Available online at www.sciencedirect.com

ScienceDirect

International Journal of Project Management 34 (2016) 1479–1492

International Journal of Project Management

www.elsevier.com/locate/ijproman

Coordinating in construction projects and the emergence of synchronized readiness

L.E. Bygballe, A.R. Swärd, A.L. Vaagaasar *

BI Norwegian Business School, Oslo, Norway

Received 16 February 2016; received in revised form 11 August 2016; accepted 15 August 2016
Available online 16 September 2016

Abstract

A construction project can only succeed when it involves effective synchronization, alignment, and adjustment of multiple project partners' contributions. Using a practice lens, this paper focuses on coordinating and explores how partners deal with the complex social processes of project working. The paper reports research from case studies of three construction projects. We show how the project partners in these projects engaged in coordinating and how they learned what formal and informal coordinating mechanisms to use and how to use them. We also show that as the project partners made sense of their ongoing engagement in coordinating, relational conditions for coordinating emerged. Together, these conditions constitute *synchronized readiness*, which is the overall relational condition that enabled the partners to deal with upcoming coordinating needs. This paper makes two key contributions to the understanding of coordinating in construction projects. First, we show that coordinating is a bottom-up and emergent process. Secondly, we introduce the concept of synchronized readiness, thereby explaining and conceptualizing how coordinated outcomes are achieved in construction projects.

Keywords: Construction projects; Coordinating; Practice; Synchronized readiness; Case studies

1. Introduction

This paper is about coordinating in construction projects and shows how coordinating is a bottom-up and emergent process. Coordinating in interfirm settings, such as construction projects, relates to the ways in which partners synchronize, align, and adjust their actions to complete their interdependent tasks (Gulati et al., 2012).

Since the late 1980s, the integration, cooperation, and coordination of construction project teams have attracted the interest of construction practitioners and researchers alike (Cicmil and Marshall, 2005). The effective coordination of multiple contractual partners' contributions is a key function in construction projects and is vital for the success or failure of a project (Bresnen, 1990; Sydow and Staber, 2002; Jha and Iyer, 2006; Hui et al., 2008; Jones and Lichtenstein, 2008; Jacobsson, 2011). Extant literature has addressed the need for new reasoning and practices in managing construction projects, in order to facilitate a change from the traditional adversarial and distrustful relationships towards greater coordination and cooperation among project parties (Cicmil and Marshall, 2005).

The literature offers different tools, techniques, and practices for achieving project team integration, including new and innovative contractual forms and procurement strategies, such as partnering (Bresnen and Marshall, 2000) and relational contracting (Rahman and Kumaraswamy, 2004). However, recognition of the insufficiencies of these formal mechanisms has led to strong calls for new management and research perspectives that acknowledge the informal nature of project work and the complexity, uncertainty and interdependencies of construction projects (Bresnen, 1990). Project management should be seen as a social conduct, defined by context, history, individual values, and wider structural frameworks (Engwall, 2003; Cicmil et al., 2006). Acknowledging the role of context and complexity means that not every coordination challenge can be foreseen when designing and planning the project. The project partners will encounter coordination gaps, i.e. instances where the required coordination is greater than the actual coordinating

* Corresponding author.

http://dx.doi.org/10.1016/j.ijproman.2016.08.006
0263-7863/00/

(Gerwin, 2004). As they start orienting towards this absence (Jarzabkowski et al., 2012), and deal with it, they will create new ways of coordinating (Jarzabkowski et al., 2012; Pauget and Wald, 2013). Therefore, it is necessary to understand how coordination activities take the form of an evolving and self-organizing process centering around project goals (Ahern et al., 2014).

The present paper is based on data from case study research and explores how coordinating takes place and how new ways of coordinating emerge as partners in construction projects respond to the coordination challenges they face. In line with extant research (e.g. Cicmil and Marshall, 2005; Bresnen, 2009), we apply a practice perspective on coordinating. This perspective provides an analytical approach for understanding the micro-processes involved in the ongoing accomplishment of coordinating (Feldman and Orlikowski, 2011), and enables us to capture the dynamic and emergent processes of coordinating (Jarzabkowski et al., 2012).

The paper's key contribution is that it empirically demonstrates and conceptualizes the process of coordinating in construction projects. We show how construction partners enact different tools, techniques, and practices (i.e. coordinating mechanisms) and how coordinating is enabled through this enactment and use of formal and informal coordinating mechanisms. As such, we show that coordinating is a bottom-up and emergent process. Furthermore, we show that as the partners engage in coordinating efforts, relational conditions, which we have combined into the label; *synchronized readiness,* emerge over time and enable the effective accomplishment of coordinated outcomes.

The paper proceeds with a theory section on coordinating in construction projects. We revisit relevant project and construction literature as well as recent perspectives on coordinating in the more general literature and, in particular, theories that depart from a practice approach to organizational life. We then present the research approach and methods, followed by a presentation of findings from the case studies. The empirical analysis and discussion lead to the development of a model for understanding coordinating in construction projects. Finally, we outline implications that emphasize the key issues relevant for augmenting the process of coordinating in construction projects beyond structural interventions.

2. Towards an understanding of the process of coordinating in construction projects

The performance of a construction project depends on the effective coordination of multiple actors' contributions and interdependent tasks. The general literature (e.g. Grandori and Soda, 1995; Grandori, 1997; Okhuysen and Bechky, 2009; Van de Ven and Walker, 1984) and the literature within project management and construction (e.g. Bresnen and Marshall, 2000; Cicmil and Marshall, 2005; Jacobsson, 2011; Jha and Iyer, 2006; Jones and Lichtenstein, 2008; Van Marrewijk et al., 2008; Rahman and Kumaraswamy, 2004; Winch, 1989) suggest and discuss various ways to achieve coordination and integration among interdependent actors, ranging from more formal tools, techniques and practices to more informal ones, such as trust (Kadefors, 2004). The effectiveness and efficiency of various inter-firm coordination mechanisms are found to depend on the type and intensity of the interdependencies involved (Van de Ven and Walker, 1984; Grandori, 1997). As Grandori (1997) notices, interdependencies that are transactional and sequential in nature are often handled by programming, rules and supervisory hierarchical roles, especially when the activities are predictable. Interdependencies that require collective action where partners need to combine their resources to solve a common activity in an integrated way on the other hand, require mutual adjustment and group decision making (Grandori, 1997). These latter types of interdependencies comply with what Thompson (1967) referred to as reciprocal interdependencies.

Much of the traditional construction literature has focused on identifying a set of generic and abstract principles for coordinating, constituted by a range of formal mechanisms (for an overview, see, for example, Jha and Iyer, 2006, 2007). However, albeit the belief in these mechanisms for enabling coordination, it is increasingly found that they might also hamper coordination. For example, classical contracts, mostly considered as a salient tool for governing projects, have been found to impede flexible interaction patterns among project participants and, consequently, the ability to coordinate and control (Bresnen, 1990; Cicmil and Marshall, 2005; Clegg et al., 2002; Dahlgren and Söderlund, 2001; Stinchcombe, 1985). Recognition of the inherent limitations in classical contracts and traditional coordination means has led to the development of new contractual arrangements and procurement strategies (such as partnering) to increase collaboration (Cicmil and Marshall, 2005). However, these new collaborative arrangements have neither produced the expected results (Bresnen and Marshall, 2000; Hartmann and Bresnen, 2011), largely because the tools, techniques and practices required to design the partnering relationships have been emphasized at the cost of the social and evolutionary processes (Bresnen and Marshall, 2002; Bygballe et al., 2010). It is increasingly being recognized that various forms of coordinating, such as partnering and collaborative technologies, shape and are shaped by interaction and social processes (Bjørkeng et al., 2009; Bresnen and Marshall, 2000, 2002; Bresnen et al., 2004, 2005; Bresnen, 2009, 2010; Bygballe et al., 2015; Cicmil and Marshall, 2005; Clegg et al., 2002; Dewulf and Kadefors, 2012; Jacobsson and Linderoth, 2010; Hartmann and Bresnen, 2011; Sage et al., 2012; Tryggestad et al., 2010; Whyte and Lobo, 2010).

The increasing concern with social and evolutionary aspects of collaboration in construction projects mirrors the more general criticism of the rational-design perspective associated with the focus on "best practice" in traditional project management (Cicmil et al., 2006; Hällegren and Söderholm, 2011; Jacobsson, 2011; Smits and van Marrewijk, 2012; Sage et al., 2013; Söderlund, 2011; Winter et al., 2006). The criticism relates to the disparity between the maturing body of project management know-how and the effectiveness of its application, as projects keep failing and stakeholders continue to voice their dissatisfaction with project performance (Cicmil and Hodgson, 2006). The critics have proposed a shift in research orientation from functionalistic and instrumental perspectives towards approaches that capture the complex, dynamic, embedded, emergent, and "irrational" aspects of projects (Blomquist et al., 2010; Cicmil and Marshall, 2005; Kokkonen and Alin, 2015; Kreiner, 1992, 1995; Pauget and Wald,

2013; Sage et al., 2010; Vaagaasar, 2011). The proponents of this shift are highly influenced by a "becoming" ontology and practice perspectives (Ahern et al., 2014; Bresnen, 2009, 2010; Cicmil and Marshall, 2005; Hartmann and Bresnen, 2011; Harty and Whyte, 2010), emphasizing social and contextual aspects (Bresnen and Marshall, 2002; Cicmil and Marshall, 2005; Clegg et al., 2002) and the importance of the emergence of a phenomenon (Bresnen, 2009), what people actually do in projects (Cicmil et al., 2006; Hällegren and Söderholm, 2011), and how they make sense of ongoing interaction patterns in the context of projects (Blomquist et al., 2010; Söderlund et al., 2008).

A practice perspective on coordinating emphasizes the act of coordinating, which is seen as a dynamic process that is continuously being created and modified in order to enact organizational relationships and activities (Feldman and Orlikowski, 2011; Orlikowski, 2007). In line with the insights from the project and construction literature referred to above, the extant literature on coordinating has acknowledged that what matters is not merely the absence or presence of a coordination mechanism, but the use of the mechanism in particular contexts (Jarzabkowski et al., 2012) when a coordination gap arises (Gerwin, 2004). In other words, it is not the mechanism itself that is important, but what it accomplishes. According to Okhuysen and Bechky (2009), the actual use of coordination mechanisms creates favorable integrative conditions that enable coordinating. Through interaction, partners create a common understanding of who is responsible for specific parts of a task (i.e. accountability); these interactions then become more predictable (i.e. predictability), and the partners create a shared perspective about how each individual's work fits within this shared perspective (Okhuysen and Bechky, 2009).

Similarly, other researchers have pointed to how the nature of partners' engagement in coordinating activities forms the characteristics of the relationships in interfirm cooperations (Gerwin, 2004; Gulati et al., 2012). For example, interaction not only enables partners to deal with coordination issues, but trust and norms of reciprocity can develop and enable further coordinating processes (Gerwin, 2004). Other relationship characteristics that are connected to high-quality cooperation, such as shared goals, shared knowledge, and mutual respect (Gittel, forthcoming), make it possible to adjust coordination means in a flexible manner (Gulati et al., 2012). Also, when the quality of cooperation is high, partners will be less inclined to suspect hidden agendas, which will again create greater willingness to invest in the relationship (Gulati et al., 2012; Larson, 1992). Trust-based relations facilitate openness and the exchange of sensitive information that may be important for successful coordination (Kale et al., 2000; Uzzi, 1997).

The above notions highlight that the act of coordinating can help create conditions that enable and shape the further coordinating process; for example, in terms of the partners' willingness and ability to adjust their tools, techniques, and practices to face the coordination challenges that arise. Furthermore, the conditions are likely to act in concert both as support and substitutes. However, as Okhuysen and Bechky (2009) noted, the conditions are not always sufficient to achieve coordinated outcomes. They are highly determined by the work context and can be eroded when, for instance, people come and go in an organization; this means that the integrative conditions must be reestablished in order to succeed with coordination. This understanding paves the way for an emphasis on the emergent nature of coordinating processes (Okhuysen and Bechky, 2009).

The theoretical discussion in this section suggests that a deeper understanding of coordinating can be acquired by exploring what project partners actually do when they engage in coordinating activities. Although coordination and cooperation issues have attracted attention within the project management and construction literatures, little has been said regarding the hinterland between engaging in coordinating activities and the achievement of coordinated outcomes, or the extent to which it is mediated by relational conditions. Our aim in the present study is to capture the complex social processes of project working. This leads us to the following research questions: How does coordinating take place in construction projects, and what enables the accomplishment of coordinated outcomes?

3. Research approach

3.1. Methodology and data collection

To answer the research questions presented above, the paper draws upon process study research based on qualitative data. Process research is concerned with understanding how things evolve over time and why they develop in certain ways (Pettigrew, 1997). Data are often represented by stories about what happened and who did what when, organized around events, activities, and choices ordered over time (Langley, 1999). Process research often adopts qualitative methodologies, since 'how' and 'why' questions are at the core of such methodologies (Yin, 2009). Thus, a qualitative process research strategy is appropriate for studying how coordinating takes place in construction projects over time.

The present paper combines data sets from three longitudinal field studies of large construction projects for the production of infrastructure and public buildings in Norway. Table 1 provides an overview of the research for each study.

The first field study concerns a new hospital that was built in central Norway between 2002 and 2014 with a budget of USD$2 billion. The field study covers one phase of this project, which ran from 2006 to 2010. The second field study is of a highway project that began in 2009 and was completed in 2012 with a budget of $USD600 million. The study followed all phases of the project execution. The final field study involves a railway infrastructure project that was executed between 2002 and 2007 with a budget of approximately USD$400 million. This field study also followed the overall project execution. All three studies focused on organizational and relational issues that are highly related to coordinating, including interaction and learning processes, problem-solving, trust-building, and the emergence and changes of routines.

The projects were interesting research settings for our purposes because they involved multiple partners engaged in the undertaking of interdependent tasks. Furthermore, all the three projects were long-term, lasting for several years. Thus, the projects were similar in terms of the context they were embedded in and how coping

Table 1
Overview of data.

	Hospital	Highway	Railway
Research period	2007–2010	2009–2012	2003–2006
Research design	Longitudinal field study	Longitudinal field study	Longitudinal field study
Data	40 interviews with representatives from client, consultants, contractors and suppliers, including top management levels and project managers. Archival data.	20 interviews with representatives from client, consultants and contractors, primarily project managers and other project participants. 42 observations (160 h). Archival data.	30 interviews with representatives from client and contractor, primarily project management. 50 observations (150 h) from weekly project meetings). Archival data.
Key topic covered	Learning processes and routines, partnering, interorganizational relationships and coordinating.	Trust processes and reciprocity, collaboration, interorganizational relationships and coordinating.	Learning processes, interorganizational relationships, and coordinating.

with coordinating needs was on the agenda, both at the strategic level and in the day-to-day project activities. However, the three projects differed with regard to the process in which this happened, such as the extent to which coordinating needs were foreseen and planned for up front and the way in which the project participants deliberately designed or more unintentionally came to use different means to cope with coordinating needs. The reason for these differences could be attributed to the differences in complexity of the project tasks and the number of partners involved, as well as the interdependence between them. For example, the hospital project involved a large number of interdependent partners, reflecting a high degree of organizational complexity. The railway project had fewer partners but was technically complex. In contrast, the highway project was less complex in terms of technical issues and the number of partners involved. The way coordinating is done and the effectiveness and efficiencies of coordinating depend on complexity in terms of the type and intensity of the interdependencies involved (Van de Ven and Walker, 1984; Grandori, 1997). Thus, we expect that the combined insights from the three cases can increase our understanding of how coordinating is done in construction projects. The longitudinal process data enabled us to observe changes in how the involved partners engaged in coordinating and how new ways of coordinating emerged over time (Langley et al., 2013). The combined data sets provided insights into the phenomenon of coordinating in construction projects involving multiple partners and the process of dealing with coordinating needs that none of the data sets could have accomplished independently (Miles and Huberman, 1994). Combining three studies provided both richness and variety. According to Langley (1999), using a small number of cases provides authenticity and also allows for rich and thick descriptions, which enables readers to judge the transferability of the findings. However, knowledge is believed to advance with the comparative method across cases (Langley et al., 2013), and using more than one study in our research enabled us to detect patterns among observed events (Langley, 1999). Such pattern recognition is considered important for theory building from case studies, and is often accompanied by a replication logic (Eisenhardt and Graebner, 2007).

The three studies were based on data collected through archives (such as organization websites, public documents, business publications, minutes from meetings, reports, contracts, evaluation reports, and manuals); observation in meetings; and formal interviews and informal discussions with project participants from the client organizations, consultants, and contractors. All interviews were semi-structured and lasted between one and three hours. Some were tape-recorded, and all were transcribed verbatim and then sent to the respondents for verification.

The interviews focused on topics related to how the partners coordinated their interdependent tasks throughout the projects and how this changed over time as coordinating needs became apparent. For instance, we asked interviewees about how they dealt with anticipated coordination needs early in the projects and found that they established formal structures in the beginning of the relations (for example, the new project delivery form in the hospital project and the contract in the highway project). We also asked how they coordinated, and found that they used various tools, techniques, and practices (for example, planning in the railway project). We also found that the interviewees often referred to relational issues when they sought to explain why certain ways of coordinating were preferred. For instance, trust was mentioned as an antecedent for using more direct communication and personal contact. By using active interviewing (Cicmil et al., 2006), the interviewees were encouraged to share their reflection and accounts of how the project solved tasks and the means used to solve ongoing coordinating needs. As such, the focus was on group-level processes and the respondents were asked to reflect on how they, as a group, responded to their partners' actions.

A primary aim of the interviews across the three studies was to capture the participants' perceptions of the situations they faced and how they handled these situations. In line with a process research approach (Pettigrew, 1997), data collection was performed in real-time as the projects progressed. This provided opportunities for in-depth scrutiny of events that required coordinating activities and capturing of the involved partners' immediate reactions and views on the benefits and challenges of the interaction processes and means employed. We interviewed many of the interviewees several times.

3.2. Data analysis

The analytical process began by reviewing the raw material and collecting instances and events in which the interviewees themselves recounted episodes and needs of coordinating, as well as events in which needs, means, and practices of such coordinating changed. The analyses focused on what the involved partners actually did to coordinate their interdependent tasks, both in the daily project work and when encountering critical incidents

and unforeseen events. We first created chronological histories of the respective cases, based on the dominant themes and events expressed by the interviewees, in combination with archival material (Miles and Huberman, 1994). We used the chronological stories as analytical tools to conduct the cross-case analysis of how coordinating was performed in the respective projects and how joint action was achieved and how it developed over time. Through this process, we identified several recurrent situations and statements that comprised the first-order concepts. For example, the interviewees talked about situations in which it was unclear who was responsible for a certain task. Other concepts concerned how the project participants coped with challenges; for example, by relying on the contract or more informal talks.

Simultaneously, while developing first-order concepts, which are concepts meaningful to the respondents, we identified linkages among the concepts that lead to second-order themes that represented theoretical concepts at a more abstract level (Nag and Gioia, 2012). We analyzed the findings more deeply in relation to the literature by using the constant comparative method (Glaser and Strauss, 1967) and systematic combining (Dubois and Gadde, 2002). The use of these methods implies an iterative process between the theoretical analysis and data collection, where the empirical findings direct attention to the theoretical analysis and vice versa. Returning to the literature, we found that many of the tools, techniques, and practices employed for coordinating largely resembled mechanisms found in previous literature on coordinating (Grandori and Soda, 1995; Okhuysen and Bechky, 2009), and in the specific project management and construction literature on relational issues (Bresnen and Marshall, 2000; Jones and Lichtenstein, 2008). These included formal mechanisms, ranging from more hierarchical ones (such as the contract and report systems) to lateral mechanisms for facilitating direct interaction (co-location, for example) and informal mechanisms for coordinating, such as the development of personal relationships and trust. The analysis showed that, across the three cases, the involved partners not only used a variety of tools, techniques, and practices (i.e. mechanisms) for coordinating, but also combined and changed them over time. There were also some interesting similarities between the projects in terms of the process in which this happened. For example, we observed that formal, more hierarchical mechanisms, such as the contract, turned out to facilitate lateral communication and sense making. Further, informal mechanisms, such as ad hoc problem solving, were sometimes formalized. Thus, the second-order themes of formal and informal coordinating mechanisms were grouped into an aggregate dimension: "Enacting coordinating mechanisms."

The enactment of different mechanisms for coordinating – that is, the emerging coordinating process – was undoubtedly important for how coordinated outcomes were actually achieved. In-depth analyses also revealed that the partners' successful engagement in the coordinating process helped develop conditions that in turned enabled coordinating. A common feature of the projects was that as the partners engaged in coordinating, they improved their ability to achieve coordinated outcomes, both in terms of identifying coordinating needs, and developing and using appropriate tools, techniques and practices to deal with these needs. Returning again to the literature, this finding complied with Okhuysen and Bechky's (2009) argument that the use of different coordination mechanisms creates integrative conditions for coordinating, which address the demands that people face when engaging in efforts to integrate their interdependent work. Thus, a final step in the analysis was to more closely examine the interplay between ongoing coordinating processes and the emerging conditions for coordinating. By combining the empirical and theoretical insights, we identified six key conditions: alertness, willingness, skills, accountability, predictability, and common understanding. The analysis revealed the relevance of the three conditions previously identified by Okhuysen and Bechky (2009); accountability, predictability and common understanding, but in addition we identified three other conditions; alertness, willingness, and skills, highlighting the more motivational and competence related aspects of coordinating. As we shall see in the below analysis and discussion, these were highly related and influenced each other (Okhuysen and Bechky, 2009). The further analysis and coding process led us to combine these conditions into an aggregated dimension, illustrating that the six condition together could be considered as key (albeit not all-inclusive) constituents of an overall *relational* condition for coordinating, which emerged in these projects. Inspired by Gulati et al. (2012), who relate interfirm coordinating to synchronizing, we termed this condition *synchronized readiness*, which reflects the partners' joint efforts to engage in coordinating activities and align their joint action (Staudenmayer et al., 2002). Thus, synchronized readiness and its six constituents are relational conditions in the sense that they emerged as the partners engaged in coordinating and came to characterize the relationships between the partners in the respective projects. Fig. 1 presents a summary of the analysis and shows the data structure, including first-order concepts and second-order themes and aggregated dimensions.

4. Coordinating in construction projects — three case studies

4.1. The hospital project

The hospital project was the largest land-based construction project in Norway at the time it was undertaken. A temporary, public client organization was established and was comprised of experienced construction people, although none of them had built a hospital before, and the novelty and complexity of the task were highly acknowledged. The project was conducted in two phases, the first of which was based on multiple general contracts. Even if this phase was successful in terms of time and costs, the coordination needs were overwhelming, the conflict levels were high, disputes remained, and people left. "We were told that people didn't like to work here, which was an important driver to do something different" (Client CEO).

Together with a 10% budget cut, the complexity of the project and the dissatisfaction with the first phase led the organization to take an alternative approach in the second phase. Instead of multiple contracts and partners, the new project was assigned to a few large design and build contracts with one building contractor and four specialist contractors. The contract with the building contractor included a partnering agreement with target price,

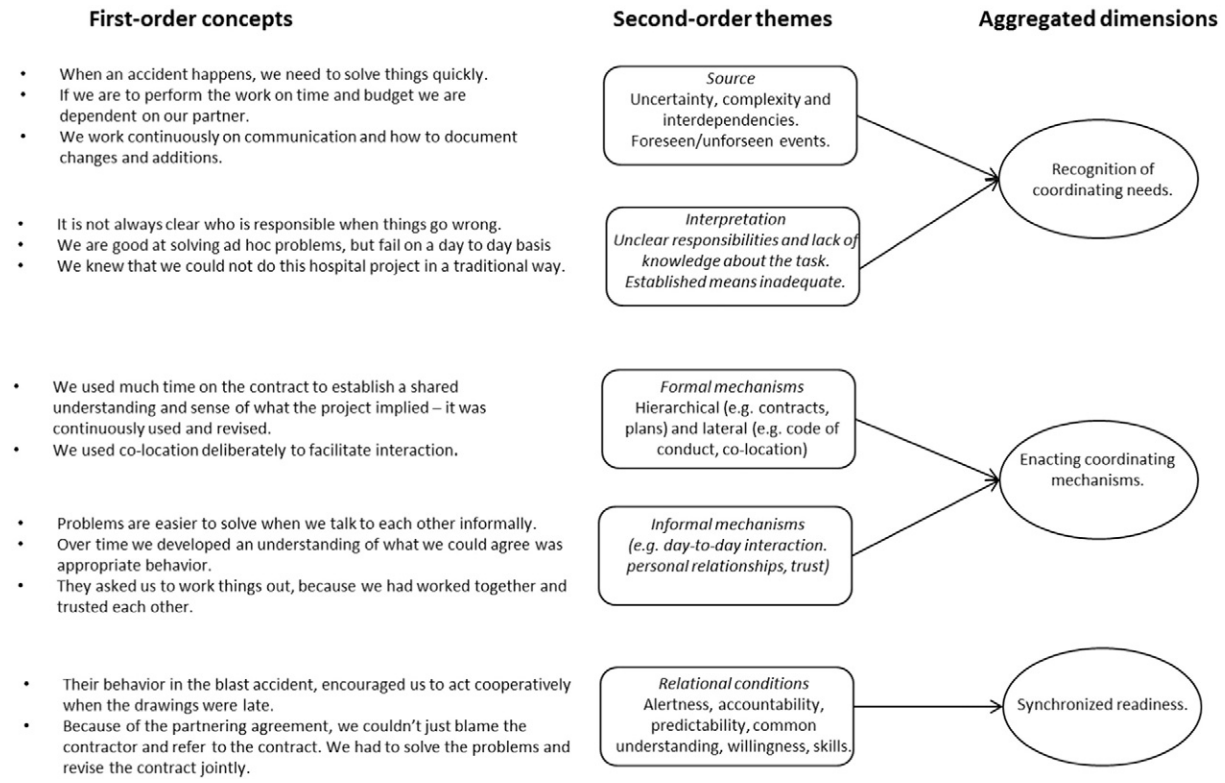

Fig. 1. Data structure.

open book, and shared gains and losses. The client, the design team, and the various contractors sat together for half a year to plan the project before the final signing of the contracts and the start of the actual construction began. They discussed how to solve particularly complex areas that would involve many specialties and interdependencies between them. A chief planner from the building contractor structured the input from the discussions and developed the master plan for the project, which was used by all of the contractors involved.

In addition to the master plan, these joint discussions resulted in the formalization of a common agreement about how to conduct the project and the methods to be used, and the signing of a code of conduct stating a commitment to collaborate. The agreement was placed on the walls in the office building where all managers from the involved partners were co-located. Together with an extensive use of symbols, such as pictures and cartoons, the code of conduct, meeting series, and the colocation were considered very important for facilitating a collaborative atmosphere. "We play the ball in our daily work. Being co-located enables us to pay attention to the small details and watch each other's body language" (Building contractor director). The top managers of the client and the building contractor shared the same office desk, sitting next to each other, which, as they noticed, made it "difficult to send angry e-mails!"

A new organizational structure was established that aligned the levels of responsibilities and communication among the partners. It also focused on local decision making and empowerment of individual workers, which was operationalized by the lean construction method (Ballard and Howell, 2003). People at the same level would communicate and problems had to be solved at the level they occurred. It was acknowledged that "the new way of organizing was painful because it broke down existing structures" (client project manager). Indeed, the organizing was revised several times.

It is evident that the client designed formal structures into the project to deal with coordination needs in an up-front and collaborative manner. The client's project director explained that "culture is something you'll achieve as a result of purposeful work; it cannot be decided. Structure can be decided, and it is the structure and the methods that over time give the culture." Despite these efforts, time delays and budget overruns occurred one year into the project. This triggered a need to revise the plan and, subsequently, the contract with the building contractor. Because of the partnering agreement, the client could not just leave the responsibility to the contractor, as the client would normally do. Rather, it was clearly acknowledged that the problems had to be solved through a joint effort. As the client's project manager put it, "if the other party isn't good, we are not good either. This is an enforced marriage, and we have to learn to live with each other." The project managers from each partner responsible for the revision knew each other well, which was considered essential if the project was to succeed. In the discussions, they went through the project in detail, including the budget, calculations, delivery schedules, procurement agreements, contract, and so forth. The client's project manager noticed that they should have done this much more thoroughly at the beginning of the project, recognizing that "partnering should not be used as an excuse for not establishing a proper contract beforehand!"

The new collaborative delivery model used in the second phase was resource-demanding, and the partners agreed that it required tremendous efforts and severe learning-by-doing. As one of the building contractor's project managers commented, "We fight just as much, but the difference is that with the traditional regime, we played by known rules." Changes were needed throughout the project, including the replacement of managers because of their inability to collaborate, readjustment of the organization model, revision of the contract and readjustment of plans, as well as continuous training of new employees. Nevertheless, the success of the project in terms of time, budget, and quality was attributed to the new collaborative model; a common saying across the different partners was, "we will never go back to where we were."

4.2. The highway project

This project was based on a design-bid-build contract, with the client being the Norwegian Public Roads Administration. The contract and plan were the main mechanisms used in the beginning of the project to coordinate the partners and to reduce uncertainty about who was responsible for which tasks. The contract was a standard type of agreement that both partners were familiar with and that is widely used in the industry. The client and contractor sat together for a short period to develop the plan for project execution before the actual construction work began. During these meetings, roles and responsibilities became clearer. The contract stipulated specific and important deadlines, but the contractor had freedom in terms of planning how to achieve those deadlines. The meetings included discussion regarding these plans, especially in relation to potentially critical operations in the project. The partners agreed that the documentation of agreements was important and agreed to use a common Web system to deal with additions and changes. The partners agreed that these meetings had been useful in terms of getting to know each other and finding a common understanding of how to work together. They also started to understand more about each other's intentions and found that both partners wanted a cooperative relationship.

> In the beginning, we were uncertain about how the relation would work as we often have experienced conflicts with this client in the past. However, as we started to interact more we found that they really made an effort to cooperate and find solutions together with us.
>
> (Contractor manager)

Aside from this joint effort and regular daily joint problem solving on site, parties expected that the contract would be used to solve potential coordination problems. The contract was seen as the key device for determining what had to be done, and by whom. As the client's project manager observed during the project's start-up: "When a problem arises, we all go back to the contract to see if it says something about how this is to be solved and who is responsible" (Client project manager).

However, one incident – a blast accident – threatened the progression and presented a unique challenge for the partners. The partners soon found that the contract itself did not offer a solution regarding how to deal with this unexpected event and new means of coordinating was required. Rather than solving the situation in the traditional way – that is, by referring to the contract and letting the contractor deal with the problems alone – the client team mobilized its own resources by offering their expertise to the contractor about how to quickly restore the power station that had been harmed in the blast accident. The partners engaged in joint problem solving to repair the damage and restore the progression by revising the plans. "When we experienced the blast accident, we found that we needed to interact more closely, and I spent much more time physically at their offices and out in the field compared to what I normally do" (Client manager).

As a result of this successful ad hoc collective action, a formal meeting series was established to deal with upcoming needs and to handle contact with subcontractors, the municipality and the public that had been affected by the temporary closing of the road. The partners recognized the benefits of solving problems together and developed an understanding of the need for other means of coordinating, thereby raising awareness regarding future possible coordination needs. Furthermore, the partners expressed that the handling of the blast accident made the relationship more trusting and they believed that the other would behave cooperatively if something similar would occur at a later time.

Approximately one year into the project, the contractor found that a lot of work had to be re-done due to misspecifications in the design. The contractor decided to be helpful and act cooperatively and, in doing so, showed a willingness to make things work. The individuals from both partners who had the most competence on drawings and design were gathered in a series of meetings to discuss the drawings that would be important for the following weeks. These meetings became a routine that were used for the remainder of the project. Both partners stated that the reason why both sides showed this goodwill was positive previous interactions in which accountability and common understanding had been established.

The use of the contract and plans were important in the early interactions but were complemented by direct interaction and the matching of roles as the partners gained experience with each other. Still, the contract remained important throughout the project period in terms of coordinating.

4.3. The railway project

The Norwegian National Rail Administration executed this project to develop and implement a new railway communication system. The project was based on a design-bid-build contract and was established with rather hierarchical chains of command, temporal pacers, such as milestones and Gantt charts, and a variety of procedures for interaction (such as system design, decision making and progress reporting). These were modified versions of the client organization's standards for project execution. Soon after starting up the project, the project manager suggested that some of the procedures be altered, arguing that

they were overly time-consuming. For example, although the design procedure described a rather sequential way of working, the participants gradually came to work closer and more frequently across the organizations as they experienced that too much design had to be reworked late in the design process because the design team and other stakeholders interpreted the task differently. The process became more iterative and more entities were designed in parallel than had initially been planned. Over time, a more general shift in the interaction pattern was observed, from being formal and rather distant in the beginning of the project to more informal and increasing in frequency. The participants would "call each other more often just to clarify matters, or just sit together and talk it through" (site construction manager). Still, the classical hierarchical regime for reporting and controlling quality and work progress with monthly reports, weekly follow-up on planned activity, and physical quality checks of production remained important for coordinating activities.

Approximately one year into the project, the contractors fell behind in their deliveries and the client intensified this control and asked for more detailed evidence of work produced. As the key contractor continued to fail with the deliveries, the client demanded a change in several positions in this contractor's organization, including the project manager's role. Along with the new people taking on key roles in the contractor's organizations, the project managers in the client organization and the key contractor decided to sit together with the core teams for two days and revise the plans and schedules:

> Time was running out and we really need to develop a common understanding of what the deliveries were and when they had to be in place. Things we thought were clear and decided upon appeared blurry when we talked about what we (that is, the project) had done or should do. We just didn't have time to live with this uncertainty and all the different ways of doing things.
>
> (Client project manager)

The conflict level had increased when the control was intensified and the demand for shifting crew was maintained, but the shift in key positions and joint rework of plans boosted the project: "I think we figured it out – how to work together" (site manager). Through this joint re-planning, the client detected that the complexity of the project created major challenges for the key contractor's planning process. Therefore, for more than six months, the project planner and other project members from the client organization were located at the key contractors' office for about half of the workweek, where they engaged in joint planning sessions.

Gradually, several levels of the project worked in a more integrated manner than the initial project design had laid out, including joint sessions for planning work among the different contractors and sub-teams involving members from the different partners in the project, such as the health, environment, and safety team and different task forces. The more integrated work environment that emerged meant the partners would meet informally more often. This allowed for more immediate responses to upcoming coordination needs. The client project manager reflected on how the process developed:

> The process just became like that, as one of us, either one of the sub-contractors, myself – or one of the team members – said that "we just need to get this done." It made us solve problems quicker. Sometimes there were single initiatives, but many of them became more durable solutions.
>
> (Client project manager)

Along with the integrated way of working, the client's top management specified a code of conduct regarding problem solving. The code of conduct, which all of the contractors agreed upon, stated that problems should mainly be solved at the level they emerged at and problem solving should be given high priority to avoid delays in the project progress. The emerging common understanding and decentralization of the problem solving seemed to enhance the willingness to engage in coordination activities at different levels. It created more goodwill and "acknowledgement by all partners of being in it together" (contract manager).

Throughout the project execution, the contract remained a very important premise provider for the collaboration. There were extensive dialogues about how the complexity of the interfaces and the technological uncertainty should be understood in terms of the contract, as well as how the contract could reflect new insights and the more collaborative form of working.

> The novelty of the system and a need for more user involvement encouraged us to work more closely to find out what this was all about. We worked continuously with interpreting the contract — how it could best be understood. We discussed things like what should actually be delivered, how should and could the delivery pace be, and how should deliveries be rewarded.
>
> (Contract manager)

In this project, the contract enabled collaboration by laying out the means of control, but most notably it was a sense-making tool, enabling communication that subsequently enabled a common understanding of deliveries and the interfaces between actors and activities.

5. Analysis and discussion

The above descriptions illustrate how the partners in the three construction projects engaged in coordinating activities and achieved coordinated outcomes. By using a practice lens, the following analysis and discussion highlight two main issues. The first concerns how coordinating in construction projects is a bottom-up and emergent process. This process includes both how coordination needs are dealt with by the use of established means for coordinating, as well how coordination needs trigger the emergence of new ways of coordinating, illustrating the dynamic nature of coordinating processes. The second issue concerns how relational conditions that enable interfirm coordinating develop through the ongoing efforts partners make to cope with coordination challenges.

5.1. Dynamic use of formal and informal coordinating mechanisms

The findings illustrate the dynamic nature of interfirm coordinating and how it is a bottom-up and emergent process. The projects' partners developed local patterns of coordinating through a learning process in which they enacted established, and often more formal and hierarchical means for coordinating, while also exploring informal means. The explorative use of coordinating mechanisms was often triggered by the particular coordination challenges the partners faced.

The literature on coordination has identified various mechanisms that enable actors to coordinate interdependent tasks (Grandori, 1997; Okhuysen and Bechky, 2009; Van de Ven and Walker, 1984). However, less is known about what people do with these mechanisms as they interact and how the coordinating process unfolds over time (Bresnen and Marshall, 2002; Jarzabkowski et al., 2012; Sage et al., 2012). The three projects were designed to coordinate the partners and their interdependent tasks and activities in different ways, largely depending on the types and intensity of the interdependencies involved (Grandori, 1997; Van de Ven and Walker, 1984). Yet what mattered was how they acted at the base of this design and gave it meaningful content within the context in which they found themselves.

The findings show that the partners used different tools, techniques, and practices to meet their coordination needs, such as contracts, plans, codes of conduct, standardization, roles, direct interaction, incentives, and artifacts and symbols. In line with previous coordination literature, we found that planning and predefined roles were used to deal with needs related to coordinating more sequential interdependencies between the partners, while interdependencies that required collective action were handled by interaction and alignment between the partners (Grandori, 1997; Thompson, 1967). However, the practice lens enabled exploration of how coordinating changed over time and how the use of different coordinating mechanisms were shaped by the partners' ongoing engagement to meet coordinating needs (Jarzabkowski et al., 2012), particularly in situations where coordinating gaps occurred and the required coordinating could not be achieved by the established means (Gerwin, 2004). For example, contracts, plans, and roles, which might be seen as formal ways of coordinating, were used both in the highway and communication system projects in a much more informal manner as the relationships developed and as the partners openly discussed and tried to make sense of the contracts and plans. Furthermore, informal means of coordinating were formalized over time once they had been seen as useful. The co-location in the hospital project is an example of how direct interaction was formalized into a structure. In the highway project, the informal meetings that were conducted as a solution to the blast accident were formalized as a meeting series when the partners experienced difficulties with drawings. Thus, our findings correspond with those scholars who have found that new project practices emerge as people coordinate in new ways (Bresnen, 2009, 2010; Cicmil et al., 2006; Harty and Whyte, 2010; Sage et al., 2012) and that information has to cross and be translated from the formal to the informal, and vice versa (Jacobsson, 2011). This illustrates that pre-specified project management design evolves as partners give social meaning to the structures through interaction.

An important implication of this finding is that the ability of partners to be flexible in the way they use and combine coordinating mechanisms will be especially important in construction projects, as unforeseen challenges are bound to occur (Jacobsson, 2011). Even in projects that are considered less complex in terms of interdependencies between the partners, such as the Highway project in our study, incidents might occur that require alternative coordinating mechanisms and flexible use of established means. Furthermore, acknowledging coordinating in construction projects as a dynamic process between project partners is interesting with regard to the interplay between project and organizational processes (Brady and Davies, 2004; Gann and Salter, 2000; Grabher, 2002; Hobday, 2000; Melkonian and Picq, 2011). The present study demonstrates the importance of organizational-level structures, such as the use of a formalized contract for coordinating. At the same time, however, it shows that the achievement of coordinated outcomes is dependent on the ability to combine the contract with emerging ways of coordinating. The importance of considering both structure and process has been advocated before (Bjørkeng et al., 2009; Bresnen et al., 2004, 2005; Cicmil and Marshall, 2005; Cicmil et al., 2006; Clegg et al., 2002; Hartmann and Bresnen, 2011; Jacobsson, 2011; Sage et al., 2012). However, few empirical studies have shown how this process unfolds.

The finding also highlights the importance of relational competence, which Pauget and Wald (2013) argued is more important than actual roles and positions to promote coordination in construction projects. For example in the highway project, we saw that the trusting relationship that developed between the partners made them more willing to try new things and contribute to coordinating. Developing an embedded understanding of which is the efficient response to various coordinating needs is an emergent learning process (Ahern et al., 2014) and often involves improvisation with coordination mechanisms (Gulati et al., 2012) and the negotiation of coordination arrangements (de Rond and Bouchikhi, 2004). This improvisation may be triggered in periods of uncertainty (Smits and van Marrewijk, 2012), and when activities are unpredictable (Grandori, 1997). In the railway project, for instance, because time was running out and the established means of coordinating were seen as very time-consuming, the partners were forced to reflect on their practices and to negotiate about new practices. In other words, as both the highway project and the hospital projects showed, sometimes "problems are good."

5.2. Relational conditions enabling interfirm coordinating

The second main issue concerns how the partners in the respective projects, as they engaged in coordinating activities over time, created conditions that enabled them to achieve coordinated outcomes. As Okhuysen and Bechky (2009) notice, the interesting issue about coordination and coordination mechanisms is what the mechanisms actually accomplish. The findings show that as the partners in the projects were

engaging in coordinating, they became more alert towards coordinating needs, recognizing the needs as they occurred and also making effort to meet these needs. These findings comply with Jarzabkowski et al. (2012), who identified awareness of coordinating needs as a basis for changes in coordinating mechanisms. Thus, one condition emerging in these projects is *alertness*. Furthermore, through engagement in coordinating activities, it became increasingly clear to the project partners that in order to solve many of the tasks, they had to share the responsibilities and jointly decide upon the tasks to be undertaken. This, in turn, both influenced and was influenced by a common understanding of the needs and how to handle them. In other words, they gradually developed a common understanding of how they, in their particular context, could meet the coordinating challenges that arose, and of which party would be accountable in which circumstances. Again, this increased the level of predictability in the coordinating. As such, *accountability*, *predictability*, and *common understanding*, as pointed to by Okhuysen and Bechky (2009), developed and comprised important conditions in these projects. Finally, as the partners experienced the benefits of new ways of solving the coordinating needs, it seemed as if they became increasingly more willing to engage in such joint coordinating efforts and also improved their ability to do so. Thus, we found that *willingness* and *skills* were important conditions emerging in these projects.

The six conditions are highly relational and came to characterize the projects and the relationships among the project partners. Across the cases, we observed how the partners were increasingly willing to invest in the relationships (Gerwin, 2004; Gulati et al., 2012; Larson, 1992) as the quality of the collaboration improved and the partners experienced what it takes to achieve coordinated outcomes. We might say that along with the relational conditions, trust developed, as we saw in the highway project, where reciprocity in actions and goodwill were seen (Gerwin, 2004; Swärd, forthcoming). The trusting relations led to more openness and exchange of information that enabled successful coordination (Kadefors, 2004; Kale et al., 2000; Uzzi, 1997). As the partners came to trust each other, they also became more willing to find solutions to the coordinating challenges (Gulati et al., 2012), such as when facing the blast accident. The increased willingness to engage in coordinating, and to do so in a flexible manner, was also seen in the two other projects. For example in the hospital project, commitment between the partners enabled a smoother renegotiation of the contract (Ring and van de Ven, 1994). In the railway project, the flexible use of the contract and the flexibility of the procedures and practices for the system design confirm Zollo et al.'s (2002) argument that commitment and trust can foster the will to negotiate and use formal coordination means more flexibly.

The findings show that the relational conditions form a positive spiral in terms of reinforcing one another, and together they can be seen to form an overall relational condition of *synchronized readiness*. This resembles Gulati et al.'s (2012) theoretical discussion of how cooperation and coordination effects can form a positive spiral comprised of positive reinforcing loops that can create synergies over time. As shown in Fig. 2, synchronized readiness is constituted by alertness, accountability, predictability, common understanding willingness and skills, and seems to be boosted in situations where the collaboration between partners is challenged, such as when the partners in the railway project choose to solve the blast accident by showing benevolence to and trust in each other. In this way, synchronized readiness incorporates the argument of Gulati et al. (2012) that collaboration depends on both the intention to collaborate (that is, cooperation) and the effective synchronization, alignment, and adjustment of tasks (that is, coordination).

The figure illustrates that a coordination need can trigger the enactment of coordinating mechanisms. The blast accident in the highway project is an example of a coordinating need that was not foreseen. In this case, the partners' recognition and interpretation of coordination need (1) led to the understanding that the contract and plans were insufficient to deal with the situation effectively. The contract had been useful for coordinating at the start of the project because it outlined responsibilities and, as such, gave predictability in terms of who was accountable for which operations and decisions. However, after the blast accident it was not clear what to do and the client acknowledged that a joint effort was required in order to handle the challenge effectively. Thus, the partners engaged in an intense interaction process in which both the contract and direct interaction were used and made sense of (2). They acknowledged that only using the contract was not an effective way of coordinating in this situation, and therefore a new way of coordinating developed in which they interacted more frequently. As they learned about each other's competencies and willingness to cooperate, trust developed between the partners. The frequent communication was seen as an effective way to solve problems and was used when other coordinating challenges occurred (3). It appears that engaging in these coordinating activities over time resulted in synchronized readiness (4). The partners became more alert to future coordination needs, and accountability and predictability were created in terms of the partners acknowledging that many of the future coordination needs would require joint efforts. They developed a common understanding of how they could solve tasks together by using appropriate mechanisms. In the highway project, for example, synchronized readiness enabled the partners to more effectively deal with the coordination needs that resulted from the delay of drawings; this way of coordinating was formalized into a meeting series. This was a dynamic and cyclical process, as illustrated at the bottom of Fig. 2.

Similar patterns were found in the other two case studies. In the hospital project, the coordinating needs were recognized from the beginning (1), as this was a complex project in which the large sets of partners were unfamiliar with the task at hand. Coordinating mechanisms allowing for close interaction were incorporated into the project from the start, and it was clearly acknowledged that close interaction and joint problem solving were key in this project. The project partners combined various ways of coordinating, including joint agreements, planning

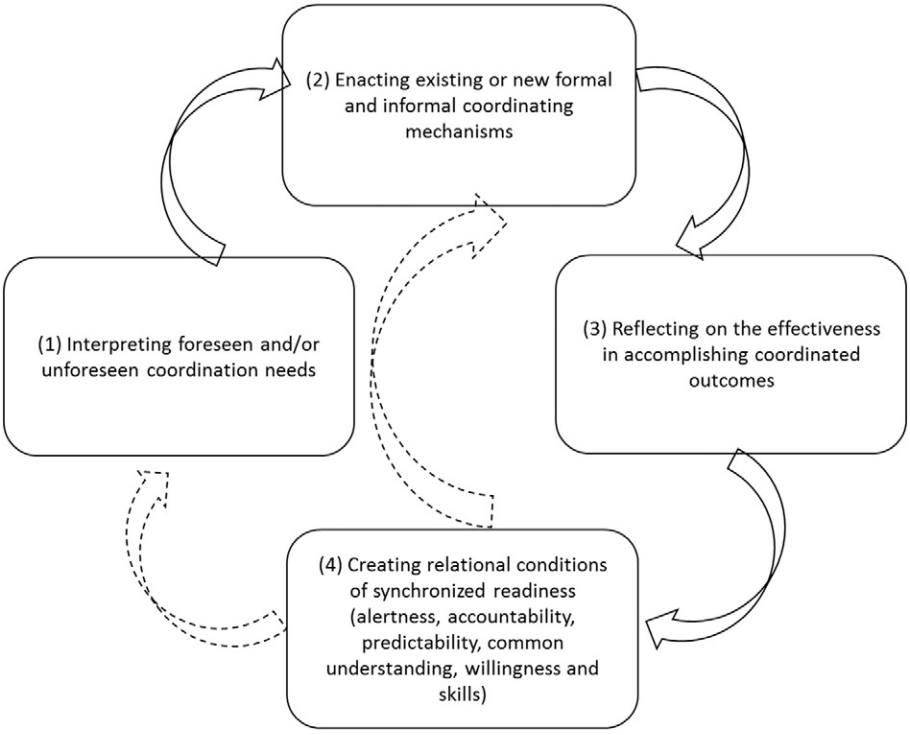

Fig. 2. Coordinating in construction projects.

with formal organizational structures, the alignment of the levels of responsibilities, communication lines between the actors, and colocation (2). The formalization and deliberate use of close interaction (3) early in the project enabled coordinated outcomes (4) and indicates that synchronized readiness also emerged early in this project. When the project then ran into trouble due to time delays and budget overruns, the subsequent coordinating needs were more effectively dealt with and the joint coordinated outcomes were achieved as a result of synchronized readiness being created. Several challenges and issues were not easily solved throughout this project. Nevertheless, the partners agreed that the efforts and means that had been established early on were key means to deal effectively with the many coordination needs that occurred throughout the project.

Finally, at the beginning of the railway project, the partners largely relied on role descriptions and contracts enabling accountability, and planning regimes provided predictability in the project. However, the partners soon found that a lot of work had to be redone because of different interpretations of tasks, and they realized that they needed new means of coordinating (1). The interaction patterns became more informal over time while the hierarchical regime for reporting and controlling remained (2). When one contractor fell behind on deliveries, the client initiated a two-day workshop to revise plans and schedules. In addition, key staff from the client organization were co-located and worked jointly with the subcontractor (3). This soon became a way of working together, as they found it to be very useful for achieving coordinated outcomes. Gradually, several levels of the project worked in a similar way, raising a common understanding and learning that they solved tasks more quickly through frequent interactions. People were more willing to coordinate in new ways, and they developed skills regarding how to coordinate in different situations and became more alert to ongoing coordination needs. As such, synchronized readiness also emerged in this project (4), enabling the partners to more effectively deal with upcoming coordination needs.

In sum, the above analysis and discussion show that as the partners engaged in coordinating activities and learned about the effectiveness of different tools, techniques, and practices for achieving coordinated outcomes, they developed a common understanding, willingness, skills, and alertness to upcoming challenges. Predictability and accountability were no longer associated solely with formal ways of coordinating and instead became connected to the understanding of how the partners responded to occurring coordination needs and who was accountable in the specific situations. However, the process by which this happened differed across the projects. From the beginning, the partners in the hospital project recognized the need for new ways of coordinating and designed these it into the project. However, this recognition was more of an emergent process in the two other projects and was based on unforeseen needs. Nevertheless, despite the process being different and the fact that several coordinating efforts were not particularly successful, the coordinating efforts in all three projects resulted in the relational condition of synchronized readiness. The concept of synchronized readiness owes much to the integrative conditions identified by Okhuysen and Bechky (2009). However, compared with the theoretical discussion offered by

these authors, the present paper shows empirically how this relational condition for coordinating in construction projects emerges. Our conceptualization aligns with previous process models where coordinating is seen as continuously recreated as participants experience and orient towards absence of coordinating (Jarzabkowski et al., 2012). However, it moves further in conceptualizing how coordinated outcomes can be achieved by emphasizing the relational conditions that emerge as actors engage in the process of coordinating. These conditions address the demands that the partners face when engaging in the joint efforts to integrate their interdependent work (Okhuysen and Bechky, 2009), and therefore enable future coordinating.

Taking a practice-based and dynamic view on coordinating makes it possible to gain insight into the micro-processes of coordinating (Jarzabkowski et al., 2012), and also offers insight into how coordinating is an emergent and self-organizing process triggered by coordinating needs. This view also sheds light on how coordinating is contingent on relational conditions and shows empirically how cooperation and coordination are two concepts that cannot be easily separated (Gulati et al., 2012). This also means that synchronized readiness evolves continuously as the project partners negotiate coordination needs and ways to deal with them. Therefore, the elements of synchronized readiness must be re-established for every project because each project involves new relationships. Moreover, as relationships and contextual contingencies are continuously changing throughout the project, synchronized readiness – and its constituents – must constantly be worked on and are always developing (Okhuysen and Bechky, 2009).

6. Conclusion

The research presented in this paper shows how inter-firm partners enact different formal and informal tools, techniques, and practices in their efforts to cope with the coordinating challenges they face. We have discussed the bottom-up and emergent nature that a coordinating process can take, and the fact that engagement in coordinating processes can lead to the development of a relational condition – synchronized readiness –that enables the effective accomplishment of coordinated outcomes.

All construction projects involve complex social processes (Cicmil et al., 2006) and our findings offer two important implications for managers. First, they suggest that lateral and more informal means are highly relevant for achieving coordinated outcomes in construction projects, even in projects that are at the off-set considered less complex and characterized mainly by sequential interdependencies. Unforeseen coordination challenges are bound to occur in these projects (Jacobsson, 2011), requiring collective action (Grandori, 1997) and mutual adjustment (Thompson, 1967). Furthermore, the study shows that these mechanisms can be designed into a project, as a structural intervention, in combination with more formalized and often hierarchical means. However, managers and other project participants should be conscious of the fact that what really matters is how coordination mechanisms are used (Jarzabkowski et al., 2012). Thus, structural interventions must be accompanied by an acknowledgement of the various underlying factors influencing the actual coordinating process (Cicmil and Marshall, 2005). Second, the concept of synchronized readiness can help raise managers' awareness of the importance of letting coordinating emerge at the project level and of the fact that it may be fruitful to encourage flexibility in the use of more established mechanisms for coordinating. Furthermore, managers of inter-firm project collaborations should encourage efforts to develop relationship characteristics among the partners that can help off-set the positive spiral in which cooperation and coordination processes reinforce one another (Gulati et al., 2012).

A limitation of our study is that the findings may be relevant only to the construction industry. However, the findings are likely to be relevant for other industries where project-based organizing is common. Future research should continue to delve into the complex processes of coordinating in other interfirm settings, focusing particularly on what differentiates coordinating across firm boundaries, and on intrafirm coordinating (Grandori, 1997). Such research is important in order to move the field forward and to close the gap between the models and methods offered by the literature and what is actually experienced by people working in projects (Cicmil et al., 2006).

Conflict of interest

There is no conflict of interest.

References

Ahern, T., Leavy, B., Byrne, P.J., 2014. Complex project management as complex problem solving: a distributed knowledge management perspective. Int. J. Proj. Manag. 32 (8), 1371–1381.

Ballard, G., Howell, G.A., 2003. Lean project management. Build. Res. Inf. 31 (1), 1–15.

Bjørkeng, K., Clegg, S., Pitsis, T., 2009. Becoming a practice. Manag. Learn. 40 (2), 145–159.

Blomquist, T., Hällgren, M., Nilsson, A., Söderholm, A., 2010. Project−as−practice. In search of project management research that matters. Proj. Manag. J. 41 (1), 5–16.

Brady, T., Davies, A., 2004. Building project capabilities: from exploratory to exploitative learning. Organ. Stud. 25 (9), 1601–1621.

Bresnen, M., 1990. Organising Construction. Routledge, London.

Bresnen, M., 2009. Living the dream? Understanding partnering as emergent practice. Constr. Manag. Econ. 27 (10), 923–933.

Bresnen, M., 2010. Keeping it real? Constituting partnering through boundary objects. Constr. Manag. Econ. 28 (6), 615–628.

Bresnen, M., Marshall, N., 2000. Partnering in construction: a critical review of issues, problems and dilemmas. Constr. Manag. Econ. 18 (2), 229–237.

Bresnen, M., Marshall, N., 2002. The engineering or evolution of cooperation? A tale of two partnering projects. Int. J. Proj. Manag. 20 (7), 497–505.

Bresnen, M., Goussevskaia, A., Swan, J., 2004. Embedding new management knowledge in project−based organizations. Organ. Stud. 25 (9), 1535–1555.

Bresnen, M., Goussevskaia, A., Swan, J., 2005. Implementing change in construction project organizations: exploring the interplay between structure and agency. Build. Res. Inf. 33 (6), 547–560.

Bygballe, L.E., Jahre, M., Swärd, A., 2010. Partnering relationships in construction: a literature review. J. Purch. Supply Manag. 16 (4), 239–254.

Bygballe, L.E., Dewulf, G., Levitt, R.E., 2015. The interplay between formal and informal contracting in integrated project delivery. Eng. Proj. Organ. J. 5 (1), 22–35.

Cicmil, S., Hodgson, D., 2006. Making Projects Critical: An Introduction. In: Cicmil, S., Hodgson, D. (Eds.), Making Projects Critical. Palgrave Macmillian, New York.
Cicmil, S., Marshall, D., 2005. Insights into collaboration at the project level: complexity, social interaction and procurement mechanisms. Build. Res. Inf. 33 (6), 523–535.
Cicmil, S., Williams, T., Thomas, J., Hodgson, D., 2006. Rethinking project management: researching the actuality of projects. Int. J. Proj. Manag. 24 (8), 675–686.
Clegg, S.R., Pitsis, T.S., Rura-Polly, T., Mossezeky, M., 2002. Governmentality matters: designing an alliance culture in inter-organizational collaboration for managing projects. Organ. Stud. 23 (3), 317–337.
Dahlgren, J., Söderlund, J., 2001. Managing inter-firm industrial projects — on pacing and matching hierarchies. Int. Bus. Rev. 10, 305–322.
De Rond, M., Bouchikhi, H., 2004. Dialectics of strategic alliances. Organ. Sci. 15 (1), 56–69.
Dewulf, G., Kadefors, A., 2012. Collaboration in public construction—contractual incentives, partnering schemes and trust. Eng. Proj. Organ. J. 2 (4), 240–250.
Dubois, A., Gadde, L.-E., 2002. Systematic combining: an abductive approach to case research. J. Bus. Res. 55 (7), 553–560.
Eisenhardt, K.M., Graebner, M.E., 2007. Theory building from cases: opportunities and challenges. Acad. Manag. J. 50 (1), 25–32.
Engwall, M., 2003. No project is an island. Linking projects to history and context. Res. Policy 32 (5), 789–808.
Feldman, M.S., Orlikowski, W.J., 2011. Theorizing practice and practicing theory. Organ. Sci. 22 (5), 1240–1253.
Gann, D., Salter, A.J., 2000. Innovation in project-based, service-enhanced firms: the construction of complex products and systems. Res. Policy 29 (7), 955–972.
Gerwin, D., 2004. Coordinating new product development in strategic alliances. Acad. Manag. Rev. 29 (2), 241–257.
Gittel, J.H., 2016. Transforming Relationships for High Performance: the Power of Relational Coordination. Stanford University Press, Palo Alto, CA (forthcoming).
Glaser, B.G., Strauss, A.L., 1967. The Discovery of Grounded Theory: Strategies for Qualitative Research. Aldine de Gruyter, New York.
Grabher, G., 2002. Cool projects, boring institutions: temporary collaboration in social context. Reg. Stud. 36 (3), 205–214.
Grandori, A., 1997. An organization assessment of interfirm coordination modes. Organ. Stud. 18 (6), 897–925.
Grandori, A., Soda, G., 1995. Inter-firm networks: antecedents, mechanisms and forms. Organ. Stud. 16 (2), 183–202.
Gulati, R., Wohlgezogen, F., Whelyazkov, P., 2012. The two facets of collaboration: cooperation and coordination in strategic alliances. Acad. Manag. Ann. 6 (1), 531–583.
Hällegren, M., Söderholm, A., 2011. Projects-As-Practice: New Approach, New Insights. Handbook of Project Management. Oxford University Press.
Hartmann, A., Bresnen, M., 2011. The emergence of partnering in construction practice: an activity theory perspective. Eng. Proj. Organ. J. 1 (1), 41–52.
Harty, C., Whyte, J., 2010. Emerging hybrid practices in construction design work: role of mixed media. J. Constr. Eng. Manag. 136 (4), 468–476.
Hobday, M., 2000. The project-based organisation: an ideal form for managing complex products and systems? Res. Policy 29 (7–8), 871–893.
Hui, P.H., Davis-Blake, A., Broschak, J.P., 2008. Managing interdependence: the effects of outsourcing structure on the performance of complex projects. Decis. Sci. 39 (1), 5–31.
Jacobsson, M., 2011. On the importance of liaisons for coordination of projects. Int. J. Manag. Proj. Bus. 4 (1), 64–81.
Jacobsson, M., Linderoth, H.C.J., 2010. The influence of contextual elements, actors' frame of reference and technology on the adoption and use of ICT in construction projects: a Swedish case study. Constr. Manag. Econ. 28 (1), 13–23.
Jarzabkowski, P.A., Lê, J.K., Feldman, M.S., 2012. Toward a theory of coordinating: creating coordination mechanisms in practice. Organ. Sci. 23 (4), 907–927.
Jha, K.N., Iyer, K.C., 2006. Critical determinants of project coordination. Int. J. Proj. Manag. 24 (4), 314–322.
Jha, K.N., Iyer, K.C., 2007. Commitment, coordination, competence and the iron triangle. Int. J. Proj. Manag. 25 (5), 527–540.
Jones, C., Lichtenstein, B., 2008. Temporary Inter-Organizational Projects. How Temporal Embeddedness Enhances Coordination and Manage Uncertainty. The Oxford Handbook of Inter-Organizational Relations. Oxford University Press, London.
Kadefors, A., 2004. Trust in project relationships — inside the black box. Int. J. Proj. Manag. 22 (3), 175–182.
Kale, P., Singh, H., Perlmutter, H., 2000. Learning and protection of proprietary assets in strategic alliances: building relational capital. Strateg. Manag. J. 21 (3), 217–237.
Kokkonen, A., Alin, P., 2015. Practice-based learning in construction projects: a literature review. Constr. Manag. Econ. 33 (7), 513–530.
Kreiner, K., 1992. The postmodern epoch of organization theory. Int. Stud. Manag. Organ. 22 (2), 37–52.
Kreiner, K., 1995. In search of relevance: project management in drifting environments. Scand. J. Manag. 11 (4), 335–346.
Langley, A., 1999. Strategies for theorizing from process data. Acad. Manag. Rev. 24 (4), 691–710.
Langley, A., Smallman, C., Tsoukas, H., Van de Ven, A.H., 2013. Process studies of change in organization and management: unveiling temporality, activity, and flow. Acad. Manag. J. 56 (1), 1–13.
Larson, A., 1992. Network dyads in entrepreneurial settings: a study of the governance of exchange relationships. Adm. Sci. Q. 37 (1), 76–104.
Melkonian, T., Picq, T., 2011. Building project capabilities in PBOs: lessons from the French special forces. Int. J. Proj. Manag. 29 (4), 455–467.
Miles, M.B., Huberman, A.M., 1994. Qualitative Data Analysis. Sage Publications, Thousand Oaks, CA.
Nag, R., Gioia, D.A., 2012. From common to uncommon knowledge: foundations of firm-specific use of knowledge as a resource. Acad. Manag. J. 55 (2), 421–457.
Okhuysen, G.A., Bechky, B.A., 2009. Coordination in organizations. Acad. Manag. Ann. 3 (1), 463–502.
Orlikowski, W.J., 2007. Socio-material practices: exploring technology at work. Organ. Stud. 28 (9), 1435–1448.
Pauget, B., Wald, A., 2013. Relational competence in complex temporary organizations: the case of a French hospital construction network. Int. J. Proj. Manag. 31 (2), 200–211.
Pettigrew, A.M., 1997. What is a processual analysis? Scand. J. Manag. 13 (4), 337–348.
Rahman, M.M., Kumaraswamy, M.M., 2004. Potential for implementing relational contracting and joint risk management. J. Manag. Eng. 20 (4), 178–189.
Ring, P.S., Van de Ven, A.H., 1994. Developmental processes of cooperative interorganizational relationships. Acad. Manag. Rev. 19 (1), 90–118.
Sage, D., Dainty, A., Brookes, N., 2010. A consideration of reflexive practice within the critical project movement. Int. J. Proj. Manag. 28 (6), 539–546.
Sage, D., Dainty, A., Brookes, N., 2012. A "strategy-as-practice" exploration of lean construction strategizing. Build. Res. Inf. 40 (2), 221–230.
Sage, D., Dainty, A., Brookes, N., 2013. Thinking the ontological politics of managerial and critical performatives: an examination of project failure. Scand. J. Manag. 29 (3), 282–291.
Smits, K., van Marrewijk, A., 2012. Chaperoning: practices of collaboration in the Panama Canal expansion program. Int. J. Manag. Proj. Bus. 5 (3), 440–456.
Söderlund, J., 2011. Pluralism in project management: navigating the crossroads of specialization and fragmentation. Int. J. Manag. Rev. 13 (2), 153–176.
Söderlund, J., Vaagaasar, A.L., Andersen, E.S., 2008. Relating, reflecting and routinizing: developing project competence in cooperation with others. Int. J. Proj. Manag. 26 (5), 517–526.
Stinchcombe, A.L., 1985. Contracts as Hierarchical Documents. In: Stinchcombe, A.L., Heimer, C. (Eds.), Organizational Theory and Project Management. Universitetsforlaget, Bergen, Norway.
Staudenmayer, N., Tyre, M., Perlow, L., 2002. Time to change: temporal shifts as enablers of organizational change. Organ. Sci. 13 (5), 583–597.
Swärd, A.R.S., 2016. Trust, reciprocity, and actions: the development of trust in temporary inter-organizational relations. Organ. Stud. (forthcoming).
Sydow, J., Staber, U., 2002. The institutional embeddedness of project networks: the case of content production in German television. Reg. Stud. 36 (3), 215–227.
Thompson, J.D., 1967. Organization in Action. McGraw-Hill, NY.

Tryggestad, K., Georg, S., Hernes, T., 2010. Constructing buildings and design ambitions. Constr. Manag. Econ. 28 (6), 695–705.

Uzzi, B., 1997. Social structure and competition in interfirm networks: the paradoxes of embeddedness. Adm. Sci. Q. 42 (1), 35–67.

Vaagaasar, A.L., 2011. Development of relationships and relationship competencies in complex projects. Int. J. Manag. Proj. Bus. 4 (2), 294–307.

Van de Ven, A.H., Walker, G., 1984. The dynamics of interorganizational coordination. Acad. Sci. Q. 29 (4), 598–621.

Van Marrewijk, A., Clegg, S.R., Pitsis, T.S., Veenswijk, M., 2008. Managing public–private megaprojects: paradoxes, complexity, and project design. Int. J. Proj. Manag. 26 (6), 591–600.

Whyte, J., Lobo, S., 2010. Coordination and control in project-based work: digital objects and infrastructures for delivery. Constr. Manag. Econ. 28 (6), 557–567.

Winch, G.M., 1989. The construction firm and the construction project: a transaction cost approach. Constr. Manag. Econ. 7 (4), 331–345.

Winter, M., Smith, C., Morris, P., Cicmil, S., 2006. Directions for future research in project management. The main findings of a UK government–funded research project. Int. J. Proj. Manag. 24 (8), 638–649.

Yin, R.K., 2009. Case Study Research: Design and Methods. Sage Publishing, Thousand Oaks, CA.

Zollo, M., Reuer, J.J., Singh, H., 2002. Interorganizational routines and performance in strategic alliances. Organ. Sci. 13 (6), 701–713.