Available online at www.sciencedirect.com

SciVerse ScienceDirect

Procedia - Social and Behavioral Sciences 58 (2012) 842 – 852

Procedia
Social and Behavioral Sciences

8th International Strategic Management Conference

Learning, R&D and Manufacturing Capabilities as Determinants of Technological Learning: Enhancing Innovation and Firm Performance

Ipek Kocoglu[a*], Salih Zeki Imamoglu[a], Huseyin Ince[a], Halit Keskin[a]

[a]*Gebze Institute of Technology, 41400, Turkey*

Abstract

Facing the globally competitive environment characterized by uncertainty, dynamism and volatility, technological learning plays an important role in firms' competitive success, supporting their ability to develop maintain and exploit dynamic core competencies, besides leveraging firms to pursue technology based strategies. At this point, extending the resource based view (RBV) of the firm and basing technological innovation capabilities on dynamic capabilities view (DCV) these assets which enable firms to develop, acquire, assimilate and modify technologies to obtain new ones, are seen as critical sources of sustained competitive advantage. However, there is limited effort in the literature on the potential complementary relationship of technological learning with these TICs. In this study, by focusing on the complementary power of learning. manufacturing and R&D capabilities which build the basis for a systematic innovation strategy through establishing appropriate routines, accumulating skills internally and developing the ability to learn selectively, their influence on technological learning is investigated. Specifically, this study will enhance the theory on technological learning by operationalizing technological learning and its characteristics which have rarely been focused on in the literature. The conceptual model is comprised of five research propositions with six main constructs namely; i-) learning capability, ii-) manufacturing capability, iii-) R&D capability, iv-) technological learning, v-) innovation and vi-) firm performance. Concurrently, the managerial implications are discussed and the empirical testing of the propositions stated in the conceptual model is suggested for future research.

*Ipek Kocoglu. Tel.: +90-262-605-1413; fax:+90-262-654-3224.
E-mail address: ikocoglu@gyte.edu.tr

1877-0428 © 2012 Published by Elsevier Ltd. Selection and/or peer-review under responsibility of the 8th International Strategic Management Conference
Open access under CC BY-NC-ND license. doi:10.1016/j.sbspro.2012.09.1062

Key Words: Learning capability, Manufacturing capability, R&D capability, Technological learning, Technological innovation capability, innovation, firm performance.

1. Introduction

The research on technological innovation has become increasingly widespread since Schumpeter proposed this concept in his book "The theory of economic development" in 1912 (Bao, 2010). It is well recognized that in today's hypercompetitive environment seeking to respond the changes constantly arising in the environment does not rely on the static process of sole knowledge accumulation (Real et al.. 2006) or growth of technology assets through resource based view (Teece et al., 1997) rather it is dependent on the mutual relationship between firm's capabilities (e.g. effective coordination and adaptation of internal and external competencies), technology (e.g. timely responsiveness), and innovation (e.g. flexible innovations) (Teece and Pisano, 1994). Parallel to this, theories of the firm are further extending towards accommodating the dynamic, heterogeneous nature of the firm and its context (Carayannis, 2000) in order to survive in the contemporary competitiveness in globalised, knowledge-based economy. As implicitly suggested by Penrose (1959) and the expanded paradigm of Teece and Pisano (1994) which evaluates how competitive advantage is achieved, both internal and external firm-specific capabilities ought to be exploited and renewed in order to respond to the fluctuations in the business environment. Indeed, according to the dynamic capabilities theory, to achieve the outcome of sustained competitive advantage firms need to develop, unique, inimitable hard to replicate, hard to transfer and most importantly "modifiable" distinctive capabilities (Teece et al., 1997; Winter, 2003). Hence a definition of dynamic capabilities essentially focusing on its flexible nature suggests that "the capacity of an organization to purposefully create, extend or modify its resource base" (Helfat et al., 2007: 4) appear as the antecedents of organizational and strategic routines (i.e. repetitive and patterned behavior that is learned especially through learning by doing and embedded in tacit knowledge (Winter, 2003)) which enable the firm management to acquire new resources, integrate and recombine them to obtain a novel resource base (Yam et al., 2011).

Considering the technological innovation capability (TIC) from dynamic capabilities point of view there emerges the need to recognize TIC as organizational routines to capture firm-specific technological and operational knowledge (Real et al., 2006) which facilitate and support technological innovation strategies (Burgelman et al., 2004) through attentive tracking of the environmental changes and timely responses, exploitation of technology sources, development or adoption of new technologies, and modification of existing or newly adopted/developed technologies (Yam et al., 2004). Thus TIC comes into prominence as a critical factor in upgrading the firms' ability to generate technological knowledge, improving the way a firm allocates resources for innovation, developing alternatives to obtain new technologies and organizing its existing resources to assimilate and internalize new technologies (Cetindamar et al., 2009; Lin, 2003). Technological learning is defined as "the process by which technology driven firm creates, renews, and upgrades. its latent and enacted capabilities based on its stock of explicit and tacit resources" (Carayannis, 2000: 393). Although some studies suggest the interplay between TIC and technological learning (Carayannis, 2000; Carayannis and Alexander, 2002; Real et al., 2006; Huang, 2011) few studies to our knowledge have spent an effort to build a theoretical background regarding the particular interrelationship based on the dynamic capabilities theory. The literature on technology and innovation management (TIM) offers little insight on how TIC, especially its dimensions