

# IT Services Design to Support Coordination Practices in the Luxembourgish AEC Sector

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**Abstract.** In the Architecture Engineering and Construction sector (AEC) cooperation between actors is essential for project success. The configuration of actors' organization takes different forms like the associated coordination mechanisms. Our approach consists in analyzing these coordination mechanisms through the identification of the "base practices" realized by the actors of a construction project to cooperate. We also try with practitioners to highlight the "best practices" of cooperation. Then we suggest here two prototypes of IT services aiming to demonstrate the value added of IT to support cooperation. These prototype tools allow us to sensitize the actors through terrain experiments and then to bring inch by inch the Luxembourgish AEC sector towards electronic cooperation.

**Keywords:** AEC, Cooperation Process, Coordination practices, IT services.

## 1 Introduction

Cooperation between actors is essential for the success of a construction project. The short-lived groups of actors, heterogeneity of stakeholders and intern strategies of their firms are the main specificities of the AEC<sup>1</sup> sector. In opposition to other industries the rationalization of work processes and their computerization are still low developed in the construction of buildings sector.

However this is not due to a delay or an archaism of the sector compared to "leading edge industries". Indeed, the diversity of projects and architectural realizations is added to the complexity of groups of actors and relations between them. In this context, the change of work method takes time, and stakeholders able to impose it don't exist. The Luxembourgish construction sector is not an exception and presents the same particularities as those of its European neighbours.

Then, the cooperative processes could be improved. In fact, delays and building defaults regularly appear on building construction sites. They are notably due to dysfunctions in cooperative processes that actors perform. These processes have to be

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<sup>1</sup> Architecture Engineering and Construction.

improved in order to limit these risks. IT innovation is a way to support these changes in professional practices.

In Luxembourg the Information Technology Resources Centre for Building (CRTI-B<sup>2</sup>) is an inter-professional organization, created in 1990. At the national level, the CRTI-B aggregates the main actors of the building sector: owners, architects, engineers, contractors etc. This organization supports integration of new Information and Communication Technologies in the building sector through innovation R&D projects. The overall objective of these projects is to lead tasks as closely as possible to the sector in order to propose concrete solutions (methods and tools software) to coordination needs of professionals coming from this working field (architects offices, design offices, home-building companies...). The primary goal of the Build-IT project is to enhance the competitiveness and the quality of the production process in the building sector by the use of ICT. Within the framework of this project, we focus on the practices of the exchange and the share of information that will ensure the interoperability between the actors of the Luxembourgish building sector. The Build-IT project encompasses a variety of research and development initiatives, most of which involve practitioners.

This article describes the first results of this project. First on a theoretical plan we address an analysis of actors' organizations in order to characterize coordination practices in building project. We present then two developments of IT services responding directly to the problems observed with practitioners, and the first validation elements. Finally, we conclude through opening future ways of actions to develop in the next stages of the project.

## 2 Cooperation Processes in AEC Projects

The terrain action carried out in the framework of the Build-IT project is completed by a theoretical background. Academic PhD works<sup>3</sup> reinforce this approach by characterizing and modelling cooperation and coordination processes in AEC.

### 2.1 Organization of Actors and Coordination Mechanisms

In AEC projects, cooperation is extremely important because projects bring together numerous independent actors during short periods. Their activities are low predictable and they very often have to adapt their tasks and decisions to the specific problems they have encountered. Organization of actors takes different forms in this evolving context [1]. It is "hierarchical" when an actor is responsible of the work of the others [2,3] (i.e. building construction coordinator). We call it "adhocratic"[4] when actors are grouped in an informal way to solve a specific problem, punctual and unanticipated.

These two fundamental forms of actors' organizations coexist during the design and building construction phases.

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<sup>2</sup> <http://www.crtib.lu>

<sup>3</sup> Three PhD theses are and have been achieved in the Architecture and Engineering Research Centre (CRAI) at the Architecture School of Nancy, France (<http://www.crai.archi.fr>).