

# THE INNOVATION JOURNEY IN CONSTRUCTION – CONSIDERING THE CONNECTING ROLE OF COMMUNITIES AND NETWORKS OF PRACTICE

## Authors

1. Crespin-Mazet, Florence, florence;crespinmazet@kedgebs.com, (Kedge Business School, Marseille, France)
2. Goglio-Primard, Karine, karine.goglio@kedgebs.com, (Kedge Business School, Marseille, France)
3. Havensvid, Malena, malena.havensvid@ntnu.no, [Presenter], (NTNU, Trondheim, Norway)
4. Linne, Ase, ase.linne@angstrom.uu.se, (Uppsala University, Uppsala, Sweden)

## INTRODUCTION

Within management studies, the construction sector is often identified as a “special case” (Harty, 2008) and has long been considered less innovative than other industries. Two oft-pointed to organisational specificities that separate this industry from traditional manufacturing are its project-based character and the scarcity of longer-term relationships (Miozzo and Dewick, 2004; Bygballe et al., 2010). In turn, this creates specific conditions for how actors can interact, learn and innovate over time. On the one hand, projects are, due to their interactive nature, viewed as innovative arenas for the birth of new ideas and solutions. On the other hand, project-specific solutions are seldom scaled up and turned into widespread innovations (Winch, 2003, 2014), even if the variety of interfaces between the project, firm and industry levels should constitute various space for innovation (Bygballe and Ingemansson, 2014). This problem is deemed to originate from the disconnection between the temporary project environment and the permanent organisation of firms: project-led learning and solutions are hard to transfer to the wider organisation of the firm and hence, to turn into business-learning (Dubois and Gadde, 2002a; Brady and Davies, 2004; Hartmann and Dorée, 2015). In this paper, we deal with the inherent paradox of this industry being inventive from a short-term stance (i.e. in projects) but being less effective in fostering learning and innovation from a long-term perspective. We focus on the interactive learning mechanisms and processes supporting the transformation of a new idea into widespread use. In doing so, we ask the following research question: *how can construction firms capitalize on new ideas and solutions across the local and global company levels and their temporary and permanent networks in generating innovations?*

IMP studies highlight the key role of interaction and high-involvement relationships in innovation processes both for the emergence of new knowledge and solutions and for supporting their widespread use (Håkansson et al., 2009; Gadde and Dubois, 2010). As mentioned by Håkansson (1987, pp. 3), innovation is “*the result of an interplay between two or more actors: in other words, as a product of a ‘network’ of actors*”. Through interaction, actors make various resource adaptations that favour the adaptation of their innovative solutions to their context of use (e.g. Ingemansson, 2010; Linné, 2012); this process also highlights the benefits that users can derive from their implementation (Harrison and Waluszewski, 2008; Waluszewski, 2011). Research on *innovation networks* similarly (e.g. Cantu et. al, 2012; Aarikka-Stenroos et al., 2017) highlights the co-creation of new knowledge and solutions

(Corsaro et al., 2012) between a diversity of actors involved in the various stages of the innovation process i.e. from idea generation to commercialisation (Aarikka-Stenroos et al., 2017). Hence, collaboration between actors with different logics and resources is an inherent part of the innovation process and essential for involving users.

These findings also hold true in the construction industry as exemplified by several IMP-based studies. Firstly it has been shown that relationships transcending several projects facilitate learning (Håkansson et al., 1999) as well as the re-use and development of important resources (Crespin-Mazet et al., 2015; Havenvid et al., 2016a;b). The deliberate efforts of construction actors to create connections between projects then aim at “bridging” learning and new solutions development (Pemsel and Widén, 2011). For project-based scholars (Cova et al., 1996; Skaates and Tikkanen, 2003), such efforts generate a more efficient use of relationships and resources both from a short-term (i.e. project) and a long-term (i.e. permanent/firm) perspective. However, few of these studies provide an in-depth analysis of how these learning and innovation processes transcend different organisational levels and move from the project level to the firm level and vice-versa (Bygballe and Ingemansson, 2014).

To analyse such processes in more depth, we therefore mobilize the community-of-practice (COP) literature which considers *communities* as a way of initiating and spreading learning and innovation. Such communities are defined as autonomous, self-emerging and ‘*tightly knit*’ groups (Brown and Duguid, 1998) whose members share the same practices and values. In voluntarily sharing their practice within the community, community members learn by practicing and exchanging with others (Wenger, 1998, 2000). Similarly, to IMP scholars, this theory considers learning as ‘situated’, i.e. dependent on the specific context in which it takes place (Lave and Wenger, 1991). Various authors have highlighted its relevance for the construction industry (e.g. Dubois & Gadde, 2002a; Bresnen et al, 2003; Sergeeva, 2017). Our research thus combines the insights from the IMP and community-of-practice literature to investigate the processes and mechanisms supporting the various phases of innovation in construction from first idea development phase to widespread implementation. Based on an in-depth case study in the French construction industry, we show how an individual idea was progressively embraced and developed by a first local *community of practice* (COP) and then further diffused and enriched by various other local COPs to progressively form a *network of practice* (NOP) that supported its adoption as a company-wide offering.

The remainder of the paper is structured as follows. First we review the IMP and communities of practice perspectives of learning and innovation respectively. Thereafter, we propose a framework of idea development and widespread implementation, which combines both intra- and inter-organizational structures of the construction industry. This framework emphasises the role of communities and networks of practice in connecting learning processes across the various organisational levels of this project-based industry. Thereafter we outline some methodological considerations in relation to our case study. Subsequently, we address the case and continuously highlight the analytical key points from each section. The two final sections discuss three main findings in relation to the framework and concludes some main implications for combining IMP and the communities of practices literatures in furthering our understanding of learning and innovation in construction.

## **THEORETICAL BACKGROUND - LITERATURE REVIEW**

### **The interactive nature of learning and innovation - an IMP view**

The IMP perspective considers learning and innovation as interactive and collective processes where knowledge is created through new combinations of existing knowledge (Håkansson and Waluszewski, 2007). Håkansson (1987) suggests that knowledge development takes place when existing bodies of knowledge are confronted and/or need to be combined among several actors. Thus, learning takes place in the interface between different actors, such as producers and users. It is then highly related to existing interfaces and relationships. In this sense, new knowledge always has a history and a specific context from which it arises; it is context dependent which makes it difficult to apply by others in other contexts and for other purposes. In this sense, knowledge is “sticky” (Von Hippel, 1994) and not easily transferable to other contexts or locations than those it originated from.

This literature also highlights that the materialization of a new idea in a widespread product, requires that its fits into systems of already existing solutions (Håkansson & Waluszewski, 2007; Harty & Araujo, 2009), i.e. with existing products, production processes and organizational routines. Hence, any new solution will depend on already existing solutions to function or become beneficial for any actor. More specifically, this process requires that the firm adapts its resources and solutions to fit into three different settings (Håkansson & Waluszewski, 2007): 1/ a developing setting, i.e. the setting involved in experimentation and ideation; 2/ a producing setting, i.e. the organisational and technical structure supplying the product/service; and 3/ a using setting, i.e. a set of different customer environments implementing the product/service. This innovation process thus distinguishes the production perspective (existing production processes and routines) and the user perspective (various technical and organisational solutions in a variety of customer environments). It also acknowledges the diversity of actors (with different logics and resources) involved in the various stages of the innovation process (Ingemansson, 2010). Innovation is then seen as the result of interaction processes in which new *resource combinations* have been confronted, combined and eventually found beneficial from the standpoint of several different actors (Håkansson and Waluszewski, 2007; Ingemansson and Waluszewski, 2009).

Interpreting innovation as new resource combinations (e.g. Waluszewski and Håkansson, 2007; Shih 2009) has several consequences. Firstly, it means that there are different possibilities of extracting value from existing knowledge or technology depending on the actor and the resource constellation that it depends upon. Secondly, the (current) benefits of anything new will only appear once confrontation and combination processes have been carried out. Thirdly, innovation processes are unpredictable and difficult to manage as changes in some part of a network affect other parts and modify the existing distribution of value across the network. Hence, while networks can be a source of innovation, they may also generate hindrances (Håkansson & Waluszewski, 2002). The interconnectedness of resources implies difficulties to replace or combine them in new ways, or to bring in new solutions that have been developed ‘outside’ of any particular constellation of resources (Gadde & Håkansson, 2001).

When addressed in the IMP literature, the construction industry is seen as “special case” due to the discontinuities of construction activities (projects) and their negative impact for longer-term relationship development. In a well-cited article, Dubois and Gadde (2002a) made a distinction between temporary (i.e. project) and permanent (i.e. firm) networks and argue that the lack of innovation in construction results from strong inter-organisational couplings in the temporary networks (i.e. within separate projects) but weak couplings in the permanent networks (i.e. longer-term business networks). Thus, while intense interaction among the actors working on a project may lead to inventive solutions and project-led learning, the lack of interactions across projects hinder their preservation and scaling-up to business-wide learning. The disconnection between the project, firm and industry level has been addressed in several studies as a core issue which the industry needs to solve to increase the opportunities for learning and innovation (e.g. Bygballe and Ingemansson, 2011; Havenvid et al., 2016) and the role that interaction and long-term relationships potentially has in achieving that (e.g. Gadde and Dubois, 2010; Crespin-Mazet et al, 2015; Havenvid et al., 2017). For instance, in a case study of learning in a construction project, Håkansson et al. (1999) found that the suppliers that experienced the most learning from a particular project were related to several other suppliers which they also had been working with in the past. Those that were without such relationships expressed less learning. Thus, the degree of learning was related to the network context of the “learning actor”. It has also been indicated that construction actors are involved in both emergent and deliberate efforts of creating more stable conditions across projects in terms of strategic relationship initiatives and more ‘organic’ forms of re-occurring relationships (Crespin-Mazet et al., 2015; Havenvid et al., 2017). This can be interpreted as both deliberate and emergent practices of trying to bridge the disconnection between the different organisational levels of the industry (i.e. project, firm and industry) or put differently, between the temporary and permanent networks. In this paper, we try to connect these two issues (innovation and interaction practices) in terms of how such (connecting) practices can be part of facilitating innovation.

### **A Communities-of-Practice view**

The literature on Communities of Practice (CoPs) finds its origin in the works of Wenger (1998) who identified the key role of such informal groups to foster learning between individuals based on practice-based knowledge sharing. For Wenger (1998), Communities of Practice are formed by tightly knit persons who share a concern or a passion for something they do i.e. a common practice (Wenger, 1998). CoPs are described as self-organized structures that emerge spontaneously, and whose members learn by engaging in frequent, social, face-to-face interactions and by working side-by-side (Wenger, 1998). CoPs thus mostly aim at developing the competences of their members in a given practice. Each COP has an identity defined by a shared domain of interest.

For Wenger (1998), the social dynamic of learning in COPS rests on two complementary processes:

- Participation processes. CoPs members commit to engage in joint activities (joint enterprise) to help each other and share information. They are mutually engaged to sharing, questioning and negotiating the meaning of their individual experiences. Thanks to participation, members constantly update ideas (Simon, 2009), sustain a common purpose, and create a

- sense of shared identity. Membership therefore implies a commitment to the domain and a shared competence that distinguishes members from other people and shapes their identity.
- Reification processes. As practitioners, members of a CoP “freeze” their practice-based knowledge in a shared repertoire of resources consisting of various elements such as a common vocabulary, a set of “war” stories, tools, methods, objects, products, artifacts or ways of addressing recurring problems. The elements of this common repertoire form various “boundary objects” that can facilitate brokering practices when CoP members exchange with other communities or external actors (Wenger, 1998, 2002).

Wenger et al. (2014, 10-14) consider the concepts of community and network as distinct but complementary to understand the “*social fabric of learning*”. For them, the network refers to the relationships, connections and personal interactions among actors who have reasons to connect to solve problems and create knowledge together. The community refers to the development of a shared identity around a topic and a collective intention. As noted by Wenger et al. (2014), these two aspects can be combined and develop together. A community involves a network of relationships and networks exist because members are committed to a joint enterprise.

After having emerged to study learning among individuals, the notion of CoPs has started to be applied to professional contexts in the 1990s, to explain learning and knowledge sharing at work (Lave & Wenger, 1991; Orr 1996; Brown & Duguid, 1991; Creplet et al. 2001; Lindkvist 2005; Haas, 1992). Since then, the study of communities of practice in firms has gained increasing interest among academics in several sectors.

In the construction industry, several authors have thus acknowledged the relevance of a practice-based approach to innovation to capture “*how particular technical configurations are elaborated in response to specific problems and why certain paths or solutions are adopted rather than others*” (Schweber and Harty, 2010). The notion of communities of practice is used to depict knowledge exchange and innovation dynamics in construction. Dubois & Gadde (2002a) adopt a global lens of the industry considering that the construction industry is characterized by a strong community of practice between firms and governmental authorities. For them, while this macro-COP supports “substantial collective adaptations”, it also hampers innovation as it promotes short-term productivity and stability rather than change.

Apart from this seminal article on industry-wide CoPs in construction, most contributions adopt a local lens emphasizing that COPS support the capture, diffusion and transfer of knowledge and learning between individual actors (Bresnen et al., 2003; Winch 2014). Bresnen et al. (2003), point out that COPS support the sharing of tacit knowledge (context, social elements) between individuals as they foster strong ties and couplings but maybe less adapted to access “more complex or new knowledge coming from elsewhere that rely more often on weak and non-redundant couplings”.

Winch (2004) identifies two possible ways in which innovations become recognized in projects and evolve from the local level to the global level and vice-versa. In the top down way, new

ideas are adopted by firms and public policy at the industry level and then implemented on projects; in the bottom-up way, innovations result from problem solving on projects and may be learned by firms. Consistent with this distinction, Brady and Davies (2004) differentiate project-led learning from business-led learning in which the latter refers to the knowledge that a firm uses when it makes strategic decisions to focus on new project business activities. Recently, the empirical work carried out Sergeeva (2017) confirms that “*innovation tends to emerge from an individual with an idea*” and becomes progressively embraced and enriched by a collective of stakeholders. This author concludes that the innovation process in projects is both individual and collective in the ways in which practitioners continuously engage with various actors inside and outside their organizations.

Dubois & Gadde (2002a) have attracted our attention to the difficulties inherent in construction activities to create links between the local and the global levels regarding innovation due to the pattern of couplings in this industry with strongly decentralised structures where ‘*the left hand not only does not know what the right hand is doing, but it also may not even know that there is a right hand*’ (O’Dell and Grayson, 1998:157).

The original work of Agterberg et al. (2010) focused on the issue of “Managing dispersed knowledge within a firm” enables to shed a new light on the dynamics of exchange between the local level and the macro level of a firm. Based on the Communities of Practice literature, they use the concept of Network of Practice (NoP) to analyze the sharing of knowledge dispersed across the geographically dispersed units of a firm (Becker, 2001). By connecting dispersed employees sharing a common practice, NoPS support the diffusion and integration of knowledge between the various geographical levels of a firm. These authors introduce two concepts to capture these phenomena

- At the local level, the concept of “embeddedness in practice” (content) refers to the extent to which knowledge is relevant to members’ local practices. According to IMP literature, this concept corresponds to the extent to which the novel idea is embedded into the internal using setting (Håkansson & Waluszewski, eds., 2007).
- At the global level, the notion of organizational embeddedness (connections) refers to the extent to which the knowledge shared and created in the NOP is integrated in the organization, applied in the formal rules, strategic guidelines, and procedures. A high-level of organizational embeddedness means the innovation is widely adopted at the company level and the corresponding knowledge is institutionalized.

Agterberg et al. (2010) also show that such knowledge dynamics rely on different management mechanisms that enforce or hinder both the content (knowledge shared and created within the network) and the connections between network members (structure and quality of links) at the local and global levels. In the next section, we take standpoint in their model of managing intra-organizational networks of practice and develop it for the intra- and inter-organizational setting of the construction industry.

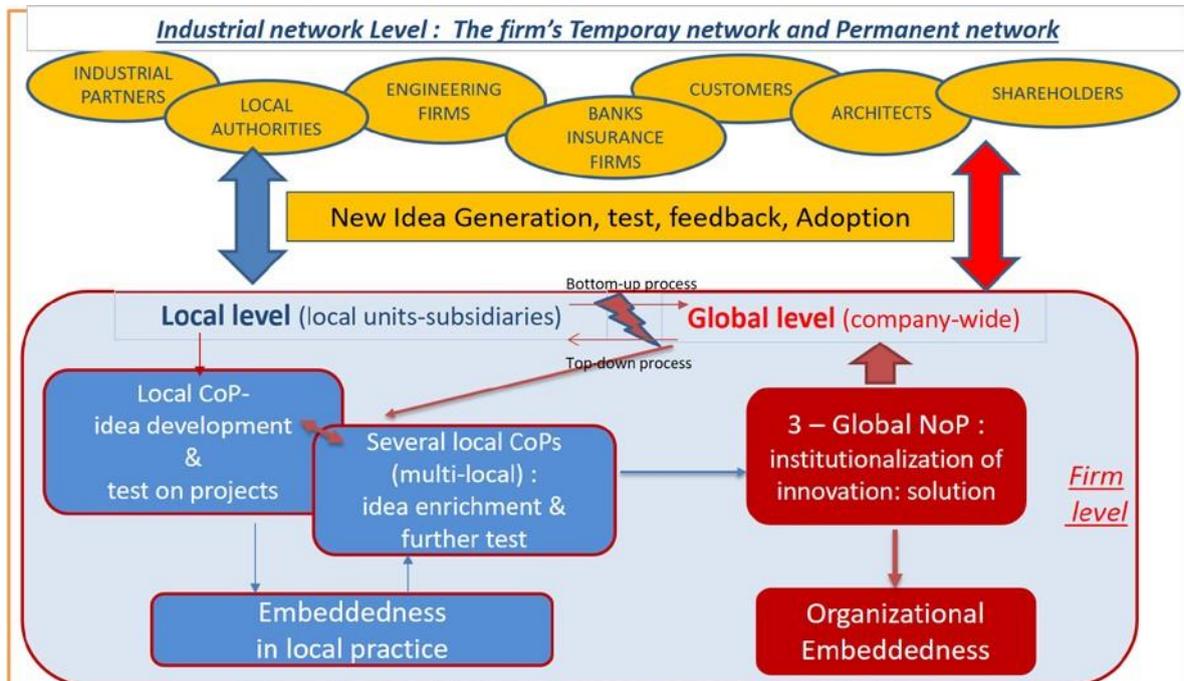
## A FRAMEWORK FOR INNOVATION IN CONSTRUCTION THROUGH COMMUNITIES AND NETWORKS OF PRACTICE

In our suggested framework (see Figure 1) we differentiate between three organizational levels of the construction industry in which idea generation and spreading of shared practices and ultimately innovation takes place; *the local level* which consists of local units of the firm (and projects they are involved in), *the global level* which entails all units and management levels of the firm on a global scale, and finally *the network level* which includes the external actors with which the firm interacts both in separate projects (the temporary networks) and from a longer-term perspective (the permanent network). Thus, the first two levels take their standpoint in the individual firm and therefore represent a firm level perspective (local and global) while the third level represent networks consisting of several firms and organizations and therefore represent a network level perspective.

As is shown in the model (See Figure 1), when a local COP actively spreads a particular piece of knowledge and related practices to other local COPs, multiple local COPs take form and a dispersed structure of local COPs sharing the same idea or practices is created. On this local level, the idea can be tested and developed within the setting of separate projects. When an idea, in terms of learning and practices related to that idea, is spreading within one local COP and on to multiple COPs within an organization we refer to this as “embeddedness in practice”. As proposed by Agterberg et al. (2010) this is when an idea becomes related and makes sense in relation to existing practices of the individuals within one or several COPs. When the idea is tested in various projects this also involves the network level in terms of the idea being presented, used and developed in relation to the collections of actors involved in the specific projects, i.e. the temporary networks. Thus, the idea is actually implemented in (temporary) network settings where it will be combined with particular resource constellations demonstrating its usefulness (or non-usefulness) and opportunities/challenges for further developments.

A crucial part of the innovation process is the institutionalization of the new idea, which requires the dispersed structure of COPs to form a *network* of shared ideas and practices, i.e. a NOP. As opposed to a dispersed structure of COPs, a NOP is an active network of multiple communities that are seeking to reify particular practices on a company-wide level. In line with Agterberg et al. (2010) we refer to this as “organizational embeddedness”. As earlier stated, a high-level of organizational embeddedness implies that the new idea is widely adopted at the company level and the corresponding knowledge is institutionalized. However, this also requires that the idea is used in relation to others, i.e. on the network level consisting of for instance customers and suppliers. It is not an innovation until it is implemented both on the global company-wide level and the network level including both the temporary and permanent networks of the firm. As the model also demonstrates, traditionally there is a great divide between the local level of the firm (local units and projects) and the company-wide level in terms of transferring project-led learning to the permanent organizations and enabling business learning (Dubois and Gadde, 2002a; Brady and Davies, 2004; Hartmann and Dorée, 2015). This is referred to as the divide between the “bottom-up process” and the “top-down process”

in the model. Here, we propose that the process of forming a local COP, several local COPs and ultimately a global NOP is key in connecting the local, global and network levels of the industry and thus facilitating the bottom-up and well as the top-down processes.



**Figure 1.** A model of idea development and widespread implementation in the construction industry which embraces its project-based character. The connecting mechanisms between the different organizational levels of local, global and network consists of communities of practice on the local level of the firm and networks of practice on the global level of the firm, which interacts with temporary and permanent networks on the network level.

## METHOD

The research process corresponds to an “abductive” approach as it involved systematic combining (Dubois & Gadde, 2002b) through a continuous combining of empirical insights with existing theory from different fields. In this process of combining empirical findings with theory, the authors needed to enrich the conceptual background of Innovation Network with another (Community of practice- practice based theory of learning). We realized that IN network literature was not alone sufficient to fully capture the richness and dynamics of development and diffusion of innovation of our case study. We needed in particular to better describe the dynamic evolution of exchanges between the local-temporary network levels and global-permanent levels on the one hand, and between the formal structure and informal structure levels. The practice-based theory of learning provided the complementary conceptual framework enabling us to better grasp the individual and informal dynamics supporting innovation in Spie batignolles. Therefore, the conceptual framework was developed simultaneously with the assessment of the empirical findings and, as such, was both a result of the case study and a way to analyze it. This (abductive) approach thus allowed for theory development.

### **Case selection and analysis**

Our research is based on one deep single case, viewed as a critical case (Koenig, 2005) to help reveal “*new theoretical relationships and question old ones*” (Dyer & Wilkins, 1991: 614). We selected this case for its insights regarding the complementary dynamics of knowledge exchange and innovation between the firm’s industrial network (both permanent and temporary) and the firm’s internal process of idea generation and development.

In this exemplary case, the innovative idea emerged at a global level thanks to the firm’s permanent network (shareholders) but initially failed at reaching its internal users as it was not adapted to the local units’ context. After initial difficulties, it was first adopted by a local COP as it resonated with its local network and previous project experiences. The members of this COP adapted the innovative idea thanks to a trial and error process where they tested and improved it with their local network (mostly the temporary network involved in various local projects). They then realized that other local units could be interested by this innovation but were sharing the same initial concerns: they thus started transferring their development to other local COPS. This generated the further enrichment of the innovation and the progressive creation of a NOP. Little by little, the innovation stabilized in a set of widely-adopted tools, methods and procedures developed by NOP members. Finally, top management acknowledged the value of these elements for the organization and integrated them in the firm’s formal strategy and organization. The NOP even led to the creation of a permanent structure in charge of promoting the innovation (corporate marketing). Hence, thanks to this internal NoP, this innovation enriched the firm’s offering development project portfolio (Tikkanen et al., 2007) and contributed to the firm’s repositioning on the market.

We used the retrospective and analytical case study strategy (Yin, 2003) to organize the data collection and analysis, with respect to the complexity and the richness of the reality of the field analyzed, and according to a “non-linear and non-positivistic approach to case research” (Dubois & Gadde, 2014: 1278). We first elaborated the chronology of the case by identifying main actors, resources and activities involved at each phase of the development and diffusion of the innovation, and synthesizing the interpretation that actors gave to events and behaviors, leading to the development of a thick description of the story (Balogun & Johnson, 2004).

We then analyzed the case based on our proposed framework which combines concepts derived from the IMP literature and the practice-based theory of learning.

### **CASE STUDY**

4<sup>th</sup> player in the French construction industry, Spie batignolles has a decentralized organization leaving a lot of autonomy to its geographical units.

#### **A first-of-a-kind partnering project: where local ‘innovations’ get lost**

In early 2000, a British investor associated to an architect from London chooses Spie batignolles to completely renovate a luxury hotel (180 rooms) that they just bought out in Monaco (The “Colombus Hotel”). The customer and the architect are used to partnering contracts and request Spie batignolles to work under this type of methodology. They choose this method due to the very tight delays, the complexity of works, tight budget constraints (no cost overruns possible)

and their lack of experience in France which requires to adapt to local norms and to work in a trust atmosphere. The customer and his architect are aware that they will have to adapt their initial specs during construction to fit with the local context and respect their time constraints. At this time, the partnering method is unknown in France and considered as extremely innovative as it relies on open book procedures, cost transparency, and trust relationships as opposed to transactional and adversarial practices. Nevertheless, the local team of Spie batignolles (the south-eastern unit) accepts to take over the challenge and to learn to apply this method on this First of the Kind (FOK) project. The local construction team forms a project team with the customer and his architect. They create a common local office at the customer's premises (in the hotel) and start developing tools to make common decisions, rapidly enact required changes or problems, share costs and purchases, report on progress etc. This project team also integrates some of Spie batignolles' qualified partners in luxury construction and jointly defines the detailed hotel specs. Spie batignolles' local team unused to working in a fully transparent manner learns a lot in this process and manages to finish the project in 22 weeks. At the end, they acknowledge the positive outcomes of this innovative experience for all the parties: the project is delivered at required performance level in terms of cost, quality and delays and with a positive margin for the contractor and partners) – an achievement that could not have been obtained under a traditional contracting mode.

The success is reported internally. But the local unit trapped in its usual habits does not build on this positive experience to modify its practices and continues “business as usual” on other projects.

#### *Analytical points*

At this stage, all this project-led learning that was developed within the firm's temporary (project) network got lost, thus pointing to a lack of embeddedness in local practice. This confirms the well-known difficulties of the bottom-up approach of innovation since the learning developed at the local level fails at being transferred and capitalized at the global level of the firm.

#### **When partnering comes back through the firm's permanent network at corporate level**

At the same time, Spie batignolles has recently merged with a British engineering firm called AMEC. This merger generates several opportunities for top management to share their experiences and see how they can learn from each other. This is how the French corporate Sales VP of Spie batignolles -Marcel- learns about the partnering methodology used by AMEC with several private customers. By questioning his colleagues from AMEC, he can access several success stories in the cement and petroleum industry that document the benefits of this approach in terms of costs savings, delays and margin. This approach resonates with Marcel's own experience and with the Columbus project carried out in the south and pushed him to try to adapt this partnering method to the French market. *“I soon understood that we could work differently. My hierarchy was not fully convinced but let me do what I wanted provided I would come back with results”.*

The Sales VP works with the Strategy & Innovation VP to draft the basic principles of this method (operational guidelines) and with the legal manager to frame their partnering contract

according to the French law. Internally, they call this partnering method Concertance (it will be branded later). Based on this internal reflection, top management sent a complete folder (power point and word document with general guidelines and principles as well as template of contract) to all regional units asking them to promote Concertance® towards their customers. However, this was far from sufficient to ensure their adoption due to the drastic change of practice that this method involved: a proactive sales approach far from the dominant practice of compliance to calls for tender and the co-development of the project specifications with customers and important stakeholders (architects, designers, specialized engineering firms, and trade specialists). Many local teams, used to arm's length negotiations expressed some doubts on the relevance of sharing costs with customers and thus continued to do "business as usual" (failure of adoption). This was particularly true of local units working with public customers which strongly voiced that this partnering approach was not adapted to their local market and to the context of public bidding. Moreover, the contract is perceived as too complex and difficult to understand. As summarized by one salesman: *"The Gods must be crazy ! The problem is that we have people who think up there at headquarters but that really have no clue about what commercial reality is about. It is purely non-saleable"*.

#### *Analytical points*

This lack of adoption clearly shows the failure of the top-down approach of innovation. The idea developed at the global level fails at being adopted by local units as it does not fit into their context of use (i.e. their traditional permanent network of customers and design partners). This confirms a lack of embeddedness in local practice (but one exception in the south-east region).

#### **The emergence of a local community – the Concertance® COP**

In the South-East region, however, the local manager (Philippe) was the first to envision the interest of this approach for several reasons. Firstly, it nicely echoed the Columbus project carried out in the same region 18 months before. Secondly, this local unit had several foreign customers in the French Alps involved in hotel construction and renovation projects and in other industrial sectors with close profiles and characteristics that could be opened for partnering. Thirdly, the local manager had recently carried out an MBA program and was personally interested in testing this innovative the method and attracted by its values.

After having encouraged his sales team to promote the Concertance method developed by the corporate team, he acknowledges the lack of appropriate sales material and their difficulty to convey principles of trust and benevolence towards customers'. After several internal meetings with the sales and design teams, they conclude that Concertance® requires more precise targeting. They thus launch a market segmentation process with the support of an external consultant. 9 colleagues (Philippe, 4 sales people, 3 design engineers, the local communication manager) commonly review 20 projects (failures and successes) over several meetings. The long and highly involved process required the sharing with colleagues of the difficulties met in selling Concertance, customers' reactions, and on required behaviors. After participation to a few meetings, two employees refused to be further involved and to sell this innovative method and decided to quit the organization.

For the rest of the local team, this process generated a better understanding of the market context in which they could use this approach. All this learning starts paying off and the team manages to sign its first Concertance® contracts on 2 very complex projects. The local team can then acknowledge its benefits both for all the parties: the company, the customer and their project partners (architects, suppliers). Apart from a more secured margin, internal teams express a much greater internal satisfaction to work in a collaborative mode and a more peaceful way of working despite the high stakes at play: “*we can focus on the project and not spend our time fighting with the teams*”. Customers on their side express their satisfaction and even their proud as testified by the manager of a new aqua-center project: “*we are very proud of this project, the result is higher than what we had imagined. Today, I would recommend Concertance to my colleagues*” (Y. Moretton)

Based on their promising results, 7 other colleagues from another unit in the same region (located 300 kms away) express their desire to join the collective reflection (10 new projects reviewed).

#### *Analytical points*

This is how an internal CoP progressively took shape through the active participation of several local colleagues. Their exchanges and the sharing of their experiences on Concertance® enabled them to enrich their selling practice through a better understanding and qualification of their various local customers (context of use). The local COP went through a process of translation of the approach to make it their own and to adapt its principles of conduct and action into their daily routine. This translation relies on a long and highly involved process of repeated trial and error with customers and the sharing with colleagues of the difficulties met in selling Concertance. Hence, the innovative idea only starts making complete sense when the teams starts adapting it to the context of their local market (context of use) which modifies their perception of the relevance of the approach. The motivation of the pioneering teams to exchange information on their practices and to share their positive and negative experiences was linked to the fact that the approach generated a lot of interest but also a lot of uncertainty for sales and construction project teams. The first production of the CoP thus consists in a customer segmentation (7 segments) with 2 target segments for Concertance® and a grid enabling to qualify customers and projects (reification process) informing and directing their market practices. This innovative set of documents served as a basis to train the newly recruited salespeople in the region. This enriched learning and sales practice brought value as it enabled them to sign their first Concertance® contracts.

#### **The enrichment of the approach with other local CoPs (multi-local CoPs)**

During corporate events (sales conventions, trainings), several of these CoP members from the south-east region share the conclusions of their segmentation with colleagues from other regions and explain how it helped them sign their first contracts. They realize that two groups from the North and the West were facing similar challenges with Concertance® and were interested in learning more from them. They thus naturally start sharing their work informally through meetings and telephone discussions. At a certain stage, the managers of these 3 units

even organize a two-day seminar to enable their members to share their reflection and practical tools such as their self-made power point presentations and Concertance® brochures. About 20 people from these 3 local CoPs attend. As a result, the western and northern CoPs decide to segment their customer portfolio and hire the same consultant. They start modifying and enriching the tools developed in the south-eastern CoP based on the reaction and feedback obtained from their customers on pilot projects (temporary network). For example, they suggest involving a project manager at earlier stages in the sales process. Top management is informed and informally supports these initiatives.

### *Analytical points*

This stage shows that thanks to their reification work, the south-eastern CoP can easily communicate to colleagues from other regions the benefits of their reflection on Concertance and how they successfully managed to embed this innovative method coming from headquarters to their local context of use (embeddedness in local practice). Their products of reification (segmentation) enabled them to cross the organizational barriers of their geographical structure. In this sense they served as boundary objects (Wenger, 1998). This motivated their colleagues from the North and the West to engage in a similar process in their local units. This is how 2 new local CoPs took form. At this stage, the potential innovation is taken on board at a multi-local CoP level. Each newly created CoP then developed its own reflection and similarly engaged in reification practices (segmentation) to adapt some of the south-eastern tools to their local context of use (specific local network of customers and partners). They work in close collaboration with their local temporary network to test and refine these tools. When these 3 local CoPs worked together in a 2-day seminar (multi-local CoP participation), they could then share their own products of reification and enrich them in collaboration. The multi-local CoPs then generates a new product of reification by introducing the key role of project manager.

### **The birth of a NOP – Network of Practice - Concertance® becomes institutionalized**

Little by little, the members of each local CoP face the need to use the same vocabulary in their documents and tools and to share a common base to avoid replications. They want “official” Concertance® brochures and sales presentations” and therefore require the support of top management. They naturally turn to the corporate Sales VP of Spie batignolles -Marcel- who had initially launched Concertance® for support. Based on the amount and quality of the work already carried out, Marcel convinces top management appoints Jacques from the corporate marketing team to the task.

With 20 years-experience in the company (including sales and construction site supervision). Michel benefits from high internal legitimacy. His first work is to coordinate their discussions around the corporate brochures and sales presentations which involves selecting the appropriate vocabulary and attributes to promote. Over time, the NoP develops a full set of common resources such as rules for classifying a project as Concertance® in the project portfolio; a unified tool to qualify customers; reference lists and success stories. Jacques gathers all these resources (common repertoire) and creates a formal reference guide and data base that could be used throughout the company. Thus, implicit knowledge progressively becomes explicit and classified. Jacques thus naturally positions himself as the manager of this cross-regional

community. As they start to win more Concertance® projects, NoP members can now test their execution approach on various pilot projects with customers and project partners (temporary network). From this stage on, several project managers and construction supervisors progressively join the Concertance® NoP to share their experience in executing the project and to enrich collective learning. As an illustration, their feedback enabled to identify the lack of training of “Project Managers” (attitudes, methods and tools) and their ambiguous role and positioning in the field which was a frequent source of conflict with Construction Site Managers. Despite their key role in Concertance®, there was not precise definition of their mission and tasks. Hence, CoP members work several months on the definition of this new function and manage to convince corporate management to recruit new staff for the job and to offer them specific training. Most of this training content is developed and delivered by CoP members. As a result, the Concertance method is enriched of new execution tools regarding interaction with customers during planning, costs and expenses (open book), organization and decision-making processes. Based on all this work and the recognition of its value both internally (motivation, improved sales and margin) and externally (increased customer satisfaction), top management decided to brand this innovative method under “Concertance®”. Today, the Concertance® brand is well-established and its method stabilized. It is now an integral part of the company’s offering development project portfolio and promoted through the corporate web site.

#### *Analytical points*

So far, the exchanges and learning on Concertance® were mostly carried out at the local level between various CoPs (participation). This stage marks the first involvement of top management with their official support (appointment of Jacques) and shows the progressive development of Concertance® at the global firm level. A NOP is being born at the company level made up of several local CoPs and a “community manager” in the person of Jacques (who is considered legitimate to play this role). Marcel clearly acts as the global sponsor for this NOP. At this stage, top managers become aware of the internal power of the brand. They realize that the success of their initial idea was partly due to the fact that some of their employees actually identified with Concertance. They realized that Concertance was more than a differentiation device to attract an external audience; it also had a considerable role in encouraging CoP involvement. It fostered the development of collective tools, methods and brochures and the sharing of best market practices based on the context of each sale. The corporate marketing team gathered these products of reification and created a formal reference guide that could be used throughout the company. Thus, implicit knowledge progressively became explicit and classified. Thanks to this reification process, the guide has been transferred to all geographical units and can now be used throughout the company and not solely by the 3 pioneering CoPs. As summarized by Jacques: *“The brand undoubtedly defines a new standard in the world of construction. A standard that is continuously enriched with new projects by sharing experiences and continuous improvement”*.

This is how the Concertance® NoP enabled to convert the initial potential innovation suggested by top management to an actual “product”. It also led to the branding of the innovative method which is now fully part of the firm’s standards and seen as a key differentiation lever for the

group. As the brand became institutionalized, its actual management was taken over by the corporate marketing team which hired new staff to that end: the formal organization progressively replaced the network of practice.

## DISCUSSION

The case illustrates several interesting aspects of learning and innovation processes in the construction industry. In this section, we bring up three main results. In the case, there were two channels for idea generation; one on the local project/unit level and one on the corporate management level. In this case both can be considered as “failures” in terms of institutionalization of new knowledge. Thus, a first interesting result is that *in order for innovation to take place there needs to be a connecting mechanism between top-down initiatives and their attempted implementation in the wider organization, and similarly between bottom-up ideas and their acceptance within top management*. As was shown by the case, the innovative ideas developed at local level of the FOK project (the Columbus Hotel) failed at becoming institutionalized. The idea was not identified as valuable for the organization and therefore it was not “reified” through further practices, methods or objects that embodied its essence. In the vein of Agterberg et al. (2010), there was no organizational embeddedness. This is a classic scenario within construction; ideas often remain only as part of a single innovative project and do not become widespread concepts or methods (Cooper, 1990; Urban and Hauser, 1993). On the corporate level, the innovative idea was reified but it was not embedded in using settings (i.e. the local units of the firm that was to practice it in relation to customers). Thus, here there was a problem of not reaching embeddedness in practice (Agterberg et al., 2010). This is considered as the “Achille’s heel of the innovation journey”; attempting to exploit an idea but not addressing the using setting and how it is to become embedded in a variety of user environments (Waluszewski, 2011).

However, the case also shows that the learning taking place within the first local project was not totally lost. In fact, it seems to fall into the creative slack of the firm. Cohendet and Simon (2007) consider that the slack is the stock of unused or underused resources (knowledge, aborted or immature ideas, relationships, social capital, physical assets, etc.) that has been accumulated across the organization’s history. The creative slack is the setting in which these ideas are shared, brewed, confronted, nurtured, enlightened, reconsidered, or simply stored so that they can be accessed at the right time. For this to happen in the Spie batignolle case, a process of incrementally anchoring the idea within several local COPs eventually turning into a company-wide network of communities (a NOP) was necessary. In this process, the participation of committed individuals on various locations was essential as well as the resulting reification in terms of embedding the emerging practices of the becoming Concertance into documents, formal practices and a brand. At this stage, the idea was mature enough and sufficiently equipped with knowledge from all local COPs to reach a stage where it needed to be turned into a finished “product”. This is where the formal resources of top management was required: firstly to aggregate and formalize this distributed knowledge into a consistent whole. Secondly, to bring it to full maturity, which at some point requires formalized structures. Crucially, these processes entail not only the transfer of knowledge or information from one structure to another, but also modification of the structures themselves. Thus, a second

interesting result is that, *there needs to be an interplay between top-down (global firm level) and bottom-up (local firm and project level) processes for idea development to turn into company-wide knowledge and practices. In this regard, communities of practice can play a key role in functioning as “vessels” for ideas and knowledge in both directions.*

The third and final result that we address is the relation between the local-global firm levels and the temporary-permanent network levels (see Figure 1). The case illustrates that the local projects were working as testing arenas or “living labs” for the new idea, not least in relation to customers. In order for the new idea to become embedded in practice, i.e. become a natural part of how the local units were relating to their customers, a long process of trial and error with customers was necessary. Thus, the reification process of the local COPs also involved intense interaction over time with customers (and other actors). Over time, as the marketing practice was branded and formalized into Concertance® as a standardized practice on a global basis, the interaction that took place between the firm and other actors from a more permanent perspective, such as customers and suppliers, was based on this concept being an inherent part of how the firm operates. The concept is thus not only related to how the firm works within projects but what it stands for as a firm. Thus, the final result that we bring up is *that in order for new ideas to turn into innovations, interaction with external actors is necessary on both the temporary and permanent network levels. Local communities of practice within projects as well as networks of practice on the company-wide level may be the key to achieving such (meaningful) interaction.*

## **CONCLUSIONS**

In this paper we have re-visited the much debated issue of the construction industry’s lack of innovation in trying to look more closely into the interactive learning mechanisms and processes supporting the transformation of a new idea into its widespread use. The main problem that we have been trying to address is the divide between the local and company-wide levels of the firm on the one hand, and between the temporary and permanent network levels on the other. Based on the work of Agterberg et al. (2010), we have suggested a framework which recognises the need for embeddedness in practice (i.e. the local embeddedness of practices) and organizational embeddedness (i.e. company-wide implementation) of any new idea to turn into a company-wide practice. Based on insights from IMP, the framework also acknowledges that in order for such practices to turn into innovations, interaction with external actors, and particularly users, is necessary. While based on theoretical insights, the framework is also the result of analysing a case study in which local communities of practice and networks of practice were key elements in connecting the local and global levels of a construction firm. Such communities and networks of practice were also essential for the firm to interact with customers in trial and error processes of developing and formalising the idea, both across temporary and permanent networks.

By combining insights from the IMP approach and the communities of practice literature, we wish to contribute to both these bodies of literature. IMP places analytical emphasis on how innovation is part of processes of combining resources in new ways across organizational

borders. As such, focus is placed on the role and content of inter-organizational relationships. The purpose of the communities of practice literature is to better understand inter-individual processes of how practices become “shared” and eventually forms communities in which individuals learn from each other and other communities. In our proposed model, these two perspective cross-fertilise each other in the sense that we can bring attention to both the role of inter-organizational relationships and company-internal learning processes. The connecting mechanism that joins the different organisational levels of projects/units within the firm and its global organisation, and the temporary and permanent networks may potentially be the phenomena of communities and networks of practice. In the sense of functioning as creators and/or vessels of new knowledge and practices such communities can be part of transcending the different organizational levels and representing an “actor” with which external actors can interact, before the new idea has turned into a company-wide concept or product.

We propose that the model should be used and further tested in additional case studies, and particularly longitudinal studies in which such lengthy and complex processes can be best captured.

## BIBLIOGRAPHICAL REFERENCES

- Aarikka-Stenroos, L., Jakkola, E., Harrison, D., Mäkitalo-Keinonen, T. (2017) How to manage innovation processes in extensive networks; A longitudinal study, *Industrial Marketing Management*, 67, 88-105.
- Agterberg, M., van den Hoff, B., Huysman, M., Soekijad, M. (2010) Keeping the wheels turning: the dynamics of managing networks of practice, *Journal of Management Studies*, 47:1, 85-108.
- Balogun, J. and Johnson, G. (2004), "Organizational restructuring and middle manager sensemaking", *Academy of Management Journal*, Vol. 47, no 4, 523-549.
- Becker, M.C. (2001). "Managing Dispersed Knowledge: Organizational Problems, Managerial Strategies and their Effectiveness", *Journal of Management Studies*, 38, 996-1018.
- Brady, T. and Davies, A. (2004), "Building project capabilities, from exploratory to exploitative learning", *Organization Studies*, Vol. 29 No. 9, pp. 1601-1621.
- Bresnen, M., Edelman, L., Newell, S., Scarbrough, H., & Swan, J. (2003). Social practices and the management of knowledge in project environments. *International journal of project management*, 21(3), 157-166.
- Brown, John Seely; Duguid, Paul (1991). "Organizational learning and communities-of-practice: Toward a unified view of working, learning and innovation". *Organization Science*, Vol. 2, p.40-57.
- Bygballe, L. & Ingemansson, M. (2014) The Logic of Innovation in Construction, *Industrial Marketing Management*, 43:3, pp. 512-524.
- Bygballe, L., Jahre, M., Swärd, A., 2010, Partnering relationships in construction: A literature review, *Journal of Purchasing & Supply Management*, 16, 239-253.
- Cantù, C, Corsaro, D. and Snehota, I. (2012), "Roles of actors in combining resources into complex solutions", *Journal of Business Research*, Vol.65, no. 2, 139-150.
- Cheng, E. W. L., Li, H., & Love, P. E. D. (2000). Establishment of critical success factors for construction partnering. *Journal of Management in Engineering*, 16(2), 84–92.
- Cohendet, P. & Simon, L. 2007. Playing across the playground: paradoxes of knowledge creation in the videogame firm. *Journal of Organizational Behavior*, 28, pp. 587–605.
- Corsaro, D, Ramos, C, Henneberg, S. and Naude, P. (2012b), "The impact of network configurations on value constellations in business markets – The case of an innovation network", *Industrial Marketing Management*, Vol. 41, 54-67.
- Cova, B., Mazet, F., and Salle, R. (1996), "Milieu as a pertinent unit of analysis in project marketing". *International Business Review*, 5 (6), 647–664.

Creplet, Frédéric; Dupouet, Olivier; Kern, Francis; Mehmanpa zir, Babak, Munier, Francis (2001). "Consultants and experts in management consulting firms". *Research Policy*, Vol. 30, p. 1517-1535.

Crespin-Mazet, F., Havenvid, M.I. and Linné, Å. (2015), Antecedents of project partnering in the construction industry: the impact of relationship history, *Industrial Marketing Management*, 50, October, 4-15.

Crespin-Mazet, F., Havenvid, M.I. and Linné, Å. (forthcoming 2018), Organizing communities for innovation in construction: connecting the temporary and the permanent, in Havenvid, M.I, Linné, Å., Bygballe, L., Harty, C., eds, *The Connectivity of Innovation in the Construction Industry- A European Perspective*. Routledge: London.

Dubois, A., & Gadde, L. E. (2000). Supply strategy and network effects - Purchasing behavior in the construction industry. *European Journal of Purchasing and Supply Management*, 6(3), 207–215.

Dubois, A., & Gadde, L. E. (2002a). The construction industry as a loosely coupled system: implications for productivity and innovation. *Construction Management & Economics*, 20 (7), 621-631.

Dubois, A. and Gadde, L. -E. (2002b), "Systematic combining: An abductive approach to case research", *Journal of Business Research*, vol. 55, p. 553–560.

Dubois A. and Gadde L.E. (2014), "Systematic combining: One decade later", *Journal of Business Research*, n° 67, p. 1277-1284.

Dyer, W. G. and Wilkins, A. L. (1991), "Better stories, not better constructs, to generate better theory: A rejoinder to Eisenhardt", *Academy of Management Review*, 16(3), p. 613–619.

Gadde, L-E., Dubois, 2010, Partnering in the construction industry- problems and opportunities. *Journal of Purchasing & Supply Management*, 16, 254-263.

Haas, P., (1992). "Introduction: epistemic communities and international policy coordination". *International Organization*, Vol. 46, n°1, p.1-37.

Harrison, D. & Waluszewski, A. (2008) The development of a user-network as a way to re-launch an unwanted product, *Research Policy*, 37:115-130.

Hartmann, A. and Dorée, A. (2015), "Learning between projects: More than sending messages in bottles", *International journal of project management*, Vol. 33 No. 2, pp. 341-351.

Harty, C.F. (2008) Implementing innovation in construction: Contexts, relative boundedness and actor-network theory. *Construction Management and Economics*, 26(10), 1029–41.

Harty, C. & Araujo, L. (2009) Aligning User Practises. In Prekert F., Baraldi E., Håkansson H., Waluszewski A., eds., *Innovation in Use of Science and Technology in Business –Exploring*

*the Impact of Using Activity for Systems, Organizations, and People*, Bingley: Emerald Group Publishing Ltd.

Havensvid, M.I., Håkansson, H. and Linné, Å. (2016), Managing renewal in fragmented business networks, *IMP Journal*, 10(1), 81-106.

Håkansson, H. (1987) *Industrial Technological Development: A Network Approach*, London: Croom Helm.

Håkansson, H., Ford, D., Gadde, L-E., Snehota, I., Waluszewski, A., 2009, *Business in Networks*, Chichester: Wiley.

Håkansson, H. & Waluszewski, A., 2002, *Managing Technological Development*, London: Routledge.

Håkansson, H., Waluszewski, A., eds., 2007, *Knowledge and innovation in business and industry: The importance of using others*, London: Routledge.

Ingemansson M. (2010) *Success as Science but Burden for Business? On the Difficult Relationship between Scientific Advancement and Innovation*, PhD thesis, the Department of Business Studies, Uppsala University.

Ingemansson, M. & Waluszewski, A. (2009) Success in Science and Burden in Business. On the Difficult Relationship between Science as a Developing Setting and Business as a Producer-User Setting, *IMP Journal*, 3:2, pp. 20-56.

Koenig G. (2005), “*Etudes de cas et évaluation de programmes: une perspective campbellienne*”, *XIVème conference of AIMS* (International Association in Strategic Management), Angers, France.

Lave, J, and Wenger, E., (1990) *Situated Learning: Legitimate Peripheral Participation*, Cambridge: Cambridge University press.

Linné, Å., (2012) *China's creation of biopharmaceutical drugs: combining political steering, military research and transnational networking*, doctoral thesis, Department of Business Studies, Uppsala University, Uppsala.

Lindkvist, L, (2005). “Knowledge communities and knowledge collectivities: a typology of knowledge work in groups”. *Journal of Management Studies*, Vol. 42, n°6, p.1189-1210.

Miozzo, M. and Dewick, P. (2004), *Innovation in Construction. A European Analysis*, Edward Elgar Publishing Ltd., Cheltenham.

O'dell, C., & Grayson, C. J. (1998). If only we knew what we know: Identification and transfer of internal best practices. *California management review*, 40(3), 154-174.

Orr, Julian E. (1996). *Talking About Machines: An Ethnography of a Modern Job*. IRL Press an imprint of Cornell University Press, Ithaca, NY/London.

- Pemsel, S. and Widén, K. (2011) Bridging boundaries between organizations in construction. *Construction Management and Economics*, 29 (5), 495-506.
- Schweber, L., & Harty, C. (2010). Actors and objects: a socio-technical networks approach to technology uptake in the construction sector. *Construction management and economics*, 28(6), 657-674.
- Sergeeva, N. (2017) Labelling projects as innovative, *Project Management Journal*, Vol. 48, No. 1, 51–64.
- Shih, T. (2009) *Scrutinizing a policy ambition to make business out of science-lessons from Taiwan*, doctoral thesis, Department of Business Studies, Uppsala University, Uppsala.
- Skaates, M. A., and Tikkanen, H. (2003), “International project marketing: An introduction to the INMP approach”, *International Journal of Project Management*, 21(1), 503–510.
- Tikkanen, H., Kujala, J., and Artto, K., (2007), “The marketing strategy of a project-based firm: the four portfolios framework”, *Industrial Marketing Management*, 36(2), 194-205.
- Von Hippel, E., (1994) “Sticky information and the Locus of Problem-Solving: Implications for Innovation, *Management Science*, 40, no.4, pp 429-439
- Waluszewski, A. (2011), “Rethinking Innovation Policy”, *IMP Journal*, 5(3), 1041-156.
- Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. New York, NY: Cambridge University Press.
- Wenger, E. (2000). Communities of practice and social learning systems. *Organization*, 7, (2), 225-246.
- Winch, G.M. (2003), “Models of manufacturing and the construction process: the genesis of re-engineering construction”, *Building Research and Information*, 31(2), 107-118.
- Winch, G. M. (2014). Three domains of project organising. *International Journal of Project Management*, 32(5), 721-731.
- Yin, R.K. (2003), *Applications of Case Study Research*, Applied Social Research Series, Second Edition, Sage Publications.