Chapter 59
Sharing Scientific and Social Knowledge in a Performance Oriented Industry:
An Evaluation Model

Haris Papoutsakis
Technological Education Institute of Crete, Greece

ABSTRACT

The chapter evaluates the contribution of shared knowledge and information technology to manufacturing performance. For this purpose, a theoretical model was built and tested in praxis through a research study among manufacturing, quality and R&D groups. The social character of science is perceived as a matter of the aggregation of individuals, not their interactions, and social knowledge as simply the additive outcome of mostly scientists, members of the three groups, making sound scientific judgments. The study results verify the significant contribution of shared knowledge to the manufacturing group performance. They also demonstrate that information technology influences notably the manufacturing group performance and, in a less significant way, the sharing of knowledge. Study results are useful to researchers and the business community alike as they may be used as a springboard for further empirical studies and can help put together strategies involving knowledge management and information technology.

INTRODUCTION

At the turn of the twentieth century many companies (BP, Canon, GlaxoSmithKline, Honda, Siemens and Xerox, among them) have tried, with varied achievement rates, to leverage knowledge assets by centralizing Knowledge Management (KM) functions or by investing heavily in Information Technology (IT) (Davenport and Prusak, 2000; Hansen and von Oetinger, 2001). In parallel, the number of new knowledge management articles, according to Despres and Chauvel (2000, p. 55) "... has more than doubled each year over

DOI: 10.4018/978-1-4666-1945-6.ch059

the past decade". Among them quite a few have proposed and tested models for the management of knowledge, with or without the support of information technologies (Knight, 1999; Larsen et al, 1999; Liebowitz et al, 2000; Kingsley, 2002). A considerably smaller number of such studies have investigated into how companies can leverage knowledge in order to improve business performance (Nelson and Cooprider, 1996; Chong et al, 2000; Firestone, 2001). Only one (Lee and Choi, 2003), among the articles reviewed for this study is combining all three variables: KM, IT and performance. This is exactly the gap this chapter is coming to fill in. Based on careful analysis of the above mentioned previous empirical studies, it builds and empirically tests a model that simultaneously explores the relationships among these three variables and their antecedents.

The chapter is organized in six sections. In the following section the theoretical framework is defined and a brief presentation of relevant previous empirical studies, focused on the links among knowledge management and information technology to business performance is given. In section three, we situate our own model within the above framework. The variables and the investigation hypotheses are defined. In section four, the research methodology is presented and details are given on the questionnaires –the principal research instruments– and the indicators used for construct measurement. In section five, the investigation hypotheses are tested, using regression analysis, and statistical data are given on questions not analyzed elsewhere. Finally, in section six, conclusions are summarized and recommendations are given for managers of collaborating groups in order to increase shared knowledge and to positively affect manufacturing performance.

THEORETICAL BACKGROUND

In the relevant literature, most attempts to investigate the links among KM and IT that lead to improved business performance, are done within the environment of the knowledge-creating company (Nonaka 1991; Nonaka and Takeuchi 1995). Building upon this pioneer work, Grant, in a series of articles (1995 with Baden-Fuller, 1996a, 1996b, 1997) and Sveiby (1997, 2001) presented in a very clear way the fundamentals of a knowledge-based theory of the firm. According to Grant (1997) –recapitulating on his previous work– the knowledge-based view is founded on a set of basic assumptions. First, knowledge is a vital source for value to be added to business products and services and a key to gaining strategic competitive advantage. Second, explicit and tacit knowledge vary on their transferability, which also depends upon the capacity of the recipient to accumulate knowledge. Third, tacit knowledge rests inside individuals who have a certain learning capacity. The depth of knowledge required for knowledge creation sometimes needs to be sacrificed to the width of knowledge that production applications require. Fourth, most knowledge, and especially explicit knowledge, when developed for a certain application, ought to be made available to additional applications, for reasons of economy of scale.

Theoretically, our research stands upon the 'knowledge-based theory of the firm' (Grant, 1997; Sveiby, 2001). The fundamental problem in traditional management theory is how to align the objectives of workers with those of managers and the stakeholders. In accordance with the knowledge-based view, "… if knowledge is the preeminent productive resource, and most knowledge is created by and stored within individuals, then employees are the primary stakeholders" (Grant 1997, p. 452). Under this perspective, management's principal challenge is to establish the mechanisms for collaborating individuals and groups to coordinate their activities in order to best integrate their knowledge into productive activity. Sveiby (2001) believes that people can use their competence to create value in two directions: by transferring and converting knowledge