

Chapter 9

Building a Radical Innovation Mechanism at Large Firms

Chintan M. Shah

Delft University of Technology, The Netherlands

J. Roland Ortt

Delft University of Technology, The Netherlands

Victor Scholten

Delft University of Technology, The Netherlands

ABSTRACT

Large firms are generally good at managing incremental innovations, yet they often lack the capabilities that are conducive to developing and deploying radical innovations (RI). Even though many large firms recognise the importance of RI, most of them fail to establish a mechanism, that is, a well defined organisational structure, management processes and resource allocation system that facilitates a systematic and continual development of RI. Drawing on extant literature we build a research framework that explains the obstacles which large firms face with respect to developing radical innovations. We collect data among three large firms, namely Shell, Nokia and IBM, and identify the practices that these firms have developed and a radical innovation mechanism that they have established to circumvent the obstacles for tapping into RI. Following these practices we conclude with implications for managers that are building a RI mechanism for their firms.

INTRODUCTION TO INNOVATION

In this chapter we discuss how large companies can foster radical innovation. We will study three cases - Royal Dutch/Shell, Nokia and IBM, and compare their approaches to innovate radically. Radical innovation in large firms is an intriguing topic, both from a managerial and a scientific perspective,

because these firms almost invariably tend to block this type of innovation although it is imperative for their long term survival. We start with defining radical innovation and then present the questions that we address in this chapter.

The classification of innovations into different types focuses attention to the outcomes of the innovation process (Kola-Nystrom, 2005; Damanpour, 1991). An innovation can be classified as a new product, process, service or market innovation

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among others. On a broader level though what remains the core is the *change* that the innovation brings along. This change can be an incremental or a radical one. For example, an incremental innovation in car engine development could be improving fuel efficiency through the use of variable fuel injection technology, while a radical innovation from the perspective of the automotive, energy and distribution industry would be to run the engine on an alternative fuel such as hydrogen or bio-fuel. Taking this perspective, innovations can be classified as 'incremental' and 'radical' (Leifer et al., 2000; Dewar and Dutton, 1986).

Incremental innovations are often targeted at existing customers by providing, for example, better performance levels than previous solutions could reach. This can take the form of either incremental year-by-year improvements or more random inclusions of technological advances (Christensen and Raynor, 2003). Succeeding in incremental innovation depends on how well a firm performs relative to its existing competitors and involves doing more of the same, but better, quicker or cheaper. There are winners and losers in this race, but the kind of players and the dynamics of the game are relatively predictable when compared to the radical innovations. The mechanisms that firms deploy to excel in incremental innovations include total quality management, Kaizen, knowledge management practices, streamlined processes, integrated product development, close customer interaction and traditional R&D, amongst others (Leifer et al., 2000).

The other side of the innovation coin is radical innovation (RI). Radical innovation can manifest in new businesses, markets, new technology paradigms, new product lines and may result in a fundamental change of the conventional business model (Morene, 1993; Leifer et al., 2000; O'Reilly III et al., 2004). Radical innovations frequently leverage advanced technology or a combination of known technologies as a basis for advantage (Kelley, 2005). They often result in product or value propositions which undermine the competences

and complementary assets on which existing competitors have built their success (Constantinos and Geroski, 2005), and disturb prevailing consumer habits and behaviours (Constantinos and Geroski, 2005) in a major way. Similarly, radical innovations are often characterized by undefined customer demands and uncertain market projections that require a substantial amount of time to prove their value (Ortt and Schoormans, 2004), making RI financially risky (Christensen and Raynor, 2003). It must be noted that the conventional R&D in large organisations is also cited as an instrument for radical innovations. Nonetheless such innovations are normally related to the mainstream line of businesses. We term such innovations as 'major innovation' (see Figure 1) instead of radical innovation. For example, a breakthrough technology developed by an internal R&D unit for enhanced oil recovery which can extract more oil than traditionally possible is a *major innovation*. Such innovations are important in order to keep the firm competitive. For example, 2-5% increase in oil recovery could potentially lead to millions in additional profit. But such innovations can hardly defend a company against external changes in environment or competitive landscape. For example, the ability to extract more oil although important may not defend an oil giant against the rising demand for energy from renewable sources which may gradually replace oil as a main source of energy. Likewise, a breakthrough technology which can reduce the thickness of a CD-player to a half can hardly defend a company from the advent of portable MP3 players by a competitor.

From a practical perspective, if radical innovation becomes successful they offer improvements in known performance features of five times or greater, an entirely new set of performance feature or a 30 percent or more reduction in costs (Leifer et al., 2000). Examples of successful radical innovations include CT or MRI scanners which brought an entirely new set of performance features when compared to two-dimensional medical imaging; PCs, which made mainframe

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