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Anna Nikulina [a,*], Leentje Volker [b], Marian Bosch-Rekveldt [c]

[a] Department of Technology and Operations Management, Rotterdam School of Management, Erasmus University, Burgemeester Oudlaan 50, Rotterdam 3062 PA, the Netherlands
[b] Faculty of Engineering Technology, University of Twente, De Horst 2, Enschede 7522 LW, the Netherlands
[c] Faculty of Civil Engineering and Geosciences, Gebouw 23, TU Delft, Stevinweg 1, Delft 2628 CN, the Netherlands

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ABSTRACT

Collaboration can bring multiple benefits to projects. Real collaboration appears, however, complex to implement. So far, there is no scientific agreement on the importance of the formal and relational (behavioural) sides of project collaboration. Through a qualitative study of two collaborating teams in large engineering and construction projects we uncover the roles of these two sides of collaboration and analyse their interplay. We find that relational and formal aspects of collaboration are complementary, yet each has a distinct role. The formal integrative mechanisms provide an arena for relational norms to be established, and for collaborative behaviours to be practiced and implemented. Relational norms transform traditional project management activities into collaborative, integrative ones. We advance theory of collaboration by offering a holistic and at the same time fine-grained view on it, and stress that project teams need to pay equal attention to both formal and relational sides for collaboration to succeed.

1. Introduction

In project environments, collaboration is often viewed as a prescription for success to interorganizational relationships: it helps parties get access to scarce resources and develop new knowledge (Dietrich et al., 2010; Hardy et al., 2003; Scott & Thomas, 2017), and can positively affect organizations' financial performance through supply chain integration (Barrat, 2004; Cao & Zhang, 2011; Eriksson, 2015; Soosay et al., 2008). In complex construction projects especially, collaboration is regarded as a remedy to persistent problems, such as adversarial relationships, low productivity, schedule and budget overruns, lack of innovation and high uncertainty (Gadde & Dubois, 2010; Suprapto et al., 2015; Walker & Lloyd-Walker, 2016).

At the same time, collaboration can be costly (Eriksson, 2015), complex (Larsen et al., 2021), and requires substantial effort and change of behaviours from the participants (Baiden et al., 2006; Cheung et al., 2003; Walker et al., 2017). Because of the temporality of projects, there is often a lack of time to develop trust between the parties (Xu et al., 2021). As future work prospects are uncertain due to the fragmented nature of the industry, organizations may be unwilling to make relationship-specific investments (Gadde & Dubois, 2010; Hietajärvi & Aaltonen, 2018; Leufkens & Noorderhaven, 2011). The large number of actors involved in projects and their diverging cultures and goals make the negotiation of mutually acceptable relational norms and rules challenging (Eriksson, 2015; Thomson et al., 2009).

In the past decades, several collaborative project delivery strategies have been developed to address these challenges, for instance, project alliance or integrated project delivery (Engebø et al., 2020). Such strategies extend the collaboration duration through early involvement of key suppliers and contractors and strengthen collaborative ties by sharing risks and benefits in commercial models (Eriksson, 2015; Hietajärvi et al., 2017). However, collaboration in projects is not necessarily restricted to a particular set of formal delivery strategies. It can also be based on a set of integrative processes and relationships that can be applied in any project (Hong et al., 2012; Manley & Hampson, 2000). A large stream of research has focused on project collaboration from this more generic perspective (Bygballe et al., 2010; Engebø et al., 2020), studying so-called 'project partnering' - a management approach (Cheung et al., 2003; Eriksson, 2010) or a "relationship strategy that […] through commitment to mutual project objectives, collaborative problem-solving and a joint governance structure […] pursues collaborative relationships, trust and improved performance." (Børve et al.,

* Corresponding author.
E-mail address: nikulina@rsm.nl (A. Nikulina).

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2017, p.694).

Researchers of specific delivery strategies and partnering approaches have extensively studied success factors (Cheng et al., 2000; Nevstad et al., 2018), implementation barriers (Gadde & Dubois, 2010; Mollaoglu et al., 2015), applicability and benefits of project collaboration (Black et al., 2000; Lahdenperä, 2012; Larsen et al., 2021). Studying these topics, scholars have often identified and contrasted opinions of the collaborating organizations instead of looking at the interorganizational collaborative domain (Sydow & Braun, 2018; Wood & Gray, 1991) or focusing on team integrative practices (Baiden et al., 2006; Walker et al., 2017). This approach has accumulated substantial knowledge about various elements that comprise collaboration (Bygballe & Swärd, 2019; Hietajärvi et al., 2017) but has been criticised for not leading to real understanding of the complex collaboration process (Hartmann & Bresnen, 2011; Stout & Keast, 2021; Thomson et al., 2009).

Another stream of literature has addressed the dynamic and contextual processes of project collaboration. This research proposes that project collaboration has both an evolving, 'emergent' relational side (Bresnen, 2009; Hartmann & Bresnen, 2011) – also referred to as behavioural elements, or relational norms (Doloi, 2009; Suprapto et al., 2015; Thomson et al., 2009) and an 'engineered' side that consist of formal processes and activities or integrative mechanisms (Bresnen & Marshall, 2002; Eriksson, 2015). For a complete understanding of collaboration these two sides need to be combined (Cao & Zhang, 2011). It is understood that the two sides of collaboration are connected, and the interplay between them is dynamic and complex (Dewulf & Kadefors, 2012; Hietajärvi et al., 2017). Their respective roles and the nature of the interplay, however, is not yet clear. Some of these studies focus only on the relational side as key for the collaboration process and its success (Cicmil & Marshall, 2005; Gottlieb & Haugbølle, 2013; Hartmann & Bresnen, 2011). Others look more at the interplay between the two sides of collaboration and either find that formal integrative mechanisms play a support role (Dewulf & Kadefors, 2012) or that the interplay is dynamic (Benítez-Ávila et al., 2018) and the formal dimension is essential, but insufficient for collaboration to happen (Bygballe et al., 2015; 2016). This lack of clarity also reflects in the models of project collaboration that combine elements from both sides but do not distinguish between them or their specific roles, as can be seen in the frameworks developed by Yeung et al. (2012), Hietajärvi et al. (2017) or Bygballe and Swärd (2019).

This complex multidimensional nature of collaboration has been a puzzle for researchers for many years (Bygballe & Swärd, 2019) and potentially an obstacle to developing theory and recommendations for managers generalizable to various contexts (Prentice et al., 2019). It may also be a reason why practically collaboration in projects remains challenging, as project teams may face confusion regarding the process of collaboration or attempt to implement too many collaboration elements at once (Engebø et al., 2019). Understanding the roles of and interplay between the two sides of collaboration is thus important for addressing the perceived complexity and contextuality of project collaboration and developing a comprehensive, generalizable theory of collaboration (Wood & Gray, 1991) in the project management literature. It also allows introducing more clarity for practitioners in what has been a "confusing landscape" (Thomson et al., 2009, p.24) of collaboration. Building on the existing knowledge about the relational and formal side of collaboration, we intend to develop a project collaboration model that demonstrates their roles and interplay. Hence, we address the following research question:

How do formal integrative mechanisms and relational norms interplay in project collaboration?

To answer this question, we empirically analyse two collaborative initiatives, examining the experiences of collaborating teams formed by different parties in large engineering and construction projects. Since such undertakings are representative of complex project organizing, we aspire that our findings will be generalizable to many project settings.

The rest of the paper is structured as follows: Section 2 offers an overview of the literature on the formal and relational sides of project collaboration. Our research method is described in Section 3, followed by the analysis of the two collaborative initiatives in Section 4. In Section 5 we present the discussion and the project collaboration model. Section 6 concludes the article with the theoretical and practical implications, reflections on the study limitations and suggestions for future research.

2. Literature review

2.1. Project collaboration and project partnering: clarification of terms

"Collaboration is a process in which autonomous or semi-autonomous actors interact through formal and informal negotiation, jointly creating rules and structures governing their relationships and ways to act or decide on the issues that brought them together; it is a process involving shared norms and mutually beneficial interactions." (Thomson et al., 2009, p. 25). This definition emphasises that collaboration incorporates both relational and formal aspects, which is crucial for this research. However, some clarifications about collaboration in projects are needed.

In projects that bring together a set of parties to pursue a particular goal (Von Danwitz, 2018), collaboration is temporally delimited and exists "[…] for the purpose of achieving specific project and business objectives […] to ensure […] effective utilization of each party's specific resources and capabilities." (Suprapto et al., 2015, p. 665). Thus, project collaboration focuses on the project objectives, whereas a long-term, strategic collaboration spans across several projects (Cheng et al., 2004). Project collaboration often extends beyond the dyad of client and contractor (Bygballe et al., 2010). The collaboration scope (Eriksson, 2015; Hardy et al., 2003) can also include suppliers and subcontractors, who play an important role in the construction works and the overall project outcome due to high levels of specialization and outsourcing in the industry (Anvuur & Kumaraswamy, 2007; Dainty et al., 2001; Xu et al., 2021; Zhang et al., 2018).

Collaboration in projects is quite often labelled 'partnering'. Both terms are frequently used in project management research, but their meaning seems inconsistent (Hughes et al., 2012). For instance, Thompson & Sanders (1998) talk about a partnering continuum, stating that collaboration is one of its phases. Vice versa, Yeung et al. (2012) view partnering as one of the types of collaborative contracting. Sometimes partnering is treated simply as a synonym to project collaboration (Bygballe et al., 2010) or relational contracting (Rahman & Kumaraswamy, 2004; Yeung et al., 2012).

We take a point of view that partnering is a specific type of project collaboration. It is a non-contractual approach to executing the projects in a collaborative way as opposed to specific formal project delivery strategies such as a project alliance or integrated project delivery (Eriksson, 2010; Lahdenperä, 2012). However, in this paper we use the terms 'collaboration' and 'partnering' interchangeably. While considering the specifics of partnering when connecting our findings to extant research, we use a more generic 'collaboration' term to discuss the literature more effectively.

2.2. Conceptualization of collaboration

To be able to empirically analyse the complex phenomenon of collaboration, researchers often decompose it into processes, dimensions, routines, or elements. In most cases, these components of collaboration reflect both its formal and relational side, but these are not always clearly distinguished and separated from each other.

Thomson & Perry (2006) and Thomson et al. (2009) view collaboration as a set of five processes or dimensions: Governance, Administration (structural dimensions); Autonomy (organizational dimension), Mutuality and Norms (relational dimensions). Governance is related to

the decisions that parties jointly make about collaboration: what collaborative bodies will govern their relationship, which behaviours are expected, or how risks and rewards will be shared. Administration covers the roles, responsibilities, and control procedures within the established collaborative structures. Autonomy is about reconciling individual and collaborative interests: although each party maintains its identity within the collaboration, it needs to adjust its behaviours and actions to achieve collective interests. Mutuality grows from interdependence as parties realise that by working together, they can achieve goals that they would not achieve individually. Finally, Norms relate to social capital norms - reciprocity and trust.

Bygballe & Swärd (2019) take a different approach and decompose project partnering into three sets of routines, which together form a cyclical partnering institutionalization process. The first set relates to creating a shared understanding of partnering, a high-level 'philosophical' concept of collaboration. These routines are followed by formal partnering practices that create the collaboration structure. Finally, these are translated in performing and re-enacting partnering practices and routines. The latter inform and improve the understanding of partnering, and a new cycle begins with the improved partnering concept. Behavioural (rules, personal relations) and structural aspects (workshops, co-location) are combined in these routines.

According to Bayliss et al. (2004), three processes ensure success of collaboration: instilling, fostering, and maintaining. Instillation refers to the emergence of the idea of collaboration at the management and executive level. Fostering is the process of explaining collaboration to the team, and maintenance is keeping the adopted collaboration principles alive – as "[…] successful partnering depends on the endurance of the partnering spirit." (p. 255). Thus, collaboration is dynamic and depends on applying specific actions that can contribute to its success, such as partnering workshops, collaboration reviews, newsletters, and incentive contracts.

Hietajärvi et al. (2017) view collaboration as a set of integration mechanisms and divide them into two groups: formal governance (for instance, goal setting, performance incentives in commercial models, processes for collaborative working, written policies and plans), and organizational and relational arrangements (such as organizational charts and job descriptions, interorganizational meetings and working sessions, social gatherings, etc.).

Finally, Yeung et al. (2012), building on studies by Nyström (2005) and Yeung et al. (2007), conceptualise collaboration or relational contracting as a set of essential (the most frequently mentioned in the literature) and non-essential elements. However, the authors do not investigate relationships between these elements (which they recognise as a weakness and need for future research) and do not reflect on their nature (relational or formal). Eriksson (2010) also suggests that there are core and optional partnering elements but offers a different list and classification. While the essential elements in Yeung et al. (2012) are exclusively relational (behavioural), Eriksson (2010) also treats certain formal collaborative techniques, such as partnering workshops or conflict resolution procedures, as core. Prentice et al. (2019) identify a 'collaborative toolbox' of eleven most common collaborative elements that they group into structure, governance and commitment, again combining relational and formal sides.

This variety of approaches to conceptualization and analysis of collaboration demonstrates the complexity and richness of this construct (Hartmann & Bresnen, 2011). Decomposing collaboration into different processes, dimensions, and elements may at first seem to result in mutually excluding approaches. At the same time, all authors demonstrate presence of both formal and relational elements in collaboration. These sources allow us to derive theoretical constructs from the literature to guide our empirical investigation and inform data coding and analysis (Mason, 2017). Based on the literature, we divide formal integrative mechanisms of collaboration (Bresnen & Marshall, 2002; Eriksson, 2015) into the three categories: (1) Governance and administration (2) Support, and (3) Joint work activities. These categories are defined based on distinct roles that they play in collaboration. Table 1 contains definitions of these categories and examples of elements that belong to them.

Scholars use very diverse terminology when talking about the relational (Thomson et al., 2009) or behavioural (Suprapto et al., 2015) side of collaboration, collaborative behaviours and attitudes (Anvuur & Kumaraswamy, 2007) or relational conditions (Bygballe et al., 2016). The term that we use - 'relational norms' - goes back to McNeil (1980), who defines them as expectations about behaviours shared by the parties (Thomson et al., 2009) or norms of social exchange (Benítez-Ávila et al., 2018). The relational atmosphere in the project is dynamic and may change even if the formal contract remains the same (Blois & Ivens, 2006). Actual behaviours of the project team may or may not be in line with the negotiated and established expectations (norms) about them. For instance, when collaborative behaviours are 'prescribed' to the team members, people will obey and attempt to behave collaboratively, but their attitude or internal relational norms may remain adversarial. Thus, it is essential to ensure real behavioural change for the successful collaboration (Baiden et al., 2006). Table 2 presents five relational norms identified in the literature.

2.3. Interplay between formal integrative mechanisms and relational norms

Bresnen & Marshall (2002) and Bresnen (2009) stress that the social dynamics between the collaborating parties in partnering projects cannot be forced and is thus emergent. In contrast, formal integrative practices can be designed or engineered by managers. These authors suggest that the two categories potentially interplay but do not examine their respective roles or how such interplay happens. Thus, project partnering can be considered a result of social interactions in the project team; it is always contextual and cannot be achieved using appropriate parties' selection procedures and contracts. This implies that the role of the formal integrative mechanisms is secondary.

Dewulf & Kadefors (2012) find that formal integrative mechanisms indeed play a supporting role yet state that partnering tools (e.g., co-location, team building events) are important for relationship building. Bygballe et al. (2015, 2016), conclude that the formal side of collaboration is not sufficient but describe it as essential because it supports the relational side and relational exchange. They also find that the interplay of formal (contracts, incentives, communication protocols) and relational elements depends on the context: the time, budget, nature of the relationship, and collaborative experience of the teams. This 'contextuality' of collaborative elements is also stressed by Sedgwick (2017) who concludes that the number and type of collaborative activities depends on the intensity and type of collaborative arrangement.

Hence, current literature appears to be inconclusive about how to conceptualise collaboration and also about the role and the interplay between the formal integrative mechanisms and relational norms in project collaboration. We intend to advance the discussion on this subject by empirically studying two collaborative initiatives and proposing a model of the project collaboration that clarifies the roles of and demonstrates interplay between its two sides.

3. Research method

To understand the interplay between formal integrative mechanisms and relational norms, we studied two collaborative initiatives of a large contractor organization (Contractor), which performs engineering, procurement, and construction (EPC) services in various sectors. Such organizations are viewed as the main drivers of collaboration in construction (Bygballe et al., 2010), as on one hand, they are connected to the project owner/client organization, and on the other hand linked to the rest of the complex project supply chain. Looking at collaborative initiatives of one focal organization allows us to disregard the effects of cultural and contextual differences (Eriksson, 2015) that may lead to

Table 1
Formal integrative mechanisms in project collaboration.

Definitions and sources	Examples of elements that belong to the three categories of formal integrative mechanisms
Governance and Administration Governance of collaboration relates to rules, policies, procedures, norms created to coordinate joint activities (Thomson et al., 2009) and enable collaboration (Klimkeit, 2013). These are structures and formal practices of partnering (Bygballe & Swärd, 2019)	Mission statement about collaboration (Thomson et al., 2009); a formal code of collaborative conduct signed by all parties (Bygballe & Swärd, 2019; Bygballe et al., 2015) Formal agreements that describe relationships (Thomson et al., 2009); formal contract arrangements that require and force partners to cooperate (Dewulf & Kadefors, 2012); collaborative project delivery model formalised in the document used and referenced during the project (Bygballe & Swärd, 2019) Board or steering committee to make decisions about collaboration (Thomson et al., 2009); Alliance Executive team (Hietajärvi et al., 2017); Alliance Board to oversee and direct the project and collaboration (Connaughton & Collinge, 2021) Planning steering by a joint group (Hietajärvi et al., 2017); integrated project team with members from all participants to manage project daily (Connaughton & Collinge, 2021) Collaboration champions appointed at the level of project management and executives (Bygballe & Swärd, 2019)
Administration of collaboration enables translation of collaborative rules and norms into real actions (Sedgwick, 2017); it defines roles, responsibilities, and control procedures within the established collaborative structures (Thomson et al., 2009).	Formal communications channels established for joint decision-making and for resolving conflicts about collaboration (Connaughton & Collinge, 2021) Organizational structure to facilitate joint problem and conflict solving (Bygballe & Swärd, 2019); coordinating bodies, cross-functional teams, liaisons roles established (Hietajärvi et al., 2017) Selection of team members based on their collaborative attitudes or prior successful collaborative experiences (Bresnen & Marshall, 2002); replacement of key functional or project managers that do not demonstrate collaborative approach (Bygballe & Swärd, 2019; Dewulf & Kadefors, 2012) Formal conflict resolution procedures (Eriksson, 2015) Formal rules, routines and practices for collaborative meetings (Bygballe & Swärd, 2019; Hietajärvi et al., 2017) Formal rules for collaborative working in risk management, design, innovation management processes (Hietajärvi et al., 2017) Shared administrative system and open book accounting (Dewulf & Kadefors, 2012); joint IT systems (Eriksson, 2015); open-book accounting (Bygballe & Swärd, 2019) Selection of contractors based on their collaborative capabilities and attitudes (Bresnen & Marshall, 2002; Connaughton & Collinge, 2021; Eriksson, 2015; Hietajärvi et al., 2017)
Support Processes that help collaboration to emerge (develop), maintain and improve (or recover), whenever necessary (Bayliss et al., 2004) Collective learning processes through which collaborating team develops understanding about what collaboration is and how to collaborate (Connaughton & Collinge, 2021).	Collaborative workshops to develop trust and discuss understanding of collaboration of the parties (Ruijter et al., 2020); series of workshops in early phases to boost collaboration and develop Alliance charter (Connaughton & Collinge, 2021); social trip to discuss and sign a formal collaborative code of conduct (Bygballe & Swärd, 2019) An independent collaboration facilitator (consultants) to encourage collaborative working and support (Connaughton & Collinge, 2021); resolve disagreements, establish cultural and behavioural norms in the alliance team (Galvin et al., 2021) Team-building events and workshops for the top management and also for the team (Bresnen & Marshall, 2002; Dewulf & Kadefors, 2012) Incentive system that rewards collaboration (Dewulf & Kadefors, 2012; Hietajärvi et al., 2017); Alliance fund to cover design and management of alliance and risks (Dewulf & Kadefors, 2012); shared incentive linked to the overall project performance (Eriksson, 2015) Collocation of project team to create collaborative culture, engage in-person formal and informal collaborative activities, improve relationships and help trust development and problem-solving (Bresnen & Marshall, 2002; Bygballe & Swärd, 2019; Bygballe et al., 2015; Dewulf & Kadefors, 2012; Kokkonen & Vaagaasar, 2018) Formal evaluation of success of collaboration (Thomson et al., 2009) The team that wishes to collaborate but lacks collaborative experience visits projects in which collaboration is successfully implemented (Bygballe & Swärd, 2019; Dewulf & Kadefors, 2012) Project managers from all collaborating parties follow a course about collaboration and conflict resolution (Bygballe & Swärd, 2019) Integrative activities for all levels, including 'blue collar' workers (joint lunch rooms, collaboration questionnaire) (Eriksson, 2015)
Joint Work Activities Project participants collaborative "actions and interactions" (routines in practice) Bygballe & Swärd (2019, p.168). Joint efforts for project management, problem solving, continuous improvements and making decisions (Meng, 2012; Thompson & Sanders, 1998).	Joint decision making workhsop about sustainability goals in the project (Connaughton & Collinge, 2021) Client and contractor establish groups to work on the implementation of lean principles (Bygballe & Swärd, 2019) Production plan is developed in multidisciplinary working groups (Bygballe & Swärd, 2019) Managers from all levels in the collaborating parties regularly meet to discuss project plans, work schedules, progress and issues (Bygballe & Swärd, 2019; Bygballe et al., 2016; Dewulf & Kadefors, 2012) Collective discussions of project risk assessment and audits to diminish conflicts (Dewulf & Kadefors, 2012) Working groups for security, cost control, technical execution, external stakeholder communication, etc. (Hietajärvi et al., 2017)

Table 2
Relational norms in project collaboration.

Relational norms	Source and explanation
Win-win philosophy	As parties are interdependent, they together can reach a goal that they cannot reach individually (Thomson & Perry, 2006; Thomson et al., 2009) Interest of every party is best served when the overall objective is reached (Meng, 2012) Neither party wins if others lose; recognition of mutual benefits (Yeung et al., 2012)
Shared vision and values	Existence of common objectives and agreement about ways to achieve them is key for collaboration success (Yeung et al., 2012) Superordinate goals (Beck & Plowman, 2014)
Commitment	Parties need to commit to changing part of their identity to reach mutual goals and put them above individual objectives (Thomson & Perry, 2006; Thomson et al., 2009) Agreement to pursuing shared objectives (Yeung et al., 2012) Top-management support of collaboration (Suprapto et al., 2015)
Transparency (openness)	Each party needs to balance its independence and collaboration, and share information necessary for the success of collaborative exchange (Thomson & Perry, 2006; Thomson et al., 2009) Open, frequent, balanced, reciprocal communication at all organizational levels (Cao & Zhang, 2011) Two-way communication: listening to each other and giving feedback at different project levels (Xu et al., 2021) Open exchange of information, but also ideas and visions decrease the number of misunderstandings and promotes trust (Meng, 2012)
Trust	Trust is a psychological state of individual members of the project team (Kadefors, 2004) Trust is needed for successful collaboration (Benítez-Ávila et al., 2018; Kadefors, 2004); at the same time, reinforced trust is its outcome (Nevstad et al., 2018) Trust is linked to no-blame culture (Meng, 2012; Suprapto et al., 2015) Interpersonal trust facilitates collaboration (Vukomanovic et al., 2021) Trust in projects is dynamic and manifests itself both in structures (trust-related rules) and in interactions (trustworthy behaviours) (Xu et al., 2021)

differences in the "manifestation of partnering" (Bresnen, 2009, p.927). The two collaborative initiatives we selected for our study are introduced below.

Initiative I - Team alignment. This initiative came about as an effort to align the project team's activities when preparing the project design and the high-level schedule and cost estimate package. The team included representatives from the Client and Contractor organizations. The project started traditionally: the Contractor won the competitive tender, and a cost-reimbursable contract was signed. Initially the team members were based in their respective offices, combining work on this project with several other projects. However, after several months it became clear that there was "no good chemistry" (Design manger, Contractor) in the team, and the Client was not satisfied with the quality and the speed of the work. The project directors on both sides were replaced to change the relationships and course of action. The newly appointed director from the Contractor side proposed a collaborative way of working, based on own positive experiences. Several functional managers with collaborative attitudes and experiences were brought on board. A number of collaborative activities were implemented in the team. They were designed based on experience from previous projects but considering the specifics of the project phase (early planning), size of the team (about 50 people), and expected deliverables. This collaborative work continued for approximately eight months, until the Client organization received the project documents, and the project team was dissolved.

Initiative II - Maximizing team potential. This initiative was part of a project that also started traditionally. The Contractor was selected based on competitive tendering procedures and was engaged in the cost-reimbursable contract for the engineering and the execution phases of the project. A Client executive suggested bringing in collaboration facilitators to improve the organizational effectiveness of the team of approximately 200 people and to coach the team to work together in the best possible manner. Safety as a key shared value - and also the process that required extra attention - was chosen as the target area. This effort was 'picked up' by the Contractor project director, who played the role of the collaboration champion and expanded the collaborative approach to processes and team members beyond the safety group in the engineering phase.

In the execution phase, the project experienced a series of delays, and it became clear that collaboration between the Client and Contractor only was not sufficient to mitigate the delay risk. The Contractor project director suggested that a partnership between all the key parties would be the only way to complete the project with minimum delays. This idea was approved by the Client, and the collaboration scope grew from two to six parties, including four subcontractors.

At the time of our data collection Initiative I was still ongoing, which provided to us an opportunity to engage in non-participant observations of the collaborating team and uncover their daily collaborative practices and behaviours. As "[…] observation allows the generation of multidimensional data on social interaction in specific contexts as it occurs, rather than relying on people's retrospective accounts" (Mason, 2017, p. 86), the first author spent three days a week in the project team for the period of six months. We also conducted 26 semi-structured interviews with the team members to improve our understanding and interpretation of observed behaviours and collaborative practices.

To increase our data richness, we also included in our study Initiative II which by the time of our data collection had been just completed. For this reason, the recollection bias (Voss et al., 2002), which is a common problem for retrospective studies, was low, and interviewees and project documentation were easily accessible. Many of the Contractor team members (managers or leads/supervisors) participated in both initiatives, and the project director (collaboration champion) was the same person. We conducted separate interviews dedicated to these collaborative initiatives. In total, we conducted 37 semi-structured interviews to study Initiative II. Appendix A lists the interviewees in both initiatives.

We took several steps to ensure the high methodological quality of our research. We triangulated all the collected data. Our non-participant observations in the Initiative I were complemented by multiple interviews. For the Initiative II, studied retrospectively, we had access to all progress project reports (38 monthly documents), from which we were able to reconstruct the collaboration 'storyline'. We also asked respondents to clarify particular events that we discovered in these documents, and examined previous research focused on the second collaborate initiative (master theses) to clarify and verify some events. During all our interviews, we asked similar questions to several respondents (who, when possible, also belonged to different organizations) to compare and verify the information we received from the interviewee. Finally, studying one collaborative initiatives 'live' and one retrospectively allowed us to improve our interview protocols and depth of investigation and interpretation.

In our research, we chose the collaborating team as the level of analysis, studying formal integrative mechanisms and relational norms with underlying collaborative behaviours. By looking at the team rather than contrasting collaborating organizations' points of view, we followed the advice of Wood & Gray (1991) and Thomson et al. (2009) to focus on the collaboration domain. Also, construction is essentially a 'team-based industry', in which project teams comprising members of various organizations drive the project from its inception to completion and play a key role (Anvuur & Kumaraswamy, 2007; Walker et al., 2017).

Various approaches to conceptualizing collaboration informed our data coding, which ensured internal validity of our research (see Section 2, Tables 1 and 2). Our main constructs, or aggregated theoretical dimensions were relational norms (Thomson et al., 2009) and formal integrative mechanisms (Bresnen & Marshall, 2002; Eriksson, 2015) - see Fig. 1 for details. The approach to data analysis was abductive (Dubois & Gadde, 2002): the literature informed our theoretical constructs, and thus they appeared from the data deductively. We first identified examples of formal integrative mechanisms and behaviours underlying the relational norms. One of the relational norms (Respect) emerged from the data and was coded inductively and added to the list of relational norms. In the next step, we examined the relationship between the three categories of integrative mechanisms. Finally, the interplay between the relational norms and formal mechanisms was analysed inductively, as these relationships have not been previously established in the literature.

4. Findings

4.1. Formal integrative mechanisms in the two collaborative initiatives

Based on the analysis of the observations, interviews, and the project documentation of the two initiatives, we created a full list of identified formal integrative mechanisms (see Appendix B). As these mechanisms are context-dependant and vary per collaborative initiative, we will not describe them all, but instead focus on how such mechanisms were developed or what role they played.

4.1.1. Governance and administration mechanisms

The rules, procedures, and relational norms of collaboration were developed and agreed upon in several ways. There was little effort to document the collaboration rules and norms in Initiative I. Time was short, the team was small, and some of the Contractor's team members had just completed another collaborative project – Initiative II. Initiative I borrowed the project charter elements from Initiative II,[1] and the guiding work principles and meeting rules were simply placed on whiteboards in the team meeting ('mission control') room.

When collaboration between the Client and the Contractor started in Initiative II, the project charter was developed during several team sessions. The charter was then printed on posters and made visible to the team in the office and on site and was repeatedly referred to in the work and team discussions. When the scope of collaboration grew to six parties, a partnership declaration was jointly created by managers of all the parties. It incorporated the values and interests of all participants. A similar approach was taken to disseminate it amongst the team.

The extended collaborating team also developed new ways of working. It held daily joint manager meetings to discuss the planned work, take the necessary coordination steps, and monitor project progress. The team members also agreed on the principles of open information sharing, striving for unanimous decision-making, helping each other, and focusing on what was best for the project. All partnership parties had an equal voice, regardless of their actual scope of work and contribution to the project.

4.1.2. Support mechanisms

Initiative I included only a few formal team integrative events. Just one information and alignment session for the whole team was held to introduce the collaborative approach. This was a presentation of new ways of working followed by an informal social gathering. The Client project director explained that more formal team-building events were not possible due to a lack of budget in a cost-driven project and to a lack of time and interest, given the time pressure. Yet, many team members admitted that another event like this would have been useful for a better alignment.

In Initiative II, Client allocated a budget for collaboration and time for developing collaborative team skills (this project was schedule-driven). Collaborative consultants (facilitators) were engaged to analyse and improve team effectiveness. Individual coaching sessions were organised for managers and facilitated alignment sessions for the management team. "It was important to have a break and to speak about collaborating and aligning goals. Sometimes it was difficult to make time for that, and not everybody was always willing… but it matters when some big decisions about the project course need to be made. And I think consultants were really useful by steering us through these discussions […]" (Construction/site manager, Client). Certain team-building events, although infrequent, were held, orchestrated around collaborative activities (e.g., building a kite in a team). Weekly team recognition events were highly appreciated by the team and distinguished this project from others. "It was like small weekly celebrations […] We received minimal rewards, but the recognition itself was important. Everybody could nominate anyone […] It was an easy way to boost the team spirit. […]" (Project deputy director, Contractor).

When the scope of collaboration increased from two to six parties, consultants facilitated partnership creation through alignment sessions with directors and managers of all participants. A substantial 'bottom up' effort to align parties' views and opinions took place. Although this approach was time-consuming, it was necessary as a fundamental behavioural change was required from the subcontractors to create a feeling of involvement in the partnership development. Because the team was big, most 'active' collaboration events were centred around the management level. The whole project team was included in collaboration through a number of team-building events, visualization of project and partnership principles on the posters on site, and regular newsletters.

In Initiative II, a shared financial incentive targeted at the project completion date was implemented for all partnership participants and, according to the interviews, played a very important role in collaboration and project success. "We all acted as partners for the benefit of the project, but also because we felt comfortable in taking decisions that required a big investment. We were aware of a clear completion scheme that granted a big prize to all of us." (Executive, subcontractor I). "I think incentive was a critical factor. It wouldn't have worked without it. I personally know [Contractor project director, name], so if he asks me to help, I'll help him. But why would I help someone I don't know?" (Executive, subcontractor H). Suggested new ways of working – helping each other instead of benefiting from each other mistakes - meant fundamental behavioural changes at all team levels. The incentive was also offered for site workers, as changing the principles of behaviour on site was essential. Each month, the site crews received a gift voucher based on the collaborative behaviours demonstrated in their daily work.

Towards the end of Initiative I, the project team undertook several measurements of collaboration. The results were discussed during a team workshop and in management meetings. As the construction manager of the Client organization commented, "We now collaborate to talk about collaboration"; the team actually appreciated the opportunity to think about collaboration and its purpose in the project. Collaboration and alignment were also measured in Initiative II. In the execution phase, collaboration measurements were even performed at the level of site crews ('boots on the ground'; for that purpose, the questionnaire was translated into 17 languages to reach all the workers).

In both initiatives, the project teams were co-located to facilitate personal communication and promote openness and trust. Functional managers and some of the leads had a counterpart in both projects, so they 'worked in couples' to maximise efficiency and alignment; both these actions also helped to develop relationships and trust on the daily basis. "I'm very satisfied about working with [name]. I think we managed to build trust and a good relationship from the beginning. For example, in the beginning I showed him what we had done with other

[1] Chronologically Initiative II precedes Initiative I. However, as we studied Initiative I 'real-time' and collected richer data on it, we present it first.

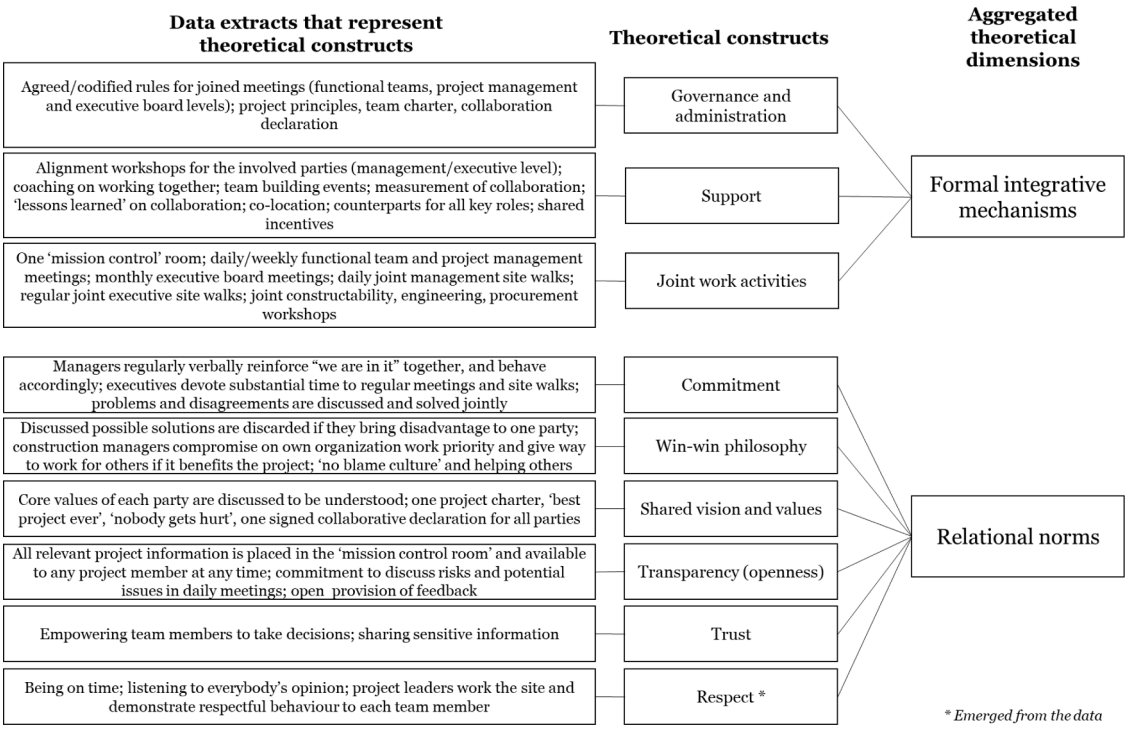

Fig. 1. Data structure.

clients so that he could review this and provide feedback to me in terms of level of detail and if that was sufficient. I think this created a feeling of openness that's very important." (Lead, electrical engineering, Contractor).

4.1.3. Joint work activities

A variety of regular project management activities provided ample opportunities for application of collaborative behaviours in both initiatives. Experience with collaboration in Initiative II allowed for a 'jump start' of multiple integrative activities in Initiative I. The way of conducting daily meetings, workshops, progress reviews, etc. changed from the traditional "client-contractor reporting mode" (Lead, instrumentation, Contractor) to joint problem identification and solving efforts. Our observations of daily management team meetings in Initiative I showed that some team members initially were sceptical about the new ways of working in the beginning. However, the appreciation for collaboration grew with time. At first, the team required reminders about the behavioural and procedural rules established for such meetings, for example, the flow of the conversation or time control. People often skipped these meetings or turned up late. After some time, more team members attended, the discussions became more open, and constructive conflicts occurred, signalling openness in expressing genuine opinions. The team also talked about the purpose and the output of these meetings, which led to adjustments in the meetings' agenda or frequency.

Functional team meetings included managers, team leads, and certain key team members. These meetings were very important, as they were the platform for translating the collaboration message from leadership to team level. The meetings, in particular in the engineering team (the biggest functional group), went through a series of scope, topic, and time changes, to adjust to the evolving team needs and phases of work.

When the scope of collaboration expanded in Initiative II from two to six parties, more effort was needed to encourage collaborative behaviours. A 'boost' of regular project team meetings, manager site walks, executive meetings and site walks, and team co-location played a role in the team integration speed. "I had about eight to twelve meetings with all crews explaining what partnership is. For them it was new, and they had to change their attitude […] I was there once or twice a week, talking to the foremen, our crews, and management. I think they trust me. Trust is very important. If you're not on site it doesn't work." (Executive, subcontractor H).

4.2. Relational norms and corresponding collaborative behaviours in the two collaborative initiatives

As relational norms and behaviours are not separable from the actions in which they manifest themselves (Baiden et al., 2006), we connect their discussion to the relevant formal integrative mechanisms. The full list of relational norms, corresponding behaviours and how they link to integrative mechanisms is provided in Appendix C.

At the beginning of the collaboration, the team needed to agree on relational norms or expected behaviours. In Initiative II, relational norms were developed through joint discussions and incorporated in the project charter and the partnership declaration. Initiative I borrowed the key values and working principles from Initiative II. In both cases, these discussions took place at the executive/management level.

In Initiative I, there was a focus on regular, daily collaborative behaviours in joint work activities by encouraging people to openly share opinions, give respectful feedback, and express concerns or disagreements. Collaborative rules of daily meetings were agreed and placed on a whiteboard in the 'mission control' room. In both initiatives, relational norms and expected behaviours were regularly explained by the managers to the team, and inappropriate behaviours – commented on and corrected. "You have to constantly mention and explain to people that you have expectations, that you raise expectations about their behaviours. You have to focus on the behaviour of people." (Engineering manager, Client). The Contractor project director and functional managers - the champions of collaboration - also demonstrated desired behaviours to the team through leading by example. Emphasis on the behavioural side was placed in every team meeting, either at the functional or management level. We observed that with time, the team members learned to behave differently: there was more desire to express opinions, more dialogue, more instances when disagreements were openly discussed and constructively resolved. A particular focus on

respect to every team member was key, potentially because traditional projects without a focus on collaboration do not assume that every team member's input and personality is treated equally. Demonstration of respect acknowledged the contribution of each team member. This was also shown in the behaviour of the project directors. Whenever they needed to speak to team members, they would walk to their desk, rather than calling them to their office, stressing equality and respect.

Many team members mentioned that collaboration in Initiative I was relatively easy during the early project phase, calling it collaboration 'honeymoon'. Agreeing on deliverables did not meet any obstacles, and making changes was easy and inexpensive, so a win-win approach was natural, and there were no grounds for tension between individual and mutual interests. However, we still observed variability of behaviours in the team. For example, although functional managers were expected to behave collaboratively (e.g., attend daily management meetings and communicate with the rest of the team), some could not truly adopt the collaborative relational norms, which led to a lack of collaborative activities or a lack of sharing information within their own group. At the same time, the highly collaborative attitudes of other managers led to a higher number of integrative practices within the team, including social gatherings outside work hours.

In Initiative II, managers' behaviours and attitudes towards collaboration also varied. For instance, collaboration was very successful in the safety team, where both the Client and Contractor managers shared collaborative attitudes and showed a high level of agreement about the decisions and management approach. At the same time, the attitude of the construction manager from the Client side was very different. He was described as "very knowledgeable and professional, but very old school, arrogant […] and frequently shouting at people" (Construction manager, Contractor). This attitude seriously hindered collaboration in the functional group. "We wanted to collaborate, but he put blocks between us" (Construction manager, Contractor). The climate in the functional group quickly changed once this manager was replaced.

In the extended partnering team, attitudes and behaviours also varied. However, although "there was quite some shouting in the room" (Site manager, subcontractor J), parties were always able to agree on what was best for the project and were open in admitting there were problems and asking for help.

In addition to shared incentive, consultant support activities positively contributed to behaviours and collaboration. For example, the collaboration coach provided feedback about the team's behaviours and coached them to give respectful feedback in Initiative I. Consultants engaged in Initiative II helped the team managers to develop leading and empowering behaviours and facilitated development of collaborative spirit and alignment of executive and managers from all parties once collaboration was extended to the subcontractors.

In the next section we discuss how our empirical findings on the roles of formal integrative mechanisms and relational norms advance the existing literature and offer the project collaboration model to demonstrate the interplay between the two sides of collaboration.

5. Discussion and implications

5.1. Relationship between the three categories of formal integrative mechanisms

The chosen formal integrative mechanisms are unique in every collaborative project, as they are tied to the purpose and context of partnering (Bygballe et al., 2015; 2016; Prentice et al., 2019; Sedgwick, 2017). Our data shows that even if these integrative mechanisms are borrowed from another collaborative project, they will be adjusted over time to meet the requirements of a particular team. Moreover, we also confirm that formal integrative mechanisms are dynamic and evolve with the needs and experience of the collaborating team (Bygballe et al., 2015; Hietajärvi et al., 2017). This dynamic can relate to the evolution of the ways daily joint work activities are executed (such as the frequency, duration or agenda of team meetings), to the set of mechanisms that foster (Bayliss et al., 2004) and support collaboration (for instance, engagement of consultants if collaboration needs extra support) or even to changes in the governance mechanisms (e.g., introduction of formal collaboration declaration if the number of collaborating parties grows).

Despite the contextuality and dynamics, our empirical analysis confirms earlier theoretical assumption that the formal integrative mechanisms can be classified into three categories based on their distinct role in the project collaboration. Moreover, these categories seem to be connected in a particular 'hierarchical' way. The first category, Governance and administration, forms a framework of processes and procedures of collaboration (Thomson et al., 2009). This framework appears first and is often developed in the partnering workshops early in the collaborative initiative (Connaughton & Collinge, 2021; Ruijter et al., 2020). In this way, the second category - mechanisms aimed at collaboration Support - provides a platform for creating collaboration 'rules'. Other elements in this category allow the team to practice collaborative behaviours or enable daily relationship building and joint problem-solving, for example, through team co-location (Kokkonen & Vaagaasar, 2018). They can also encourage engagement in collaboration through shared incentives (Eriksson, 2015; Hietajärvi et al., 2017). Overall, the Support category helps translating the rules and norms agreed by executives or project managers into team routines in practice (Bygballe & Swärd, 2019). The third category of integrative mechanisms - Joint work activities - creates a feedback loop to the Governance and administration level and may signal a need for a change in the rules. For instance, over time, collaborative daily management activities can become redundant or need to be redesigned to suit the team's evolving needs. Struggles in the daily joint work activities can also signal that more activities are needed to support collaboration - thus connecting to and influencing activities in the second category of integrative mechanisms.

5.2. Link between governance and administration mechanisms and relational norms

At the beginning of a collaborative initiative, the team needs to establish rules and procedures, define the roles and responsibilities of parties and various management actions (Thomson et al., 2009). The team also has to negotiate the relational norms to ensure that all team members have a similar understanding of what collaboration means for that particular project (Eriksson, 2010; Ruijter et al., 2020).

The level of formalization and codification of these rules and norms may be positively associated with the team size and the scope of collaboration. The more parties participate in the collaboration, the more likely the potentially divergent cultures and processes need to be aligned formally (Matinheikki et al., 2016). Our data also confirms prior findings that the level of codification may be negatively correlated to the level of collaborative team experience. The experienced team in Initiative I, in which some members had a prior collaborative experience, required less effort to establish rules and procedures to collaborate (Bygballe et al., 2015). Thompson & Sanders (1998) and Eykelenboom (2018) stress the importance of codifying the relational norms in a project charter or declaration of collaboration. Such a document signed by all participants signals alignment and agreement about the key principles and goals of collaboration (Bygballe et al., 2015; Connaughton & Collinge, 2021).

Furthermore, it is necessary to align the relational norms with formal processes and procedures of collaboration. For instance, if one of the relational norms relates to openness and sharing information, channels through which information is shared need to be made available for the team (e.g., project information in the 'mission control room', regular joint meetings to support openness and the ability to share information). At this level, the team creates the highest 'philosophical' level of understanding of what collaboration means and how it will happen

(Bygballe & Swärd, 2019); negotiated relational norms form part of the larger set of agreed rules, processes, and procedures about the collaboration. The relational and formal sides need to be established in parallel, as this is vital for their alignment and harmonization. At the beginning of the collaboration, both established processes, procedures, and norms signal intended, future collaborative actions, and expected behaviours (Thomson et al., 2009). Taken together, this is the level of the *rules* of collaboration in the project collaboration model (see Fig. 2 below).

5.3. Link between support mechanisms and relational norms

Prior research shows that not all projects practice team building activities (Dewulf & Kadefors, 2012), although Bygballe and Swärd (2019) discuss such routines as workshops and co-location as typical partnering practices. There is no agreement in the literature about whether these are core or optional integrative mechanisms. Eriksson (2010) suggests that start-up partnering workshops, follow-up workshops, and team-building events constitute the core collaborative tools. Bayliss et al. (2004) also state that regular collaborative workshops are important for collaboration success. At the same time, Yeung et al. (2012) report that facilitated workshops and continuous collaboration improvement are non-essential.

We find that support mechanisms have a distinct and important role as enabler of collaboration. They may vary in scope, intensity (frequency), complexity, cost, and effect. The choice of these mechanisms seems to relate to several aspects. First, a general perception of their importance and need for them (Dewulf & Kadefors, 2012). Second, big team-level events that are costly and complex to organise may depend on budget and time pressure (Bayliss et al., 2004). Thirdly, the collaboration experience of the team: if the key team members (functional managers, project directors) share a collaborative past, fewer alignment mechanisms are needed (Bygballe et al., 2015).

Initially, alignment workshops at the executive and management level, especially with external facilitators, can help the team agree on collaboration objectives and rules and ensure alignment between the parties (Connaughton & Collinge, 2021; Hietajärvi et al., 2017; Ruijter et al., 2020). However, not only managers but all team members need to learn how to collaborate and support mechanisms provide a platform for this purpose (Bresnen, 2009; Eriksson, 2015). Various support mechanisms help to translate negotiated relational norms into real behaviours by exposing team members to collaborative practices, making them reflect on collaboration (for instance, in collaboration measurement undertakings), or simply providing opportunities for their joint cooperation and communication through co-location or availability of counterparts (Kokkonen & Vaagaasar, 2018).

Co-location is an effective collaboration enabler, as it creates an opportunity and desire for open and more intense communication (Bresnen & Marshall, 2002; Bygballe & Swärd, 2019) and the development of personal relationships. Even if other team-building events and techniques are absent, co-location creates a "[…] close social context [that] allowed for personal relationships and joint understanding to emerge without explicit team-building or other partnering measures" (Dewulf & Kadefors, 2012, p. 247). Our findings confirm that co-location facilitates direct communication and develops trustful relationships. It was especially appreciated when the collaboration scope expanded: being close and discussing all the questions and issues results in more effective teamwork. In both initiatives, the teams had dedicated space for their meetings (Kokkonen & Vaagaasar, 2018) where key project information and behavioural principles were displayed, encouraging open communication and demonstrating transparency.

The use of incentives in partnering can be an important way of reinforcing collaboration in the short term and helping to build trust between clients and contractors in the long term (Eriksson, 2015). In our study, financial incentives were applied when the scope of the collaboration in Initiative II expanded, and the behaviours and actions of multiple parties had to be aligned quickly and efficiently. Incentivization was a key driver in the team's effort to change from traditional to collaborative behaviours. Yet, incentivization remains a controversial

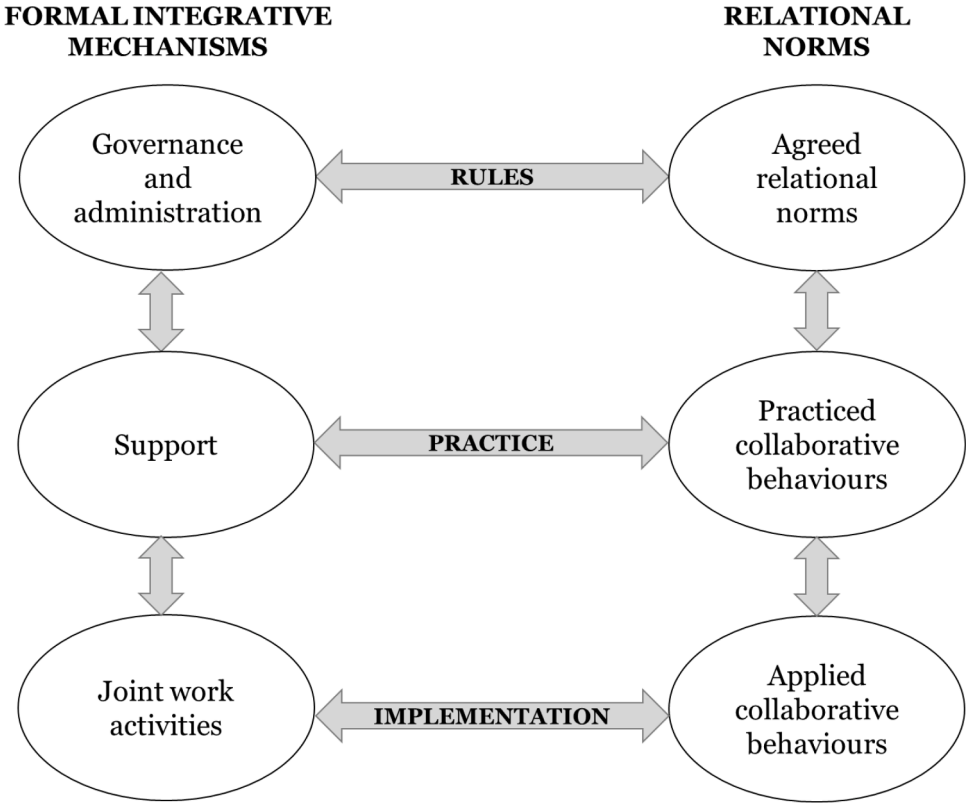

Fig. 2. The interplay between formal integrative mechanisms and relational norms in project collaboration.

subject in research and practice as also stated by Dewulf & Kadefors (2012). It is not recognised as an essential element of collaboration (Tang et al., 2008; Yeung et al., 2012), but can create common goals (Anvuur & Kumaraswamy, 2007). However, if it is not designed and managed properly, it can drive collaborative relationships in the wrong direction (Suprapto et al., 2015).

In sum, the second category of integrative mechanisms plays an important role in providing an opportunity for the team to focus and reflect on the importance of collaboration and develop collaborative behaviours. In essence, it is the support of collaboration or level of *practice* of collaborative relationships in the proposed project collaboration model (Fig. 2).

5.4. Link between joint work activities and relational norms

Collaboration does not replace solid project management, but transforms it (Eykelenboom, 2018). The regular exercise or practical collaborative routines is extremely important (Bygballe & Swärd, 2019). Yet, the intention to execute daily work activities together with a partner (e.g., conducting daily planning meetings together) does not by default make them integrative mechanisms: applying collaborative behaviours within them does.

Our study shows that any project management activity may become an integrative mechanism if collaborative behaviours are present in it. Regular joint work activities create the strongest and the most recurring links: they provide an opportunity to exercise collaborative behaviours (Jacobsson & Roth, 2014) and develop personal relationships and trust for all team members without limitation to the management level (Bresnen & Marshall, 2002; Xu et al., 2021). At this level, the role of functional managers as 'translators' of collaboration from the top level to the team is very important. Our data shows that when managers do not behave collaboratively, their teams cannot collaborate either. In these cases, replacing non-collaborative managers is the right decision (Bygballe & Swärd, 2019; Dewulf & Kadefors, 2012).

The role of joint work activities is crucial. If agreed relational norms and corresponding collaborative behaviours are not pursued in regular project management activities, collaboration remains an abstract intention on paper (Ruijter et al., 2020). However, if appropriate behaviours are exercised daily in multiple joint work activities, over time, the agreed relational norms become adopted and 'lived by' norms of the team, leading to a real, fundamental change of behaviours (Baiden et al., 2006). Thus, this is the level of the true *implementation* of collaboration in the project collaboration model (Fig. 2).

5.5. A project collaboration model - the interplay of integrative mechanisms and relational norms

Splitting the formal integrative mechanisms of project collaboration into three distinct categories allows us to uncover their role in more detail and to make a step forward towards understanding the nature of their interplay with the relational side. The three categories of these mechanisms – Governance and administration, Support, Joint work activities - provide an arena for relational norms to be developed and agreed, and for collaborative behaviours to be practiced and implemented. The relational norms and collaborative behaviours, in their turn, change the way the traditional project work is executed, making joint work activities truly integrative. Thus, we view the two sides of collaboration as complementary. Both need to be considered for project collaboration to be properly understood but, above all, to happen.

The nature of formal and sides of collaboration are indeed different. We confirm the existing opinions that it is possible to design or engineer a set of formal integrative practices and tools. However, it is impossible to force the relational side of collaboration (Bresnen, 2009), as people need to accept it voluntarily and need time to embrace it (Eykelenboom, 2018). Given the different nature of both sides, project collaboration understood holistically is neither engineered nor emergent. For a complete understanding of the process of collaboration (Cao & Zhang, 2011), we need to take into account the complementarity of its sides and acknowledge their unique features. We present the project collaboration model that visualises the answer to our research question - the interplay of formal integrative mechanisms and relational norms in the project collaboration.

Previous research stressed both contextuality and complexity of project collaboration (Bygballe & Swärd, 2019; Eriksson, 2010; Hartmann & Bresnen, 2011). Our approach – focus on the role rather than a particular set of dynamic and contextual collaboration elements - allows overcoming the problem of perceived uniqueness of each collaborative project (Bresnen, 2009; Bygballe et al., 2015). It also allows clarifying the respective roles of the two sides of collaboration and ultimately illustrating the potential interplay between them. In sum, our model makes a step towards a more clear and generalizable view on the project collaboration (Prentice et al., 2019) and understanding what collaboration really means (Stout & Keast, 2021).

6. Conclusions, limitations, and future research directions

6.1. Theoretical contributions

Our research adds to the body of literature that views project collaboration or project partnering as an approach not limited to a particular project delivery strategy but as a set of relational norms and formal management activities that lead to team integration and the maximization of its potential (Eriksson, 2010). So far, scientific studies about the interplay between the two sides of collaboration have been inconclusive. The existing literature suggests a 'support' role of the formal side of collaboration to the evolving social exchange through which collaboration truly happens and finds that the interplay is context-specific. In this empirical study, we uncover the roles of the two aspects of collaboration and the nature of their relationship. We find that context-specific formal integrative mechanisms can be classified into three categories according to their distinct role in the collaboration: (1) Governance and administration (2) Support (3) Joint work activities. We also clarify how relational norms and behaviours are related to each of the three categories of integrative mechanisms. In this way we advance collaboration theory by proposing a more complete and at the same time fine-grained view on collaboration in a project environment.

6.2. Practical implications

This study provides insights for project organizations on how to approach collaboration design and management. We highlight the importance of paying equal attention to the formal integrative mechanisms and relational norms of partnering, and alignment of both sides. The set of integrative mechanisms and the number and wording of relational norms will always be unique for every project and is likely to change as collaboration evolves. However, understanding distinct roles those formal integrative mechanisms play allows investing effort in each of the categories proportional to the team's needs. For collaboration to really happen, it is not sufficient to establish its rules and conduct integrative events. Collaboration must be practiced on a daily basis in all project management activities. Applying collaborative behaviours in these activities is what makes collaboration 'real'.

The role of functional managers is crucial in translating negotiated expected behaviours into truly collaborative behaviours of every team member; collaborative leaders at the top project level cannot do this alone. If key managers do not demonstrate the required collaborative behaviours and acceptance of negotiated norms, they may have to be replaced.

6.3. Limitations and future research

The data in our study originates from a rather small number of

collaborative initiatives involving the same organization. While the findings may be generalizable to the project settings in different industries, replication studies would be needed in other empirical settings to enrich or challenge our findings.

The collaborative initiatives that we studied represent an example of ad hoc, non-prepared collaboration. Studying the interplay of integrative mechanisms and relational norms in a context of formal, contractual collaborative strategies with parties selected based on their collaborative capabilities, may demonstrate specific features that we have not been able to uncover. Finally, while the project team is a very suitable level of analysis in studies of the project collaboration, changing the level to individual or organizational will likely bring additional insights into our proposed model of the interplay between integrative mechanisms and relational norms in collaborative projects.

Appendix A. List of interviewees

Initiative I (26 interviews in total)

Role in the project and total number of interviews	**Project directors** 2 interviewees 3 interviews	**Quality** 1 interviewee 2 interviews	**Design** 2 interviewees 2 interviews	**Engineering & Safety** 10 interviewees 10 interviews	**Construction** 3 interviewees 3 interviews	**Procurement/ contracting** 2 interviewees 2 interviews	**Project controls** 3 interviewees 3 interviews
Client 9 interviews	Project director 1 h F2F	*No quality representatives in the team yet*	Design manager 55 min F2F	Engineering manager 1 h F2F Lead, civil 1 h 10 min F2F Safety manager 50 min F2F	Construction manager 1 h F2F Site manager 1 h 30 min F2F	Procurement manager 45 min F2F	Project controls manager 50 mins FTF
Contractor 16 interviews	Project director 2 h 1 h 20 min Both interviews F2F	Quality manager 1 h 50 min Both interviews F2F	Design manager 1 h 10 min F2F	Engineering manager 1 h 30 min F2F Lead, civil 1 h F2F Lead, mechanical 1 h F2F Lead, piping 1 h 15 min F2F Lead, electrical 1 h 10 min F2F Lead, instrumentation 50 min F2F Lead, safety 1 h 15 min F2F	Construction manager 2 h F2F	Contracts manager 1 h F2F	Project controls manager 1 hour F2F Lead, scheduling 1 hour F2F

+1 interview 50 min F2F with the collaboration/lean coach

Initiative II (37 interviews in total)

Role in the project and total number of interviews	**Project director /manager/site manager** 7 interviewers 9 interviews	**Quality** 1 interviewee 1 interview	**Safety** 1 interviewee 1 interview	**Engineering** 5 interviewees 5 interviews	**Construction** 4 interviewees 4 interviews	**Procurement/ contracting** 4 interviewees 7 interviews	**Project controls** 2 interviewees 2 interviews
Client 5 interviews	Project manager 1 h phone Deputy project manager 1 h phone	*No manager, function was outsourced*	*Manager not available*	*Manager retired*	Construction/ site manager 1 h 40 min phone	Procurement & contracts manager 1 h phone 30 min phone	*Manager on long-term leave*
Contractor 21 interviews	Project director 3 interviews x ~1 h F2F Deputy project director 1 h 20 min FTF	Quality manager 1.5 h F2F	Safety manager 1 h phone	Engineering manager 1 h 30 min F2F 1 h 10 min F2F Lead, electrical 1 h F2F Lead, civil 1 h 15 min F2F Lead, piping 50 min F2F	Site manager 1.5 h F2F Modular yard manager 1 h phone Construction manager 1 h 10 min phone	Contracts manager 3 interviews x ~ 1 h F2F Contract engineer 1 h F2F Project materials manager 1 h 30 min F2F	Project controls manager 1 h 30 min F2F Senior estimator 1 h F2F
Subcontractor H 2 interviews	Project executive 1 h phone Site manager 1 h phone						
Subcontractor I 2 interviews	Project executive 1 h phone Site manager 1 h phone						

(*continued on next page*)

(*continued*)

Subcontractor J 2 interviews	Project executive 1 h 15 min phone Site manager 1.5 h F2F
+ 3 interviews with collaborative consultants (1 h 15 min phone, 1 h phone; 1,5 h F2F)	
+ 2 interviews with student researchers on the project (both phone, ~1 h each)	

Appendix B. Formal integrative mechanisms identified in the collaborative initiatives (full list)

(based on observations, interviews, and analysis of the project documentation)

Initiative I	Initiative II
Governance and Administration	
• Agreed rules about conducting daily management and functional team meetings (time, duration, order of flow, behavioural rules) • Key project principles adopted from another collaborative project; not formalised but visualised in the project team meeting room • Project team org chart that shows all team as one - available for all team members (shows counterparts, names and people's photos)	• Team charter • Collaboration (partnership) declaration signed by all partnership participants • Agreed rules about conducting meetings (see Initiative I) • Agreed rules about frequency and content of executive meetings • Agreed rules about management and executive site walks • Functional managers who do not demonstrate capability to collaborate are replaced
Support	
• Collaboration measurement tool to capture collaborative 'moods' in the team (towards the end of the phase), collaboration KPIs and discussions • Liked-Learned session • Collaboration/lean coach (temporary) for the team to conduct effective collaborative meetings • One 'new wave' team meeting at introduction of collaboration approach • Informal social gatherings in the functional groups (initiative of the functional managers) • Team co-location in the Contractor's office (2–3 days a week) • Counterparts for the most team members (lead and manager level) • One 'mission control room' for team meetings with regularly updated project information (visual materials) available and open for all team members	• Coaching sessions (team and individual) with the collaboration consultants • Observation and feedback of work meetings by the collaboration consultants • Alignment sessions for executives and managers for the client and Contractor team • Team building events (periodical social events for the whole team out of the office) • Team recognition program (weekly) • Collaboration measurement and improvement efforts • Capturing project experiences on collaboration – 'lessons learned' session and document • Alignment sessions (partnership declaration development) and team building for all partnership participants - executives and site managers • Team co-location (same office floor, different offices) and shared offices for some disciplines (e.g., safety and process); both in the office and on site • Counterparts for the most team members (lead and manager level) • One 'mission control room' for team meetings with regularly updated project information (visual materials) open and available for all partners • Shared financial incentive • Incentive for 'boots on the ground' personnel to promote collaborative behaviours
Joint work activities	
• Daily team meetings with the Client and Contractor team members. Engineering team – twice weekly internal meetings, twice weekly with counterparts. Designer team – daily with counterpart teams, daily with management team. If managers are not present, team leads replace them • Joint workshops (engineering, constructability, etc.) • Progress reviews with extended number of team members (not only managers) – focused on problem-solving rather than reporting and control	• Joint workshops (engineering, construction, etc.) - multifunctional • Weekly function reviews include client (process, safety, engineering) • Integrated safety team: one organigram, chart, one safety program, joint safety meetings, etc. • Daily planning meetings – all partners' managers • Weekly collaborative project reviews – all partners, manager level • Bi-weekly executive meetings and site walks – all partners • Managers take a daily morning walk on site – all partners

Appendix C. Data extracts supporting relational norms (for both collaborative initiatives)

Relational norms *Quotes from the Project charter and Collaboration declaration documents*	**Collaborative behaviours in which relational norms manifest** *Descriptions based on the observations (O) and summarised interviews (I)*	**Examples of formal integrative mechanisms to which relational norms and collaborative behaviours are linked** *(Governance - G, Administration – A, Support – S, Joint work activities – J. Governance and Administration kept separately as distinct processes within one category).* *Examples based on the observations (O), documentation analysis (D) and summarised interviews (I)*
Commitment We honour our commitment/word and recognise its value for the team. We demonstrate learning through action inside a 24-hour performance cycle. Being responsible matters. We are delivering something difficult; the faster we recognise failures and recover, the sooner we succeed.	• The project director and functional managers talk about 'doing it together' in meetings and townhalls, act openly and collaboratively, daily walk across the project floor to talk to the team members, keep their office doors open, and ask if any help is needed (O) • In the execution phase, project managers from all partners walk the site to check performance, safety, etc. All managers can comment on unsafe behaviours of any workers, regardless of the company they work for (I).	• Relational norms codified in the Team charter and later in the Collaboration declaration (G; D, I) • Agreed rules about frequency and content of executive meetings and site walks (A; D, I) • Measurements of collaboration and improvement actions (S; O, D, I) • Lessons learned session about collaboration (S; O, D, I) • Shared incentive (S; D, I) • Co-location (S; O, I)

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	• The team sticks to joint actions and problem solving in situations where things do not go as planned – e.g., when the client announces tender for the next phase, the team continues to work with the counterparts, daily meetings, etc. to deliver the design, schedule, and cost estimate (O). If one of the parties underperforms in the coalition, all managers discuss what can be adjusted in their work and what extra resources can be brought in to help this subcontractor (I). • All executives meet and visit the project site regularly. Each company executive visits the site regularly and explains what behavioural changes are needed and why – talking to managers, supervisors, and blue-collar workers (I).	• Counterparts (S; O, I) • Regular meetings of executive and managers at all levels, also site walks (J; I)
Win-win philosophy We act for what works best for the project. There is no individual success without the team succeeding as a whole. We do what is best for the project. We are aligned in our common goal. We are fair and reasonable.	• The team discusses how possible solutions affect each other's work; solutions that harm some of the team members are discarded (I: O). • Executive teams daily discuss work plans, identify conflicts and discuss priorities and adjustments; those who 'lose' today accept it and do not insist on continuing their own work (O). • Managers help each other, 'no blame' approach. Subcontractors offer each other available equipment and suggest bringing additional people to staff up an underperforming contractor (I). • When the problem is identified, there is no discussion about who is guilty. The focus is on how to solve it and who can do what to fix the issue (O; I). • Resources, e.g., equipment, can be shared amongst the collaborating parties without charging each other for the hours and use (I) • Team members agree to adjust work plans to optimise overall work, even if there is short term compromise for one of the participants (I). • The team discusses solutions and ways to help underperforming parties and find ways to save overall performance (I).	• Relational norms codified in the Team charter and later in the Collaboration declaration (G; D, I) • Agreed rules about frequency and content of executive meetings and site walks (A; D, I) • Collaboration development workshops (S; D, I) • Coaching sessions (team and individual) with the collaboration consultants (S; O, I) • Facilitated leadership team alignment sessions – for all collaborating parties (S; I) • Team building events for the whole team (S; I) • Shared incentive (S; D, I) • Crafts ('boots on the ground') recognition program for collaborative behaviours (S; D, I) • Project org charts that shows the whole team as one (S; D, O) • Integrated safety team and program (J; D, I) • Weekly collaborative project reviews, joint progress reviews (J; O, I)
Shared vision and values We function as One Team with One Brain.	• Project charter and coalition declaration are discussed together by the executive and management team of collaborating parties. Suggested wording from team members is recorded and combined into one document (I). • Core values and what they mean for the project are discussed in team meetings (O). • Project directors and managers talk about goals and project principles regularly, also in team meetings (O). • Safety mission is strictly followed. If any team members observe unsafe behaviours, they stop work, even if it is the crew from another collaborating party, and even if it puts performance/ schedule at risk (I).	• Relational norms codified in the Team charter and later in the Collaboration declaration (G; D, I) • Agreed rules about frequency and content of executive meetings and site walks (A; D, I) • Formal meeting for the project team to introduce collaborative approach (S; D, I) • Agreed meeting rules in which collaboration and core values are discussed (S; O, I) • Collaboration development workshops (S; D, I) • Coaching sessions (team and individual) with the collaboration consultants (S; O, I) • Facilitated leadership team alignment sessions – for all collaborating parties (S; I) • Team building events for the whole team (S; D, I) • Crafts ('boots on the ground') recognition program for collaborative behaviours (S; D, I) • Regular meetings of executive and managers at all levels, also site walks (J; D, I) • Daily planning meetings with all collaborating parties (managers) (J; I, O) • Joint multifunctional workshops (J; D, O, I) • Integrated safety team and program (J; D, I)
Transparency (openness) We operate from trust, openness of mind, and willingness to listen. When in doubt, we speak so that problems surface early. Feedback from others says how open and trusted I am. Silence is the least helpful contribution we can make. The only stupid question is the one not asked.	• Information about project progress, risks, and deliverables is provided to all team members (charts in meeting rooms, weekly memo updates, etc.) – different managers are responsible for different parts of update (O, I). • Counterparts share 'reasonably confidential information' e.g., related to relevant experiences from other projects with different counterparts, regarding traditionally sensitive subjects such as price or proprietary drawings (O). • Communicating face-to-face: team members walk to each other, instead of using email or phone (O, I). • Communicating frequently with counterparts to align on all steps (O). • Team members in the meetings provide feedback constructively and respectfully if something goes wrong (O). • People have time for counterparts and team members, are available for discussions and help (O). • An 'open-door approach' by the project directors and functional managers – anybody can walk in for questions, concerns or a chat (O, I). • The team together discusses collaboration in a very honest and open manner, how successful it was and what were the challenges and outcomes (O).	• Relational norms codified in the Team charter and later in the Collaboration declaration (G; D, I) • Lessons learned session about collaboration (S; O, D) • Team building events for the whole team (S; D, I) • Team recognition program (S; D, I) • Co-location (S; O, I) • Counterparts (S; O, I) • One "mission control room" for team meetings with regularly updated project information (visual materials) (S; O, I) • Joint multifunctional workshops (J; D, O, I)
Trust We operate in trust, openness of mind,	• Counterparts share 'reasonably confidential information' e.g., related to relevant experiences from other projects with different	• Relational norms codified in the Team charter and later in the Collaboration declaration (G; D, I)

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and willingness to listen. The feedback from others says how open and trusted I am. I will restore the trust and openness that my actions may have eroded. We honour our commitment/word and recognise its value for the team.	counterparts, regarding traditionally sensitive subjects such as price or proprietary drawings (O). • Functional managers empower leads to make decisions and work with their counterparts, without overcontrolling (O). • In the team meetings, people who promised something say that they may not deliver it on time, and then a new commitment is jointly agreed (O, I).	• Agreed rules about conducing meetings that require being on time and providing respectful feedback (A; O, I) • Co-location (S; O, I) • Team building events for the whole team (S; O, I) • Informal social gatherings organised by functional managers for their teams (S; O, I)
Respect We care about the well-being of every team member. We care about everyone on the project. We operate in trust, openness of mind, and willingness to listen. We are respectful and known for generous acts of collaboration.	• Treating everyone equally. Every person and job are important for the project. No hierarchy. Project directors and functional managers have an open-door policy, walk on the project floor to talk casually to any team members O, I). • Everybody has the right to voice their own ideas, thoughts, and concerns; one person talks at a time, everybody listens (O, I). • "Thank you" is regularly said for good work. Contributions are recognised and celebrated in weekly meetings, newsletters, etc. (O, I) • Managers try to understand and accommodate different cultures (e.g., Asia, Europe) (I). • People arrive at meetings on time and keep to the time schedule. Volunteer timekeeper gives notice of how much time is left, and meetings end on time (O).	• Relational norms codified in the Team charter and later in the Collaboration declaration (G; D, I) • Open-door policy adopted by the management team (A; O, I) • Agreed rules about conducing meetings that require being on time and providing respectful feedback (A; O, I) • Team recognition program (S; D, I) • Crafts ('boots on the ground') recognition program for collaborative behaviours (S; D, I)

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