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Chapter XX

Productivity Impacts from Using Knowledge

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EXECUTIVE SUMMARY

This is a longitudinal case study that explored the relationship between use of organizational memory and knowledge, knowledge management, and knowledge worker productivity within the engineering group at a nuclear power plant. Three data points were taken over five years. The group used a knowledge management system (KMS) and it was found that the system improved effectiveness/productivity of the organization. The organization had not identified measures for determining productivity improvements, so the key results of the case study are models showing the impact of knowledge use on productivity.

INTRODUCTION

Kaplan and Norton's (1992) Balanced Business Scorecard measures the value of IS to the organization with one of the factors considered being the ability of the organization to sustain learning and improvement. Learning and organizational learning are the processes by which experience is used to modify current and future actions. Huysman, Fischer, and Heng (1994) as well as Walsh and Ungson (1991) believe organizational learning has organizational memory (OM) as a component. Stein and Zwass (1995) and Walsh and Ungson (1991) define OM as the means by which knowledge from the past is brought to bear on present activities, thus resulting in higher or lower levels of

organizational effectiveness. Improving effectiveness can result in improved organizational performance and adding value to the organization. Organizational learning (OL) uses OM as its knowledge base. Davenport and Prusak (1998) define knowledge as an evolving mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information that in organizations often becomes embedded in documents or repositories and in the organizational routines, processes, practices, and norms. Alavi and Leidner (2001) view organizational knowledge and OM as synonymous labels.

Knowledge management (KM) is defined by Malhotra (1998) as that process established to capture and use knowledge in an organization for the purpose of improving organizational performance. We refine KM to be the process of selectively applying knowledge from previous experiences of decision making to current and future decision-making activities with the express purpose of improving the organization's effectiveness. Jennex and Olfman (2002) view KM and OM as manifestations of the same process only in different organizations. User organizations "do" knowledge management; they identify key knowledge artifacts for retention and establish processes for capturing it. OM is what IT support organizations "do"; they provide the infrastructure and support for storing, searching, and retrieving knowledge artifacts. OL results when users utilize captured knowledge. That OL may not always have a positive effect is examined by the monitoring of organizational effectiveness. Effectiveness can improve, get worse, or remain the same. How effectiveness changes influences the feedback provided to the organization using the knowledge. Figure 1 illustrates these relationships.

Additionally, Strassmann (1990) and Rubin (1994) propose that adding value to the organization or the organization's customers improves the productivity of the organization. Rubin (1994) defines "added value" as being the result of improved organizational performance.

KMS are systems designed to manage organizational knowledge. Alavi and Leidner (2001) clarify KMS as IT-based systems developed to support/enhance the processes of knowledge creation, storage/retrieval, transfer, and application. Additionally, a KMS supports KM through the creation of network based OM, and support for virtual project teams and organizations and communities of practice. A final goal of a KMS is to support knowledge creation.

An organization implements a KMS to improve its ability to capture, store, and reuse knowledge with the expectation that it will improve its learning and overall performance through improved decision making. Ultimately, organizations implement a KMS to help the organization to learn and improve with the expectation that organizational effectiveness/productivity will improve. This case study looks at an organization that manages and uses knowledge to determine if KM truly does improve productivity.

The case study covers 5 years with data collected during three time periods. The first time period was in 1996 with the second time period being in 1998 and the third in 2001. The first data collection period utilized a survey and 40 interviews. The second data collection period occurred after the organization had completed a voluntary retirement program resulting in a 25% turnover in staff and utilized a survey and 10 interviews with new members to the organization. The third data collection period occurred while the organization was undergoing reorganization and reduction in force and utilized 22 interviews, 14 with interviewees from the first period, six with interviewees from the