Chapter 19
The Different Key Processes in the Implementation of Knowledge Management Among IC Designers, Distributors and Manufacturers

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ABSTRACT

This study is an exploratory investigation of the enabling roles of knowledge management for integrated circuit (IC) Designers, Distributors, and Manufacturers. This study explores the different enabling roles in terms of knowledge creation, storage/retrieval, transfer and application when businesses implement knowledge management in upstream, midstream, and downstream firms in the IC industry. Three cases, Winbond, Worldpeace, and Taiwan Semiconductor Manufacturing Company (TSMC) were studied and analyzed systemically to illustrate the findings and insights in this study. The findings in this study point out that IC designers may focus more on knowledge storage, while IC distributors pay more attention to knowledge application and IC Manufacturers emphasize knowledge creation. The necessity to implement knowledge management in the distribution industry is also emphasized in this study. Moreover, the reasons for the different enabling roles are presented in the 'Insights from Case Studies' section of the paper.

INTRODUCTION

Today a 'Third Industrial Revolution' is under way; knowledge will replace land and a firm's physical or financial resources as the most important asset (Thurow, 1999). Even Drucker (1993) argues that in the new economy, knowledge is not just another resource alongside the traditional factors of production - labor, capital and land, but is the only meaningful resource today. Tangible assets will be decreased or consumed because of use, but intangible assets ─ knowledge, information and technology will grow through sharing and application. In many industries, firms can sustain their competitive advantage if their abilities in learning and evolution progress faster than their competitors. Thus, organizations should learn to survive in the fast changing and intensely competitive environment, continually redesigning themselves into learning organizations (Parker & Nitse, 2005; Daft, 1998).

Knowledge is a limitless resource in the knowledge-based economy; therefore, organizations should learn, store, transfer and apply knowledge to add value or gain competitive advantage (Sveiby, 1997). Knowledge management (KM) refers to identifying and leveraging the collective knowledge within the organization to help in competing (von Krogh, 1998). Discussions amongst policy makers, industry representatives and academics about KM are in fashion (Lange, 2006). KM is usually discussed and implemented in high-tech industries (e.g., Texas Instruments (TI) and TSMC) and the software industry (e.g., Microsoft and Oracle), where it is the basis for competitive advantage. However, it remains unclear whether the implementations of KM in upstream, midstream, and downstream firms focus on the same key process in the related industries. For example, do the designers (upstream firms), distributors (midstream firms) and manufacturers (downstream firms) in the IC industry all focus on the creation of knowledge? Should all firms pay the same attention to every process when imple-

menting knowledge management? Unfortunately, there are no research findings yet to indicate the key processes of knowledge management in the upstream, midstream, and downstream firms of the supply chain. This study illustrates how knowledge management is implemented in high-tech related industry - IC designer, distributor, and manufacturer, as those play the roles of upstream, midstream, and downstream firms in this supply chain. Reasons for the different enabling roles of knowledge management in these three types of firms are also discussed.

LITERATURE REVIEW

KM is based on applying the fullness of an organization's knowledge and this requires representing it, transferring it, making it accessible and encouraging its use (Metaxiotis & Psarras, 2006). In addition, KM is concerned with systematic, effective management and utilization of an organization's knowledge resources (Demarest, 1997). It consists of the creation, storage, arrangement, retrieval and distribution of an organization's knowledge (Demarest, 1997; Saffady, 2000). Alavi and Leidner (2001) classified the processes of KM into four steps: knowledge creation, knowledge storage/retrieval, knowledge transfer and knowledge application, representing a detailed process framework of organizational KM with a focus on the role of Information Technology. This systematic framework is shown as Figure 1 and each process is interpreted clearly in the following sections.

Knowledge Creation

Organizational knowledge creation involves developing new content or replacing existing content within the organization's tacit and explicit knowledge (Pentland, 1995). In today's rapidly changing environment, organizations have to focus on the creation of knowledge, instead of relying

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