

Social BIMM: gothic underlying design ethic of the contemporary architect

The relationship between the design process and building information modelling and management (BIMM) revolves around the concept of collaborative design methodologies and discovering common grounds in striving for shared goals. In this context, the socio-cultural aspects of the process are sometimes left behind in traditional matrices of architectural design, despite – as Lean mind set teaches us – being one of the success criteria for any organization involved in project characterized by a high degree of complexity.

Taking into account the current scenario where digitalization is modifying and reshaping the processes, interactions between social sciences and Project Design Management support the wide range of phenomena such as creativity, problem solving, collaboration, shared design. Thus development of innovative project management methodologies based on social aspects looks urgent.

The Aviation architecture industry develops a complex product with the efforts of multi-disciplinary teams along a process hindered by discordances that struggles to increase productivity. Achieving a reliable flow of information is one of the most critical difficulties in the Design process, since all involved project participants are meant to generate, manage and transform project information that composes an “abstract description” of a product. This difficulties are not steadily understood because of missing knowledge by project participants, leading to wastes such as reworks caused by missing updates on documents, increase of production times due to growing information complexity, non-value-adding design iterations. Lean design approach can be considered within such view also as a social supportive methodology.

Management as a social science is usually divided by Architectural design and construction. Since Leon Battista Alberti in his *De Re Aedificatoria* (1472) defined rules - both theoretical and practical as well, to guide the artists' work - design practice and building activity were separated from the gothic unity representative of the master masons' tradition. Alberti's negation of gothic tradition evidence is in the *Tempio Malatestiano's* marble envelope that ignores the former gothic windows rhythm. Such elitist theory has had strong influence along modern centuries, contravening the understanding of the architectural project as a social construct around which the whole process revolves, aggregating resources and materializing the “building factory”.

Project Information sharing and collaborative management are fundamental leads in the trail to constructability. It can be defined as the optimal use of joint knowledge and practice for planning, design, procurements and field operations to reach project objectives and meet clients' requirements, while limiting and removing all the processes, sub-processes and activities that do not contribute to deliver building quality, hence satisfaction. In a BIM-infused process, the project participants collaborate to generate Project Information Organisational Memories and gather them in a coordinated and integrated model: this processes exploit synergies between BIMM and the aforementioned Lean mind-set by a “natural alignment”.

In this framework, BIM modelling can be compared to the unitary building tradition of the gothic architecture, where information asset are shared and worked together to achieve the common goal of creating the model. The model itself - as product of the architectural process – becomes the options measurement instrument and the base building block of the latter Maintenance and Operation phase.

Despite the time scale being completely different in the current age respect to the past, this comparison lays ideas to spark the conversation on reshaping processes in the digital age.

The AECOO industry (Architecture, Engineering, Construction, Owning and Operating) is traditionally conservative and extremely resilient to innovation, despite being pushed by the sector transformation. Project participants who cannot cope with the pace of the industry are generally pushed out of the market and doomed to vanish, since they cannot adapt to new operational and business models. What is happening is that some of them could be substituted by new project participants that embrace the change and are able to manage it.

Attention has also been focused on the market reshaping showing life cycle and innovative network projects, infrastructures, complex buildings and services. With the concept of Smart Cities, they combine initiatives involving new technologies to fabricate and use cities where data is becoming more and more valuable asset as distributed resources rather than monolithic software through any kind of device or application. Manufacturing methods are also changing from high-intensity manual work methods to automated, 3D-printing and robotics, thus increasing data value for data-driven design and manufacture. All this, it should be noted, that the development of new operating models, procedures and contracts, as an expression of consensus among industry players, have a decisive role in promoting change. In fact, increasingly complex technologies require a process approach and intensive collaboration. Instead, the traditional procedural and contractual system based on fragmentation of services and the ongoing selection of different suppliers does not encourage collaboration, viewed as a synonym for value loss over the protection of company knowledge. This is so critical that the market, especially in the aerospace and sanitary sectors, tends towards service models in which the cost of life cycle and the functionality of the solutions are more relevant than the lowest price offered at the tender.

BIM implementation is by definition a collaborative practice, as it involves the work of several project participants, that work together with contractors to literally build a complete and coordinated model constituted by information. Moreover in this BIM-infused project framework, it should also be considered that the higher is the profitability margin is for the project, the higher will be the efforts of project participants in sharing efforts to feed the model. The paradigm shift generated by this work framework evolution creates new knowledge and skills requirements also in social aspects for the AECOO practice, implying the discard of the obsolete *fordist* approach.

The equal enhancement of people, process and technology, the three pillars of the design process has to be tailored on the socio-technical system of the project itself to maximize benefits of BIMM integration. This is particularly true when dealing with client objectives conversion into technical requirements and management. Since BIMM allows explicating such requirements and full transparency between the client and the project development team. In particular, project visualization capabilities of BIMM methodologies are useful when dealing with the client and to support project information management and organization, hence to deliver value to them.

Knowledge of how Lean and BIM are decisive in relation to the change in project production, construction and operation processes in general, but also that achieving the benefits expected from the two approaches requires greater consideration of the characteristics of the work and management environment, which are deeply influenced by social phenomena.