

PROMOTING PROJECT TEAM COORDINATION IN REPETITIVE PROJECTS

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Abstract: Interdependencies within and between project teams and changes occurring throughout a project's lifecycle create a need for project team coordination. The existing research on project team coordination has mostly focused on large or innovative projects. In addition, the existing research has focused mostly on the ways project team coordination takes place in different projects, with less focus on how beneficial circumstances for coordination are created or promoted. This study contributes to these knowledge gaps by studying how a standardized project management methodology introduced by a parent organization can promote project team coordination in repetitive projects. An embedded single-case study design with qualitative interview-based data collection was followed. The case firm introduced a management framework in its service centers to promote project team coordination in repetitive maintenance projects. The interviewees perceived improvements in communication, visibility of project and portfolio status information, and information sharing. The improvements were enabled by two coordination mechanisms of the management framework: regular meetings and visual whiteboards. The perceived improvements were considered beneficial for project team coordination, both within and between project teams.

1. Introduction

Teamwork is an established form of work in all organizations, including project teams (Chiocchio & Hobbs, 2014). Teamwork is beneficial for myriad reasons, but mainly because teams tend to outperform individuals acting alone (Baiden & Price, 2011). However, in teamwork, the division of work between team members or between multiple teams creates interdependencies (Hoegl, Weinkauff, & Gemuenden, 2004). This division of work and its consequent interdependencies, combined with possible changes occurring throughout the project, create the need for coordination between various teams and team members (Galbraith, 1973; Hoegl et al., 2004). Here, coordination is defined as “integrating or linking together different parts of an organization to accomplish a collective set of tasks” (Van de Ven, Delbecq, & Koenig Jr., 1976, p. 322). This article focuses on coordination in projects, especially in and between project teams (i.e., project team coordination). The earlier literature has discussed project team coordination as one element of teamwork quality (Hoegl & Gemünden, 2001; Hoegl et al., 2004), emphasized the multi-mechanism (Dietrich, Kujala, & Artto, 2013) and dynamic (Dingsøy, Moe, & Seim, 2018; Dingsøy, Rolland, Moe, & Seim, 2017; Gkeredakis, 2014) nature of project team coordination, and demonstrated a positive relationship between project team coordination and project performance (Hoegl et al., 2004; Nidumolu, 1995), for example. Regarding context, the existing empirical research on project team coordination is dominated by large-scale and/or innovative projects (Bick, Spohrer, Hoda, Scheerer, & Heinzl, 2018; Dietrich et al., 2013; Dingsøy et al., 2018, 2017; Espinosa, Slaughter, Kraut, & Herbsleb, 2007; Gkeredakis, 2014; Hoegl et al., 2004). However, not all projects are complex and/or large in scale, and the findings covering project team coordination in highly innovative projects might not apply in less innovative projects (i.e., projects with lower levels of complexity and uncertainty) (Hoegl, Praveen Parboteeah, & Gemuenden, 2003). This article contributes to this knowledge gap by exploring project team coordination in repetitive machinery maintenance projects. In most of the existing empirical studies on project team coordination, the unit of analysis has been a project, a project team, or a member of a project team. In addition, the research focus has tended to be on the ways coordination takes place in different projects. In this article, the

attention shifts to the actions of the parent organization. In particular, this article proposes that a parent organization can take actions to promote or create beneficial circumstances for project team coordination in its project-based activities. A typical way for parent organizations to affect, guide, and instruct the behavior of project managers and project teams is through the introduction of a project management methodology (PMM). PMMs represent good practices and the knowledge foundations required for managing projects successfully (APM, 2012; Garel, 2013; Lehtonen & Martinsuo, 2006; PMI, 2013). Although some studies argue that a PMM promotes project success (Joslin & Müller, 2015), following a PMM does not guarantee project success (Lehtonen & Martinsuo, 2006), different projects call for different management approaches (Morris, Crawford, Hodgson, Shepherd, & Thomas, 2006), and deviations from the ways of working set out by a PMM can occur for various reasons (Vuorinen & Martinsuo, 2019). There are various PMMs, ranging from the standards set by and bodies of knowledge of official institutions to tailored company-specific frameworks (Garel, 2013). Despite the nature or the characteristics of different PMMs, all PMMs standardize or structure project-based work in the organization to some extent. This article argues that implementing standardized or structured ways of working (i.e., introducing a pre-defined set of coordination mechanisms) is one potential way for a parent organization to promote project team coordination. The goal of this article is to develop new knowledge on the ability of parent organizations to promote project team coordination in project-based activities by asking the following research question: How can standardized ways of working, introduced by a parent organization, promote project team coordination in repetitive projects?

2 Literature review

2.1 Project team coordination

This empirical study focuses on repetitive projects—particularly machinery maintenance. In repetitive maintenance projects, different teams or team members are responsible for the different work phases of a project. Thus, several interdependencies exist, creating a greater need for project team coordination. Repetitive projects, such as machinery maintenance, differ in many ways from innovative projects, which possibly leads to project team coordination taking on a different quality in these contexts (Hoegl et al., 2004). The empirical context of this study is described in more detail in the research methods section. The article is structured as follows. In the next section, the literature on project team integration and standardized ways of working in projects is reviewed. The third section describes the embedded single-case study design, data collection, and data analysis. The fourth section describes the perceived implications of the new ways of working on project team coordination. In the fifth section, the empirical findings are discussed in light of the earlier literature. The main contributions relate to the viewpoint of the parent organization on project team coordination, the conceptualization of coordination as a package of supplemental coordination mechanisms, and the importance of project team communication for project team coordination in repetitive projects. Finally, the study’s theoretical contributions and managerial implications are summarized and its limitations and ideas for future research are discussed.

When organizations grow and their tasks become more complex, work is typically divided between teams or organization members. This division of tasks into subtasks and the division of work between teams or people creates interdependencies and a consequent need for coordination (Galbraith, 1973). To achieve coordination, organizations utilize different coordination mechanisms (e.g., plans or meetings) and coordination modes (e.g., impersonal, personal, and group modes of coordination) (Dietrich et al., 2013; Van de Ven et al., 1976). Coordination can be formal or informal, explicit or implicit, or “bottoms up” (i.e., more pre-planned and formal) or “top down” (i.e., more delegated and informal) (Banks, Pollack, & Seers, 2016). The existing literature has been argued to put only limited focus into informal or implicit coordination (Banks et al., 2016). There is an extensive field of literature on coordination with strong roots in permanent organizations. Significantly less is known about coordination in temporary organizations (Bechky, 2006; Faraj & Xiao, 2006). However, as in permanent organizations, a similar division of work and tasks takes place in temporary organizations and creates a consequent need for coordination. In project teams, coordination is required both intra-team and inter-team in both intra-organizational and inter-organizational settings. Examples of empirical studies on project team coordination are summarized in Table 1. Following the delimitations of this study, **Table 1** includes empirical studies on coordination in intra-organizational projects. Table 1 demonstrates how there have already been several studies answering the call for additional research on coordination in temporary organizations (Bechky, 2006; Faraj & Xiao, 2006). The studies have described coordination problems (Bick et al., 2018; Espinosa et al., 2007), emphasized the complementary roles of different coordination mechanisms (Dietrich et al., 2013) and revealed the dynamic nature of project team coordination (Dingsøy et al., 2018, 2017; Gkeredakis, 2014), for example. Despite these answers to the calls for additional research, two knowledge gaps in the existing empirical research justify the need for additional research in general and this study in particular. The first justification refers to the empirical contexts of the earlier research. Of the studies exemplified in Table 1, almost all have focused on innovative and/or large-scale projects. These kinds of contexts include software development (Bick et al., 2018; Dingsøy et al., 2018, 2017; Espinosa et al., 2007), product or organizational development (Dietrich et al., 2013; Hoegl et al., 2004) and large

Study	Context and method	Main findings
Bechky, 2006	- Film projects - An ethnographic study, four projects	- A role-based view of coordination in temporary organizations emphasized. - Characteristics affecting coordination: role duration, expectations of future interaction, and visibility of work.
Bick et al., 2018	- Software development projects - A single-case study	- Lack of dependency awareness as a key explanation of inefficient coordination in agile software development.
Dietrich et al., 2013	- Product development or organizational development projects - A multiple case study	- A portfolio approach to project team coordination emphasized; in other words, coordination being practiced through combinations of coordination mechanisms and modes. - Three coordination patterns identified: centralized, decentralized, and balanced coordination.
Dingsoyr et al., 2017	- Large agile software development projects - A two-case study	- Focus on the group mode of coordination, especially meetings as coordination mechanisms. - Changes in coordination mechanisms over time: from scheduled to unscheduled meetings and vice versa.
Dingsoyr et al., 2018	- Large agile software development projects - A single-case study	- A variety of coordination mechanisms in use. - Coordination is not static, but coordination mechanisms change over time (e.g., a gradual transition to unscheduled meetings).
Espinosa et al., 2007	- Geographically distributed software development projects - A single-case study	- Three types of coordination: technical (e.g., redundant code), temporal (e.g., schedule issues), and procedural (e.g., non-adherence to the established process). - Special coordination problems caused by geographical distribution (e.g., fewer opportunities for interaction). - Shared knowledge of the task and team, task and presence awareness help coordination.
Gkeredakis, 2014	- Large construction projects - An ethnographic single-case study	- Emphasizes the viewpoint of coordination in practice; coordinating in addition to coordination. - Coordination is a dynamic cycle between focus on getting the local tasks done and focus on ensuring compatibility with external interdependencies and conventions. This cycle requires coordination efforts to be adjusted constantly.
Hoegl et al., 2004	- Product development projects - A longitudinal survey design	- Focus on the performance effects of project team coordination. - A positive relationship between project team coordination and project performance, especially schedule performance. - Project team coordination considered especially important in teams with many technical interfaces with other teams and in the early and middle phases of complex projects.

Table 1. Empirical studies on project team coordination in intra-organizational projects.

construction projects (Gkeredakis, 2014). However, it is not self-evident whether the same findings apply in environments with lower levels of complexity and uncertainty as well (Hoegl et al., 2003). The second limitation of the earlier research relates to the unit of analysis. In most of the earlier empirical studies, the analytical focus has been on a project, project teams, or project team members. Consequently, the viewpoint of the parent organization has received significantly less attention. Therefore, this article proposes that the parent organization can take methodical action to enhance and promote project team coordination in its project-based activities. Although none of the earlier studies in Table 1 have taken this viewpoint explicitly, some implicit support for this idea has been offered. For instance, Calamel, Defélix, Picq and Retour (2012) discussed the

importance of human resource management for coordination in inter-organizational projects, and Hoegl et al. (2004) discussed ways for managers to promote and improve intra- and inter-team collaboration. This study focuses explicitly on a set of coordination mechanisms (Dietrich et al., 2013) purposefully introduced by a parent organization.

2.2 Project management methodologies and standardized work in projects

One way that parent organizations affect, guide, and instruct project managers' and project teams' behavior is through the introduction of a PMM. Various PMMs exist, ranging from the standards and bodies of knowledge of official institutions to

3 Research methods

3.1 Research design and case context

tailored company-specific frameworks (Garel, 2013). PMMs vary in terms of their comprehensiveness, formality, and systematism, and between standardized versus customized PMMs (Joslin & Müller, 2015; Lehtonen & Martinsuo, 2006), for example. Even if organizations are very active in using such models and methodologies, companies often create or tailor them to meet their own needs (McHugh & Hogan, 2011; White & Fortune, 2002).

Recent empirical evidence has argued that a positive relationship exists between the use of a PMM and higher project performance (Joslin & Müller, 2015, 2016). However, other studies have also emphasized that following a PMM does not guarantee project success (Lehtonen & Martinsuo, 2006), that different projects call for different management approaches (Morris et al., 2006), and that project teams and actors are forced to deviate from the ways of working instructed by PMMs (Klein et al., 2015; Vuorinen and Martinsuo, forthcoming), for example. Despite the nature or characteristics of different PMMs, at least to some extent all PMMs standardize or structure project-based work in an organization. This article's main argument is that introducing standardized or structured ways of working is one potential way for a parent organization to promote project team coordination in its project-based activities. This idea of a parent organization promoting coordination with purposeful actions has received little attention in the literature on either project team coordination or PMMs.

This study employs an exploratory qualitative research approach and follows a case study strategy. Case study designs are particularly suited to answering "how" questions and exploring the key phenomena in real-life settings (Yin, 2009). In this study, taking an exploratory approach is justified by the limited amount of existing research on this topic, especially with regard to parent organizations' viewpoints on coordination. The research is designed as an embedded single-case design, meaning that multiple subunits are explored within a single case (Yin, 2009). In this research, the case study focuses on the project business of an engineering company, and the subunits are service centers implementing maintenance projects.

This study used purposeful sampling to choose the case organization (Silverman, 2010) by searching for an organization with an established history in project-based deliveries and an orientation toward service-intensive projects. Service-intensive projects (in this case, maintenance projects) were considered an illustrative example of less innovative repetitive projects (as compared to the innovative and complex projects that are mostly studied in the existing literature). The case organization (hereafter EngineeringCo) selected offers engineering solutions both as standard products and as tailored solutions delivered as customer-specific projects, and it supports these solutions through maintenance, repair, modernization, and spare parts services. The company is a typical example of a manufacturing company that offers its customers both tangible products and intangible services, as both standard and tailored solutions. In that way, EngineeringCo can be considered representative or typical, thereby justifying the single-case design (Yin, 2009).

In this study, the focus is on EngineeringCo's maintenance projects performed in its service centers. The deliveries of EngineeringCo's machinery are critical for its customers' operations and are large in terms of capital. Both due to wear and mechanical stress, and in order to ensure uninterrupted operations in the customers' manufacturing businesses, these machines require maintenance. Maintenance tasks include both regular and scheduled maintenance and unexpected and ad hoc maintenance. Maintenance tasks take place both in the customers' premises and in the service centers. In this article, the focus is on maintenance projects performed in the service centers. In these kinds of maintenance projects, a machine's

component or module is shipped from a customer to a service center for maintenance. After finishing the maintenance tasks, the component or module is shipped back to the customer. EngineeringCo has a long history with selling and maintaining various product models. Consequently, there is some variety in the requirements of the maintenance projects in terms of what has broken or needs maintenance. Service centers also maintain components from EngineeringCo's competitors' machines, which increases this variance. Nonetheless, most of the maintenance projects have similar, distinct project phases. As a result, different employees and employee groups (i.e., project teams) are responsible for each of those project phases. The project phases include customer service, logistics, and different maintenance activities (e.g., operating different machines and tools), for example. Due to several recognized problems in maintenance project performance and in the old ways of working, a standardized management framework for guiding and structuring project management (i.e., a PMM) was introduced by EngineeringCo. The new framework was developed by a few of the company's experienced key personnel with assistance from an external consultancy company and implemented in several service centers globally. This study focuses on the perceptions of the employees in those service centers.

3.2 Data collection and analysis

Primary data were collected through semi-structured interviews. Twenty-five employees representing five service centers were interviewed, covering different organizational levels, roles, and responsibilities in the service centers, including top management, middle management, production planning, sales, and production workers, for example. Secondary research data, particularly plans and documentation of the management framework, complemented the primary data. **Table 2** summarizes the data collection.

The semi-structured interviews focused on the perceived changes when compared to the situation before the new framework, the perceived benefits and challenges of the new ways of working, and the interviewees' ideas for how to improve on the new management framework. The focus of the interview questions was not on any pre-defined case projects but instead on the interviewees' perceptions of the project business of the service centers. The native languages of the interviewees varied, but all the interviews were held in English. The interviews were recorded and transcribed. Illustrative quotations used for this article were slightly edited to enhance their readability, while ensuring that the core message of the quotations was unaltered.

A two-round approach to the data analysis was taken. In the first coding round, a very inductive approach was followed and all the relevant quotations were coded following the "in vivo" coding strategy. A quotation was considered relevant if it discussed a perceived benefit or challenge of the new way of working, a characteristic of the old way of working, or a perceived difference between the two. In the second coding round, similar codes were renamed and merged and further grouped into categories. The final categories regarding the perceived challenges or benefits included: availability of project information, common direction of a service center, communication between project actors, decision-making, person-dependency and visibility of the project's status.

Table 2. Summary of the data collection.

Service center	Alpha	Beta	Gamma	Delta	Epsilon
Location and culture	- Far from home country - Culturally different	- Close to home country - Culturally similar	- Far from home country - Culturally different	- Far from home country - Culturally similar	- Far from home country - Culturally similar
No. of interviews	3	7	5	5	5
Average duration of interviews	31 min (20–38 min)	32 min (16–69 min)	27 min (18–40 min)	29 min (21–39 min)	24 min (15–36 min)

When analyzing the findings from each of the five service centers (i.e., the subunits of the embedded case study), it turned out that the interviewees' perceptions of the new management framework were very similar. Consequently, a thematic instead of a cross-case analysis was performed. The findings first report some background information on the characteristics and implementation of the new management framework. Then, the perceived changes and implications of the project team coordination are described. The original challenges and the benefits achieved are divided into three subsections: communication and sharing of information, focus and decision-making, and coordination within the service centers.

4 Findings

4.1 Introducing the new management framework

Before the introduction of the new management framework, each of EngineeringCo's service centers took their own approaches to managing maintenance projects. Consequently, the level of efficiency in managing maintenance projects varied significantly across the service centers. Therefore, the new framework was introduced by EngineeringCo to enable a coherent approach toward project management and to make the maintenance project processes more efficient. EngineeringCo (i.e., the parent organization) developed the new management framework in collaboration with a consultancy firm. During the development work, a development workshop was organized and representatives were selected from the service centers to participate. When the development work had finished, the management framework was

introduced in the first service center. Although the main elements of the framework were defined by the parent organization (in collaboration with the consultancy firm), various details had to be tailored to meet the needs of the service center. The service center personnel and representatives of the parent organization and the consultancy firm worked together on this tailoring work for several days. After the introduction of the framework, the employees' experiences, learnings, and feedback were documented to develop the framework and to assist in the future rollouts. In the following months, a similar process took place in other service centers. At the time of the data collection for this article, the framework had been introduced in five service centers around the globe. The new framework was built around a very consistent maintenance project process (i.e., project phases), and it consists of three main elements: regular meetings, visual whiteboards, and a structured process for continuous improvement.

Regular meetings follow a standard agenda and take place regularly, almost daily. Importantly, there are meetings taking place at different organizational levels: at the team level, at the production level, and at the service center level. Visual whiteboards are designed to track the status of the maintenance projects. All the whiteboards are tailored both between and within the service units, but they all share the same goal of visualizing the status of the projects (with respect to the pre-defined project phases) and selected key performance indicators. As is the case with regular meetings, visual whiteboards are also implemented at different organizational levels. A structured process for continuous improvement was designed to ensure efficient problem solving and process development. All the employees can highlight improvement opportunities by marking them on the whiteboard. The improvement ideas are considered immediately (typically the following day) and either handled at the team level or, if necessary, on the production level. Of the three framework elements, this study focused on the regular meetings and the visual whiteboards as they deal directly with coordination. The following subsections discuss the changes perceived by the interviewees after the introduction of the management framework.

4.2 Improved communication and sharing of project information

Prior to the introduction of the new management framework, communication and collaboration within project teams and between project actors (i.e., within and between project phases) was considered fragmented, irregular, and unstructured. In particular, there was a lot of variance between and within the service centers. Some service centers or project teams held regular meetings and engaged in structured communication, while in others communication was more person-dependent, irregular, and ad hoc.

The introduction of regular meetings into the routines of the maintenance projects was considered beneficial for inter-team and intra-team communication. The interviewees described how it is easier to discuss and communicate when all the relevant people are present, meetings take place regularly, and meetings are efficient and structured. For example:

"This is a big improvement. I don't have to ask every day, 'Do we have an answer?' [Before] Every day I had to ask [that]." (Service center Beta)

"Because we have all the representatives from each department so we can get the answer right away. It's very easy to have a common understanding where we are at the moment."
(Service center Gamma)

The visual whiteboards were also considered beneficial for improving communication and efficient decision-making, both within the projects and between them. Before the new management framework, if there had been any problems in the previous work shift, for example, it was up to the employees themselves to communicate the issues to each other. If they forgot, or the relevant people did not meet, significant delays or "hassles" could occur. The visual whiteboards enable the sharing of information outside of the regular meetings. As the interviewees explained:

"...it [a visual whiteboard] gives everybody a chance to see it every day and you talk about it every day. You wouldn't talk about it if you just put it on a piece of paper." (Service center Epsilon)

"Now it's visual for all the layers in the company, or in the workshop, and in the office." (Service center Beta)

In addition to the visual nature of the whiteboards, their "equal" or "democratic" nature was considered beneficial as well. In particular, the whiteboards, and to some extent the regular meetings, were considered to promote equal access to project information. As was described in the interviews:

"And the operator can see this whiteboard too so they know what has happened." (Service center Beta)

"Everybody, not supervisors or managers only but also the operator, can tell us what is happening and everybody can see. That is good." (Service center Gamma)

Giving all employee groups access to project information was perceived as an improvement by representatives from all the service centers. Representatives from two of the service centers also explained how a lot of similar information had already been available in various IT systems before the implementation of the new management framework. However, not all employee groups, such as operators and production workers, had access to those IT systems or even to computers. In this way, the physical nature of the whiteboards was considered beneficial as well.

4.3 Improved focus and efficient decision-making

Improved communication and the sharing of information enabled by the regular meetings and the visual whiteboards were considered to increase the visibility of the status of the maintenance projects and the maintenance project portfolios. Several interviewees described how, before the new management framework,

employees tended to limit their focus to their own project phases and to the current work (project) at hand. As a manager of one service center explained:

"They [operators or production supervisors] just had one A4 sheet with a printed schedule of each machine. Not the whole overview [of the service center and the projects]." (Service center Beta)

Empowered by the new management framework, all project actors go through all the ongoing and upcoming projects in the regular meetings (with the main focus being on problematic or critical projects). Similarly, all the projects are visible on the visual whiteboards, with the critical or problematic issues highlighted using color codes. This allows all the employee groups to coherently see the overall status of the service center and the maintenance project portfolios. As two interviewees described:

"We go through each project one by one and then find the problems, if there are any." (Service center Alpha)

"We can see rather quickly what's going on in the workshop through the different whiteboards."
(Service center Beta)

Another problem in the past had been inefficient decision-making. Caused by the issues in communication and the limited visibility of the status of the service center and the maintenance project portfolio, significant delays could take place. The regular meetings and the visual whiteboards are perceived as enabling and even "forcing" more efficient decision-making:

"We are catching things at the service center that haven't been caught or brought up in the past because there wasn't a mechanism to communicate those things." (Service center Delta)

"On the board there should be a reason why a project is not progressing and we should all be able to respond and react to that as well." (Service center Epsilon)

A similar idea was expressed in relation to the regular meetings. In particular, several interviewees highlighted the participation of all the relevant people in the regular meetings as beneficial for efficient decision-making.

4.4 Better coordination within the service centers

Emphasized especially by the white-collar respondents, several interviewees highlighted the effects of the new management framework on person-dependency, communication of a common direction, and working as one coherent unit. Without the structured elements of the new management framework, proper communication and the sharing of information was very much up to the individual employees. As one interviewee recalled:

"If I forgot to tell him [some other employee], he had no clue what was missing or what he was supposed to be doing to it and where the job was at." (Service center Beta)

Since the introduction of the new management framework, the regular meetings enable regular communication between all the relevant project actors. In addition, the visual whiteboards ensure that information is shared outside of meetings. The latter benefit was described by one interviewee:

"Whiteboard is like a reminder to everybody. You see the whiteboard and are like: 'something has happened, okay I need to follow this one up closely.'" (Service center Gamma)

Some managerial-level interviewees described how the new management framework enabled the entire service center to work better as one coherent unit, instead of as individual employees or as separate teams working on separate phases of the maintenance process. One managerial-level interviewee summarized the difference as follows:

“Everybody is more or less aware of what’s going on, what should be done today, what will be delivered tomorrow, what should be completed, those kinds of topics.” (Service center Beta)

This quotation demonstrates how the new management framework is perceived as promoting project team coordination in the service centers. **Figure 1** summarizes the key changes perceived by the interviewees, grouped into project team communication, project information, and decision-making, focus, and direction.

5 Discussion

The goal of this study was to develop new knowledge on the parent organization’s ability to promote project team coordination in its project-based activities in response to the following research question: “How can standardized ways of working, introduced by a parent organization, promote project team coordination in repetitive projects?”

This study answers the calls for more research on coordination in temporary organizations (Bechky, 2006; Faraj & Xiao, 2006). The novelty of this study lies in its focus on a parent organization’s perspective on project team coordination.

This viewpoint frames the parent organization as an active actor, not just as the context or environment for its project-based activities. The previous literature has discussed the active role of the parent organization from the perspectives of integration (Lehtonen & Martinsuo, 2009), project learning (Bakker, Cambré, Korlaar, & Raab, 2011), and project selection (Lefley, 2013), respectively. However, the existing research has insufficiently covered the aspect of project team coordination. This study has demonstrated how the parent organization can take purposeful actions in promoting team coordination in its project-based activities. After identifying issues in the existing ways of working, the case company (i.e., the parent organization) developed and introduced a new management framework (i.e., introduced new coordination mechanisms). The findings of this study demonstrate how these purposeful actions of the parent organization had positive implications at the project level. In contrast, most of the earlier studies analyzed coordination mechanisms and modes “as they are” in single projects, or they focused on the role of internal project actors in pursuing coordination.

This study joins the discussion analyzing coordination as a package of coordination mechanisms (Dietrich et al., 2013). Although limited to two coordination mechanisms—regular meetings and visual whiteboards—the findings of this study demonstrate how the coordination mechanisms complement each other in promoting project team coordination. As summarized in Figure 1, the two coordination mechanisms carry different implications for project team coordination. An incomplete understanding of project team coordination would have been reached had the focus been limited to only one coordination mechanism (Dietrich et al., 2013). By considering the viewpoint of the parent organization, this study contributes to the discussion on PMMs as well. This study has shown how a less comprehensive PMM, in other words a PMM that does not cover all aspects of project management (Joslin & Müller, 2015), can be beneficial when managing repetitive projects. In addition, regarding the benefits of PMMs, this study has proposed a specific connection between the introduction or utilization of a PMM and perceived improvements in project team coordination. In this way, this study complements the findings of earlier studies that have considered PMMs as project success factors or demonstrated a positive relationship between the use of PMMs and project performance (e.g., Joslin & Müller, 2015, 2016). Finally, this study emphasizes the strong connection between communication and coordination and the special characteristics of repetitive projects. In repetitive projects, such as small-scale maintenance projects, the project phases are relatively well defined and distinctive. Although in many ways beneficial, these distinctive project phases can render

the overall status of the individual projects and the overall project portfolios invisible to the project teams and team members. A package of coordination mechanisms promoting communication and the sharing of information can be especially useful in these kinds of contexts. Repetitive projects have received less attention in the project management literature in general and in the literature on project team coordination in particular.

6 Conclusions

6.1 Theoretical contributions

The empirical study has focused on project team coordination in repetitive maintenance projects, thereby differentiating this article from the previous literature that is dominated by complex, innovative, or large-scale projects. This study has revealed the clearly defined and distinct project phases and the importance of project team communication and visibility to project status information as special characteristics for project team coordination in that context. While the earlier literature predominantly studied project team coordination “as it is,” this study has demonstrated how the parent organization can take active steps (i.e., design and introduce coordination mechanisms) in promoting project team coordination in its project-based activities.

Finally, this study has conceptualized project team coordination as a package of coordination mechanisms. This study has demonstrated how different coordination mechanisms supplement each other, in other words, how they have different implications for project team coordination. By studying coordination mechanisms with a strong focus on communication, this study has demonstrated how better communication can take place in the group and in impersonal coordination modes as well, in addition to the more obvious personal coordination mode. In the context of repetitive projects, together these coordination modes may activate learning and knowledge diffusion between projects and therefore contribute to capability development over the long term.

6.2 Managerial implications

The findings of this study have several implications for project management practitioners. The viewpoint of the parent organization and the concept of coordination as a package of coordination mechanisms emphasize how the parent organization can promote coordination in its project-based activities by designing a package of coordination mechanisms (e.g., a management framework). When

	Issues or problems before	Perceived improvements	
		Regular meetings	Visual whiteboards
PROJECT TEAM COMMUNICATION	<ul style="list-style-type: none"> - Irregular, unstructured communication - Higher levels of person-dependency 	<ul style="list-style-type: none"> - All the relevant people are present - Communication is frequent and structured 	<ul style="list-style-type: none"> - Less person dependency in information sharing
PROJECT INFORMATION	<ul style="list-style-type: none"> - Project information not readily available to everyone 	<ul style="list-style-type: none"> - All the relevant people are present → broader sharing of information 	<ul style="list-style-type: none"> - Project information easily available (visible) for everyone
DECISION-MAKING, FOCUS AND DIRECTION	<ul style="list-style-type: none"> - Inefficient decision-making and unnecessary waiting - Limited focus on a task or a project phase - Limited visibility of the status of the project portfolio 	<ul style="list-style-type: none"> - Efficient decision-making <p><u>The management framework as a whole:</u></p> <ul style="list-style-type: none"> - Better visibility of the overall status of the service center and the maintenance project portfolio - Better focus on the overall maintenance projects, instead of individual project phases 	

Figure 1. Perceived improvements after the introduction of the management framework.

designing the package of coordination mechanisms, the complementary roles of the coordination mechanisms should be taken into account.

Another important aspect highlighted by the findings of this study is the crucial role of communication and the sharing of information in project team coordination. Parent organizations should seek out ways of enabling and ensuring intra-team and inter-team communication and facilitate easy access to project and portfolio status information. As illustrated in this study, different and complementary coordination mechanisms and coordination modes can be utilized for these purposes. A unique feature of repetitive maintenance projects is the relatively clear division into distinctive project phases and the simultaneity of multiple projects. Coordination in and between project teams can be used as a means of doing the right thing at the right time and thereby successfully manage the portfolios of different activities. In these kinds of contexts, it is especially important for the parent organization to help employees expand their line of vision from the current work at hand to the whole project and other simultaneous projects.

6.3 Limitations and future research

The main limitations of this study relate to its empirical and methodological setting. The empirical focus was limited to the project-based activities of one engineering company. The possible bias caused by this limitation was mitigated by studying coordination in five service centers (i.e., an embedded single-case study design). Still, the findings of this study should be tested in a wider range of different organizations. Similarly, the generalizability of the findings beyond the context of repetitive maintenance projects requires further investigation. Methodologically, the findings are mostly based on the interviewees' retrospective perceptions. The possible bias caused by this limitation was mitigated by interviewing a number of interviewees with varying roles and backgrounds and across the different service centers, with their somewhat different cultures and histories in terms of managing the maintenance projects. The timing of the interviews was planned so that the interviewees already had some experience of the new ways of working after the introduction of the management framework but could still recall their experiences prior to the implementation of the new management framework.

This study proposes several avenues for future research. The findings should be tested in different contexts, including in different parent organizations and different projects. In addition, since this study was among the first to emphasize the parent organization's viewpoint and its purposeful actions in promoting project team coordination, its findings remain relatively exploratory and call for additional research to be undertaken with more nuanced approaches and explanatory research goals.

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"THIS STUDY HAS
DEMONSTRATED HOW THE
PARENT ORGANIZATION
CAN TAKE ACTIVE STEPS
(I.E., DESIGN AND
INTRODUCE COORDINATION
MECHANISMS) IN
PROMOTING PROJECT TEAM
COORDINATION IN ITS
PROJECT-BASED
ACTIVITIES."

"A UNIQUE FEATURE OF
REPETITIVE MAINTENANCE
PROJECTS IS THE RELATIVELY
CLEAR DIVISION INTO
DISTINCTIVE PROJECT PHASES
AND THE SIMULTANEITY OF
MULTIPLE PROJECTS."

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