

Chapter 12

Technology–Push or Market–Pull?

A Model for Managing the Innovation Process in Malawian Firms

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ABSTRACT

Technological advancements and market needs are some of the significant forces fuelling the introduction of products and services in a wide range of business sectors. Many product and service providers have utilized the so-called technology-push and market-pull, the simple linear views of innovation which prescribe the use of technological discoveries and the involvement of the market respectively to produce goods and services. Others have gone further to adopt models of innovation which recognize the interaction of the different functional units of a firm and the combination of the technology-push and market-pull views with feedback from the external environment. Malawi has witnessed the introduction of a complete array of technology-based products and services catering for different business sectors. This paper investigates how Malawian firms manage the process of innovation in the development or introduction of Information Technology (IT) products and services and proposes suitable models which firms can adopt in managing and strategizing around technological innovation in the Malawian environment. The results suggest that while firms must adhere to specific models of innovation, it is generally useful to take full advantage of the linear market-pull model and the conceptual framework of innovation.

INTRODUCTION

Innovation and invention are different but related terms that have often been confused in literature. While invention centres on the creation of new ideas and knowledge, or application of existing

ideas to new products (Hannay, 1980), innovation goes further to develop the invention into a product in the market (Trott, 2002). Many models have been developed to help organizations understand and manage the innovation process. Rothwell (2002) identifies the simplest level as the linear

DOI: 10.4018/978-1-4666-2934-9.ch012

model, which considers innovation as a sequence of activities. Dominant views in this model are that either technology or the market is the primary source of ideas to achieve successful innovation. These views are termed technology-push and market-pull respectively. Other models emphasize on the importance of combining the knowledge of the different functional units of an organization. And yet others incorporate the technology-push and market-pull views and identify communication and feedback loops between the different elements of the organization and the external environment.

The existence of many models of innovation does not, nonetheless, introduce a general model that may cater for all industries, or specifically any industry in Malawi. Innovation would create a competitive advantage for firms offering IT products and services in Malawi to one or more of such industries as telecommunications, banking, accounting, financial services, agriculture and healthcare. This paper, therefore, investigates the management of innovation in the introduction of IT products and services in Malawi. In this context, the various models of innovation are discussed to provide the necessary background for analysis and observation. The paper further draws from literature to propose innovation models suitable for Malawi.

The document is organized as follows: the first section introduces the research followed by a review of literature in section two. In section three, the gap in literature which the study intends to fill is identified. The research methodology, presentation of the research findings and an analysis of the results dominate sections four, five and six respectively. A summary of the study is given in section seven.

Literature on the Models of Innovation

Niosi (1999) identifies four generations of the models of the innovation process which have been subsequently extended to five generations by Rothwell (2002). The first and second genera-

tions are characterized by simple linear models, the so-called technology-push and market-pull models respectively. The third generation models take into account the interaction and feedback between the different functions of an organization namely R&D, marketing and manufacturing. The fourth generation models focus on integrating the activities of different parts of an organization working on projects in parallel and creating links and strategic alliances with other organizations. The fifth generation models are considered to be emergent and focus on the use of the interactive model of innovation in combination with organizational processes that aim at improving efficiencies in knowledge transfer.

The linear model of innovation has been influential in the science and industrial policy for many years (Trott, 2002). This model considers innovation to be a linear sequence of activities that are either technology-driven (technology-push) or market-driven (market-pull) (Figure 1). The technology-push view of innovation assumes a sequence of activities from the discovery of new ideas by scientists in R&D, application of the ideas to new products by manufacturing engineers and the promotion of the final product to customers by marketing personnel (Niosi, 1999). Borés et al. (2003) observes that in the technology-push model, product offerings by firms are based on assumed as opposed to well-known market needs. This model is only applicable in a few industries such as pharmaceuticals (Khilji et al., 2006) due to factors such as long lead times and high technical uncertainty (Becker & Lillemark, 2006). In such firms, often times as the technology evolves, the long lead times render any market research ineffective, or in worst cases misleading and the high levels of technical uncertainty, which often means insufficient knowledge is available to determine the exact benefits of a drug, hinders market input in product development. The market-pull view of innovation stresses on the importance of interacting with customers to achieve successful innovation (von Hippel, 1978, as cited in Trott, 2002; Clark, 1979). There's a close interaction

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