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Managing concurrent construction projects using knowledge management and set-based thinking.

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Abstract

One key issue in construction industry is how well firms manage concurrent projects effectively and obtain required construction benefits. However, achieving this is not easy and challenging because several activities need tacit and explicit knowledge involved. The purpose of this research is to develop a generic knowledge management (KM) algorithm using 'learning from' and 'sharing to' (LXS) matrix. We discussed the main concepts and strategies for rapid learning through KM in construction projects. Some of the concepts discussed include set-based thinking, agile project management and planning, iteration management. Moreover, the research discussed these concepts in light of one of Norwegian construction project program. The research first looked at key literature in the field, identify the crucial issues in organizing KM in construction projects, and finally elaborate the case of E39 ferry-free highway construction proposed by Norwegian public road authority (NPRA). The result from the KM matrix showed smaller projects are better to learn from all of the project phases than the large projects. The vice versa is true from sharing perspective. The results instigate the roles of learning and sharing and urge to intervene systemic KM in concurrent construction projects management.

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Keywords: construction projects; knowledge management, learning, sharing, set-based thinking, agile planning, iteration.

1. Introduction

According to PM magazines recently published on PMI, managing multiple/concurrent projects bemoaned by project managers. This is mainly because managing multiple projects overload managers with more work, affect project performance, and in some cases create challenges to complete projects with a given resources (time and

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budget). On the other hand, competitiveness, resource scarcity, and the need for resource optimization pushes industries forward to manage multiple projects concurrently. General literature considers construction industries as a competitive, with a tight schedule, diversified processes and not standardized production. In addition, several stakeholders and actors temporarily assigned to complete the projects and this even make more challenging to manage the project. These typically create pressure on construction managers to hold challenging responsibilities and handle various projects with complex activities simultaneously.

In such challenging situation, construction managers need to have capability (knowledge) on how to prioritize, execute (handle) various activities, and ability to utilize appropriate methods (tools) effectively. According to [16], project managers are special type of professionals with special knowledge, skills and training. Recent literature discussed about the need and advantages of learning and knowledge management in construction [2]. To obtain the benefits from KM, construction firms put their endeavor to expose project managers for formal training to build the knowledge and develop the PM skills. According to [5, 18], construction projects have great knowledge and information flows during lifecycle of the project which is considered an asset for companies that should not be wasted.

The goals of these efforts are to enhance the learning and sharing process. Learning and/or sharing could be within ongoing projects, completed projects, and experienced personnel involved in these projects. In this regard, [1] argue that reuse of existing organizational knowledge, which gained through experience, can greatly reduce the time spent on problem solving and increase the quality of work. Construction projects can learn from within the same company or outsiders, and from both small/large projects of shorter/longer project life spans. The type of knowledge acquired through the learning and sharing process could be tacit or explicit [12]. Fortunately, the relevance of both tacit and explicit knowledge, the distinction between them, critical success factors and the likes are well documented in KM literature. Nevertheless, only a relatively small proportion of construction organizations have implemented KM systems [5]. Indeed, some construction organizations embedded KM as a strategy. According to [20], 40% of the construction already have the strategy but it seems took longer time to invest on it.

One challenge is how to evaluate or measure KM. Typically, lack of systematic methods of learning and sharing processes that are feasibly difficult to evaluate in practice. In this connection, there is lack of real-time and readily exploitable (usable) methods (tools). According to the general literature, KM methodological developments and the capability to use these methods would help to create value on the construction investment.

According to [21], knowledge will not bring value unless it is actively used. To use knowledge effectively in construction projects, firms should consider KM as a part of firm's strategies. Literature notably identified KM as a framework for designing an organization's strategy that can help to learn, to create economic and social value [14]. In the same light, the strategic advantages of KM has been considered as a key driver for better organizational performance and competitiveness. Regardless of several discussions on strategic advantages of KM in literature, our research would focus on methodological improvement as a part of KM implementation while managing concurrent projects. Typically, this research focuses on learning/sharing the knowledge and experiences in various sized multi construction projects. We approached the discussion using the following main research questions:

- How can we systematically identify projects to ''learn or share'' knowledge to other projects with various project size and life span?
- How projects can facilitate KM in the learning and sharing process? States of the art discussions.
- What could construction project get or benefited from these processes?

1. Methodology

The paper is conceptual but in light of practical discussion from Norwegian construction project. The need for this research emanates from lack of formal methodology for learning and sharing process in knowledge based construction organizations. Typically, in construction that run several concurrent projects with different size and project life span. The research uses KM and construction focused literature. In addition, it discovers some good practices and adaptable methods from production (product development) systems, such as iteration management, set-based thinking, and agile PM planning. The paper attempted to develop learning and sharing matrix to facilitate KM in construction.