

Chapter 26

The Role of BIM in the Architectural Design Process: Learning from Practitioners' Stories

Anita Moum

SINTEF Building and Infrastructure/Norwegian University of Science and Technology (NTNU), Norway

ABSTRACT

The objective of this chapter is to identify the role of BIMs in the architectural design process from the practitioners' point of view. The chapter investigates the main factors affecting the practitioners' use of BIM, and how BIM impacts their work and interactions. The chapter presents a holistic research approach as well as the findings from its application in four real-life projects. In these projects, much of the practitioners' focus was on upgrading skills and improving technology. Nevertheless, a number of their challenges were linked to the nature of the architectural design process, particularly to its "hard-to-grasp" iterative and intuitive features. A conclusion of this research indicates that the role of BIM is affected by the many interdependencies, relations and interfaces embedded in the highly complex and partly unpredictable real world practice. A future challenge would be to understand, master and balance these relationships - upstream and downstream across multiple levels, processes and activities. The presented holistic research approach and the related findings contributed to research which aimed to embrace the complexity of real-life problems and gain a more comprehensive understanding of what is happening in practice.

1 INTRODUCTION

"The architect must be able to do two things; i.e., understand what people need and build houses."

By asking architects about what they see as their main responsibility and contribution to the design process, it is likely that they especially mention two points: first, creating good architecture, and second complying with the contract conditions and requirements of the clients, users and building authorities. The first point is related to the product,

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the second is related to the processes leading to production of that product.

Architects traditionally play distinct and important roles in the architectural design process (Gray and Hughes, 2001). Their highly complex, sophisticated and in part tacit skills (Lawson, 2006) make them suitable for several tasks and roles – from being design specialists, translating the many project constraints and information into physical form, to being involved in management tasks where they lead, coordinate and administrate the design process. Architects are, however, not alone in their efforts to create successful buildings and real estate. Cuff (1991) describes design as ;

“A social construction, where buildings are collectively conceived”.

Behind both the seemingly simple quotations above is a highly complex universe where predictable and unpredictable interactions, interrelations and interdependencies between actors and processes create our physical environment.

The Practice of Architectural Design meets the Digital World

More than thirty years ago the architects and other practitioners involved in the architectural design process faced an entirely new situation due to the new and rapidly expanding Information and Communication Technology (ICT) industry. They have, however, been slow to adapt the new technologies in their work and interaction. Compared to other industries, the Architecture-Engineering-Construction (AEC) industry is lagging behind when it comes to the successful implementation and use of ICTs (Gann, 2000; Wikforss, 2003a). Despite the high expectations on the potential of the new technologies in enhancing growth and improving processes, the productivity status of the AEC industry described in the Latham Report (Latham, 1994) is still an issue of concern in many countries.

With the new millennium and the growing awareness within the industry about the potential of the new technologies, more and more powerful industry stakeholders have participated in research and development (R&D) projects to encourage and promote the integration of ICT into the practice. In recent years an array of international and national joint efforts and alliances have been introduced (Bazjanac and Kiviniemi, 2007) i.e in Denmark, Finland, Norway and the USA. These initiatives support 3D object-based modeling and Building Information Modeling. The integration of these technologies is expected to lead the AEC industry into a new era, characterized by better communication and exchange of architectural design information between project actors involved in all phases of the building’s life cycle. There is thus an increasing pressure on practitioners for adopting new technologies in their work and interactions. Furthermore the implementation of these technologies is expected to impact both working methods and role definitions in their projects (Berg von Linde, 2003; Sundell, 2003; Wikforss, 2003a, 2003b). Crucial questions arising out of observations of trends and movements within the current industry and research are;

“How the adoption of new technologies will affect the development of good architectural design solutions and real estate? What happens with the complex universe of interactions and interdependencies between processes, roles, and actions which are an integral part of the architects’ and other practitioners’ daily work?”

Research dealing with ICT in the AEC industry has been dominated by a focus on the development and improvement of new software and hardware systems, and on technology related to issues of implementing these in practice (Wikforss and Löfgren, 2007). More research is needed on the impact of non-technological and human factors - an issue which has increasingly gained the attention of researchers (Amor et al.,

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