Chapter 12

Information Technology Capability, Knowledge Assets and Firm Innovation: A Theoretical Framework for Conceptualizing the Role of Information Technology in Firm Innovation

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ABSTRACT

In this paper, the author presents a theoretical framework that establishes an indirect link between IT capabilities and firm innovation by characterizing the mediating role of knowledge assets: knowledge networks and knowledge capabilities. Firm innovation itself is characterized as innovation development and innovation commercialization. The search on literature of IT capability and innovation revealed a very lukewarm recognition towards firm level variables in knowledge networks, knowledge capabilities, and distinction between innovation development and commercialization. Backed up by detailed reviews of literature on innovation, strategy, and entrepreneurship, the author posits propositions linking the aforementioned constructs, and proposes a framework for future research linking IT Capability with Firm Innovation.

INTRODUCTION

Innovation is defined as “the design, invention, development and/or implementation of new or altered products, services, processes, systems, organizational structures, or business models for the purpose of creating new value for customers and financial returns for the firm” (Advisory Report to the Secretary of Commerce of the US, 2008). Innovations are agents of “creative destruction” (Schumpeter, 1934, 1950): they can destroy existing markets and yet often yield vast new market opportunities (Aboulnasr, Narasimhan, Blair, & Chandy, 2008), substantially changing the competitive landscape in the market. From the perspective
of the market, while incremental product and service innovations allow to distribute shares within an existing market, radical innovations imply a high potential for market expansion that substantially increase the size of the existing market by using significantly different technology and offering significantly greater benefits that were previously not available (Golder & Tellis, 1997, 2004; Chandy & Tellis, 1998; Golder, Shacham, & Mitra, 2008).

From the perspective of innovating firms, product and service innovations can result in substantial cannibalization of existing business, whereby innovations take away sales from the firm’s existing products in the category (Chandy & Tellis, 1998). From the perspective of incumbent competitors that already have products within the category of an innovation, product and service innovation imply a high potential for market destabilization, not only seizing business from existing competitors, but also repositioning existing products relative to each other (Aboulnasr et al., 2008). Thus, large gains can be obtained from firm innovation while steep losses can be incurred from firm obsolescence (Powell, 1998). To compete and survive, firms increasingly depend on their knowledge assets to continuously innovate products, services, and business processes (Cohen & Levinthal, 1990; Zahra & George, 2002b).

The innovation pathway consists of combined activities leading to new, marketable products and services and/or new product delivery systems (Burgelman, Christensen, & Wheelright, 2006). Innovation is a complex and dynamic process which is very knowledge intensive. This paper develops a framework that conceptualizes the role Information Technology (IT) plays in developing knowledge assets that are critical to firm innovation. In addition, and to ease the process of model building, we assume that the external environment within which the firm operates is constant.

**IT CAPABILITY AND FIRM INNOVATION**

The knowledge assets necessary for innovation include technological knowledge and product-market knowledge. Firms that possess these necessary knowledge assets will be more successful with creating and commercializing firm innovations (Nerkar & Roberts, 2004). According to Nerkar and Roberts (2004), technological knowledge develops as a result of a specific history of technological experience, while product-market knowledge (which they refer to as complementary knowledge assets) develop as a result of a specific history of product-market participation. The process of developing technological knowledge (such as patents) which can be used to create new products and services is referred to as Innovation Development (ID). The process of bringing the innovations that firm creates to market is referred to as Innovation Commercialization (IC).

Technological knowledge is characterized as technological inventions developed through exploration, discoveries and research. Advanced technological knowledge allows firms to create new products and services. Nerkar and Roberts (2004) argue that in order to successfully commercialize new products and services, firms also need to possess complementary knowledge assets that allow firms to effectively meet the needs of the market. This complementary knowledge referred to as product-market knowledge is characterized as manufacturing, logistics, sales, and marketing assets such as market related knowledge, distribution channels, and customer contacts, customer behaviors and preferences. Greater product-market knowledge, provides firms a better understanding of customer needs, and is therefore better able to tailor new offerings to meet those needs through new products and services. The complementary knowledge assets enhance the firm’s ability to accurately predict product-market developments.