

Chapter 11

Impacts from Using Knowledge: A Longitudinal Study from a Nuclear Power Plant

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ABSTRACT

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 5 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

This article explores the impact of using knowledge on the productivity in an engineering organization at a nuclear power plant. Intuitively, knowledge management (KM) researchers believe in the proposition that reusing knowledge will lead to improved organizational performance; however, while there is abundant anecdotal evidence to support this proposition, finding empirical evidence to support this proposition is difficult. Additionally, while the KM research community is generating KM success and effectiveness models, many

of which include impacts on organizations and individuals, we are not doing a good job generating models to explain how this impact improves organizational or individual performance.

This article looks at an engineering organization over several years and presents results that answer this key research question: does reuse of knowledge lead to greater productivity, by showing that the reuse of knowledge results in improved individual and organizational productivity/performance. Additionally, models are presented to show how the reuse of knowledge improves individual and organizational performance.

BACKGROUND

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. 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, is the process 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 uses OM as its knowledge base. Finally, Alavi and Leidner (2001) and Jennex and Olfman (2002) view organizational knowledge and OM as synonymous labels.

Davenport and Prusak (1998) view 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. They found that in organizations, knowledge often becomes embedded in artifacts such as documents, video, audio, or repositories and in organizational routines, processes, practices, and norms. They also say that for knowledge to have value it must include the human additions of context, culture, experience, and interpretation. Nonaka (1994) expands this view by stating that knowledge is about meaning in the sense that it is context-specific. This implies that users of

knowledge must understand and have experience with the context, or surrounding conditions and influences, in which the knowledge is generated and used for it to have meaning to them. This also implies that for a knowledge repository to be useful it must store the context in which the knowledge was generated. That knowledge is context specific argues against the idea that knowledge can be applied universally; however, it does not argue against the concept of organizational knowledge. Organizational knowledge is considered to be an integral component of what organizational members remember and use, meaning that knowledge is actionable. This longitudinal study focused on an engineering group in a single nuclear plant, as it was recognized that this organization had a shared context for understanding the knowledge that was being captured and reused.

Jennex (2005) utilized an expert panel, the editorial review board of the International Journal of Knowledge Management (IJKM), to generate a definition of KM as the practice 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. Another key definition of KM includes Holsapple and Joshi (2004) who consider KM as an entity's systematic and deliberate efforts to expand, cultivate, and apply available knowledge in ways that add value to the entity, in the sense of positive results in accomplishing its objectives or fulfilling its purpose. Finally, Alavi and Leidner (2001) concluded that KM involves distinct but interdependent processes of knowledge creation, knowledge storage and retrieval, knowledge transfer, and knowledge application. Taken in context, these definitions of KM focus on the key elements of KM: a focus on using knowledge for decision making and selective knowledge capture. This is important as the selective focus on knowledge capture separates KM from library science, which attempts to organize all knowledge and information, and the decision making focus emphasizes that KM is

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