Chapter 2.20
A Knowledge Management Portal System for Construction Projects Using Knowledge Map

H. Ping (Jack) Tseng
National Taiwan University, Taiwan

Yu-Cheng (Vincent) Lin
National Taiwan University, Taiwan

ABSTRACT

Knowledge management (KM) has become an important term in the construction industry. Knowledge management involves creating, securing, capturing, coordinating, combining, retrieving, and distributing knowledge. Most know-what, know-how, and experience exists only in the minds of individual participants during the construction phase of construction projects. The knowledge can be reused and shared among the involved engineers and experts to improve the construction process and reduce the time and cost of solving problems. Sharing and reusing knowledge depends on acquiring and preserving of both tacit knowledge and explicit knowledge as the property of a corporation. This study addresses application of knowledge management in the construction phase of construction projects and proposes a construction activity-based knowledge manage-ment (ABKM) concept and system for general contractors. This chapter proposes a practical methodology to capture and represent construction project knowledge by using knowledge maps. Using knowledge maps, users can get an overview of available and missing knowledge in core project areas and take appropriate management in tacit and explicit knowledge. Also, a Web-based system is developed to assist and present project-related knowledge by providing keyword and map search on the Internet environment. The ABKM system is then applied in a case study of a construction precast building project in Taiwan to verify our proposed methodology and demonstrate the effectiveness of sharing knowledge special in the construction phase. By effectively using information and Web technologies during the construction phase of a project, knowledge can be captured and managed to benefit future projects. The combined results demonstrate that an ABKM-like

system can be an effective tool for all experts and engineers participating in construction projects by utilising the knowledge management concept and Web technology.

INTRODUCTION

Knowledge is the true asset of a marketing-oriented organisation, and its integration across departments and disciplines should be emphasised (Carneiro, 2001). Many organisations are now engaged in knowledge management (KM) efforts in order to leverage knowledge both within their organisations, and externally to their stakeholders and customers (Malhotra, 2000, 2001). These assets, or knowledge, can be classified as either tacit or explicit. Explicit knowledge is that which has been codified and expressed in formal language; it can be represented, stored, shared, and effectively applied (Nonaka & Takeuchi, 1995). Tacit knowledge is knowledge that is difficult to express, represent, and communicate (Nonaka & Takeuchi, 1995). The distinction between these two types of knowledge is relevant because each must be managed differently. Knowledge management in the construction phase mainly deals with the process of creating value from construction operation, organisation, to company knowledge. Valuable knowledge can be available in different forms and media, such as in the minds of experts, in operation procedures, and in documents, databases, intranets, and so forth; however, knowledge management in the construction phase of projects aims at effectively and systematically collecting and sharing the experience and knowledge of the project by Web-based and intranet technologies.

The reuse of information and knowledge minimises the need to refer explicitly to past projects, reduces the time and cost of solving problems, and improves the quality of solutions during the construction phase of a construction project. If experience and knowledge are shared, then the same problems in construction projects do not need to be repeatedly solved. Reduced problem solving has the following advantages: (1) the cost of problem solving is reduced; and (2) the probability of repeated problems is decreased. Several enabling activities should be considered to help to achieve the ultimate goal of efficient experience and knowledge reuse; experience and knowledge should be preserved and managed—that is, they should be captured, modelled, stored, retrieved, adapted, evaluated, and maintained (Bergmann, 2002).

Knowledge reuse and update improves the performance of future activities and projects. Most of the data and information for construction projects are stored in paper-based documents; these consist of contracts, specifications, notes, discussion, and field reports. In order to facilitate the information management and enable knowledge reuse, it is important to convert the paper document into electronic versions to be shared and applied in other and future projects. Information and knowledge of a project can then be identified as project components in the project management and preserved in a Web-based system that provides the platform for the exchange and storage of information and knowledge.

LEARNING OBJECTIVES

1. Understand the application of knowledge management for construction projects.
2. Understand each phase of knowledge management specific for construction projects.
3. Form a case study for knowledge management using knowledge map in the construction phase.
4. Study procedures of implementing knowledge management for construction projects.
5. Study procedures of applying knowledge mapping in knowledge management.

Related Content

Exploring the Relationship between Organizational Memory and Business Innovation

Adel Alhashemand Amin A. Shaqrah (2012). *International Journal of Knowledge-Based Organizations (pp. 32-46).*

www.irma-international.org/article/exploring-relationship-between-organizational-memory/68972

A Performance Analysis of Semantic Caching for XML Query Processing

Boris Novikov, Alice Piguland Anna Yarygina (2013). *International Journal of Knowledge-Based Organizations (pp. 40-60).*

www.irma-international.org/article/a-performance-analysis-of-semantic-caching-for-xml-query-processing/101193

A Knowledge Management Portal System for Construction Projects Using Knowledge Map

H. Ping J. Tserngand Yu-Cheng (V.) Lin (2005). *Knowledge Management in the Construction Industry: A Socio-Technical Perspective (pp. 299-322).*

www.irma-international.org/chapter/knowledge-management-portal-system-construction/25014

Modeling the Metrics of Individual, Organizational and Technological Knowledge Sharing Barriers: An Analytical Network Process Approach

B. P. Sharmaand M. D. Singh (2014). *International Journal of Knowledge Management (pp. 43-57).*

www.irma-international.org/article/modeling-the-metrics-of-individual-organizational-and-technological-knowledge-sharing-barriers/112065

Web 2.0 Collaborative Learning Tool Dynamics

Marianna Vivitsou, Niki Lambropoulos, Sofia Papadimitriouand Alexandros Gkikas (2009). *Knowledge Networks: The Social Software Perspective (pp. 105-130).*

www.irma-international.org/chapter/web-collaborative-learning-tool-dynamics/25450