Faculty of Design

2013

The "self-organizing" project": A "systemic" view of the design and project processes

de Bois, Michel

The "self-organizing" project": a "systemic" view of the design and project processes

Keywords: self-organizing project; project processes; iterative processes; informality; structuring

This paper examines the phenomenon that allows the built environment (design) project to organize itself and carry out its objectives. The hypothesis states that: projects influence, transform and create the organizations and processes that conduct them, following a dynamic and iterative process, referred to as «self‐organizing » and « structuring ». This « active organizing » process generates transformations – organizational and structural – conditioned by the very nature of the project itself.

To support this assumption (hypothesis), an ontological frame, based on four categories of analysis has been devised, including: (a) organization and structures; (b) the project and its processes; (c) the artefact and its design, and; (d) actors' dynamic. These knowledge fields are put in relations using systemic principles and tools within the paradigmatic frame of complexity.
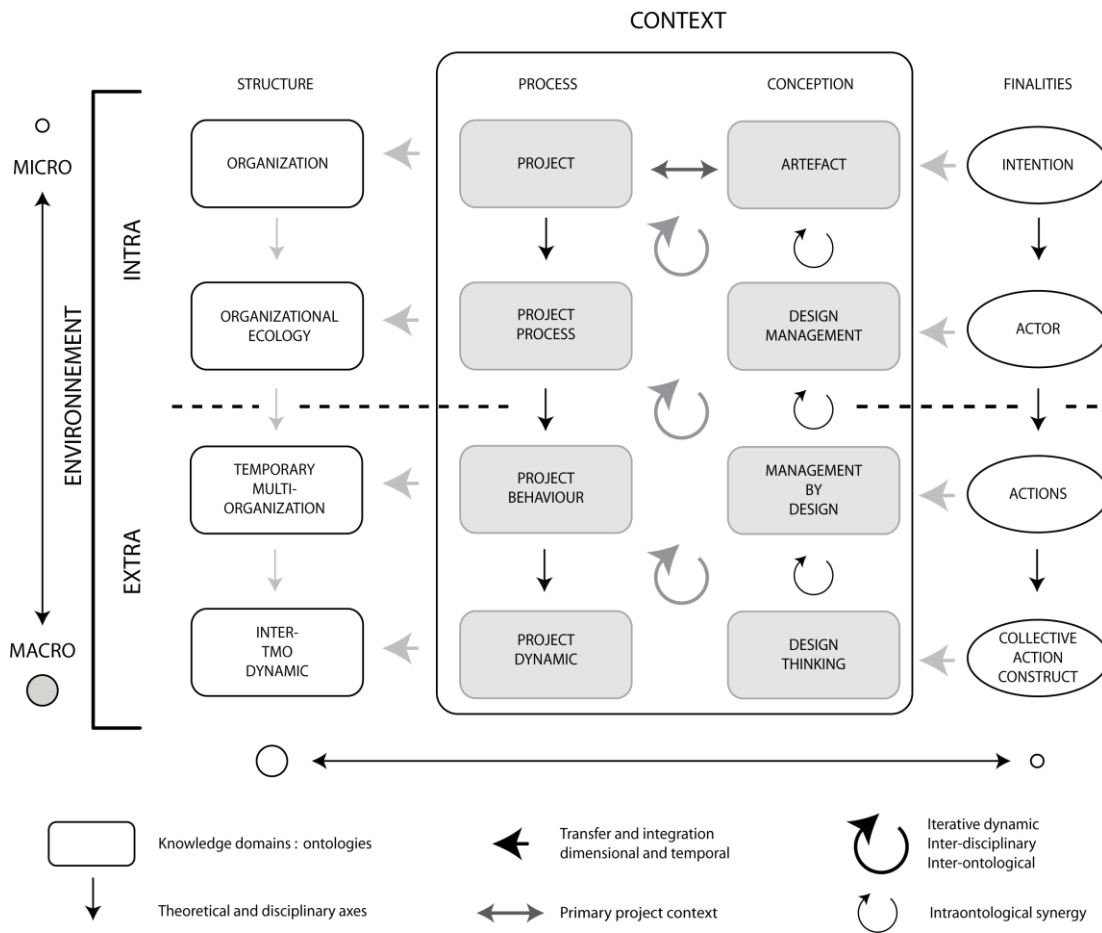
Figure 0.1: Ontological frame

In order to frame and describe the « self-organizing » phenomena within projects, this research, through case studies and case surveys, explored the following topics: (1) the design thinking approach to projects and actors' dynamic behavior ; (2) the informality of communications and coordination ; (3) contingency factors that influence the « structuring » of the temporary multiorganization – TMO; (4) the typologies of the TMO, and ; (5) the study of iterative processes and their influence on organizational structures.

The analysis produced a set of seven results. They help validate sub-hypotheses that

state that: a process of «self-organization » generates transformations – organizational and processual – linked to the specific nature of the project. Therefore, the project : (1) is conducted by both formalized and often linear management approaches as well as iterative design process, the former being non-linear and self-organizing and responding to systemic principles ; (2) contributes to create its own processes of development, and ; (3) constitutes a contingency factor that influences the structuring of the TMO that is created to conduct the project itself.

Two important contributions are drawn from these conclusions : (1) the existence of inter-organizational work constellations; (2) the statement of the « organizing project » that: based on the « self-organization » approach, the project « organizes » itself, the processes and the organization(s) that are created to conduct it.

Theoretical framework

Three theoretical frameworks were combined for this study. First the theories of organizations, and more specifically, the concept of the temporary multi-organization (TMO). Second, the project management and design theories. Finally, in order to describe the complexity of the interactions and the relations between processes and structure, we call on concepts of second generation systems theory (Le Moigne, 1999; Morin, 1977).

a. <u>Organizations</u> : Our assessment of the organizational context is based on the distinctions made in the literature between formality and informality, and how it can help describe the interactions between organizational entities, both internally and externally. There is no doubt that Mintzberg's (1979, 1983a, 1983b) concepts and typologies represent a strong base for the study of the internal structure of organizations. They are also compatible with the study of the Temporary Multiorganization (TMO) that conduct construction projects; that is, the temporary groups of companies and stakeholders that conduct construction projects. According to Mintzberg (1979, p. 71), work constellations are quasi-independent groups of individuals who work on decisions appropriate to their position in the hierarchy. These groups can be formal, informal or mixed. As for interactions between organizations that compose the TMO, we refer to Stringer (1967), Packendorff (1995) and Kenys (2009), who argue that informality is even stronger in these temporary structures than within individual organizations.

According to organizational theories, the complex context within which projects evolve, due to their dynamic organizational structure, had to be assessed (Davidson Frame, 2002; Gidado, 1996; Kagioglou *et al.*, 2000; Pryke & Smith, 2006a). The study of individual organizational structures (Clegg *et al.*, 2006; Demers, 2007; Mintzberg, 1983b) and of the dynamic arrangement of TMO participants (Bryant *et al.*, 1978; Kenis *et al.*, 2009; Lundin & Steinthórsson, 2003; Packendorff, 1995) that conduct projects serves as the main canvas onto which our reflection and analysis is projected.

b. Project management and design theories : Whereas they embody the process-related aspects of projects, both fields also confront each other. They are based on different premisses and use different approaches (Boland *et al.*, 2004; Shamiyeh, 2010). Project management traditionally uses formal linear methods and it is « tool oriented ». Its theoretical bases are sparsely distributed and largely contested, in the light of project failures identified in the literature – mainly costs overruns, delays, lack of information, tangled communications and lower quality (Koskela *et al.*, 2002; Pollack, 2007; Williams, 2005, 1999). Problems are formulated in advance instead of being assessed in context, and the process is focused on optimization and finding solutions. Design theory instead emphasizes iterative and unstructured processes (Dorst, 1997, 2011; Rowe, 1987). It insists on the importance of redefining the problem space within the process and producing « satisficing solutions » (Cross, 2006; Simon, 1969). However, processes of management and design often need to be conducted simultaneously. Understanding how they work, both independently and jointly, help us conceptualize the interactions *within* and *between* organizations (Koskela *et al.*, 2002). Finally, it is important to note here that many definitions exist to describe a process in management theory. (Hernes, 2008; Pettigrew, 1997). Yet, we adopt the following : a process is « a sequence of individual and collective events, actions and activities unfolding over time in context » (Van de Ven, 1992, p. 192).

c. Systemic principles : Based on the theory of complexity (Morin, 1977), second generation system principles express the dynamic nature and behavior of interrelations over time (Durand, 2004; Le Moigne, 1977, 1999), evolving in a system open to its environment. The systemic vision focuses on interrelations between components of a system – and their level of organization, which are themselves interacting. Systemic vision is thus complementary to the analytical approach which focusses on the study of individual elements. This is where the

notions of model and modelling are at the centre of the systemic approach as it is « rendering intelligible a phenomenon that is perceived complex, by amplifying the actor's reasoning while he is projecting an intentional intervention within the phenomenon » (Le Moigne, 1999, p. 5).

Morin's system vision and analysis principles (1977, in Fortin, 2005, p. 24), consist in organizing elements, processes and relationships based on system behaviour instead of structure. Here, a model is not the representation of a situation or the state of a system. It is a tool that helps to understand a system of actions, by establishing and naming relations between elements of the system. The modelling of actions is characterized by recursive processes, defined by three dynamic functions : transfer through time; morphological transformation and spatial transfer (Le Moigne, 1999).

These dynamic process of « active organization » are expressed by Le Moigne (1999) in the concept of « organisa(c)tion ». This French neologism is derived from three concepts defined by Morin (1977) as : (a) (auto) self-organization : the condition where the system or subsystem is able to maintain a certain equilibrium state, thus self-sustaining, within an environment that is itself dynamic; (b) eco-organization : where systems and subsystems interact together forming another system and; (c) re-organization : where systems, by interacting together and with their environment adapt and re-invent themselves, in a dynamic manner. Together, they express « the action of simultaneously organizing disorder by establishing and maintaining recursive relationships, in order to sustain a given system » (Le Moigne, 1999, pp. 73-74, loose translation).

Systems theory also lead us to focus our attention on formality and informality. Previous research has highlighted the existence of informal forms of influence *within* and *between* organizations (de Blois *et al.*, 2010; Lizarralde *et al.*, 2011). Various studies also claim that authority and power roles that drive decisions are influenced by : (a) actors' divergent roles and heterogeneous motivations (de Blois & De Coninck, 2009); (b) specific discipline perspectives within the project (Abbott, 1988) ; (c) procurement strategies and other legal agreements (Rowlinson & McDermott, 1998); (d) the influence of internal constellations (Mintzberg, 1983b); and (e) the influence of external and internal pressure groups, including operators and users (Chinyio & Olomolaiye, 2010; Lizarralde *et al.*, 2011; Winch, 2010).

Therefore, some authors who embrace the advantages of systemic principles suggest that project performance rely on the use of alternative methods (Koskela & Howell, 2002; Williams, 1999; Winter & Szczepanek, 2007). This implies a better and alternative comprehension of project theory (Boutinet, 1990, 2010), of processes (Bengtsson *et al.*, 2007; Hernes, 2008; Winch, 2010) and of informal relations within the TMO (Barrett & Sutrisna, 2009; Kenis *et al.*, 2009; Rank, 2008). It permits to assess the dynamic characteristics of relations between processes and structure, through the project evolution, translating into an « organizing » activity.

Research Statement

The traditional project management approach states that projects are *organized* with a set of tools and methodologies that enable managers to *plan* and control its various parameters, processes and outputs towards the efficient achievement of objectives (Cleland & Ireland, 2006; Kagioglou *et al.*, 2000; Walker, 2007). According to this notion, the project is organized and controlled (i.e. managed) from the beginning to the end. We refer to this approach as the *organized* project.

A different perspective addresses the complementarity of formal and informal project processes in which project parameters, variables and actors constitute the basic *organizing* elements that drive the project process and its structuring. We call it the *self-organizing* project, an approach based on second generation systemic principles that defines organizational behavior and actors' dynamic through complexity theory (Bonami *et al.*, 1996; Crawford *et al.*, 2003; Jackson, 1995). This perspective proposes that *structuring* represents only one side of the problem, one that is complemented by *organizing* processes (Le Moigne, 1999; Winch, 2010). If there are constraints imposed by the established processes and structure on the project and its variables, there may be in return a structuring influence, by the project, on the processes and the organizational structures. It is therefore natural to hypothesize that the project defines the processes and the structures that need to be designed and implemented for its own execution. To support this claim, Thiry (2007) mentions that :

> *« In turbulent environments, the relative autonomy of project teams, constantly changing project conditions and ambiguity of the organizational context often*

result in emergent working practices that influence the organizational environment. This enactment process results in two basic praxeological implications : (a) the recognition that project management practice can and will influence organizational practices and, in so doing; (b) that an alternate position may open a door for a redefinition of organizations through projects by supporting the adoption of new challenging organizational theories for project-based organizations » (2007, p. 655) *(italic by author).*

Keeping this in mind, our assumption states that : (1) the definition and transfer of project intentions transform the organizational structure and its processes, and (2) organizational *structure* influences the project processes. If validated, this hypothesis confirms that projects generate informal roles and communications that generate a *self-organizing* process that transforms the established structures and processes and, by extension, the Temporary Multi Organization, distorting the formally established – and legally bound – project procurement strategy.

Methods

Longitudinal case

Longitudinal case studies (Yin, 2004) help examine in details the transformations that occur in a project, the processes and the structures, starting from the early phase of definition of project intentions (Halinen & Tornroos, 2005; Pettigrew, 1997). We focused our inquiry on the initiation and programming activities of construction and design projects that unfolded within a public organization (the Sépaq) that conducts projects in national parks in the province of Quebec in Canada. Diagrams were produced that illustrate the project decision-making sequences using decision categories (Mintzberg *et al.*, 1976). Finally, a mapping describes the *organizing* process and the resulting iterative re-organizing of the project.

One of the main challenges of this longitudinal study consisted in developing the adequate tools that would allow for the observation and the analysis of the different processes that initiate and produce change within the Sépaq. The processes were studied by analyzing the interactions, through time, between key variables of the project decision-making process. These variables are described below. The protocol had to establish the comparison between the *organized* – planned and linear – and the *organizing project* – informal and iterative. We

assumed that in order to understand what makes a project diverge from its planned course, we cannot solely rely on project changes and their effects. We also need to contextualize the arguments that lead to the decisions that generate these effects through direct observation.

The analytical tool developed for that purpose is based on the identification of : the TMO structural characteristics ; the actors' roles and disciplines ; the project brief and specifications ; the project phases and project decision categories. Three overlapping cycles of observations and analysis of the data allowed to refine the tool which was then tested in three pilot cases of construction projects. The first cycle studied internal operational documents of the client organization, in regards to the operations and the structure of the construction department, its project processes and tools. The second cycle studied standard projects already completed and compared the planned project to the final results. The third cycle focussed on testing and refining the approach, in situ, on the three pilot case studies.

Processes and decision-making sequences were observed, mapped, analyzed and modelled according to : (a) actors' and stakeholders' dynamic, which identifies actors' different roles during the project (de Blois & De Coninck, 2008; de Blois & Lizarralde, 2010) ; (b) the structures and mechanisms of coordination and communication between actors, (formal and informal) (de Blois *et al.*, 2010); (c) construction specific contingency factors that influence the structuring of the TMO, namely the internal structure of the project client and informal relationships between actors (Lizarralde *et al.*, 2011) and ; (d) the complexity of the relations intra- and interorganizations that shape the TMO (Lizarralde *et al.*, 2011).

The « self-organizing » Project

In this study, we sought to verify if the informal processes – *self-organizing* phenomenon – had permanent effects on the formal organizational structure and project processes. Conversely, if project variables have a structuring influence on the processes and the organizational structure, there may be in return constraints imposed – through iteration – by the established processes and structure on the project. This context creates a confrontation enabling a mutual adjustment. It forces an adaptation that results in re-organizing processes affecting both structures and processes.

Put in perspective of our initial questions, we assert that there is a notable difference between the planned processes against : (i) what is observed from actors actions and (ii) what actors perceive of their actions. As we expected, the transfer of needs, when project intentions and concept are *reformulated*, produces substantial effects on the organizational structure and processes, through iteration loops, resulting in a *structuring* process.

The *self-organizing* phenomenon was observed through the following behaviours : the displacement of decision centres in response to project reorientations ; the emergence of inter-organizational work constellations; the appearance of new unplanned processes ; the emergence a new organizational unit responsible for addressing specific strategic and tactical development objectives. These were all documented by the mapping of interrelated and highly iterative decision sequences.

The analysis of the decisions and resulting behaviours allowed to synthesize the three following effects : (a) permanent effect of project variables on operational processes – self-organization; (b) reciprocal influence between project and organizations, observed through the dynamic nature – interactions – between the project and the organizational units, both being influenced by restrictions imposed by the other – eco-organization, and ; (c) the resulting effects of processed project variables, through decision-making, on the organizational structure – re-organization. These effects are translated into Fig. 7 (Figure 0.2).

Auto- *organizing*
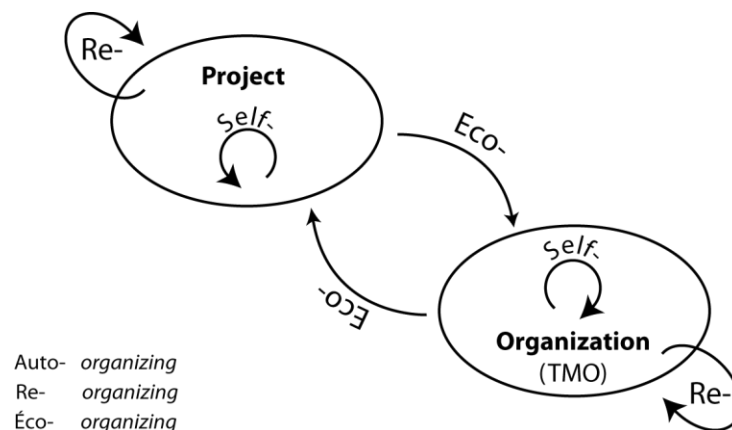Re-   *organizing*
Éco-   *organizing*

Figure 0.2: Project-Organization System Behaviour : Self-, Eco-, Re-organization

    a. <u>Effects of project variables on operational processes (self-organizing)</u> : This

adaptation phenomenon – organizing, structuring and processing – was observed at different project management levels and project stages, even when the processes had been carefully planed as to include all stakeholders (Pryke & Smith, 2006b). The development of project intentions were not synchronized with project planning, stakeholders involvement and client approval. They evolved mutually throughout the project process, forcing a constant adaptation – and the design – of processes, wether proactively or retroactively. This design of processes, in adapting to project variables or in reaction to change in program, is characterized by the *organizing* process. The literature remotely refers to it as *management by design* (Boland & Collopy, 2004). This recursive *organizing* cycle shapes the project; it bounds together the necessary elements for it to be developed and realized. Structures, processes and actors acting together towards reaching coherence, do gain in efficiency in adopting more flexible soft and systemic approaches, as put forward by these authors (Koskela *et al.*, 1997; Weick, 1998; Williams, 1999; Yeo, 1993). As a result, a design approach to « project systems » presents significant advantages when applied to the type of projects that deal with complexity and uncertainty, by easing adaptation through the monitoring of iterative processes.

b. <u>Reciprocal influence between project and organizations</u> (eco-organizing) : As observed, from actors' actions, their decisions and the effects of those decisions, the inclusion of new project variables is perceived as interference in the process. Conversely, the formal instated processes, and formal organizational structures, are a cause of interference for new ideas or unplanned project input.

c. <u>Effects of project variables on the organizational structure (re-organizing)</u> : The project, in *self-organizing*, gradually imprints permanent changes, as was expected. The analysis and modelling of processes and structures reveals the emergence of new organizational structures. The synergy imposed by projects while driven by evolving strategic objectives, has lasting repercussions on those structures.

We observed some degree of adaptation of the organizational structure as it tends to adapt to knowledge that is not available at the outset of the project. The circularity of « cause-effect » and « effect-cause » observed in processes implies that projects and organizations are mutually co-present and co-deteriminant in the behaviour of the system.

Other causes of disruption also include concepts and terminology that are not familiar with the decision makers or in between disciplines and professions (Abbott, 1988), magnifying informal communications. In those instances, actors tend to reject or modify a concept in order to adapt it to formal accepted structures and processes already established, instead of modifying and/or designing processes in order to better integrate new project components. This knowledge is often unknown, intentionally ignored, or even discarded as being too complex to manage (Walker, 2007; Wild, 2002; Winter *et al.*, 2006), but it does eventually resurface with adverse effects, intensifying iterations. Decision No4 and 5 exemplified this situation while adjustments were needed between two departments that were not used to work together. It resulted in the appearance of constellations, as documented in decisions No3, 5 and 6.

Consequently, designing and promoting flexible and adaptable processes and structures, within an ever changing context of uncertainty, seems to indicate a better integration between and within the project intentions and the organizational structures.This systemic approach — *self-organizing*, in retrospect, addresses the shortfalls of the underlying « project management theory » – in reference to noticeable project failures – as a result of its underlying formal and organized vision (Williams, 1999).

Conclusion

The objective of the study was to observe how informal communications and decision making processes, which have a strong influence on the structuring of the multi-organization that conducts the project, interfere with the formal processes of project development, by comparing the *organized* with the *organizing* project. Our assumption stated that : (1) organizational *structures* condition the project processes and that, in return; (2) the definition and transfer of project intentions transform the organizational structure and its processes.

The method included a longitudinal case study and the development of a decision-making mapping tool. The tool was assembled from the diversity of fields, from theory and practice : systems, design, management and organizations. The framework and the tool allowed to map and analyze how project and organization influence each other, from a decision-making perspective. In order to document these influences we identified (i) how the processes evolve over time and (ii) how they affect the formal processes and structures.

The common characteristic observed in all cases studied is that the processing of project components, analyzed through decision processes, have a direct effect on organizational structures and processes. These project components are comprised of (i) the variables of a project that constitute the building blocks of the initial formulation of intentions; (ii) all the elements that come into play during the process : actors and their actions; informal communications; external factors and context variables. Our results confirm this hypothesis . Projects do generate informal roles and communications initiating a *self-organizing* process that transforms the established structures and processes.

The management of projects, open *to* and driven *by* a design process, is consequently open *to* the design *of* processes, through an approach *by* design. It constitutes the basic underlying arguments of the proposed concept: that project intentions are systemically linked to the processes and structures of organizations that support them; as a consequence, projects have an *organizing* capability. The parallel between the informal decision-making process and the iterative design process is emphasized by the results drawn from the mapping tool. The project, the organizations and the processes tend to reach a state of mutual *coherence* (re), they form together a system that is *self-organizing* (auto)*,* evolving with the environment (eco).

Implications and future research

Implications for practice involves providing a tool for the analysis of data pertaining to the decision-making process over time. The mapping suggests the potential links between decision sequence, actors' changing roles and the emergence of work constellations assembled between participants of the TMO. This potential link helps understanding communication and coordination aspects of project and design management processes, in this case during the briefing process. It implies that each project can be assessed in regards to its specific intents and constituents and that project processes, as well as work constellations can be designed, adapted and monitored accordingly.

The development of forecasting methods, in regards to the relation between the decisions taken, the nature of processes implemented and the resulting effects represents an additional planning tool. The strong influence of decisions on the planned project processes, when processed by actors through informal communication channels, characterizes the

dynamic relation between project and organizations. It provides a new window in dealing with the causes of uncertainty. The same applies for the influence of decision processes on the project phase arrangement, which in turn has significant effects on the dynamic evolution of the TMO – its design structure, mainly in consideration of the emergence of work constellations. Further study is needed to better understand how these constellations are integrated in the project process and if procurement strategy can be adapted to such a model.

Finally, considering: (i) the existence of the self-organizing project; (ii) the important role that the transfer of intentions plays in the project process and: (iii) the substantial impacts that this phase has on the outcome of the project, it is suggested that the early phase of project development could be paired with a similar program aimed at designing the TMO, and the processes, best suited to each project context. The underlying systemic principles of the *self-organizing* project can serve as a guide for testing its implementation. It will be further explored.

Our analysis also generated conclusions on the effects of the « organizing process » on the organizational structure of the TMO. These results will be presented in an upcoming paper and are complementary to the typology presented in previous research (Lizarralde *et al.*, 2010, 2011). These papers, combined, open a new field of inquiry into the intra- and inter-organizational dynamics and network analysis of: (i) decision making processes; (ii) organizational structuring of TMOs and; (iii) systemic approaches to project and design management.

Bio

Michel de Blois graduated from the University of Sherbrooke in Management and then completed a Bachelor's degree in Environmental Design before starting his own practice in furniture and interior design. He quickly expanded his expertise in manufacturing his own product lines as well as into the construction business as a manufacturer/contractor of highend specialty architectural metals, acting as a General Contrator. He specialized in design management for a variety of institutional and commercial clients. After nearly twenty years in the field, he completed an Msc.A in Design and Complexity at the University of Montreal, as well as a Ph.D at the Faculté de l'Aménagement of he same institution. He is research assistant affiliated with the Groupe de Recherche IF, grif and Mosaic Group (HEC). As the principal of Design Integration Management, he acts as a design management consultant. He tought project management at the school of Industrial Design and at the school of Architecture at the masters level. He now teaches product and service design at the School of Design, Université Laval in Québec City.

Abbott, J. (1988). *The System of Professions: an Essay on the Division of Expert Labor*. Chicago: University of Chicago.

Barrett, P. & Sutrisna, M. (2009). Methodological strategies to gain insights into informality and emergence in construction project case studies. *Construction Management & Economics*, *27*(10), 935-948.

Bengtsson, M., Müllern, T., Söderholm, A. & Wahlin, N. (2007). *A Grammar of Organizing*. Cheltenham: Edward Elgar Publishing Limited.

Boland, R. J. J. & Collopy, F. (2004). Design Matters for Management. In R. J. J. Boland & F. Collopy (Eds.), *Managing as Designing* (pp. 3-18). Stanford: Stanford University Press.

Boland, R. J. J. & Collopy, F. (Eds.). (2004). *Managing as Designing*. Stanford: Stanford University Press.

Bonami, M., De Hennin, B., Boqué, J. M. & Legrand, J. J. (1996). *Management des Systèmes Complexes, Pensée systémique et intervention dans les Organisations*. Bruxelles: De Boeck Université.

Boutinet, J.-P. (1990). *Anthropologie du projet* (3ième ed.). Paris: Quadrige.

Boutinet, J.-P. (2010). *Grammaire des conduites à projet*. Paris: PUF.

Bryant, D. T., Foster, P. M., Spink, P. K. & Luckman, J. (1978). Multiorganizational Relationships on Large Building Sites and Their Influence on Morale and Effectiveness. *Construction Management & Economics*, *Doc. No. COOR 91/2T424.*

Chinyio, E. & Olomolaiye, P. O. (Eds.). (2010). *Construction Stakeholder Management*. Oxford: John Wiley & Sons.

Clegg, S. R., Cynthia, a., Lawrence, T. B. & Nord, W. (Eds.). (2006). *The Sage Handbook of Organization Studies*. (2nd edition ed.). London: Sage Publication.

Cleland, D. I. & Ireland, L. R. (2006). *Project Management: Strategic Design and Implementation*. McGraw-Hill.

Crawford, L., Costello, K., Pollack, J. & Bentley, L. (2003). Managing soft change projects in the public sector. *International Journal of Project Management*, *21*(6), 443-448.

Cross, N. (Ed.). (2006). *Designerly ways of knowing*. London: Springer.

Davidson Frame, J. (2002). *The new Project Management: Tools for an Age of Rapid Change, Complexity and other Business Realities.* San Francisco: Josey-Bass.

de Blois, M. & De Coninck, P. (2008). *The Dynamics of Actors' and Stakeholders' Participation (ASP): an Approach of Management by Design*. Paper presented at the CIB-W096, Design Management in AEC, Sao Paulo.

de Blois, M. & De Coninck, P. (2009). The Dynamics of Actors' and Stakeholders' Participation (ASP): an Approach of Management by Design. *Architectural Engineering and Design Management*, 176-188.

de Blois, M., Herazo., B.-C., Latunova, I. & Lizarralde, G. (2010). Relationships Between Construction Clients and Participants of the Building Industry: Structures and Mechanisms of Coordination and Communication. *Architectural Engineering and Design Management*, *6*(2010), 1-20.

de Blois, M. & Lizarralde, G. (2010). *A System of Classification of Temporary Multi-Organizations in the Building Sector*. Paper presented at the CIB World Building Congress 2010, Salford.

Demers, C. (2007). *Organizational Change Theories: a Synthesis*. Thousand Oaks: Sage.

Dorst, K. (1997). *Describing Design: a comparision of paradigms.* Delft, Pays-Bas, Delft.

Dorst, K. (2011). The core of 'design thinking' and its application. *Design Studies*, *32*, 521-532.

Durand, D. (2004). *La Systémique* (9ième ed. Vol. 1795). Vendôme: Presse Universitaire de France.

Gidado, K. I. (1996). Project complexity: The focal point of construction production planning. *Construction Management and Economics*, *14*(3), 213-225.

Halinen, A. & Tornroos, J. A. (2005). Using case methods in the study of contemporary business networks. *Journal of Business Research*, *58*(9), 1285-1297.

Hernes, T. (2008). *Understanding Organizations as Process: Theory for a Tangled World*. New York: Routledge.

Jackson, M. C. (1995). Beyond the fads: Systems thinking for managers. *Systems Research*, *12*(1), pp. 25-pp. 42.

Kagioglou, M., Cooper, R., Aouad, G. & Sexton, M. (2000). Rethinking construction: the Generic Design and Construction Process Protocol. *Engineering Construction & Architectural Management (Blackwell Publishing Limited)*, *7*(2), 141.

Kenis, P., Janowicz-Panjaitan, M. & Canbré, B. (Eds.). (2009). *Temporary Organizations*. Northampton: Edward Elgar Publishing Limited.

Koskela, L., Ballard, G. & Tanhuanpää, V.-P. (1997). *Towards lean Design Management*. Paper presented at the 5th Annual Conference of the International Group for Lean Construction IGLC-5, Gold Coast, Australia.

Koskela, L. & Howell, G. (2002). *The theory of project management: explanation to novel methods*. Paper presented at the Proc., IGLC-10, 10 th Conf. of Int. Group for Lean Construction.

Koskela, L., Huovila, P. & Leinonen, J. (2002). Design management in building construction: from theory to practice. *Journal of Construction Research*, *3*(1), 1-16.

Le Moigne, J.-L. (1977). *La théorie du système général*. Paris: Presse Universitaire de France.

Le Moigne, J.-L. (1999). *La modélisation des systèmes complexes*. Paris: Dunod.

Lizarralde, G., de Blois, M. & Davidson, C. H. (2011). Relations intra- and inter-organizations for the study of the Temporary Multi-Organization in construction projects. *International Journal of Project Organization and Management (IJPOM)*, *3*(11), 57-77.

Lizarralde, G., de Blois, M. & Latunova, I. (2010). Structuring of Temporary Multi-Organisations: Contingency Theory in the Building Sector. *Journal of Project Management*, *42*(4), pp. 19-pp. 36.

Lundin, R. A. & Steinthórsson, R. S. (2003). Studying organizations as temporary. *Scandinavian Journal of Management*, *19*(2), 233-250.

Mintzberg, H. (1979). *The Structuring of Organisations*. Englewood: Prentice Hall.

Mintzberg, H. (1983a). *Power in and Around Organizations*. New York: Prentice Hall College Div.

Mintzberg, H. (1983b). *Structure in fives : designing effective organizations*. Englewood Cliffs, N.J. Toronto: Prentice-Hall ; Prentice-Hall Canada.

Mintzberg, H., Raisinghani, D. & Théorêt, A. (1976). The Structure of 'Unstructured' Decision Processes. *Administrative Science Quarterly*, *21*(2), 246-275.

Morin, E. (1977). *La Méthode: 1. La Nature de la Nature*. Le Seuil.

Packendorff, J. (1995). Inquiring into the temporary organization: New directions for project management research. *Scandinavian Journal of Management*, *11*(4), 319-333.

Pettigrew, A. M. (1997). What is processual analysis? *Scandinavian Journal of Management*, *13*(4), 337-348.

Pollack, J. (2007). The changing paradigms of project management. *International Journal of Project Management*, *25*(3), 266-274.

Pryke, S. & Smith, H. (Eds.). (2006a). *The Management of Complex Projects: a rerelationship approach*. Oxford: Blackwell.

Pryke, S. & Smith, H. (2006b). The Management of Complex Projects: a rerelationship approach. In S. Pryke & H. Smith (Eds.), *Scoping a relationship approach to the management of complex projects* (pp. 21-45). Oxford: Blackwell.

Rank, O. N. (2008). Formal structures and informal networks: Structural analysis in organizations. *Scandinavian Journal of Management*, *24*(2), 145-161.

Rowe, P. G. (1987). *Design Thinking*. London: MIT Press.

Rowlinson, S. & McDermott, P. (1998). *Procurement Systems: A Guide to Best Practice in Construction*. Taylor & Francis.

Shamiyeh, M. & DomRL (Eds.). (2010). *Creating Desired Futures: How Design Thinking Innovates Business*. Basel: Birkhäuser GmbH.

Simon, H. A. (1969). *The Sciences of the Artificial*. Cambridge: MIT Press.

Stringer, J. (1967). Operational Research for "Multi-Organizations". *Operational Research Quatterly*, *18*(2), 105-120.

Thiry, M. & Deguire, M. (2007). Recent developments in project-based organisations. *International Journal of Project Management*, *25*(7), 649-658.

Van de Ven, A. H. (1992). Suggestions for studying the strategy process: a research note. *Strategic Management Journal*, *13*, 169-188.

Walker, A. (2007). *Project management in construction* (5th ed.). Oxford, UK ; Malden, MA: Blackwell.

Weick, K. E. (1998). Improvisation as a Mindset for Organizational Analysis. *ORGANIZATION SCIENCE*, *Vol. 9*(No. 5), 543-555.

Wild, A. (2002). The unmanageability of construction and the theoretical psycho-social dynamics of projects. *Engineering Construction & Architectural Management (Blackwell Publishing Limited)*, *9*(4), 345.

Williams, T. M. (1999). The need for new paradigms for complex projects. *International Journal of Project Management*, *17*(5), 269-273.

Williams, T. (2005). Assessing and moving on from the dominant project management discourse in the light of project overruns. *Transactions on Engineering Management (IEEE)*, *52*(4), 497-508.

Winch, G. M. (2010). *Managing Construction Projects: An information Processing Approach*. Chichester: Wiley-Blackwell.

Winter, M. & Szczepanek, T. (2007). *Reframing Project Management: new thinking, new practice*. Gower Publishing.

Winter, M., Smith, C., Morris, P. & Cicmil, S. (2006). Directions for future research in project management: The main findings of a UK government-funded research network. *International Journal of Project Management*, *24*(8), 638-649.

Yeo, K. T. (1993). Systems Thinking and Project Management - time to reunite. *International Journal of Project Management, 11*(2), 111-117.

Yin, R. K. (2004). *Case Study Research: Design nad Methods* (Fourth ed.). Thousand Oaks: Sage.