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Research on Effectiveness of Technology Transfer from a Knowledge Based perspective

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Abstract

Many SMEs in newly industrialized countries with limited technological infrastructure and R&D resources can still compete successfully at the international level. Those SMEs typically depend on technologies that are transferred from foreign partners of developed Western countries. Even though the topic of technology transfer has long been studied, the main stream studies focus on the hardware aspects, the soft –knowledge- facet of technology transfer is still a matter of concern. This study bridges a gap in the extant literature by examining interrelationships between knowledge sharing and the effectiveness of technology transfer from developed countries to SMEs in developing countries. In studying the data from 33 Turkish SMEs, and using the partial least squares structural equation modelling (PLS-SEM), we find that explicit knowledge sharing forms the fundament of technology transfer. Also the findings address a significant deficiency regarding tacit knowledge sharing.

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1. Introduction

Since 1990s firms have had to confront more and more highly complex and turbulent environments. Management of technology offers ongoing challenges to firms, due to the increasing cost and complexity of products and services against a background of global competition, IT-based innovation networks, accelerating industrial change, and of a shortening technology life cycle (TLC). In view of the fact that worldwide changes and progress are generally attributed to the development or introduction of new technologies and more than 50% of the new products and process are outsourced, the topic of technology transfer has become an important theme for both practitioners and academicians (Inzelt and Hilton, 1998; Kim and Kim, 2000; Lin and Berg, 2001; Lehner and Maier, 2000). Technology, the basic theme of this transfer process, is widely accepted as essential for improving the economy and

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wealth in changing competitive landscape. Evidences across many countries and firms, have illustrated that there is an increasing appreciation in which the long term the ability to master technology and to manage and generate technological change is a determinant for competitiveness and capacity to grow (Guan et al. 2005). Accordingly, effective acquisition and utilization of new technology from an outside source can contribute significantly to the firm success (Palviaa et al. 2002: 719)

Recent studies (e.g., Henry et al., 2009; Salahaldeen, 1995; Lee et al., 2012) have demonstrated the importance of foreign research and development (R&D) to domestic productivity growth. One aspect of globalization concerns the increased transfer of technology among countries and firms especially from developed countries to the developing ones (Jones and Ruffin, 2008). Many SMEs in newly industrialized countries with limited knowledge infrastructure and R&D resources can still compete successfully at the international level (Asakawa and Westney, 2013). Those SMEs usually depend on technologies that are transferred from foreign partners in developed countries (Lin, 2003). Hence, the topic of technology transfer has become an important theme for both practitioners and academics. Technology transfer is the flow of technology from one place to another, for example, from one organization to another, from a university to an organization, or from a country to another. It has been described as being product-embodied, process-embodied or personnel-embodied (Guan et al., 2005). While the hardware aspect of the technology is emphasized in the main stream perspective in which technology transfer is considered to be a one-way process from the donor to the recipient; the software part is underlined on modern view; and technology transfer turns out to be a two-way communication process (Buratti and Penco, 2001) based on knowledge sharing on a mutual exchange (Amessea and Cohendet, 2001; Dahl and Pedersen, 2004).

Knowledge sharing is a mechanism installed to encourage the sharing of expertise throughout an organization. (Fong and Lo, 2005). To a greater extent firms are utilizing interdisciplinary organizational structures in which employees share knowledge and expertise within and between units, groups and hierarchical levels and other firms with the intention of dealing with complex tasks (Krogh, 2002). Even the extant literature abounds of many different approaches concerning the knowledge sharing process such as tool based (Scarbrough, Swan and Preston, 1999; Swan, Newell, Scarbrough, and Hislop, 1999), incentive based (Bartol and Srivastava, 2002; Bock and Kim, 2002; Liebowitz and Chen, 2001) or articulation based (Lee, 2001; Nonaka and Takeuchi, 1995); our study focused on the articulation based on the assumption that a technology transfer is closely related to the articulation level of the given knowledge in terms of tacit and explicit.

The theory of KM suggests that tacit knowledge is not easily replicable and transferable (Nonaka and Takeuchi, 1995). The level of tacit knowledge determines the extent to which organizations will be competitive in a turbulent market, and it composes the unique technologies of the firm (Ng et al., 2012). Johannessen et al. (2001) suggested that even technology has long been considered the transfer of explicit knowledge; without tacit knowledge, the background technology would never be adapted fully. Accordingly, this study aimed to provide new insight into the theory of KM by addressing a knowledge sharing schema among partners to achieve technology transfer. Furthermore, Çavuşgil et al. (2003) claimed that most KM research is limited to knowledge transfer at the individual level. This study aimed to explore the effects of knowledge sharing –between donor companies of developed Western countries and recipient SMEs of newly industrializing countries- on the effectiveness of technology transfer.

The remainder of the paper is organized as follows. Section 2 provides a review of the relevant literature to establish a clear theoretical ground and describes the specific hypotheses for the research model. Section 4 presents the empirical results to test the assumptions. Section 5 concludes the paper.

2. Literature Review and Hypothesis Development

2.1 Technology and Technology Transfer

We are presently in a transitional period, as disruptive technologies compete for markets in developing countries and top-down and bottom-up communications initiatives try to exploit these technologies to bridge the ‘digital divide’ (Talyarkhan et al., 2004). To understand this technology and innovation based competition we should first identify what the technology is. Technology is the integration of any tool or technique, any product or process, any physical equipment or method of doing or making, by which the human being potential is broadened. In this delineation

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