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New boundary spanners: Emerging management roles in collaborative construction projects

Tina Karrbom Gustavsson*

KTH Royal Institute of Technology, Real Estate and Construction Management, 100 44, Stockholm, Sweden

Abstract

Project management roles and functions, which are standardized and clearly defined in literature, vary in practice. This study explores project management roles and functions in collaborative construction project practice. The findings, which are based on a longitudinal case study of a collaborative construction project, reports that several project management roles emerged during the project process, for example collaboration manager, BIM-manager and cooperation manager. The findings also report associated risks with the emergence of new management roles, for example information overload and misunderstanding. These new managerial roles served both as boundary spanners when creating and maintaining relationships between stakeholders, and as innovators when challenging the traditional and ingrained adversarial construction project practice. The findings contribute to the growing literature on collaborative approaches in construction and to the discussion on the transformation of project management roles and functions.

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Keywords: construction projects; collaboration; project management; bundary spanners

1. Introduction

Construction projects are becoming increasingly complex and difficult to manage (Chan et al., 2004). The complexity is added by the reciprocal interdependencies between different stakeholders, such as financing bodies, authorities, architects, engineers, lawyers, contractors, suppliers and trades (Clough et al., 2008) which makes it necessary for construction projects to improve integration, cooperation, communication and coordination (Dainty et

* Corresponding author. Tel.:+ 46 8 790 87 99
E-mail address: tina.karrbom@abe.kth.se

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al., 2006). This requires intra- and inter-organizational processes that support communication (Karrbom Gustavsson and Gohary, 2012) and build trust between stakeholders (Kadefors, 2004), which is why an increasing number of studies have focused on stakeholder management in construction projects (for example Olander and Landin, 2005) and collaborative approaches such as partnering (for example Bresnen and Marshall, 2000; Bygballe et al, 2010; Eriksson, 2010; Jacobsson and Roth, 2014). However, while many studies on collaborative approaches in construction have focused on critical success factors (Chan et al., 2004), and trust (Kadefors, 2004; Laan et al., 2010), less focus has been on project management roles and functions. Hence, there is a knowledge gap on management roles and functions in the literature on collaborative project approaches.

Project management roles and functions are increasingly studied in project management and construction management research (eg. Styhre, 2006; Sommerville et al., 2010; Kelly et al., 2013). There is for example the discussion on the bureaucratization of the project manager function reducing the project manager to an administrator, which in turn is an example of the project management function being subjected to translation from what is by definition is dealing with extraordinary, unique and temporary endeavours (Styhre, 2006). While management roles and functions in projects have been widely standardized by different bodies, i.e. for example Project Management Institute, PMI, and International Project Management Association, IPMA, with the result of an increasing consensus on project management roles in literature, they vary in practice (Stummer and Zuchi, 2010).

The study presented in this paper reports findings from a longitudinal case study of a collaborative construction project. The research aim is to explore organizational processes in construction projects by looking into the development of management roles and functions. The concept of boundary spanners (Tushman and Scanlan, 1981) is used here for interpreting how certain members of a community of practice can act as boundary spanners and create an arena for mutual engagement and change (Wenger, 1998). The findings indicate that several management roles were emerging during the project process. Findings also indicate that these roles emerged for stakeholder management purposes such as intra- and inter-organizational communication. This research is of importance for evaluating and developing collaborative project practices, and in a broader perspective also the construction industry and its processes. The findings are also of relevance for the development of project theory (Söderlund, 2004), in particular on the transformation of project management roles and functions.

This paper is structured as follows: Next a background to managerial challenges in the construction industry. Then follows an outline of the theoretical framework before the method-section. The paper ends with the findings and finally the discussion.

2. Background

The construction industry has a reputation of poor quality, adversarial relationships, low productivity and a reluctance to change (Egan, 1998; Winch, 2010). While traditional construction project practice was based on rigid and impermeable boundaries between processes, stakeholders, and professions, which made communication, co-operation and integrated project practices difficult (Dainty et al., 2006), collaborative construction project practices have been developed to transform adversarial relationships into cooperative ones (Eriksson et al., 2007). These practices serve to facilitate co-operation, mutual trust, knowledge sharing and innovation (Kadefors, 2004; Eriksson, 2010). However, not all collaborative projects are a success (Lu and Yan, 2007) and research indicates that for example lack of continuous and honest communication can cause for ineffective construction partnering (Ng et al., 2002).

A managerial challenge in collaborative projects is the multitude of stakeholders, which puts high demands on communication and coordination capabilities (Dainty et al., 2006) as well as stakeholder management capabilities (Olander and Landin, 2005). As collaboration is dependent upon activities that build relationships, interconnections and interdependencies, boundary spanning has been suggested to work as driver for this (Bossink, 2004; Di Marco et al., 2010; Fellows and Liu, 2012). Boundaries are also especially interesting temporally and spatially emerging locations of development, learning and change in construction project work practices (Kerosuo, 2006, Karrbom Gustavsson and Gohary, 2012).

3. Theoretical framework

Stakeholder management theory describes stakeholders and how they can be analyzed and handled (Freeman, 1984). It combines organizational management with business ethics and focus on the relationship between the

organization and its stakeholders (Chinyio and Olomolaiye, 2010). These relations can have both positive and negative impact why stakeholder management points to the importance of maintaining good relationships with stakeholders. Hence, it works as a form of social inclusion (ibid.). Stakeholders are individuals or groups who have a vested interest in the success or failure of a project and the environment within which the project operates (Olander, 2007, p. 278) and they can be divided into the following two categories: Internal stakeholders, that is those who are members of the project coalition or who provide finance and external stakeholders, that is those affected by the project in a significant way (Chinyio and Olomolaiye, 2010, p. 3).

3.1. Organizational boundaries and communities of practice

According to Aldrich and Herker (1977) boundaries can be understood as defining characteristics of the organisation while boundary roles are the link between the context and the organisation. Boundaries can be considered to be both enabling and constraining structures (Hernes, 2003), and they should be explored as emerging social processes (Kerosuo, 2006). Organisational boundaries can be described as institutional transformation (Scott et al, 2000), which provides a historically based image of institutional change and explanations to why changes occur in organisations. Organizational boundaries can also be understood in relation to the theory of situated learning in communities of practice (Lave and Wenger, 1991; Wenger, 1998) that provides descriptions of learning and change on the micro-level of boundary action, processes and practices.

Communities of practice (Lave and Wenger, 1991; Wenger, 1998) are separated by boundaries and peripheries. Boundaries refer to discontinuities and lines of distinction between the inside and outside of a community and peripheries represent continuities and connections. Communities of practice are groups of individuals who share a concern, or a passion, for what they do and they continuously learn as they interact. Furthermore, three characteristics are crucial for a group of individuals to become a community of practice: the domain, the community and the practice (Wenger, 1998).

First, membership of a community implies a commitment to a shared domain of interest and a shared competence that distinguishes members from other individuals. Secondly, members engage in activities and discussions, share information and develop relationships that enable them to learn from each other. Thirdly, members of a community of practice are practitioners and develop a shared repertoire of resources, experiences, stories, tools and ways of addressing recurring problems (Wenger, 1998). Following the community of practice approach, and linking it to complex and constantly changing day-to-day construction project practice, it is the boundary encounters such as the boundary activities that enable continuity (Wenger, 1998). It is the building of relationships, interconnections and interdependencies that supports sense making and facilitate mutual understanding of a complex context (Weick, 2009).

3.2. Boundary roles and boundary spanners

Two classical functions of boundary roles suggested by Aldrich and Herker (1977) are information processes and external representation. Boundary roles are exposed to a large amount of information which they make sense of before passing it on. Thus, the ability of the boundary spanner in detecting, summarizing, interpreting and communicating information further is an important factor for organisational performance, innovation and change (ibid). Also, boundary roles involved in the process of maintaining or improving the legitimacy or hegemony of a community of practice act as mediators, negotiating power relations between different communities of practice (Aldrich and Herker, 1977).

The concept of boundary spanners (Tushman and Scanlan, 1981) can be used for interpreting how certain members of a community of practice can take on a boundary role and create an arena for mutual engagement where new practices are likely to emerge (Wenger, 1998). Williams (2002) suggest that boundary spanners are “key agents” who are managing inter-organizational activities and define “the competent boundary spanner” as an individual with networking skills and the ability to cultivate inter-personal relationships. The competent boundary spanner builds sustainable relationships, is skilled at influencing and negotiating and knows how to manage complexity and interdependencies (Williams, 2002). The boundary spanner has communicative and political skills and the ability in bridging interests, professions and organisations (Webb, 1991, in Williams, 2002).

4. Method

The studied project was a collaborative construction project executed in Sweden. The project duration was 4.5 years and the project had a budget of 450 million SEK. The building is a public building of 13 000 square meters including an assembly hall, restaurant, cafe and offices. The procurement form was" General Construction in collaboration" and the aim was to implement and follow a collaborative approach based on trust, open economy, mutual goals and to share responsibility for the project between the client and contractor. A collaborative agreement including collaborative conduct rules and a target price was signed between client and contractor and continuous social activities such as collaborative workshops were pursued during design and production.

The case was selected based on expert sampling, and the outspoken collaborative ambitions by both client and contractor. In addition, the case project stakeholders welcomed collaboration with academia, providing the researchers with access to documents, people and participant observation at the project office, the construction site and at social events. The case study followed a longitudinal case-study approach (Yin, 2008) starting with planning, visits, discussions and interviews in 2011, continuing with participant observation, formal and informal meetings and discussion with project participants and additional interviews during 2012 and 2013. Tentative research findings have been reported back to the project participants in workshops and seminars. In-depth interviews were conducted with 14 respondents, selected to represent both internal and external stakeholders. The interviews were based on a semi structured interview guide with open-ended questions and lasted between 60 and 120 minutes. The interviews were transcribed and a research team of two researchers did the initial analysis. The analysis was later developed further by one of the researchers to enable deeper analysis of organizational processes and followed an interpretative and exploring process where theory and empirics challenged each other through an abductive process. There was a search for emerging patterns and themes, i.e. social constructs (Silverman, 2001) in order to gain a comprehensive understanding of the organizational processes. Managerial roles and responsibilities are examples of the emerging themes during the analysis.

Participant observation was also conducted at formal and informal meetings. The researcher got access to coffee rooms at the project office and at the construction site office and was also invited to social events such as the collaborative workshops. In addition, the researcher went on numerous site-walks and had continuous communication with the client´s project manager about the progress of the project. Hence, the empirical material is rich and consists of field notes from participant observations (i.e. notes from formal and informal discussions and events), internal and external documents (i.e. project time plans, organizational charts, collaborative project goal agreements, meeting memos, 3D-models), and interviews with both internal and external stakeholders.

Interpretative case studies are recommended when the aim is to understand emerging processes (Linderoth & Jacobsson, 2008).

5. Findings

The client, who had high collaborative ambitions as well as ambitious intentions for innovative design, collaboration based on trust, effective communication and high project performance, was the one initiating the project. The findings will first be presented on a project stakeholder level, then with focus on emerging management roles and finally on boundary spanners.

5.1 Project stakeholders

The internal project stakeholders were the client, a large governmental property client in Sweden specialised in higher education and research, the tenant which is a large university and a long-term tenant to the client, the contractor which is a major Nordic building company, the architect firm which is run by an internationally well known architect, the founder which in this project is a trust, engineering consultants such as for example electrical engineering and structural engineering. Among the external stakeholders were specialists contracted during design, for example in landscape, fire, acoustics, humidity, steel etc. Other external stakeholders were material suppliers, subcontractors, the municipality, other construction projects, authorities and inhabitants.

Most of the internal project stakeholders had the possibility of using a shared project office during the design. This shared space, including conference room, coffee room and offices nearby the construction site, supported informal communication, learning and problem solving. Most of the internal stakeholders also shared office during

the production phase. The site office, which was equipped with a "visual room" (later a "visual corridor") where project specific information such as project time plans, illustrations, digital models etc. was visualized on the walls, became an information and communication hub.

5.2 Managing internal stakeholders

The client initiated the project after that the tenant had received a generous donation and assigned a project manager to the project and it was the client's project manager who was managing the whole project process as the client representative. Already when planning the project process on a strategic level, the client´s project manager contracted two *design managers* to manage the design process, both schematic design and detailed design. The design process included many of the stakeholders and the design managers, of which one was an architect and the other a civil engineer, worked with planning, organizing, coordinating and facilitating design meetings, and they continuously reported back to the client´s project manager.

The client had decided that the design process would be using 3D-object based modeling. Hence, a specialist in BIM (Building Information Modeling) was contracted during early design to act as *BIM-manager*. The BIM-manager coordinated and facilitated BIM-meetings and also gave support to design managers, architect and engineering consultants during the work with the architectural and engineering digital design models. The BIM-manager also integrated the separate models into one joint project specific BIM-model and it was also the BIM-manager who made continuous up-dates.

5.3 Managing external stakeholders

The case project was executed in an urban area currently under extensive development with several major construction projects pursued in parallel in the same urban area. In addition, there were major infrastructure projects going on in the area – bridges, tunnels and roads, which made the traffic situation complex, challenging and difficult to control when it came to deliveries of material etc. Thus, close contact with the other projects, the municipality and other authorities was a necessity. The client´s project manager handled this complex urban-multi-project context, which required regular contact with several external stakeholders, by contracting a project *coordination manager* who took an overall contextual perspective and who regularly participated in external meetings with external stakeholders and reported back to the client´s project manager. The coordination manager regularly spent time at the project office to informally communicate and interact with internal project stakeholders.

5.4 Managing the client and contractor-relation

There was also a *collaboration manager* contracted by the client´s project manager to manage the client-contractor relationship, i.e. to plan and facilitate social activities such as the collaboration workshops and to follow up the collaborative goal agreement, which was developed in the early stages and signed by the internal project stakeholders to establish commitment. To facilitate continuous commitment and improvements, the collaborative goal agreement was regularly followed up by surveys and discussions at collaboration workshops managed by the collaboration manager. There was also a target price developed in order for the client and contractor to mutually gain economically from keeping up an efficient collaboration and an efficient project process. The collaboration manager, who had a background as engineer, prepared and facilitated the social activities in close collaboration with the client's project manager.

During production, the contractor's project manager and project director managed the work on site in cooperation with the contractor´s site manager, the installation manager, the installation coordinator, several supervisors, foremen and many subcontractors. There were also two *construction managers* as the client´s representatives on site during production controlling the site work and linking the contractor´s site management team and the client´s project manager. The design managers and representatives from the architect firm as well as some of the engineering consultants were also partaking in meetings as the site office to follow up on the production and give advice when needed.

5.5 Emerging management roles in a collaborative construction project

The collaborative project approach applied in this project was a relatively new organizational setup for most case project stakeholders. The purpose of the collaboration project was, according to the respondents "*to jointly work for the projects best"* and *"always put the project first*". This project was also said to be "*the most collaborative project*" the respondents had ever taken part in. It was also said to be the project "*that has taken collaboration most serious*". However, from an overall perspective following the general construction procurement form, the client´s project manager was overall responsible for the project process, from idea to finished building.

According to the respondents, more than twenty different management roles emerged during the project process. For example "senior project manager", "project manager", "design manager", "site manager", "project director", "construction manager", "installation manager", "BIM-manager", "coordination manager", "collaboration manager", "foreman" etc. All these management roles had, in one way or the other, the function of coordinating project work and facilitating communication and trust between different project stakeholders. They were exposed to a major amount of internal and external information, for example project plans, deviations and specifications as well as digital 3D-models, which they had to make sense of, interpret and pass on. Most of them were located in the joint project office (during design) and the joint site office (during production) creating, interpreting and sharing complex information. The design managers, collaboration manager, coordination manager and BIM-manager were partaking already during the design, while others, like the construction managers, were partaking in the project later on. There were also some managers that left during the process, for example the design managers and the BIM-manager. The management roles that were partaking throughout the project process, from early design to end of production, was, beside the client´s project manager, the coordination manager and the collaboration manager.

6. Discussion

There was boundary spanning pursued in the project to facilitate collaboration, communication and trust between stakeholders. The boundary spanning took place in joint offices and during formal and informal meetings. The boundary spanning was pursued by the client´s project manager and performed in practice – in the day to day organizing processes – via the managerial roles such as coordination manager, BIM-manager and collaboration manager. The boundary spanning included both inter- and intra-organizational communication enabling sharing of information and experiences as well as mutual sense making and the building of trust (Kadefors, 2004; Dainty et al, 2006). Boundary spanning is a two-way process and highly dependent on a joint effort. Boundary spanning could not be accomplished without collaboration between client and contractor when challenging and changing old ingrained functional boundaries and culturally defined practices (Dainty et al, 2006). For boundary spanning to take place there is a need for individuals, i.e. boundary spanners or "key agents" (Williams, 2002), to initiative, facilitate and maintain relationships. In the studied project, there were management roles emerging that served as "key agents" during the project process, for example the design managers, the BIM-manager, collaboration manager, coordination manager and construction managers.

There were obviously differences among the boundary spanners in the case project, for example on how long they were partaking, their informal power and if they had external relationships or not. It is also of importance to critically reflect on the number of management roles in the project and the obvious risk for confusion, communication errors, mistakes and information overload with unclear and/or overlapping roles and responsibilities in complex organizations such as construction projects. The different "managers" in the studied project played the important managerial role as boundary spanners and in their day-to-day work they challenging old practices and cultures. As such, they were also organizational innovators – pioneers – that can serve as role models or mentors and take part in preference groups for others in the conservative construction industry to imitate in order to enable the much needed change (Massini et al, 2005). Thus, further research on boundary spanners is of importance for the development of construction project management.

There are collaborative and communicative challenges that this case study does not acknowledge in depth such as dispersed project teams (Sole & Edmondson, 2002) and multicultural project teams (Ochieng & Price, 2010). This is an empirical limitation of this study. Another empirical limitation is the fact that the case project was a

general construction project, or design-bid-build project (Winch, 2010) and not a design-build project. This limits the generalization of the findings.

The case project in this study, with its collaborative ambitions, can be interpreted as an example of boundary spanning in itself, distinguishing it from other 'conventional' construction projects. The project is thus interesting as a role model – a "key agent" – for management of collaboration in construction. The boundary spanners identified contribute to construction project practices evolving towards more integrated project processes and towards a renewal of construction project practice. The conclusion is that more knowledge and understanding of boundary spanners is of importance for management of construction projects.

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