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Examining the roles of government policy on innovation

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ABSTRACT

Research has shown that government policies and regulations can promote or hinder innovation. Policies and regulations that are stringent and focused can potentially stimulate significant and fundamental changes in product and process technology. However, policies and regulations can create obstacles and restrictions that sometimes pose a hindrance to innovation. Thus, while a number of innovation diffusion policies have been practiced in an incremental and ad hoc manner in many developed and developing countries, absent a set of research propositions, little empirical work has been well-positioned to investigate the effectiveness of these policies. In reviewing the existing literature on policy and innovation, it is possible to propose several research propositions regarding the role of government policy in promoting and sustaining innovation through the mediating factors, namely, the firm's willingness, capacity, and opportunity to change. In addition, the current state of the field on the theory and practice of innovation offers the opportunity to suggest propositions for investigating how government policies impact two different types of innovation, namely incremental and radical innovations. These research propositions offer implications for the policy makers and managers in general.

1. Introduction

Government, referred to as the aggregation of public-sector agents (Link & Scott, 2010), continues to exert a profound role in promoting and sustaining innovation, that is, innovation continues to serve as a fundamental driver of the economic health of national economies particularly when it is actively and effectively supported by governmental agencies. Government can provide the opportunity for technological transformation and sustainable development through the establishment of clear standards and policy goals while being flexible in allowing the firms to use various means to achieve those goals (Ashford, 2000; Bossink, 2002). In addition, direct support of research and development, tax incentives for investment in sustainable technologies, and other technical assistance initiatives under industrial policy can create a favorable business environment. This can in turn help promote and sustain innovation and industrial development (Nelson & Rosenberg, 1993; Porter, 1998).

One example is the US initiatives in technology policy in the reduction of an antitrust restriction on collaboration in research and the improvement of the enforcement of intellectual property protection. The passage of the Bayh–Dole Patent and Trademark Amendments Act of 1980 has changed the role of universities within the US innovation system. The university patent licensing and technology transfer offices have seen significant growth since the Bayh–Dole Act permitted federal agencies to grant licenses to small businesses and nonprofit institutions, including universities, for patents based on research funded by federal agencies at federal, contractor-operated laboratories (Mowery, 1998). The 1984 National Cooperative Research Act (NCRA) also helped facilitate innovations. The NCRA promoted a research consortium involving US computer and electronic firms, resulting in the early growth and operation of the microelectronics and computer technology industry (Mowery, 1998).

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Another example, illustrating the impact of government policy on innovation, is the construction of a second phase (Laibin B) of power plants in southern China's Guangdong province. In 1996, a circular was issued to encourage competitive bids. Funded at a cost of over $616 million, Laibin B is a set of two 350 MW coal-fired power plants designed to supply needed power as China continues its rapid industrialization. Laibin B was the first pilot project under a new legal and regulatory infrastructure to support Build–Operate–Transfer (BOT) projects; its structure was intended to become the blueprint for future BOT projects. Two key innovations of this project were that the concession was awarded in a competitive bidding process and that the project was 100% foreign-owned. Such innovations represent "administrative innovations", which include new procedures, policies, and organizational forms (Van de Ven, 1986). Coming on line in 2000, Laibin B represents an excellent example of the manner in which a motivated national government, working in partnership with an international consortium, can promote policies designed to encourage innovation and infrastructural development (Davis, 2003).

While government policies and regulations can promote significant fundamental changes in product and process technology, which can also benefit the industrial innovators (Ashford, Ayers, & Stone, 1985), if not carefully managed, they can actually have significantly deleterious effects on innovation (Kemp, 1997; Liu, Simon, Sun, & Cao 2011; Narasimha, 2008; Xiwei & Xiangdong, 2007). Policies and regulations can contribute to, among other results, unfair competition (Grossman & Helpman, 1992), too much state control, and bureaucracy (Goh, 2003). They can have a negative effect on productivity and competitiveness of the firms because of the increased operating cost burden. This was evident in several European industrial sectors, where there were increased worries about the decline in competitiveness of a number of European industries compared to those of the US and Asian countries. In the construction industry, for example, while regulations can prevent legal disputes by determining the quality of services to be delivered, they can cause heavily detailed specifications that constrain the ability of the firm to innovate and diffuse innovations (Hartmann, 2006). This, later, caused the policy makers to reduce the regulatory burden on industry (Leitner, Wehrmeyer, & France, 2010). Thus, it is evident that multiple effects, both positive and negative, can proceed from governmental action in industrial policy-making.

The objective of this study is to examine the role of government policies in promoting and sustaining innovation. Based on the review of the literature and the current innovation strategy of the US government, this paper presents research propositions underlying the role of innovation policies. Particularly, three contributors of innovation – namely, the willingness to change, the capacity to change, and the opportunity to change – were used as a basis for the propositions. The paper also presents research propositions for investigating the impact of government policy on incremental innovation versus radical innovation. We believe that it should be time to take a serious look at the impact of the policy on innovation by conducting a large sample study. These research propositions, therefore, provide significant contribution to the literature as they provide a foundation for future empirical studies and also offer some implications for project management.

2. Understanding innovation

Research on innovation, including its antecedents, supporting structures, and implications for private organizations and public policy, has grown at a phenomenal rate since the last century. Literature suggests that innovation, as a research topic, gained more traction in the research community during the Second World War when policy makers in the US and then elsewhere became interested in R&D and innovation as important contributors for military progress (Godin, 2006). Fagerberg, Fosaas, and Sapprasert (2012) noted, in their review of the knowledge base of innovation, that the work of Schumpeter has had a profound impact on our understanding of innovation as a dynamic force that causes continuous transformation of social, institutional and economic structures (Andersen, 2009; McCraw, 2007). As part of our general understanding of the government's role in effective innovation policy making, it is useful to understand what innovation is, how innovations occur, and what contributes to successful innovations.

In general, as summarized by many researchers (Rogers, 1983), an innovation is a new idea, which may be a recombination of old ideas, a scheme that challenges the present order, a formula, or a unique approach which is perceived as new by the individuals involved. By this definition, innovations consist of both new technical and administrative ideas (Van de Ven, 1986). Technical innovations represent new technologies, products, and services. Administrative innovations represent new procedures, policies, and organizational forms. While many researchers such as Daft and Becker (1978) prefer keeping technical and administrative innovations distinct, Van de Ven (1986) emphasized looking at them as a combination since most innovations consist of new technical and administrative components. Fagerberg (2004) and Fagerberg and Verspagen (2009) further offer a definition of innovation as "new combinations" of existing knowledge and resources; the distinction between invention (new ideas) and innovation (implementing these in practice); the classification of innovations into product, process and organizational innovation, and the keen interest in how radical their social and economic impacts are (making distinctions between revolutionary, radical and marginal or incremental innovations).

How innovations occur and what contributes to successful innovations are challenging questions and can be answered from many perspectives. Those aspects are categorized into research focused at the individual level and at the organizational level. At the individual level, cognitive capabilities of an individual are essential to the creation of ideas (Sexton & Barrett, 2003). Schumpeter, particularly in his early work (see Schumpeter, 1910, 1912), emphasized the important role that committed entrepreneurs capable of overcoming an inert or resisting environment play in innovation. Later on, Schon (1963) suggested the presence of a champion as a contributor of the success of technological innovation. A champion typically refers to an individual who informally emerges to actively and enthusiastically promote innovation through the crucial organizational stages (Achilladelis, Jervis, & Robertson, 1971). Many researchers agree that champions have an essential role in the successful implementation of an innovation (Gambatese & Hallowell, 2011; Markham & Griffin, 1998; Van de Ven, 1986). Howell and Higgins (1990), however, determined that champions have an impact not only on idea implementation, but also on idea generation, suggesting that innovation championing behavior follows distinct roles at different innovation stages.