in the areas of innovation, technology-driven innovation, and external technology commercialization. It subsequently develops an integrative model of technology-driven innovation and external technology commercialization, which combines various extant frameworks of internal and external commercialization of internal technologies and thereby provides a holistic understanding of what it takes to successfully commercialize technology. The model presents various phases in the process from technology to commercialization, such as divergence, convergence, technology transfer, development, validation, commercialization, and product line expansion, and presents the relevant intersections and the alternative commercialization paths. Hereby, this chapter provides a holistic perspective and a practical tool for managers seeking viable commercialization opportunities inside or outside of their firm boundaries.

DOI: 10.4018/978-1-61350-341-6.ch004
INTRODUCTION

Research and practice in the area of open innovation has grown tremendously over the last few years, although a better understanding of the theory and practice of open innovation is still called for (Gassmann, 2006; Gassmann et al., 2010; West et al., 2006). Most research in open innovation follows Chesbrough (2003) who describes open innovation as the use of external sources of innovation and the associated opening up of firm boundaries. On the one hand, open innovation entails utilizing external innovation and knowledge to accelerate internal innovation (e.g. Laursen & Salter, 2006), while it, on the other hand, entails finding external commercialization paths for internal technologies (e.g. Lichtenthaler, 2009). This outbound perspective is based on the assumption that companies cannot or do not always want to internally commercialize their inventions but rather look for external applications to capture value from these inventions. However, as put by Enkel, et al. (2009) “while most researchers focus on the outside-in process, theory lacks of a clear understanding of the inside-out or outbound activities.” (p. 313) Accordingly, despite some case-based research and some recent studies that show prevalence of external technology commercialization (ETC) (Lichtenthaler & Ernst, 2007; van de Vrande, et al., 2009), a comprehensive and practical model that describes the process of ETC is yet to be developed. Moreover, to the extent that the literature addresses this issue, it is largely remote from also considering the alternative of internal technology commercialization. To further advance this area, this chapter proposes a model that provides an overview of the different steps in the process of identifying commercially attractive applications when companies have a technology “on the shelf”, which also combines internal and external alternatives for technology commercialization. To reach this goal, the model provides a technology-driven view of the product development process, which integrates various frameworks in extant literature to provide a holistic perspective and a practical tool for managers seeking viable commercialization opportunities inside or outside of their own firm boundaries.

MODELS OF INNOVATION

While some innovation projects are driven by latent, unsatisfied customer needs (market-driven innovation), others are driven by the creation of a new technology or scientific breakthrough (technology-driven innovation). These two models have very distinct implications for how companies can and should manage the innovation process, not only in terms of creating new technologies but for finding viable commercialization opportunities as well.

One of the first known innovation models is Rothwell’s (1994) Linear Technology Push Model (Figure 1). Developed in the 1950s during a period of rapid industrial expansion, this model suggests that all innovation stems from scientific breakthroughs.

In the early 1970s, many markets were reaching maturity and overall competition among companies increased. In order to capture market share in mature markets, organizations were spending more resources on marketing. It became important to meet the client’s demands better than...