

# MODELS OF INQUIRY ACROSS DISCIPLINES FOR THE BUILT ENVIRONMENT: PROJECT BEHAVIOUR AND MANAGEMENT BY DESIGN

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## ABSTRACT

Comparing the differences between the traditional approach to project development and management (that focuses on the organized project) and the project as an organizing process, shows the advantages of design thinking for improving participatory protocols, such as “project-grounded” research, for the initiation of built environment project. In applying design thinking for problem setting across disciplines, shared understanding of critical issues, emphasizing actors and stakeholders’ intentions, facilitates interdisciplinary knowledge building and sharing aimed at problem solving. The well noted absence of design thinking in problem setting and inquiry into ‘that-which-can-be’ (as defined by Nelson & Stölterman (2003) is directly related and caused by the persistent traditional mechanist theoretical and methodological paradigm in which projects are embedded. The “organizing” properties of Design Thinking, articulated around systems thinking in managing interactions, facilitates the definition of complex issues in which all actors and stakeholders (AS) play a predominant role. Innovative procedures, such as ‘Management by Design’ highlight the role of AS for structuring the project from and through the design process. Management by Design requires revising the dynamics of actors-stakeholders participation (ASP) as to include it as a driver for problem setting/solving. The introduced notion of the “organizing project”, based on Le Moigne’s (1999) “organi(s)action” model articulated around Morin’s (1977) principles, is proposed here as a “social actions construct”. It allows for a more global vision of the project, one which considers elements and stakes otherwise hidden in the traditional “organized project” perspective. This paper draws on the experience of the “Art, Architecture et Paysage” (AAP) (Coste *et al.*, 2008; de Blois, 2007, 2008) research project, that was conducted in Saint-Étienne, France.

*Keywords: systems thinking; design thinking; management by design; organizing project; actor-stakeholder dynamics; project management.*

## 1 INTRODUCTION

This line of reasoning aims to clarify design’s untapped potential role within the context of the building industry project practice as experienced by project management and design management. Design practice and project behavior are studied from the viewpoint of the respective positions of the actors-stakeholders – disciplinary positions, intentions and roles – on the one hand, and the organizational concepts and structures of the project on the other. The goal is not to explore methodologies aimed at improving the design process or, by extension-reduction, design management; rather the contrary. It is more a confrontation of the traditional sequential approach of project management by exploring the real foundations that drive and maintain the momentum of change driven through projects, such as: the actors and stakeholders (AS) and their intentions; thinking, doing and acting (“*penser*”, “*faire*”, “*agir*”); the quest and the project.

The failure of “design methods”, which were repudiated by the same authors that devised them (Alexander, 1971; Broadbent, 1969; Jones, 1970; Lawson, 1980 in Gedenryd, 1998, p. 59), raise fundamental questions about their adoption by the management sciences who use it as a tool frame aimed at understanding and devising complex structures and processes to better “manage the project process”. Understanding and managing the design process based on management principles that rely on inadequate design methodologies seems, in that matter, rather contradictory. “*The usual difficulty is that of losing control of the design situation once one is committed to a systematic procedure which seems to fit the*

*problem less and less as designing proceeds* (Jones, 1970, p.27 in Gedenryd, 1998, p.60). Nevertheless, design management takes that route. They do not consider the challenge that understanding design poses: “*In studying design as a process, one is looking at the process-component of largely content-based decisions. This severely limits the power of a process-oriented methodology to understand what is going on in the design activity.*” (Dorst & Dijkhuis, 1995, p.265)

The literature on design process and theory is abundant but also contradictory (Alexander, 1964; 1971; Archer, 1965; Broadbent & Ward, 1969; 2002; Chan, 1990; Cross, 1984; 2006; Cross *et al.*, 1996; Dechow, 2004; Dorst & Dijkhuis, 1995; Gedenryd, 1998; Jones, 1970; 2003; Kruger & Cross, 2006; Lawson, 1980; Liedtka, 2004; Macmillan *et al.*, 2002; Newsome *et al.*, 1988; Popovic, 1996; Rehman & Yan, 2007; Rittel *et al.*, 1984; Rowe, 1987). It offers a wide variety of models based on the analysis-synthesis linear rational thinking as well as the iterative loop models. No consensus has been reached and the linear mechanistic option still prevails for project management.

Therefore, design process models are widely used in project management. Unfortunately, they do not take into account the iterative nature of the “design activity” in prescribing models for its management. The characteristic linear process of project management tools does not permit the full potential for the design activity to produce its best results, as information necessary for the development of concepts and details will be come available only at a future stage (Austin *et al.*, 2000; 2001; 2002).

## 2 THEORETICAL AND OPERATIONAL CONCEPTS

The research is set in a multidisciplinary setting. Specific concepts based on a design thinking perspective were adopted and used for the implementation of the protocol (see research method) and the following discussion. These concepts are briefly presented. Design thinking refers to the multifaceted nature of the design activity (Boland & Collopy, 2004; Cross *et al.*, 1996; Gedenryd, 1998; Lawson, 1980; Owen, 2007; Rowe, 1987): iterative, solution driven, systemic vision, synthesis versus analytic, human-centered, adaptability, ability to visualize and visual communication, etc. Design management refers to the still emerging discipline that focuses on the management of the design activity, seen as a function variable/service within the project process. Management by design introduces the design thinking approach to project management as an alternative to information processing decision making, thus introducing a ‘solution driven’ approach instead of a ‘problem solving’ one. The organized project refers to the mechanist, structured, planned, and linear nature of traditional project management models. Finally, the project as an organizing process refers to a more complex concept based on Boutinet’s (2004) project theory, as well as Le Moigne’s (1984; 1999) general systems theory and Morin’s complexity theory (1977; 1996; Morin & Lemoigne, 1999).

We establish here that the project, as much as it can be planned, organized, and structured prior to its actual initiation and realization, is also submitted to a dynamic self-structuring process. This process, within the built environment project, is driven by the actors and stakeholders (AS) actions, as well as by intangible context specific variables and uncertainty situations. The protocol involves gathering and mapping information about: (i) the project structure, the research group structure and communication channels (formal and informal); (ii) the identification of each organization responsible (or the most influential); (iii) each organization’s field of expertise; each individual’s respective discipline and finally each individual’s motivations (professional, personal, or ethical) towards the project.

The position of the stakeholder becomes ever more complex through the interactions among the several stakeholders. (Gero, 2002; Gero & Kannengiesser, 2004; Hatchuel & Weil, 2002) “I integrate my project in the other’s”, (Sartre in Boutinet, 2005, p. 42) is well illustrated by the Figure 1 below. Each stakeholder has to insert their own project/intentions/goals within an expanded dynamic set of projects. These projects operate at different levels, including: the individual, the respective disciplinary codes of conduct, the organization(s) and embedded projects, the main project and so on.

A project is only possible through collective action and acceptance. In addition, despite the complexity

of the interactions expressed, the treatment which is made by the organizational theories is much too simplistic. These theories accept this complexity but fail to translate it into practice. In addition, this reality is weakly reflected in standard organizational models, in reference to Mintzberg (1982; 1983; 1989). Consequently, the project management models, being models primarily based on this conception of organizations – structures and processes –, the approaches remain limited in practice and offer little alternative to conventional analytical models.

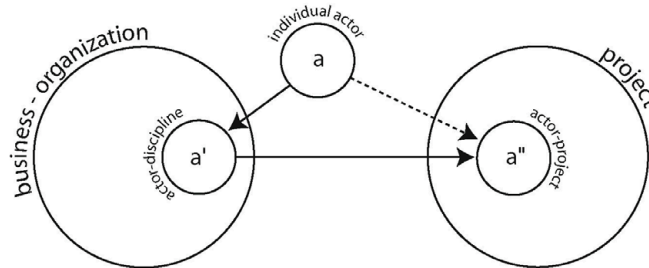


Figure 1: Triple stance-game-stakes: enterprise-project-3-actors (Source: De Blois, 2007 , p. 49)

### 3 RESEARCH METHODS

An array of qualitative methods are adopted for this exploratory project into ASP at project initiation. The “project grounded” research (PGR) method (Findeli, 2004; Findeli *et al.*, 2008; Findeli & Coste, 2007) is proposed. The method focuses mainly on generating relevant knowledge that contributes to the improvement of design practice. As Findeli *et al.* (2008) puts it, PGR focuses on research through design, thus making the difference between research for design (technology, ergonomic, aesthetic, psychological, etc) or about design (its objects, its processes, its actors and stakeholders, its meaning for society, etc., mainly conducted by other disciplines for their own benefit). PGR focuses on the relevance of results (for knowledge, for practice, for education) for the advancement of the design discipline. In our case “design” is an integrated activity throughout the built environment project process. It implies a look and a critique of design management, which traditionally corresponds to the management and control of all the conception activities, but only between the feasibility and construction phases.

The approach implements a procedure for multidisciplinary problem setting (Coyné, 2005; Rittel & Webber, 1973) as opposed to problem solving, through shared understanding of stakes. But, considering the confrontation of paradigms (Dorst & Dijkhuis, 1995; Visser, 2006) it is recommended to include both rational and situativity problem setting/solving approaches. It implies also the design of a mixed method protocol. The main driver consists of applying “design process and methods” into ASP by conducting small workshops within actual projects. “Project-grounded” research calls for the conduct of participatory action research methods, adopting a “grounded theory” posture using ethnomethodology’s interpretation, all within a case study framework. This unique mix assembles a proper tool set of methods specially adapted for problem setting and multi-disciplinary design research.

Design process and ASP are used to (i) model and compare the organizational structure of the project and (ii) demonstrate the evolution of roles of AS throughout the project process. A qualitative analysis of case studies is then conducted based on the material extracted from the “grounded theory” section of the study, conducted during the workshops. It is then processed and filtered a second time through Atlas.ti (Atlas. Ti, 2007) to generate the multi-disciplinary material (terminology, concepts, issues) needed for the second round of workshops. The second round of workshops serves as the basis for actual project programming.

The qualitative case study analysis is also used as a complementary tool for: modelling informal organizational structures, based on the theories Mintzberg (1979; 1983) and for producing a map of AS dynamics. Informal and semi-structured interviews are necessary to complete the mapping, originally assembled from formal data collected from various document sources (reports, charts, websites, etc.).

To better understand the dynamic of AS, each interviewed individual is then categorized using a double system aimed at identifying disciplinary hegemony within the project structure. The first categorization identified individual's academic and professional affiliation. They are sorted by project disciplines. The second one wished to identify the "hidden agendas" of AS by identifying all other interests that might influence their official duties assigned though their role in a specific project, such as personal interest, ethical concerns, political affiliation, cultural history, etc.

This hypothesis aims to establish the potential strategic role of design, as one of the first steps of project initiation, and then to examine the scope of the practice of design, to finally clarify the potential role of design within the context of the building industry. It is partly supported by a discussion of the organizational structures of projects of the building industry and the model of project management illustrated by the 'Process Protocol' (Kagioglou *et al.*, 2000). Design practice and project behavior are studied from the viewpoint of the respective positions of the actors-stakeholders (disciplinary positions, intentions, and roles) on the one hand (Abbott, 1988; Crozier & Friedberg, 1977), and the organizational concepts and structures of the project on the other (Boutinet, 2004; 2005; Mintzberg, 1979). The goal is not to explore methodologies aimed at improving the design process. Instead the study proposes a confrontation of the traditional sequential and linear approaches of project management by exploring the real foundations that drive and maintain change through the development of the project (Boland & Collopy, 2004). This includes the AS and their intentions: think, do, and act ("penser", "faire", "agir"), uncertainty anticipation, and management. All of which affect the choice of strategies in complex projects.

#### 4 DISCUSSION AND CONCLUSIONS

The results stress the limitations of "design methods" (Alexander, 1971; Broadbent, 1969; Jones, 1970; Lawson, 1980 in Gedenryd, 1998, p. 59) for problem solving. This raises questions about their adoption by the management sciences that use them as a tool for understanding and devising complex structures and processes to better manage the project process.

In contrast to the rigid and fragmented processes of project management, the thinking *by* design postulates that the conception of design spaces allows for an approach that is both global and specific for the project and its components, its intentions, and its purposes. To that end, it is also assumed that the iterative characteristics of the design activity towards problem definition, the approach from the whole and the parts, the premise of the complexity of the problem, and the mechanisms for decision making, are all essential elements as much to the project control as to the design process. Consequently, the two processes (problem solving and designing) share noticeable similarities. However, these similarities are not always reflected in practice. It is therefore possible to offer alternatives to current methods of problem-solving by a reversal towards *problem-setting*.

Decision makers do not always define the scope of the problem they have to deal with. Often, the process of developing a shared understanding is not an integral part of their practice. The traditional institutionalized mechanist segmented approach is by nature multi-disciplinary, where each specialty addresses its own problems and issues within their respective expertise. The systemic nature of the proposed approach asks, at a minimum, to be inter-disciplinary. Instead of looking at separate "elements" constitutive of the whole, the research focus is on formalizing "relations" in between disciplinary knowledge and AS. These workshop protocols are resource intensive and logistically complex to coordinate within a real project scenario. A thorough qualitative content analysis (with Atlas.ti (2007) of the workshops (audio, video, and other visual material (Coste *et al.*, 2008; de Blois, 2007) is essential in order to attest to the validity of the results. In this case, time constraints, protocol inconsistencies, and methodological fine tuning produces limited, although promising, results.

The results, obtained with the "project-grounded" research protocol are exploratory and preliminary. They indicate that flexible adaptable project structures contribute to a better project initiation process. These

structures need to be developed collaboratively, at project initiation, while taking into consideration the potentially evolving roles of AS. The comprehension and the description of multi-level project behavior systems (interactions of subprojects within the main project as seen through ASP) are essential in this context. They are usually described with specific procedural models that do not allow for the grasp of the entire complexity of the issues. Design thinking can play a decisive role by strategically embedding itself within organizations and projects, while suggesting a new comprehension-conception of the actors and organizational forces in action, the processes, and the standards, so that the pertinent projects may be brought to term (Borja De Mozota, 2003; Cooper & Press, 1994; Oakley *et al.*, 1990). It is important to question this approach and to suggest the contribution of several alternative models that, once combined through workshop protocols (Checkland, 1981; Checkland & Scholes, 1999; Findeli & Coste, 2007; Wilson, 2001), allow for a new perspective on the project. Just as Boutinet (1990, p. 153) suggests, “it is no longer about analyzing a system, but to design it better”.

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