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Design management in the building process - A review of current literature

Vegard Knotten[a,c]*, Fredrik Svalestuen[b,c], Geir K. Hansen[a] and Ola Lædre[b]

[a]*The Norweigian University of Technology and Science, NO 7491 Trondheim, Norway*
[b] *The Norwegian University of Technology and Science, NO 7491 Trondheim, Norway*
[c] *Veidekke Entreprenør AS, N-0214 Oslo, Norway*

Abstract

The architecture, engineering and construction (AEC) industry has experienced the declining productivity and some of this is due to deficiencies in building design. The focus on energy efficiency and sustainability makes it even more important to reduce such deficiencies. The managing of building design phases might be one of the most challenging forms of management in the AEC industry, i.e. it involves managing both outputs as drawings and creativity as minds. There must be enough room for creativity so that a building project can evolve to serve clients' needs. There are pooled, sequential, reciprocal and intensive interdependencies in building design that need to be handled or coordinated differently. A particular building design phase most likely consists of all the four types, yet dominance shifts between them through sub-phases. The logic of creative processes is difficult to understand and, therefore, to manage properly. In this paper, these four interdependencies and their coordination are described based on the literature review. The key findings indicate that the reliance on the same management approach to handle both reflective and sequential dependencies might be contra productive.

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1. Introduction

The architecture, engineering and construction industry (AEC) have a potential to increase productivity and increase the value of projects. There is a common apprehension that the overall performance of the AEC industry

* Corresponding author. Tel.: +47 918 42 758; fax: +47 73 59 53 59
E-mail address: Vegard.Knotten@ntnu.no

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has not evolved with other industries and that there still are too many quality errors, leading to rework (e.g. Love et al., 2003; Love & Li, 2000; Meland, 2000). A finger is pointed towards building design as a major factor of low performance (Ballard & Koskela, 1998). Especially, the poor management of early design phases has proven to be the cause for document deficiency and rework (El. Reifi & Emmitt, 2013; Tilley, 2005). Moreover, it has been proven that these problems influence building projects as a whole negatively in terms of increased costs or reduced productivity (Baldwin et al., 1999). Similarly failures to fully understand clients requirements and value influence the value of buildings negatively in a form of clients not getting what they really need and want (Thyssen et al., 2010).

The term value is arguable for many definitions (Salvatierra-Garrido et al., 2012), but in this paper it is regarded in the context of owners, clients and users. Value can be regarded as something that improves a project, either as a final product or a successful process (Eikeland, 2001). It is in the early stages of the design phase where the influences of stakeholders is largest and the costs of changes are lowest, making this the best stage for value realisation (Samset, 2008). This stage is also most complex to understand, carry out and manage.

Many projects are not able to realise their value potential and this is argued to be due to managerial problems in the design phase (e.g. Hamzeh et al., 2009; Hansen & Olsson, 2011). One of the reasons for this is the complexity of the design phase, and especially the early design phase where iterations are essential for value creation (Ballard, 2000). The management of a mass production factory can always be planned sequentially, where activity A must be completed before activity B can start. This is seldom the case for building design management, where you want several iterations to generate value, consequently making the early stages of the design phase a complex process to manage.

In this paper, the processes of building design, the complexity of those processes and the most current practice of building design management are described, based on the literature review, as follows.

2. Conduct of the literature review

Compared to project management, there are only a few books written about building design management describing specific challenges in design management (Blyth & Worthington, 2001; Emmitt & Ruikar, 2013; Eynon & Building, 2013; Gray & Hughes, 2001; Sinclair, 2011). The research is mainly presented in papers and articles. In order to describe complexity, building design management is linked to organisational management.

The literature review was done by applying the seven steps of Creswell (2003). The topic words were building design management. These were chosen to give understanding of the amount of literature with those keywords. The search of relevant literature has been using the search engine with a reference to the last 10 years. The search string was “Building near/0 Design near/1 management”. The databases were AB/Inform (AB), Web of Science (WoS) and Scopus (Sco). The first search presented 289/6/192(AB/WoS/Sco) articles in the different bases and these were then reduced to 60/6/69 after discarding commercials and irrelevant journals (e.g. medical, chemistry etc.). Then the results were skimmed by reading the abstracts, keywords and titles, discarding those who were irrelevant. The review paper of Svalestuen et al. (2014) gives a good insight of the substantial amount of work done in the IGLC community concerning building design management, and this was added as well.

3. Results of the literature review

3.1. The building design process

In order to try to understand the difficulties of design management it is also important to understand the process in building design. The design process is often divided in several stages or phases. An example is the RIBA plan of work which has divided the construction process into the seven stages where stages 1 through 4 include design work (RIBA, 2013). The flow of information, focus points, planning and managing differ in these stages. A simplified definition is to say that design management is about managing people and information (Emmitt & Ruikar, 2013). People in this context are stakeholders in a building project and information being deliverables among stakeholders.