Towards the dynamics of trust in the relationship between project-based firms and suppliers

Abstract

An increasing number of projects crosses organisational boundaries and inter-organisational trust is key to achieving consistent outcomes among different organisations. While research has demonstrated the relationships between trust and managerial practices in project organisations, the dynamics of trust in project ecologies and the driving force behind dynamics have received little attention in empirical research and require investigation. Analysing the relationship between a project-based firm and its supplier at three project data points and from the perspective of structuration theory, the study showed how trust was reproduced and developed in successive interactions. The findings suggested that the dynamics of trust is driven by the interplay of trust-building structures and interactions that generate and maintain a sense of ontological security in the relationship. Moreover, the interplays of structures and interactions were found at individual, project and firm levels of project contexts. To reproduce and develop trust requires consistency between structures and interactions in multilevel contexts, which can be achieved through top-down management interventions and bottom-up learning processes. The study enriches trust theories in project studies by theoretically and empirically explicating the process of trust reproduction and development and the driving force of trust dynamics in the multilevel project contexts.

1. Introduction

Delivering complex projects in various industries usually requires the involvement of multiple loosely coupled yet interdependent organisations (Bakker et al., 2011; Winch, 2014). Good or excellent

outcomes need inter-organisational collaboration and cooperation (Sydow and Braun, 2018). Against this background, research has called for a relational approach to study inter-organisational projects that focuses on relationships and their dynamics (Smyth and Pryke, 2008; Steen et al., 2018). Trust is foundational to a relationship and dynamic. Existing trust theories have addressed the characteristics of trust and trust development (e.g., Kramer and Lewicki, 2010; Lewis and Weigert, 1985; Mayer et al., 1995; Zucker, 1986). In project studies, researchers have pointed out how trust is established within projects and managerial actions that create antecedents to trust (Kaulio, 2018; Swärd, 2016; Xu, 2019). Trust has been repeatedly argued to be a key success indicator for collaboration (Rauniar et al., 2019; Shazi et al., 2015), a principle to cope with interdependence and uncertainties (Kalkman and de Waard, 2017; Ligthart et al., 2016) and one type of governance mechanism facilitating the flow of information and resources (Benítez-Ávila et al., 2018; Bradach and Eccles, 1989; Powell, 1990). Once established, trust encourages knowledge sharing and relationship-specific investment that embed resources in social networks (Latusek and Vlaar, 2018), yielding social capital that can enhance the outcomes of actions (Bourdieu, 1986; Nooteboom, 2007).

However, what has received less attention is the reproduction and development of trust in successive interactions where contexts change within and between projects. Moreover, the changes might occur at multiple levels of organisation, since resources, actors and rules of conduct are dispersed in project ecologies (Bresnen et al., 2004; Engwall, 2003; Manning, 2008). Relationships and trust are not static. Proactive and reactive responses to the internal and external changes lead to renegotiation. This dynamic is typically emergent and incremental by shocks to the systems of actions, which can be corrosive (DeFillippi and Sydow, 2016). Such a conceptualisation requires the analysis of trust in the interactions between actions and structures that result in the dynamics (Sydow, 2006). Structuration theory provides an analytical lens for this. A structuration perspective puts neither actors nor structures first; instead, it is the recursive interactions between the two that form social phenomenon such as trust. From the perspective of structuration theory (Giddens, 1984), structures at multiple levels of systems, such as institutional arrangements, industry norms and organisation policies enable and constrain trust between

organisations (Bachmann and Inkpen, 2011; Möllering, 2005). On the other hand, the continuity and transformation of trust need interactions between actors or collective actors at different levels of organisations (Giddens, 1990; Steen et al., 2018; Sydow, 1998).

Taking a structuration perspective, the paper represents an attempt to build on prior work and dig deeper into relationships towards developing a thorough understanding of the dynamics of trust. The present research draws on a single case study of an inter-organisational relationship between a project-based firm and its supplier in the UK construction industry. The research question is:

How is trust, from project-based firms to their suppliers, dynamically reproduced and develops in interactions?

Specifically, it explores how trust dynamics as the service interactions unfolded in a highways project. Semi-structured interviews were conducted with both firms at the procurement, then execution and finally completion stage of the project. The relationships between project-based firms and their suppliers are investigated as a neglected area in project studies (Manu et al., 2015; Meng, 2012). Specialisation and subcontracting provide project-based firms with flexibility and competencies to meet changing demands in an uncertain and dynamic environment (Dubois and Gadde, 2002a; Tam et al., 2011). However, the development of trust is found to be challenging between project-based firms and their suppliers, and the lack of collaboration between these firms has further led to the underperformance of projects and project businesses (Eriksson, 2010; Koufteros et al., 2007). Therefore, there is a need to broaden the scope of the relational approach to include the relationships between the project-based firms and suppliers and the dynamic aspect of relationships.

The research enriches trust theories in project studies by explicating the process of trust reproduction and development in successive interactions. Inter-organisational relationships in projects are not continuous and are reproduced and develop in successive interactions embedded in long-term relationships at firm and individual levels. Trust is enabled by structures at different levels but also

emerges in interactions in respond to uncertainties and risks in multilevel project contexts. Hence, the present study goes beyond managerial actions at project level and reveals how trust dynamics in recursive interplay of trust-enabling structures and actions at multiple levels. In doing so, it responds to the recent call (Sydow and Braun, 2018) to provide an empirical understanding of the why and how of inter-organisational project dynamics, from the perspective of trust.

2. Theoretical background

2.1. Inter-organisational trust and relationships in project studies

Trust has been conceptualised in a wide scope of areas such as psychology (Rotter, 1967), sociology (Giddens, 1990; Luhmann, 1979) and organisation studies (Bachmann and Zaheer, 2013; Kramer and Lewicki, 2010; Mayer et al., 1995). In project studies, the concept of trust has been discussed in various contexts such as construction, disaster response and recovery, shipbuilding and product development (Ligthart et al., 2016; McLaren and Loosemore, 2019; Shazi et al., 2015; Smyth et al., 2010). Based on extant research (e.g., Mayer et al., 1995; Rousseau et al., 1998; Smyth et al., 2010; Sydow, 1998), we use a working definition of trust as an actor's current intention to rely on the actions of or to be vulnerable to another party, based on the expectation that the other party can reduce risks and co-create value in a relationship. A relationship can be interpersonal. It can also be inter-organisational based upon the sum of the key interactions and individuals. Inter-organisational trust reflects the collectively-held trust intention by members in one organisation towards another organisation (Fulmer and Gelfand, 2012; Zaheer et al., 1998), which can be manifested in organisational actions.

It is commonly recognised that trust is hard to initiate and maintain in project contexts as complexities and uncertainties often cause risks and discontinuity in relationships. Some studies assumed that relationships are temporary and terminate once the project is completed (Dubois and Gadde, 2002a). Project partners may lack the resources and motivation to invest in relationships, focus on self-interests and behave opportunistically when uncertainties and risks arise. Relational contracting has been

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promoted to establish trust in project relationships, which links to practices such as collaborative procurement and project partnering (Bygballe and Swärd, 2019; Kadefors, 2004). It is believed that projects are organised under a hybrid mode of governance (Eccles, 1981; Winch, 2006) and trust, either as a substitute for market and hierarchy (Powell, 1990) or as complementary to price and authority (Bradach and Eccles, 1989), facilitates the pursuit of greater joint value among different parties (Benítez-Ávila et al., 2018). Relational contracting promotes trust as a governance mechanism and practices that form the antecedents to trust-based relationships such as shared values and open communication (Kadefors, 2004; Suprapto et al., 2016; Wong et al., 2008). While this stream of research helps identify trust-building strategies, the findings are largely static, and we still lack detailed knowledge about how inter-organisational trust emerge under a relational contract or within a partnering project. Clients and project-based firms have focused more on the governance mechanisms of price and authority in their procurement practices, hence process and output control instead of relational control (Eriksson and Laan, 2007; Hartmann and Caerteling, 2010). It has been pointed out that pre-defined collaborative plans, rules and activities are insufficient for optimising relationships and trust in complex projects (Aagaard et al., 2015; Bresnen, 2007).

Other research has been investigating managerial actions and practices and their influences on the formation of trust. It has been argued that in contexts where tasks are emergent and time is constrained such as disaster recovery and response projects, clear roles, identities and shared expectations on acceptable behaviour are key to swiftly building trust (McLaren and Loosemore, 2019; Meyerson et al., 1996). Maurer (2010) reveals that project staffing can create stability and familiarity between team members that lay the foundation for trust in projects. Trust does not exist in vacuum. It is influenced by the history of interactions and prior ties between key actors (Xu, 2019). Buvik and Rolfsen (2015) identifies that early integration of teams, development of a common philosophy, open communication and early and clear role expectations can contribute to the development of trust in the early phase of project. During project execution, relational norms such as reciprocity and equity have been found helpful to maintaining trust relationships (Swärd, 2016). Researchers have pointed out the dynamic

relationship between trust and control over time. Specifically, control tends to predominate over trust as relationships start. The collaboration may evolve into a system at later stages where trust and control are complementary and reinforce each other to strengthen the confidence (Kalkman and de Waard, 2017; Long and Sitkin, 2018; Xu, 2019).

Findings of existing research have mostly focused on trust and relationships at project level. However, relationships and trust in project settings are dynamic in multilevel contexts. It is insufficient to study trust-building managerial actions at project level but also how relationships and trust are reproduced and develop in successive interactions and in relation to different levels of organisation (Jones and Lichtenstein, 2008). It has been argued that project actors are embedded in multilevel contexts – that is, project ecologies – including projects, organisations, inter-organisational networks and organisational fields (Manning, 2008; Stjerne et al., 2019). Embeddedness implies the relational links or ties between actors and organisations (Uzzi, 1997). Relationships between firms typically tend to remain at least as a 'sleeping relationship' until they are reactivated for future projects (Smyth, 2015a; Sydow and Braun, 2018), despite the "institutionalised termination" (Lundin and Söderholm, 1995). Also, organisations might continue collaboration on other projects that run partly in parallel with the completed projects (Bengtson et al., 2018). Successive or parallel projects usually involve different project teams of the same parent firm (Bengtson et al., 2018). Even if the same teams continue the partnerships in the next project, they might have distinct goals, task structures and team requirements, at least partially, from prior experiences (Grabher, 2002; Lundin and Söderholm, 1995). In other words, successive interactions and changes in multilevel contexts impact inter-organisational relationships in project contexts. Few project studies have investigated how to establish and maintain potentially longer and lasting relationships in relation to firms and considered the temporality and embeddedness of projects. Sydow's (2006, 1998) and Kroeger's (2013) insightful studies form rare exceptions, but they are largely conceptual. A theoretical and empirical account on the dynamics of trust in multilevel project contexts is therefore needed to improve inter-organisational relationships and outcomes.

This study focuses on the relationship between project-based firms and their suppliers. Project-based firms are legal entities that undertake most or all business activities in the form of projects (Whitley, 2006; Winch, 2014). The term 'suppliers' refers to firms that provide specialist goods and services for project-based firms. The relationships between project-based firms and clients have been researched to an extent (e.g., Laan et al., 2011; Suprapto et al., 2015). Less attention is paid to the relationships between project-based firms and their suppliers including their continuity and development within and across projects (Ahola et al., 2017; Martinsuo and Ahola, 2010). Managing relationships with suppliers in project-based industries are complex due to the discontinuity of project demand, uniqueness of each project, the uncertainty of requirements, and the specialisation and interdependencies between different organisations and their activities (Eriksson and Pesämaa, 2013; Vrijhoef and Koskela, 2000). This is different from supply chain relationships in other industries as well as other types of inter-organisational relationships, such as alliances where long-term collaboration and continuity of relationships are expected (Eriksson and Pesämaa, 2013). For project-based firms, effective relationships with supply chain partners are needed to facilitate resource allocation, share risks, generate innovation and improve performance (Aagaard et al., 2015; Koufteros et al., 2007; Meng, 2012; Shazi et al., 2015), but also to develop dynamic capabilities to create and maintain strategic advantages so that project business supply chains can survive in their market (Brady and Davies, 2004; Khalfan and Maqsood, 2012; Söderlund et al., 2008). Explicating the dynamic process of developing and maintaining trust can help us understand how and through which mechanisms project-based firms and suppliers can develop and maintain relationships that bring about mutual benefits within and beyond projects, given the temporary organising form of project businesses. If collaboration is facilitated and enhanced, then theory says it can be effective in helping integrate the system and manage the other complex project factors (Bygballe and Swärd, 2019; Martinsuo and Ahola, 2010).

In summary, despite the rich insights provided by prior studies, we know little about trust dynamics in multilevel project contexts. Inter-organisational relationships in project settings are reproduced and develops in successive interactions where contexts change. Relationships change and some changes get

built into the organisations at firm and project levels. Moreover, trust-building structures locate at difference levels of organisations. This study has focused on the implicit renegotiation of relationships and how aspects get embedded in multilevel contexts. This conceptualisation requires a multilevel view to investigate both structures and interactions that recursively produce trust, which structuration theory helps unpack.

2.2. *The foundations and dynamics of trust: a structuration view*

Trust is generated and develops where things are uncertain and involve risks (Luhmann, 1988). To trust needs ontological security to accept the risk of loss if the trusted party falls short of the trust bestowed (Luhmann, 1979; Mayer et al., 1995). Ontological security is a sense of continuity (Giddens, 1990), a state resulting from sense making of one's own experiences in a relationship, whether interpersonal or within a group, and feeding into the need to assess whether there is anything to fear. Experience is conceptualised as the process and outcome of interactions between actors, organisations and systems that together create cognitive, emotional and behavioural responses (Chandler and Lusch, 2015; Edvardsson et al., 2005). In this vein, ontological security can be derived from higher-level systems where relationships are embedded (Bachmann and Inkpen, 2011; Zucker, 1986), such as formal and informal norms in project-based industries (e.g. Bechky, 2006; Meyerson et al., 1996; Swärd, 2016). It can also emerge from experiences with other actors and organisations, either in the past or present (Buvik and Rolfsen, 2015; Maurer, 2010). Actors might assess the other party's trustworthiness in a purposive way, or through discursive learning (Giddens, 1984; Nooteboom, 2002), but also learn via shared experiences and monitor actions and perceptions afterwards in a reflexive way (Smyth et al., 2010; Staber and Sydow, 2002). Perceived trustworthiness such as the capability to complete tasks, work as a team, refrain from opportunism and be willing to perform to their best when experiencing difficulties forms the ontological security in the relationship (Mayer et al., 1995; Nooteboom, 2002). These experiences enable actors to gain a shared understanding of the circumstances in which they are

embedded and confidence in their continuity (Luhmann, 1988), which lays the foundation for a "leap of faith" in project uncertainties (Smyth, 2008).

Structuration theory conceptualises the duality of structure as empirically unobservable rules and resources. While rules and resources can enable and constrain actions, they are sustained, reinforced and, in some cases, changed by actors' interactions (Giddens, 1984). In this vein, to understand the reproduction and development of trust it is necessary to examine it within actor-driven interactions (Sydow, 1998). Interaction is a mutual process in which actors or organisations are involved in each other's practices (Grönroos and Ravald, 2011). Project actors draw on rules and resources embedded in project ecologies to construct trust-related interactions and possess the capability to ignore, replace or recreate rules and resources in ways that differ from the original (Bresnen et al., 2004; Kroeger, 2013; Manning, 2008). In other words, structure is "what gives form and shape to social life, but it is not itself that form and shape" (Pozzebon, 2004, p. 253). Specifically, Giddens (1984) constructs two dimensions of the duality of structure, the dimension of structure and the dimension of action. Structures of signification are rules that lend shared meanings of actions in particular contexts. In project contexts, they can be regarded as shared interpretative schemes, such as organisational values, assigned roles and identities, which guide the process of sensemaking and communication between project actors (Staber and Sydow, 2002). For instance, the notion of "strategic partner" suggests a particular form of relationship and of interpreting the degree of trust and trustworthiness that is distinct from a one-off supplier. Structures of legitimation are rules that legitimise what and how actors should do in a particular context (Staber and Sydow, 2002), such as relational contract guiding how actors and organisations should act to demonstrate the spirit of trust in projects. Structures of domination are means of production that actors use to actualise their purposes, which take two forms, the structure of controlling material goods and services (allocative resources) and of coordinating human activities (authoritative resources) (Edvardsson et al., 2015). Examples of structures of domination include market, hierarchical structures and social relationships.

On the other hand, the dimension of action, which includes communication, power and norms, shapes practices as observable expressions of structures. Knowledgeable actors, such as project managers, choose among rules and resources from multilevel contexts and integrate the contextual experiences to construct interactions (Kroeger, 2013). For continuing trust and relationships it requires behaviour signalling trust and trustworthiness in interactions in order to demonstrate the practical significance of trust (Jarratt and Ceric, 2015; Lewis and Weigert, 1985). However, such behaviour is not determined by mere roles and routines from higher levels of contexts (Kroeger, 2013). Actors reinforce or change their perceptions and behaviour in interactions with the other party as they cognitively, experientially and reflexively learn about each other (Luhmann, 1979). The principle of partnering between firms might not be adopted in project interactions especially when interests are divergent between project actors and systems between the firm and projects are weak (Cicmil and Marshall, 2005; Smyth, 2015a). In other words, communication, power and norms in interactions reproduce rules and resources to various degrees and can also modify the original ones, depending on the knowledge of actors and the influence of situations (Bresnen et al., 2004). It follows from this that the duality of structure drives the dynamics of trust. The recursive interaction between structure and action generates the perception of trustworthiness, employs trust relations to allocate resources, and legitimates norms of trust and trustworthiness (Sydow, 1998).

3. Methodology and methods

3.1. Research design

We undertake a qualitative single case study to explore the dynamics of inter-organisational trust. A single case study method offers a zooming-in opportunity for empirically exploring the dynamic phenomenon in a local situation (Eisenhardt, 1989; Yin, 2009). The case is based on the data collected in a research project by the first author, which was about the examination of trust dynamics, but the

focal study is more of an exploration of the dynamic phenomenon and its driving force with greater depth of data about the single dyad – the main contractor and the subcontractor firms.

In this study, the UK construction industry serves as the empirical field. Construction projects are complex, and it is less likely that a single construction firm has the capability and resources to complete a project on its own. Construction firms employ, on a temporary basis, specialised suppliers to deliver services which they integrate, thereby acting as systems integrator (Davies et al., 2007). Those representing their respective organisations in the project are interdependent with each other, while, at the firm level, these organisations are loosely-coupled and relatively self-contained (Dubois and Gadde, 2002a). Despite the temporary nature of the projects, relationships and thus trust between project businesses and their supply chains typically exhibit some continuity across projects (Bengtson et al., 2018; Ebers and Maurer, 2016; Smyth, 2015a). The relationships between main contractors and their subcontractors are key to projects, yet they are believed to be transactional due to the reliance on competitive tendering in order to pursue lowest possible cost (Broft et al., 2016; Eriksson and Pesämaa, 2013; Kadefors, 2004). Various forms of collaboration and management interventions have been promoted in the construction industry, but the outcomes of collaboration vary (Bresnen and Marshall, 2011; Mason, 2007; Nyström, 2008). In some cases, despite the partnering agreement with clients, main contractors still expect their suppliers to compete based on price (Broft et al., 2016). All together, these features of the construction industry provide an amplified basis for investigating trust in the relationship between project-based firms and suppliers.

The focal case, case Alpha, was purposely chosen as the relationship between the project-based firm, referred to herein as Road Ltd., and its subcontractor, referred to herein as Surface Ltd., is characterised as long term. Furthermore, the contextual properties at the firm and project levels had a significant effect on the development of trust. As will be detailed below, due to the personnel change over the successive business, the reproduction and development of trust in the focal case relied on the firm-level relationship as well as past relationships initiated and sustained at the individual level. Moreover, the focal case was

situated in the project context where the client and the project-based firm established a long-term collaborative relationship. Project studies have investigated trust development in temporary relations within one contract or between contracts (e.g., Buvik and Rolfsen, 2015; Swärd, 2016). This research built upon previously developed theory and focused on the implicit renegotiation of inter-organisational relationship and how trust got embedded in the structure of relationships in the project setting. We expect the insights from the case study can increase our knowledge trust in project environment (see Yin, 2009).

3.2. Case background

The case setting was illustrated in Table 1. Case Alpha involved an inter-organisational relationship between a major construction firm, Road Ltd., and its surfacing subcontractor, Surface Ltd. The surfacing project is part of a highways improvement scheme that aimed to mitigate congestion and improve road safety. Road Ltd. had full responsibility for delivering the project for the client, a UK government agency charged with operating, maintaining and improving motorways and roads in England. Surfacing began at the last stage of the overall project and thus was highly dependent on other works, which were mostly self-delivered by Road Ltd.

Table 1 Description of case Alpha

	Setting
Main contractor	Road Ltd. • Highways sector of a large UK construction company • Long-term collaborative relationship with the client • Categorising suppliers into different tiers • Using a formal agreement to build strategic relationships with suppliers
Subcontractor	Surface Ltd. • A small-medium size surfacing company • Newly-established West Midlands branch
Case project	• Surfacing project in a highways improvement scheme • Procurement method: collaborative framework for the main contract; limited bid invitation for the surfacing contract • Contract type: NEC3 target cost for the main contract; NEC3 re-measured quantities for the surfacing contract

| Main contractor-subcontractor relationship | • Long temporal duration; project-by-project collaboration |
| | • Preparing to establish a strategic partnership after project Alpha |

Road Ltd. is the highways sector of a large UK construction company. Road Ltd. has directors managing different programmes of projects and project managers responsible for each project. Surfacing Ltd. is a small-medium size surfacing company. The West Midlands branch of Surface Ltd. was responsible for project Alpha, which had a general manager and functional managers, such as commercial managers and operations managers, charged with different aspects of all projects in that region. Each project was delivered by a team led by a supervisor. Figure 1 summarises the organisation structures of the two companies.
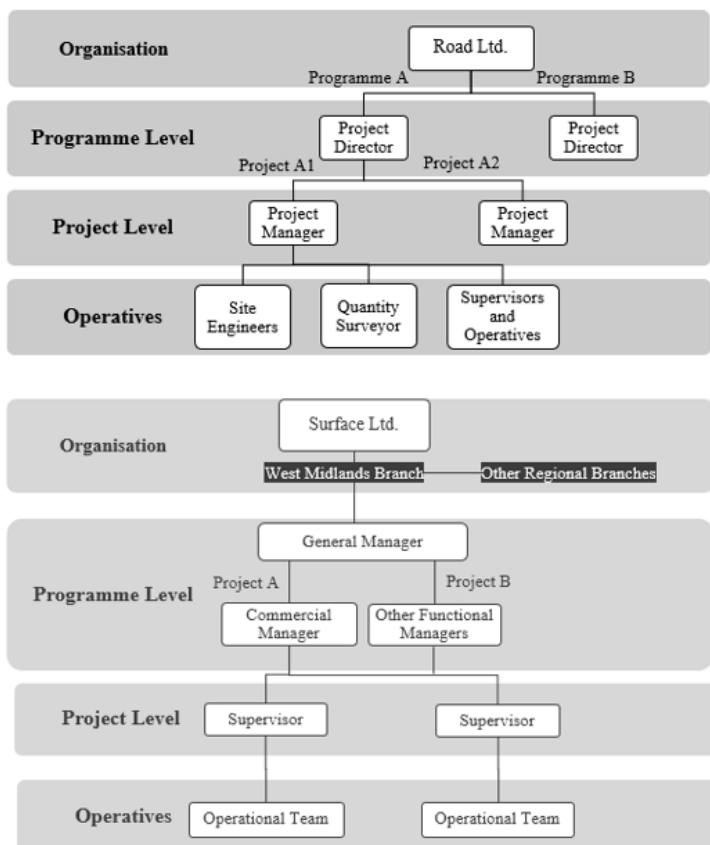
Figure 1 Illustrative examples of organisation structures

The relationship between Road Ltd. and Surface Ltd. is characterised by a long temporal duration and collaboration on a project-by-project basis. By the time project Alpha started, Road Ltd. was considering

establishing a strategic partnership with Surface Ltd., which involves a formal partnering agreement signifying mutual commitment to continue collaboration in multiple consecutive projects in the next four years. Therefore, both companies acknowledged that project Alpha was key to the future partnership.

3.3. Data collection

To investigate the sequence and flow of events and understand processes over time, data were collected from both parties in real time as the main contractor and its subcontractor jointly delivered a project (Pettigrew, 1990). Specifically, we conducted three waves of semi-structured interviews at the preconstruction, then execution and, last, soon after the completion of the project, as illustrated in Figure 2. The three-wave data collection enables us to capture both historic and contemporary processes and track changes in small steps (see Saldaña, 2003).
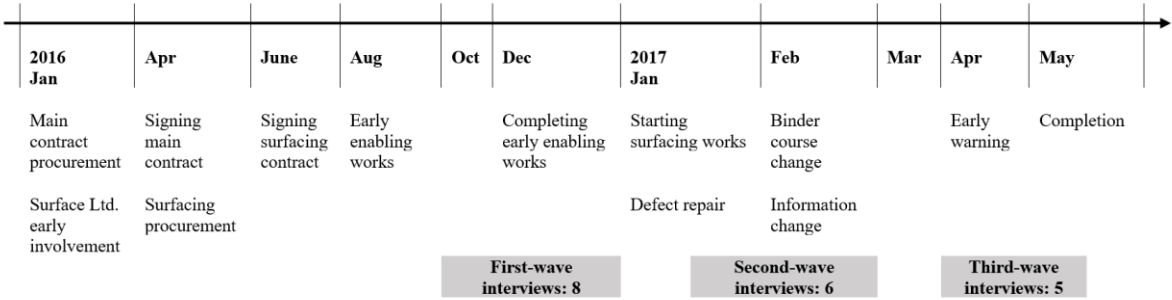
Figure 2 The case study chronology

To capture a more detailed and balanced picture of the phenomenon, we selected six informants from different functional units and hierarchical levels of both the main contractor and subcontractor, including positions such as supply chain manager, project director, project manager, quantity surveyor and site engineer. To examine changes, we tried to interview the same informants over multiple visits, but, due to the handover of the project from the procurement or bid teams to the project teams and redistribution of staff between projects, some informants were substituted by others with similar roles. The informants

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represented the key roles in the different phases of the project and shared insights from different levels of organisations. As will be specified in the following section, data analysis was conducted in parallel with data collection to identify the emergent themes, which can be followed up in subsequent interviews. Data collection was completed by the end of the focal project as no new themes emerged from the third-wave interviews at the project completion stage. In total, 19 semi-structured interviews were conducted. Table 2 summarises the interviewees' profiles.

Table 2 Interviewees' profiles

	Programme management roles	Project management roles	Operatives and quantity surveyors
Road Ltd.	One interview with the supply chain manager, at the preconstruction stage One interview with the project director, at the preconstruction stage	Three interviews with the project manager, one at each of the three stages	Three interviews with the quantity surveyor, one at each of the three stages One interview with the stakeholder manager, at the preconstruction stage Two interviews with the site engineer, at the execution and completion stages
Surface Ltd.	Three interviews with the general manager, one at each of the three stages	Two interviews with the supervisor, at the procurement and execution stages	Three interviews with the commercial manager, one at each of the three stages

A topic guide was used to gather information in eight areas: general information about informants; project information, progress and changes; general issues related to the relationship between the two companies; perceived risks; organisation structures; management practices; past experiences and future collaboration; attitudes and behaviour towards the other party. Interview questions were designed to ask informants' views on *their own company and the other company*, such as practices of their own firm, interactions between the two firms and attitudes towards the other firm. Individual views and attitudes were aggregated to form collective views and attitudes representing their organisation. Through the reflective comments of interviewees, we gathered information about the recent past project, but a more in depth a focus on the detailed relationship within the focal project in the shadow of past. All interviews were recorded with permission and transcribed; site meetings were also attended, and field notes made during each visit. Documents such as public project information regularly updated by the client and the

contract between Road Ltd. and the client were also gathered to complement data from interview and field notes.

3.4. Data analysis

3.4.1. Analysis strategy

The research started with existing trust theories (e.g., Mayer et al., 1995; Nooteboom, 2002; Sydow, 1998), which led to the conceptualisation of trust and helped design the fieldwork. Due to the inherent difference between project and more stable inter-organisational settings, theory was not built in a deductive way by applying general theories on trust. Instead, it was built through an iterative process where local findings were constantly compared with concepts from existing trust theories and systematically combined (see Dubois and Gadde, 2002b). Meanwhile, the meanings of some concepts were revised or refined according to empirical findings. Structuration theory (see Giddens, 1984) was employed as the theoretical lens to inform the explanation for empirical findings.

It was recognised that the scope of the original research project is limited to pursuit a longitudinal analysis. Some of the events had occurred prior to the study and were analysed retrospectively, while others were in time. We relied on a series of snapshots, like Zeno's arrows, to infer the dynamics through change, that is how trust changed at a detailed level from the evidence that formed the snapshots. Indeed, a critical realist view is taken where events and experiences are in actual and empirical domains, and the process that has powers to drive those events and experiences occupies the domain of real (Bhaskar, 1998; Smyth and Morris, 2007). Whether these powers are actualised depends on the conditions, hence contextual and emergent (Sayer, 2000). The emphasis of the analysis, therefore, was the generative mechanisms and emergence that entail the presence of trust phenomenon; the totality consists of the dynamic process of trust development. The analysis was enhanced by the rich reports of interviewees repeatedly recalling changes about past and present experiences.

3.4.2. Analysis process

The unit of analysis is the inter-organisational relationship between a project-based firm and its supplier. The first step was constructing a chronological history of the case. The focus was on what the two organisations did related to each other and when (see Langley, 1999; Van de Ven and Poole, 2005). Following the case history, we started to uncover themes that influenced trust at different stages of the project (see Gioia et al., 2013), using MAXQDA 12. We indexed the interview data with terms and phrases used by the interviewees. Practices and interactions that influenced the attitudes and behaviour towards the other party or the inter-organisational relationship between the two companies were collated into first-order themes. One example of first-order themes is the statement that, although there had been a supply problem in the prior project, Road Ltd. perceived few risks in the future collaboration as it learned that Surface Ltd. had strengthened the supply chains by sourcing from local suppliers, which was noted as "learning about/from the past".

Meanwhile, we sought to understand the relationships between first-order themes, leading to second-order themes. With the development of the second-order themes, the initial empirical findings were found to be in accordance with structuration theory (see Giddens, 1984), for instance, the mutually constitutive relationship between the shared meanings of 'tier-one suppliers' among Road Ltd. actors (firm-level structure of signification) and the openness in communication (dimension of communication in interactions). We then employed the theory to build theoretical explanations for patterns of second-order themes. For instance, gathering information about the supplier's past performance was a form of purposive learning about the trustworthiness, hence 'discursive learning' from the structuration lens, whereas perceiving the supplier as integrity and benevolence during and after joint problem solving was interpreted as 'reflexive learning', which is an unintended consequence of shared experiences.

Lastly, the second-order themes were combined into aggregated dimensions that led to the theoretical model of reproducing and developing trust. Figure 3 illustrates the data structure, whereas the theoretical model (Figure 4) will be discussed following the presentation of findings.

Illustrative quotes and field notes	First-order themes	Second-order themes	Aggregate dimensions

Figure 3 Data structure   18

4. Findings

4.1. Relational arrangements at multiple levels

In Case Alpha, relational arrangements were found at multiple levels of organisation. At the firm level, Road Ltd. categorised suppliers based on its own values and strategy, suppliers' competence and past performance. Suppliers that were most likely to create value for the project business were recognised as tier one and awarded a strategic agreement signalling a mutual commitment to collaboration in the next four years. Moreover, the structure that helped reproduce inter-organisational trust between the project-based firm and the supplier was beyond the dyadic relationship. Road Ltd. was one of the appointed main contractors under the client's collaborative procurement framework and has worked with the client in a series of projects in the last four years. The client employed collaborative framework procurement methods to better integrate supply chains and optimise the value. Specifically, a limited number of contractors signed collaborative framework agreements that ensured programmes of projects within five years and limited the competition among appointed companies. For Road Ltd., the continuous businesses led to assurance and confidence in forming strategic agreements with suppliers and maintaining long-term relationships.

At the project level, Road Ltd. and Surface Ltd. have frequented joint routines during the execution. The project management teams had a pre-start meeting before each new phase, during which they planned work sequences and resource levels together. The two teams also had a weekly collaborative meeting to review progress, share information and plan changes. On a daily basis, Road Ltd.'s project manager met supervisors of both companies. Also, under the collaborative agreement, the client initiated open accounts with the main contractor and suppliers and monitored the payment from the main contractor to supply chains. At the individual level, Surface Ltd. appointed the specific general manager to the project who were familiar with Road Ltd. at the firm and interpersonal levels. The general manager had

successfully delivered several projects for Road Ltd. and maintained a good relationship with the project manager of project Alpha.

4.2. Trust in structures: forming trust-related rules and resources

Relational arrangements provided structural conditions for trust development, even though the personnel and project teams changed in successive interactions between the two companies.

4.2.1. Structuring perceived trustworthiness as shared interpretative schemes

The potential strategic agreement induced the shared interpretations within the main contractor that Surface Ltd. were qualified for the tier-one supplier, hence competent for delivering quality service and committed to the relationship. This perception was strengthened by the involvement of Surface Ltd.'s general manager and the interpersonal relationships between key actors, as commented by the project manager of Road Ltd., "I worked with a couple of them before, so I know they are good at their jobs". Perceived trustworthiness from past projects enabled the supplier to early involve in the present project and help the main contractor develop the main bid. Moreover, the shared interpretation was reproduced in joint routines at the project level.

> *…there was consistent set of people delivering for [Road Ltd.] and consistent set of people delivering for [Surface Ltd.]. The familiarity encourages the whole relationship and encourages honest and open speaking throughout and mitigating of risks. (General manager, Surface Ltd.)*

Joint routines and the same personnel ensured consistent communication within the project, which nurtured familiarity between actors and thus a sense of security in their interactions. The sense of security encouraged collective actors to perform trustworthy behaviour such as openness and honesty in interactions.

4.2.2. Structuring trust-related norms

Furthermore, the strategic agreement induced expectations on the supplier's capability and behaviour in service interactions. For instance, one expectation of Road Ltd. was that key suppliers were able to swiftly adapt to changes during execution. However, the West Midlands branch of Surface Ltd., which would be responsible for the execution of project Alpha, did not meet this expectation in the most recent project due to supply delays. The branch was newly established and still used Surface Ltd.'s main resource base, which was remote from the site. Recognising Road Ltd.'s expectation and the root cause of the problem, Surface Ltd. started to build relationships with local suppliers to strengthen their supply chain in the Midlands.

> *It [the recent project] wasn't particularly positive. So, we've really gone back to the basics. We put someone in full time, we really engaged the client, we really planned well together, really spent time on this one. (General management, Surface Ltd.)*

On the supplier's side, the continuity of works from the strategic agreement motivated Surface Ltd. to invest in the relationship, satisfy the requirement for tier-one suppliers and thus "get accepted" by Road Ltd. The allocation of the general manager also raised the relational awareness and familiarity at the individual level. These actions mitigated perceived risks from the past experience, as commented by the project director "we knew [about the] problems we had previously. We got assurances that they've done things to make sure that would not happen again".

4.2.3. Structuring trust as means of resource allocation

It was stressed by the participants that trust relations were used to facilitate resource allocation in emergent changes. For example, one change was asked by the client to repair existing damaged road surfacing. Due to the emergency of the work, Road Ltd. did not formally issue the instruction; instead, the project manager telephoned Surface Ltd.'s general manager to ask about the company's availability for the task.

There's a notice period in [the] contract, which they could say, "We cannot come in two weeks". But they looked at and programmed their resources and said, "If we move these [programmes for other projects] around, we can help you out." And that is all about relationships. Without that relationship, that wouldn't happen. I don't know what we would do… on this job they've confirmed when we needed them. (Quantity surveyor, Road Ltd.)

By using trust relations in uncertainties, Road Ltd. relied on Surface Ltd. to deliver the service in quality and time. Yet it provided opportunities for the supplier to signal their capability to adapt to changes and their good intentions, which "confirmed" the main contractor's expectation on the first-tier suppliers, "to put us [Road Ltd.] high in priority for servicing our jobs. If there are performance issues, we want them to be able to resolve very quickly" (Project director, Road Ltd.). In other words, the perceived trustworthiness and the legitimised behaviour of first-tier supplier encouraged the main contractor to use trust relations to deal with risks and guided the supplier's actions, which, as the supplier performed to the expectation, reproduced and developed trust.

4.3. Trust in interactions: performing trusting and trustworthy behaviour

4.3.1. Balanced power

Trusting and trustworthy actions were found to emerge where the interactions were perceived as equitable by both the main contractor and the supplier, especially in the face of operational and relational risks. For instance, when the delivery of the binder course was changed from daytime to night-time due to Road Ltd.'s own mistake in the procurement, Road Ltd. first admitted their mistake and promptly informed Surface Ltd. of the change. The two parties did not refer to contract terms in the first place but jointly adapted the programme, resources and activities. While operatives were delivering the tasks together, commercial teams completed the formal procedures in accordance with the contract

requirement. Surface Ltd. signalled their integrity and benevolence, which was reciprocated by Road Ltd.,

> *They carried out the work with good faith… everyone has got faith for that… when [the] time comes, we will implement that as a compensation for them and pay them what they are due.*

(Quantity surveyor, Road Ltd.)

Surface Ltd.'s relational investment induced the perception of being trusted on the Road Ltd.'s side or the 'faith' that the other party had in them, which further led to the responsibility of maintaining fairness in the exchange to reciprocate the trust.

In the last step of the surfacing works, Road Ltd. and Surface Ltd. jointly decided to accelerate the works and shorten the programme. Nevertheless, the client changed the project information, which hindered the plan. This information change imposed operational and relational risks on both parties. It might severely cost both parties since resources for the related activities had been allocated. Instead of blaming each other and referring to the contract to safeguard their own positions and transfer liabilities, Road Ltd. and Surface Ltd. adapted the plan to "worked together for a common goal" (Quantity surveyor, Road Ltd.) and "took a joint interest of shared responsibility in the whole project to ensure that we deliver it well" (General manager, Surface Ltd.). "Common goal", "joint interest" and "shared responsibility" implied a more balanced power relation between the main contractor and subcontractor.

4.3.2. Two-way communication

The two parties also maintained two-way communication during the project execution. The shared interpretation of good competence encouraged Road Ltd. to inquire and listen to Surface Ltd.

There are lots of benefits but just being able to have that discussion, what other opportunities are there, improves quite a good relationship. So, our confidence is increasing in [Surface Ltd.'s] ability. (Project director, Road Ltd.)

On the Surface Ltd.'s side, the main contractor's trusting behaviour increased the sense of security and promoted their engagement in the project activities. One example was a meeting attended by the first author. The supervisors of both companies were observed to take turns to lead the conversation about how to solve each other's problems. As the general manager said, "The best way they can help us is to engage us. Let us be a part of it. Listen to what we've got to say – and they do that, as much as they can. That mitigates our risks as well". The supplier's engagement and openness, in return, reproduced trust in the intentions including integrity and benevolence, as the project manager of Road Ltd. commented, "You just know that they raise a question straight away and in front. Straight away. They are not trying to hide anything". As the project progressed towards completion, the two-way communication was also conducted at the firm level. Road Ltd. and Surface Ltd. had mutual feedback through review meetings, survey, and report. The feedback was transferred to the firm level and performance was assessed against tier-one supplier criteria. As a result, the strategic partnership was perceived as very likely by both parties. For Road Ltd., Surface Ltd. "definitely got closer to [the] top [of] that list …definitely somebody that we will use again" (Project manager, Road Ltd.). For Surface Ltd., Road Ltd. changed from 'anyone' "whose main contract is with [the client]" to a client that was "particularly good at getting everyone involved. [To] understand the importance of the supply chains", which "not all contractors do" (General manager, Surface Ltd.).

4.3.3. Relational control

Furthermore, as the two-way, fair, and reciprocating behaviour consistently performed, they were regarded as an informal rule of conduct within the project. The effect of the informal rule was particularly reflected in managing commercial and relational risks when the two companies could not reach an agreement on the amount of compensation for Surface Ltd. Instead of invoking contractual

mechanisms, they had meetings between managers where "we will talk through [the early warning]. We will listen to what they have to say, and they will listen to [what we] have to say" (Project manager, Road Ltd.).

> *Agreements [on early warning] are made by discussion between the key people within two parties to ensure that things are set out in a fair and reasonable, considered manner, and not detrimental to either party. So, we are not overly contractual or commercially aggressive by playing [the] contract to our advantage and trying to profit from that. So, it's all called gentlemen's agreements. (General manager, Surface Ltd.)*

The "fair and reasonable, considered manner" described above was legitimised as the "gentlemen's agreements" in the interactions. In other words, equity and reciprocity were normalised as a rule, under which groups of actors controlled their own behaviour so that the relationship was maintained, and trust reproduced.

4.4. Ontological security: creating the sense of continuity in experiences

As suggested in previous sections, a sense of security was recognised in the interplay of trust-enabling structures and interactions. The sense of security was raised as Road Ltd. learned that the supplier performed to their expectations. Such learning could be intentionally assessing the supplier's competence and intentions in the past experiences. As discussed, Surface Ltd.'s actions of learning from the past, strengthening the supply chains, offering early advice and allocating personnel, as it was learned by Road Ltd., reassured about the future collaboration and enhanced the competence trust. The sense of security also emerged in the process of monitoring the project performance and in joint activities, as the main contractor learned about the supplier's efforts in a reflexive way. From the perspective of Surface Ltd., its ontological security was induced by the main contractor's trusting

behaviour, such as keeping openness and fairness in interactions, as commented by the supplier's general manager:

If we had another thought [that] we might have a slight issue or that is not quite what we thought, these potential commercial implications, we regularly spoke throughout the project. They enjoy the collaborative nature of it. Being able to have confidence to give them the bad news as well as good news. And the confidence to do that is probably the main one.

Consistency between structures and interactions was found to be essential to ontological security. In the surfacing project procurement, Road Ltd. invited Surface Ltd. and another subcontractor to competitively bid for the surfacing works in order to ensure that the price was competitive in the market. As Surface Ltd.'s price was higher than that of their competitor, Road Ltd. withheld the information about the other subcontractor's price and tried to lower Surface Ltd.'s price. It could be inferred that despite the firm-level strategy of developing the relationship with Surface Ltd. to strengthen the supply chain for long-term value across projects, at the project level, project actors tried to opportunistically seek the lowest cost from the supplier. The use of power to manipulate price caused the perception of inequity on the supplier's side, as Surface Ltd. perceived that they were "guided to where our price should be" and only "had the last shout" (General manager, Surface Ltd.). At the early stage of interactions after signing the contract, the communication between Road Ltd. and Surface Ltd. was featured as contractual and task-focused. Contract was heavily relied on to transfer liabilities and risks, as the commercial manager of Surface Ltd. commented in the preconstruction phase, "Things go well as long as you stick to what we've got on the contract". It could be inferred that a sense of insecurity emerged in the manipulating and safeguarding patterns of behaviour, which were not aligned with expectations from relational arrangements.
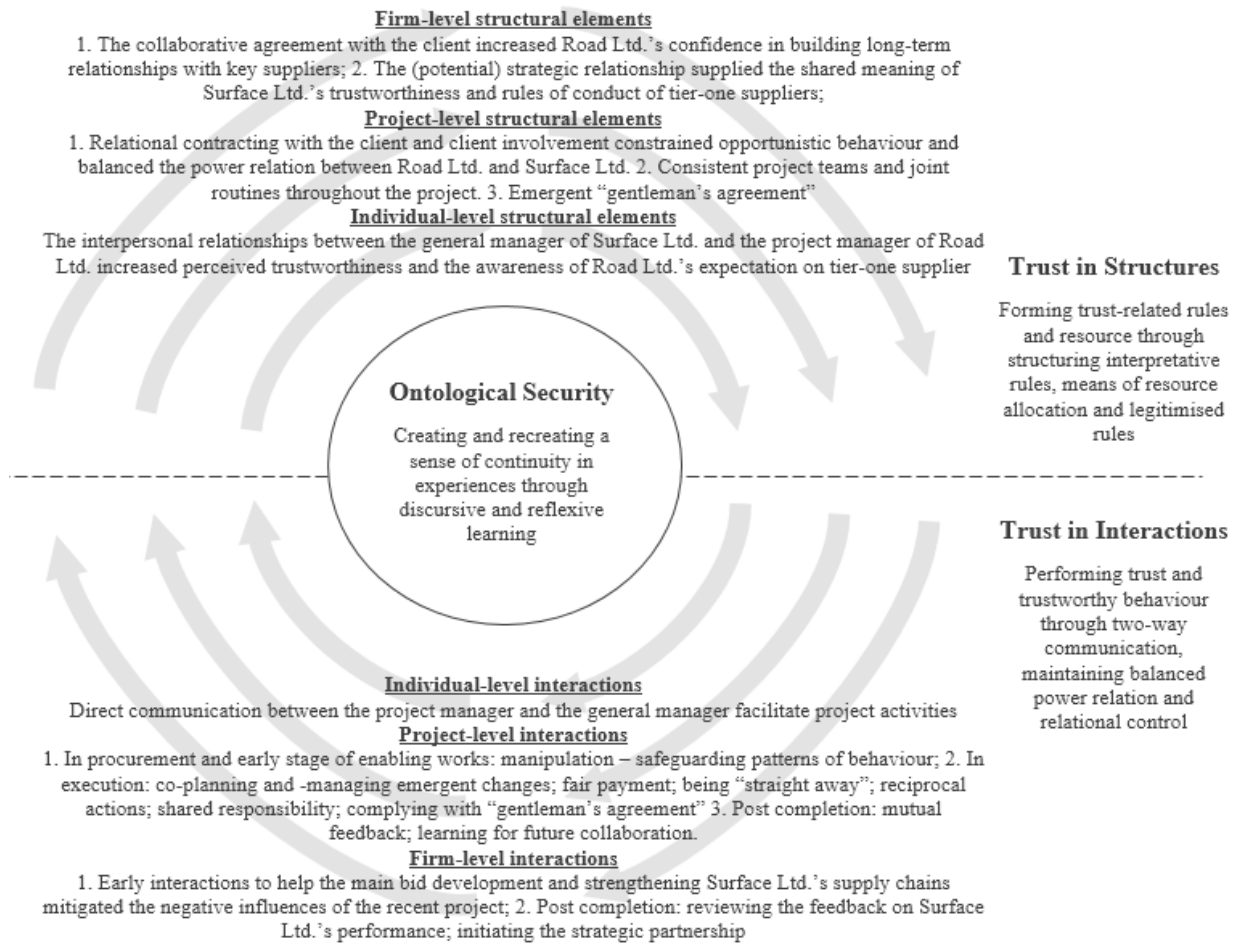
Firm-level structural elements
1. The collaborative agreement with the client increased Road Ltd.'s confidence in building long-term relationships with key suppliers; 2. The (potential) strategic relationship supplied the shared meaning of Surface Ltd.'s trustworthiness and rules of conduct of tier-one suppliers;

Project-level structural elements
1. Relational contracting with the client and client involvement constrained opportunistic behaviour and balanced the power relation between Road Ltd. and Surface Ltd. 2. Consistent project teams and joint routines throughout the project. 3. Emergent "gentleman's agreement"

Individual-level structural elements
The interpersonal relationships between the general manager of Surface Ltd. and the project manager of Road Ltd. increased perceived trustworthiness and the awareness of Road Ltd.'s expectation on tier-one supplier

Trust in Structures

Forming trust-related rules and resource through structuring interpretative rules, means of resource allocation and legitimised rules

Ontological Security

Creating and recreating a sense of continuity in experiences through discursive and reflexive learning

Trust in Interactions

Performing trust and trustworthy behaviour through two-way communication, maintaining balanced power relation and relational control

Individual-level interactions
Direct communication between the project manager and the general manager facilitate project activities

Project-level interactions
1. In procurement and early stage of enabling works: manipulation – safeguarding patterns of behaviour; 2. In execution: co-planning and -managing emergent changes; fair payment; being "straight away"; reciprocal actions; shared responsibility; complying with "gentleman's agreement" 3. Post completion: mutual feedback; learning for future collaboration.

Firm-level interactions
1. Early interactions to help the main bid development and strengthening Surface Ltd.'s supply chains mitigated the negative influences of the recent project; 2. Post completion: reviewing the feedback on Surface Ltd.'s performance; initiating the strategic partnership

Figure 4 The reproduction and development of trust

5. Discussion

Figure 4 illustrates the process of trust reproduction and development in the firm-supplier relationship. Trust-building rules and resources were arranged at the firm, project and individual levels and guided the actions of the project-based firm and supplier. Trust-enabling structures induced the legitimated rule of conduct between two parties and the shared perception that the other party was competent, honest and benevolent encouraged trusting and trustworthy behaviour in interactions. Moreover, once it was established, the trust relation was repeatedly employed as the means of resource allocation to facilitate project activities. Structural arrangements laid the foundation for reproducing and developing trust. Actors made use of and encoded trust-building rules and resources in specific actions in a context to

signal trust and trustworthiness. Furthermore, the influence was not only top-down but also bottom-up. Shared interpretations also emerged in the two-way communication and where power was balanced in interactions. "Gentleman's agreement" was legitimised as the rule of conduct in the reciprocating and equitable interactions, in which the project-based firm and supplier controlled their own behaviour in order to maintain the trust relationship. Lastly, ontological security, that is a sense of continuity between past, present and future experiences, emerged in the interplay of trust-enabling structures and interactions. To raise and maintain ontological security required learning, which can be discursive, that is to purposively assess the other party's trustworthiness, but also reflexive, that is to monitor actions and perceptions as a reflection after interactions with the supplier, "as a reassuring consideration" (Luhmann, 1979, p. 36).

The present study demonstrates that trust dynamics is driven by the interplay of trust-enabling structures and interactions. It was observed that the interplay went in two ways. First, a top-down approach imposes collaborative arrangements to structure trust relations, which can influence the interpretations and actions of project actors. It has been noted that formal collaborative mechanisms have positive effects on shared values, common goals and openness in communication (Kadefors, 2004; Suprapto et al., 2016; Wong et al., 2008). Formal structures also clarify roles, identities and joint routines, hence generally acknowledged guidelines of behaviour that increase predictability in interactions (Bechky, 2006; Meyerson et al., 1996). This study is in line with these views and further explains that the rules and resources derived from collaborative arrangements induce a sense of security in the relationship. As Bachmann (2001, pp. 358–359) noted that structural arrangements induce trust in systems since power "can hardly be (mis-)used by them [individual actors] for opportunistic strategies". It was observed that collaborative mechanisms help ensure consistency in the communication and create a shared understanding of trustworthiness that helps regularise expectations and actions of the project-based firm and the supplier. Furthermore, the study found that the shared understanding is transferred in successive interactions through past relationships between key actors. This is in line with the study of Buvik and Rolfsen (2015) who found that prior ties helped form the climate of shared trust at the early stage of

project interactions. In addition, the positive effects of the collaborative arrangements between the project-based firm and the client on the firm-supplier relationships were identified in the study. The long-term partnership with the client promotes the collaborative approach to managing suppliers at the firm level, and, at the project level, open account and risk-sharing contract constrain opportunism and promote trustworthiness in interactions between the project-based firm and the supplier (Manu et al., 2015).

Trust also emerges from trusting and trustworthy actions, hence the bottom-up interplay of structures and interactions. Two-way and open communication provides opportunities for learning about the other party including the capability of solving problems and integrity. Regular communication enables the sharing of information about each other's preferences and expectations (Lewicki and Bunker, 1996). It was found that trust emerges through discursive and reflexively learning as a repertoire of signals of trustworthiness is initiated and mutually comprehended and the ontological security is maintained. Moreover, trust develops as it is employed to facilitate resource allocation between the two parties. The findings corroborate that trust emerges from embracing uncertainty and vulnerability and when it is used as an authoritative resource to reduce risks (Latusek and Vlaar, 2018; Luhmann, 1988). It was found that the project-based firm's trust encouraged the supplier to invest more in the relationship. Relationship-specific investment has been regarded as a mechanism for generating trust as it limits opportunistic behaviour through creating a fear of legal sanction or losing economic hostages (Nooteboom et al., 1997). However, this study suggests that those investments bond two parties relationally. Suppliers invest in relationships, in the form of small actions that signal their capability and good intentions, to satisfy or exceed the expectations of project-based firms. Such investments induce the project-based firm's perception of being trusted and the responsibility of maintaining fairness to reciprocate the trust, which in turn increase the supplier's confidence in acting trustworthiness in interactions. These findings suggest that to reproduce and develop trust requires both trustee and trustor to perform trusting and trustworthy actions so that equity and reciprocity emerge and maintain the power balance in the relationship. Reciprocity signals a mutual commitment to and forms positive expectations

of the relationship (Pervan et al., 2009; Swärd, 2016). Project-based firms and suppliers make fair dealing and seek benefits proportional to their investments, with the condition of maintaining relationships (Ring and Van de Ven, 1994; Tsanos and Zografos, 2016; Venselaar et al., 2015). This study builds upon the extant contributions and further suggests that the reproduction of trust requires that trusting and trustworthy actions, including openness, integrity, reciprocity and equity, are regarded by actors *as* the rule of conduct between two parties, hence forming relational norms, or 'gentlemen's agreement', in a bottom-up way. These emergent rules of legitimation enable relational control under which actors control their own behaviour to comply with the normative practices and relational expectations and to restrain opportunism so that relationships are sustained. Furthermore, the findings showed that relational control helps stabilise the firm-supplier relationship under project risks and uncertainties.

Furthermore, the study suggests that to reproduce and develop trust in successive interactions requires consistency between structures and interactions and between different levels of project contexts. It has been recognised that project actors are embedded in multilevel contexts (Manning, 2008; Stjerne et al., 2019). Inter-organisational relationships in project settings are not necessarily continuous and are reproduced and develop in successive interactions embedded in long-term relationships at firm and individual levels. It was observed that despite the collaborative strategies at the firm level, the cost-focused goal at the project level still led to manipulation and safeguarding behaviour that hinder trust development. Bases of power disperse in project business. Project-based firms are decentralised and authorise project actors power at use, but whether and how to use power depends on interests of firms but also requirements and resources in the projects (Bresnen et al., 2004). Also, the time and functional or silo constraints within the project businesses result in the weak systems between the project and firm levels (Smyth, 2015b), which in turn cause difficulty in realising collaborative strategies and transferring trust between the firm, project and individual levels and across projects. This points to the necessity for strengthening the links between the firm and project levels so to form and maintain the shared climate of trust in project business.

6. Conclusion

This study explored the dynamics of inter-organisational trust in project contexts, particularly the relationship between project-based firm and supplier. It contributes to trust theories in project studies by theoretically and empirically demonstrating how trust is reproduced and develops in successive interactions yet with changing contexts at multiple levels of organisations. Moreover, the study offers a dynamic lens of theorising inter-organisational relationships in project contexts. Project uncertainties and dynamics cause changes of actions at individual, project and firm levels in which trust emerges. Trust-enabling structures also locate at different levels. Yet most project studies focus on trust within and between projects, but not in relation to firms. The present study goes beyond managerial actions at project level and explicates the interplay of trust-enabling structures and interactions in multilevel contexts that drives trust dynamics. To reproduce and develop trust in project contexts needs consistency between structures and interactions and between multilevel contexts, which is achieved through top-down management interventions and the bottom-up learning process. A clear understanding of how and why trust and relationships dynamics in empirical settings can further benefit project management theories and practices such as the design and implementation of relational contracting in inter-organisational projects, relationship management systems in project businesses and other innovative collaborative arrangements at different levels of organisations.

The scope of the study limits the pursuit of a longitudinal study. We relied on a series of snapshots, like Zeno's flight of arrows, to infer the dynamics through change, which is enhanced by the three-wave interviews. A longitudinal study is helpful in deepening the understanding of the role of the past and future in project organisations beyond the most recent experiences. Moreover, the research findings shed light on the influence of suppliers' trust on project performance, pointing to the necessity of future studies on inter-organisational relationships in project-based supply chains. Additional research can be carried out to focus on trust dynamics in other project-based industries to promote analytical generalisation of the concepts presented here.

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