

The Value of Trust in Construction Supply Chains

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I, Jing Xu confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis

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Abstract

Construction supply chains have a high level of specialism and involve loosely-coupled and relatively self-contained subsystems. Value is always co-created in networks of relationships. Effective relationships between those representing their respective organisations in the project are necessary for effective integration and healthy interdependencies to grow and be maintained. Relationships in construction supply chains have been featured as transactional and do not always generate effective working. Collaboration has been repeatedly proposed to counteract these trends and trust has been identified as a key success indicator. Yet less research interest has been in trust dynamically co-created through service interactions and leveraging value for those involved. This thesis aims to demonstrate the dynamic value of trust in construction supply chains, in particular relationships between main contractors and second-tier subcontractors, an under-researched area by supply chain and project management bodies of knowledge (BoKs). Taking the perspective of structuration theory and service-dominant logic (S-DL), this process-based research focuses on supply chain relationships in service ecosystems. Seventy-one semi-structured interviews were conducted at the preconstruction, then execution and finally completion stage of three construction projects. The findings reveal that trust development is both an intended and unintended process and involves various types of interaction. It is found that the interplay between different types of interactions can form the trust phenomenon in which the value of trust unfolds. Trust helps increase service value by improving the service experiences of those involved; the better service enables higher performance levels. The study also demonstrates the conditions for trust in terms of structures of service ecosystems and time. This study contributes to knowledge in that it 1) theoretically and empirically demonstrates the value of trust and relationship in construction project management and supply chain disciplines, 2) advances the relational approach in both disciplines and 3) links trust and relational concepts with S-DL.

Impact statement

This research aims to explore the value of trust in construction supply chains. The concept of value goes beyond mainstream economics towards perceived benefits for individual experiences, organisation performance and service effectiveness including public service.

The research produced findings in three themes:

- 1) Interactions between construction-related organisations in delivering public and private projects, including construction project businesses, their supply chains and stakeholders in public and private sectors;
- 2) The process of trust and relationship development between construction project businesses and supply chains in delivering projects;
- 3) The value of trust in terms of improving individuals' service experiences, service effectiveness and organisation performance.

Research findings from each of these themes have provided a range of benefits for academia and industry:

- 1) Individuals and organisations participating in the research: research presentation transferred knowledge about service-dominant logic that can be used to improve practices and service effectiveness; multiple-wave interviews at different stages of project lifecycle helped individuals and organisations reflect their own practices in on-going projects, identify value co-created with their partners as well as problems, and thereby enhance project performance;

Evidence of interactions, trust development and value can be used to develop relationship and knowledge management programmes, systems, practices and codes of behaviour to develop project and organisation dynamic capabilities, improve supply chain relationships, reach higher performance and lever value in future service for society.

- 2) Academia: the research has produced one book chapter, two conference papers and one journal article that is currently under review. Extant publications and presentations combined theories and approaches from multiple disciplines including construction and project management, sociology, organisational studies and

marketing, which can benefit researchers who are interested in the above disciplines as well as cross-discipline theories and methods.

Beyond current impacts, pathways to future impacts on wider stakeholder and academic communities include:

- 1) Journal article publication, conference presentation and dissemination: continuing the dialogues on relationship-centric and service-driven management approach, value co-creation and trust in the academic community, mapping out a future research agenda that is relevant to the needs of researchers and practitioners.
- 2) Action research based on the findings of this research that involves public and private organisations in the construction industry: this research will transfer knowledge about value co-creation in the service ecosystem and dynamic capabilities to support value co-creating activities, including trust and relationship management with stakeholders, learning between different levels of service ecosystem, between projects and the organisation, and across projects and structuring systems to facilitate top-down and bottom-up transferring of rules and resources.

In doing so, organisations can enhance the awareness of relationships and relationship value, develop the capability of executing relational contracting, delivering effective service and co-creating value for themselves, their partners and ultimate service beneficiaries – the society. In the long term, the action research can improve the effectiveness of collaborative procurement and execution of public and private construction projects, change the arms-length, if not adversarial, relationships between construction organisations, and cultivate a collaborative and transformational culture in the industry for continuous improvement.

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Introduction

The value of trust

“A complete absence of trust would prevent [one] even getting up in the morning.”

(Luhmann, 1979, p. 1)

Trust is a social phenomenon that enables interactions among actors and organisations. In the broadest sense, trust sustains institutional, social and organisational life (Luhmann, 1979; Giddens, 1990; Kramer and Tyler, 1996). Trust in abstract systems, consisting of expert knowledge, involves faceless commitment that sustains everyday life, for example travelling by aeroplane from London to Beijing without concern as to who the pilot is. The continuity and transformation of faceless commitment and trust in systems need recursive production and reproduction of face-to-face commitment and trust in organisations and individuals as ‘access points’ of abstract systems (Giddens, 1990). Taking the example of travelling by aeroplane, trust in aviation and other expert systems is strengthened and transformed by interactions between passengers and crew during the 10-hour journey from London to Beijing, such as the way the pilot deals with emergencies and the service provided by flight attendants. In other words, trust in systems enables the *“working of knowledge of which the lay person is largely ignorant”* and is sustained or transformed by trust in persons that seeks *“indicators of the integrity of others (within giving arenas of action)”* (Giddens, 1990, p. 88). As such, trust relations are basic to both social systems and individuals; as O’Neill (2002, p. 3) observed, *“without trust we cannot stand”*.

At the meso- and micro-levels, trust draws attention in the practice of inter-organisational and interpersonal relations especially where actors and organisations are interdependent, and collaboration is necessary for creating value. A relationship can be interpersonal. It can also be inter-organisational based upon the sum of the key interactions and individuals. This thesis focuses on inter-organisational trust in construction supply chain relationships. Inter-organisational trust is regarded as the collective-held trust by members in one organisation towards another organisation (Zaheer, McEvily and Perrone, 1998). In this thesis, actors in main contractors have a collective or aggregate view of trust towards subcontractors as organisational entities. In this vein, inter-

organisational trust is believed to be an appropriate governance mechanism for enhancing communication quality, reducing transaction costs and increasing project efficiency (Zaheer, McEvily and Perrone, 1998). Once established, trust may align separate interests into a collective unit and generate an environment of integrity and openness where actors are willing to share risks, commit resources and work jointly, though it is recognised that blind and unconditional trust is unwise (Sydow, 1998; Zaheer, McEvily and Perrone, 1998; Nooteboom, 2002; Smyth and Thompson, 2005; Pinto, Slevin and English, 2009). In contexts of increasing complexity and uncertainty, increased specialism and interdependence, such as the construction industry, trust is needed not least because of the call for non-adversarial working and integrated supply chains (Egan, 2002; Wolstenholme *et al.*, 2009). It helps improve individuals' service experiences and the efficiency and effectiveness of service provision, which has implications for performance. Trust helps lever service value for actors and organisations involved in construction activities as well as clients and end users.

“You may be deceived if you trust too much, but you will live in torment if you do not trust enough.”

(Frank Crane, as quoted in Business Education World, Vol. 15, 1935, p. 172)

The value of trust is not without interest. Sociology and psychology point out the intrinsic value of trust, which can be hedonic or based on self-identity (Blau, 1964; Giddens, 1990; Erikson, 1993). Intrinsic value means that trust and trust relations are valued for themselves in that they improve the wellbeing or quality of life of actors and collective actors. It is not hard to understand that many people find it more pleasurable to have trust-based relations than to have to deal with suspicion and opportunism. There is also a social and psychological urge to find others to trust, to be trusted and to be recognised. The diminution of community and kinship networks means that interpersonal trust needs to be earned by the parties involved and requires self-disclosure and self-enquiry; that is, demonstrating openness and integrity to the other while discovering oneself in a reflexive way. As such, self-identities are socially constructed as a reflexive project for individuals. The social construction of identities also establishes a social footing that serves as a point of reference and supplies meaning in communications (White, 1992; Luhmann, 1995). At the organisation level, though they are less likely to have an intrinsic urge, collective actors can have socially-oriented motives, in the will to be recognised and achieve satisfaction from excellent outcomes. Social recognition is not necessarily served by

being trustworthy and trusting; accumulating power may be another way. The point is that social orientation can bridge the intrinsic value and extrinsic value of trust in that social recognition can help achieve goals in a way not independent from the relationship, parties involved and the exchange process (Nooteboom, 2002).

It is the exchange process that increases the relevance of trust in the delivery of construction projects. The extrinsic value of trust builds upon interactions, which are in turn enabled by trust between actors and organisations in the face of institutional arrangements in the business environment (Nooteboom, 2002; Bachmann and Inkpen, 2011). Most economists tend to assume the impersonality of the transaction and ignore the exchange process (Nooteboom, 2002), in which actors and organisations build networks of relationships, share resources and learn from experiences, and, in doing so, they co-create value for the present and future (Vargo and Lusch, 2004; Smyth, Lecoivre and Vaesken, 2017). Service exchange involves interactions that are vital to the creating of value and trust (Ballantyne and Varey, 2006; Payne, Storbacka and Frow, 2008). This is especially true in the delivery of construction projects in that the exchange process is complex too, taking a long duration of time. Good or excellent outcomes need collaboration and cooperation in complex and uncertain contexts (Smyth, Gustafsson and Ganskau, 2010). Investing in social relations embeds resources in social networks and yields social capital as a relational asset enhancing the outcomes of actions (Bourdieu, 1986; Portes, 1998; Granovetter, 2005; Nooteboom, 2007; Laud *et al.*, 2015). Trust affects actors' and organisations' opportunities for constructing and maintaining social capital, hence the outcomes of collaboration (Lin, 2002). The latter, in turn, motivates the continuity of relationships and trust. In other words, extrinsic value can drive the initiation and maintenance of relationships in the form of increased profits and allocable resources in transactions for instance (Laud *et al.*, 2015). Managing relationships in this way is aligned with the theoretical paradigm of transaction cost economics (Nooteboom, 2007). On the other hand, actors and organisations can be bonded by intrinsic value that generates social recognition and reputation going beyond transactions. Social capital also has a role of maintaining and developing relationships and trust (Nooteboom, 2007).

Extrinsic and intrinsic value, nevertheless, are not necessarily perceived as distinct, though they are analytically distinguishable. An important question is how they are related to the perception of trustworthiness, behavioural orientations and behaviour of actors. In relation to construction project management, Smyth (2008) presented a

framework of trust drawing conceptual, philosophical and methodological elements together to deepen the understanding of trust in project businesses. Later, Smyth (2010) conceptually and empirically explored the value of trust between project businesses. While trust among project-based organisations is essential, it is particularly challenging to develop and sustain in projects, especially between contractors and suppliers. Firm-level trust depends on performance and relationships at the project level. Main contractor and second-tier subcontractor relationships were identified to be worse than client and main contractor relationships (Alderman and Ivory, 2007).

Trust, including trust-related perceptions, orientations and behaviour of actors and organisations, and its value in construction supply chains is the focus of this thesis. The overarching aim of the thesis is to explore the value of trust in construction supply chains, in particular relationships between main contractors and second-tier subcontractors.

Collaboration in construction supply chains

Chapter 1 discusses the context of the research and stresses the significance and the difficulties of inducing and maintaining collaboration in construction supply chains. Construction supply chains have a high level of specialism and consist of loosely-coupled and relatively self-contained subsystems such as specialist contractors and suppliers (Dubois and Gadde, 2002b; Pryke, 2009). The increased complexity and societal demands for the value delivered through construction projects render difficulties, if not impossibilities, for a single firm to reconcile unfolding uncertainties, let alone lever value in the construction project lifecycle. Specialisation and subcontracting enable project businesses at each level to concentrate on their own core business, and to share risks and liabilities with other actors, so that they become more flexible and capable of meeting changing demands and providing an effective service (Lai, 2000; Manu *et al.*, 2013). Main contractors, subcontractors and suppliers are interdependent with each other and collaboration among supply chains is necessary if projects are to be delivered and project businesses are to survive (Dubois and Gadde, 2002b; Bygballe and Jahre, 2009).

However, achieving coherent teams and collaborative practices in the process of service delivery is not self-evident. Fragmented approaches to managing construction projects and supply chains have caused inefficient production and communication, arms-length relationships, blame cultures and opportunism, which ultimately reduce value for clients, contractors, suppliers, end users and society (Kadefors, 2004; Fulford and Standing,

2014). One barrier to improving supply chain relationships is the institutional logic of goods-dominance and project-focus that emphasises transactional efficiency and promotes practices maximising short-term profits and assessing performance in a project-by-project way (Kadefors, 2004; Smyth, 2015a). Under goods-dominant logic (G-DL) and project-focused logic (P-FL), partnering projects and collaborative mechanisms simply move the singular transactions to multiple transactions over time in order to profit from supply chains (Alderman and Ivory, 2007; Smyth, 2015b). Trust relations are viewed as a temporary vehicle to increase project efficiency, and terminate with the project; trust is said to be mostly built from scratch (Dubois and Gadde, 2002b). In some cases, partnering has been used as a guise by main contractors to reap the profits from second-tier subcontractor (Alderman and Ivory, 2007; Bresnen, 2007), which dramatically worsens supply chain relationships and leads to the perception that partnering projects “*are only paying lip-service to the principles of partnering*” (Brown *et al.*, 2001, p. 195).

A considerable body of construction project management studies has focused on collaborative mechanisms and tools (e.g., Rahman and Kumaraswamy, 2008; Bygballe, Dewulf and Levitt, 2015). The effects of such mechanisms and tools vary (c.f. Cicmil and Marshall, 2005; Brady and Davies, 2014). The lack of empirical studies on supply chain relationships, especially the process of relationship development in project delivery, might contribute to the difficulties of implementing partnering arrangements into practice (Bresnen and Marshall, 2000; Eriksson, 2015; Ahola, Vuori and Viitamo, 2017). Most studies have concentrated on client and main contractor relationships (Bygballe, Jahre and Swärd, 2010). It has been identified that second-tier subcontractors and suppliers have less understanding of collaborative mechanisms and question the benefits they can attain through collaborating with main contractors (Mason, 2007). This points to the necessity of supplying a relationship-based approach to managing supply chains that places supply chain relationships at the centre of analysing and theorising, focuses on value-in-use for both main contractors and supply chains, and prepares to handle uncertainties and dynamics in a social context over time. Trust is fundamental to relationships and enables collaboration between actors and organisations. The desired result is to form trust among supply chains that motivates actors and organisations to share resources and risks, learn from experiences, take responsibilities and co-create value.

Research objectives and questions

Based on the research context of construction supply chains, the overarching aim is broken down into detailed objectives:

- (1) Identifying the process of trust development in construction supply chains;
- (2) Providing an institutional logic, at least complementary to G-DL and P-FL, as a lens by which to analyse value and value-creating activities in construction;
- (3) Shedding light on the value of trust for those involved, including main contractors and subcontractors, as well as a broader view on value beyond points of transactions towards value-in-use over time (Vargo and Lusch, 2004; Saxon, 2005).

To achieve the aim and objectives, primary research questions are formulated as follows:

- (1) Whether and if so how does trust from main contractor to second-tier subcontractor develop during service interactions between the two?
- (2) Whether and if so how does trust from main contractor to second-tier subcontractor dynamically help increase service value during service interactions between the two?

Problem statement

Chapter 2 reviews extant trust theories in various domains and disciplines. Literature has produced a kaleidoscope of concepts of trust, which require some clarification. This research has conceptualised 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. The focus is inter-organisational trust from main contractor to second-tier subcontractor. Inter-organisational trust reflects the collectively-held trust intention by members in one organisation towards another organisation (Zaheer, McEvily and Perrone, 1998). It has been recognised that trust develops in the face of institutions and institutional arrangements (Zucker, 1986; Bachmann and Inkpen, 2011); it also needs interactions. In a business context, interaction is a mutual or reciprocal process in which two or more parties are involved in each other's practices or in contact with each other (Grönroos and Ravald, 2011). It can be direct, meaning that interacting parties are co-present in a context and can simultaneously influence the process (Echeverri and Skålén, 2011; Grönroos and Voima, 2013); it can also be indirect, though a medium or media.

Interactions enable actors and organisations to know more about the other party's ability, benevolence and integrity, which can lead to trusting behaviour (Mayer, Davis and Schoorman, 1995) and demonstrates the practical significance of trust (Lewicki and Bunker, 1996). Developing trust in interactions between actors and organisations is dynamic and needs cognition, intuition and behavioural enactment (Lewis and Weigert, 1985; Lewicki and Bunker, 1996; Rousseau *et al.*, 1998; Smyth, Gustafsson and Ganskau, 2010). The phenomenon of trust that has been formed in such interactions can be demonstrated in dimensions of perception, orientation and behaviour. Under different extents of trust, actors and organisations might perceive the trustworthiness of another party's competence and intentions differently. The orientation of engaging in trust-based relationships might be self-interested or socially-oriented (Lyons and Mehta, 1997; Smyth and Edkins, 2007). The perception and orientation can lead to behaviour that demonstrates different values of trust.

In the domains of construction project and supply chain management, some studies have built upon sociological and organisational models to seek antecedents and outputs of trust in projects (e.g., Hartman, 2000; Wong *et al.*, 2008; Pishdad-Bozorgi and Beliveau, 2016). Whereas this stream of trust research illustrates a comprehensive map of trust-related factors, the results are static snapshots of trust. Like Zeno's arrow, an individual snapshot gives a glance of trust in a given point of time and space but sheds little light on the understanding of the essence of trust. The dynamic process of trust development in contexts and over time needs further investigation.

Inspired by transaction cost theory (Williamson, 1985, 1996), some studies perceive trust as a governance mechanism at the project and corporate levels that complements or substitutes market price and hierarchical authority (e.g., Winch, 2001). Based on trust as a governance mechanism and drawing upon social contract (Macneil, 1980), some researchers draw attention to relational contracting and the design of formal mechanisms for promoting trust relations in order to promote project efficiency (e.g., Rahman and Kumaraswamy, 2012). This line of research, however, faces internal and external challenges of transferring trust at the governance level to operational and behavioural levels and maintaining a consistent service (Bresnen, 2007; Smyth, 2015a). Moreover, relational contracting is largely reactive on the supply chains' side and, without the support from relationship management, is insufficient for sustaining healthy interdependent and effective relationships (Smyth, 2015b).

Also related to Macneil's (1980) theorising of relational norms in contractual relationships, the conditions of trust – that is, the atmosphere and culture derived from specific trusting behaviour conducted by actors in interactions – has been demonstrated (e.g., Smyth and Thompson, 2005). However, how the phenomenon of trust and norms of behaviour form and how the phenomenon helps lever the performance of those involved remain unanswered. Many studies have viewed trust as a mechanism for reducing perceived risks and transaction costs (Winch, 2001; Doloi, 2009). Reducing risks is important for project organising, but value creation is the fundamental driving force behind business activities. To investigate the value of trust, it is necessary to link trust with value-creating activities between construction supply chain partners.

Chapter 3 introduces service-dominant logic (S-DL) and compares S-DL with goods-dominant logic (G-DL) and project-focused logic (P-FL) in the context of construction projects and supply chains. G-DL and P-FL emphasise the economic value determined at the point of transaction or series of transactions – that is, value-in-exchange, the active role of suppliers in producing the value proposition as ‘quantifiable evidence’ of the value, temporary nature and uniqueness of projects. Managerial approaches based on G-DL and P-FL neglect exchange processes, interactions and relationships between customers and suppliers (Skålen *et al.*, 2015). In the context of construction projects, subcontractors are suppliers of specialist projects and main contractors are the intermediate customer of these subcontracted projects. Main contractors integrate specialist components into a whole product, a construction project, and deliver it to clients and end users such as building occupants. The latter is the customer of the overall project. In this thesis, subcontractors refer to firms that provide specialist goods and services for main contractors. The delivery of construction projects is a process where main contractors as intermediate customers of subcontracted projects usually participate in the delivery, interact with subcontractors as suppliers and provide service. The shadows of the past and future as well as rules and resources at multiple levels of the service ecosystems influence perceptions, normative practices and power relations in current interactions and hence knowledge transfer and capability building in project businesses and networks (Brady and Davies, 2004; Manning and Sydow, 2011). G-DL and P-FL fall short in addressing the active role of main contractors as intermediate customer in the service process, influence of past and future, and contexts where relationships are embedded and have value beyond present projects.

S-DL is proposed as a complementary logic to G-DL and P-FL. S-DL shifts the focus away from projects, goods and services towards service and relationships in service ecosystems (Vargo and Lusch, 2008, 2016). This inherently-relational feature links S-DL with construction project and supply chain management, and this research. S-DL regards relationship and trust as an operant resource that acts upon goods, services and other operant resources and can improve resource integration and value co-creation (Vargo and Lusch, 2008). In this vein, the value of relationship and trust goes beyond bringing repeated transactions. Under S-DL, main contractors and subcontractors can only create value propositions, namely construction projects and components. By participating in service interactions, actors have more opportunities for mutual learning, knowledge sharing and relationship building, hence gaining resources and service rights as financial and social capital that lever value for future service exchanges, which is part of value co-creation. Trust informs and is part of the service interactions in that it may encourage communication and learning between main contractors and subcontractors, help create and adapt shared meanings in uncertainties and dynamics, ensure reciprocity and equity in the service process and outcomes, and nurture relational norms between actors and organisations. Value co-creation is founded upon trust-based interactions at different levels of service ecosystems that align actors' value expectations as reciprocal promises *"to and from suppliers and customers seeking an equitable exchange"* (Ballantyne and Varey, 2006, p. 344).

Although S-DL is inherently relational, relationship-related concepts, such as trust, have gained little attention in the S-DL literature. The relational, zooming-in, interactive and multilevel aspects of service interactions and value co-creation that include both customer's and producer's service experiences and value need investigation – pointing to the necessity for embodying a relational approach in the S-DL community that focuses on relationships. The theoretical points of departure identified in the literature review are summarised below:

- 1) The dynamic process of trust development in construction supply chain relationships;
- 2) The unfolding value of trust in terms of service provision and outcomes;
- 3) The relational, zooming-in, interactive and multilevel nature of service interactions;
- 4) The influences of time and structures of the service ecosystem on trust and value.

Theoretical, philosophical and methodological foundations

Building blocks of the research: the conceptual framework

Based on problems and gaps identified in the literature review, five building blocks were identified and consisted of the conceptual framework of this research. They also served as theoretical expectations of this thesis that linked the phenomenon of trust with interaction process, structures and value.

- 1) *Trust phenomenon*. The phenomenon of trust links attitudinal trust and behavioural trust and shows how actors' attitudes towards the others party's competence and intentions are manifested in behaviour, therefore revealing the practical significance of trust. Attitudinal trust includes the perception of trustworthiness and orientation of trust. Based on extant research and in the light of S-DL, 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 actor, based on the expectation that the other actor can reduce risks and co-create value in a relationship (Mayer, Davis and Schoorman, 1995; Rousseau *et al.*, 1998; Sydow, 1998; Smyth, Gustafsson and Ganskau, 2010).
- 2) *Interaction*. This process-based research explores trust in on-going processes of service interactions between main contractors and second-tier subcontractors. Despite the significance of structures, trust develops or erodes in interactions between actors and organisations (Barney and Hansen, 1994). Trust is dynamic over time, influenced by the shadow of the past as well as expectations of the future (Poppo, Zhou and Ryu, 2008; Buvik and Rolfsen, 2015; Ligthart, Oerlemans and Noorderhaven, 2016; Ahola, Vuori and Viitamo, 2017).
- 3) *Structures of the service ecosystem*. Trust and relationship in projects are affected by structures of the service ecosystem, including projects, organisations, inter-organisational networks and organisation fields (Grabher, 2002; Manning, 2008; Edvardsson, Tronvoll and Gruber, 2011; Akaka, Vargo and Schau, 2015). Those structures provide actors, rules and resources that constrain and enable the constitution of trust and the enactment of trust value at the project level (Edvardsson, Tronvoll and Gruber, 2011). Also, structures can help generate a sense of ontological security, by creating a healthy level of accountability and furnishing common knowledge that sustains day-to-day practices, for instance, which form the base of

trust (Giddens, 1990; Meyerson, Weick and Kramer, 1996; Bachmann and Inkpen, 2011).

- 4) *Time dimensions of past and future*, which constrain and enable trust development (Poppo, Zhou and Ryu, 2008; Buvik and Rolfsen, 2015).
- 5) *Value*. Value creation is the driving force behind project businesses. Instead of focusing only on reducing risks, this research considers the effects of trust on value-in-use. The concept of value-in-use goes beyond value-in-exchange and includes all kinds of perceived benefits that can better lever or realise value under current and/or future states of actors and/or organisations (Vargo and Lusch, 2004).

The conceptual framework guided the research design and empirical research.

Process-based perspective

Chapter 4 discusses the philosophy and methodology of this research. For the reality, we take the worldview that the movement, change and thereby processes are the basic forms of the universe, and seemingly stable and concrete entities and substances such as organisations are the momentary outcomes or effects of historical processes (Bergson, 1946; Rescher, 1996). We recognise the existence of substances and treat them as manifolds of process. On the basis of ‘becoming’ ontology, this thesis takes the perspective of critical realism and regards the reality as consisting of three domains – the real, the actual and the empirical (Bhaskar, 1975). The task of the thesis is to explore trust and its unfolding value between “*what we experience, what actually happens, and the underlying mechanisms that produce the events in the world*” (Danermark, Ekstrom and Jakobsen, 2001, p. 21). The emphasis is on the generative mechanisms and emergence that entails the presence of phenomena (Sayer, 2000). This thesis studied the process of trust development and the unfolding value by investigating the generative mechanisms, emergence as well as the phenomenon of trust entailed.

Methodologically, this research is qualitatively-based and uses a multiple case study method. Case study facilitates a zooming-in view and the exploration of the phenomenon in the local context (Yin, 2009), which fits the research aim and objectives of exploring the value of trust in the process of developing trust. This research is in line with process-based studies (Weick, 1979; Langley, 1999; Chia, 2002; Tsoukas and Chia, 2002; Van de Ven and Poole, 2005; Langley and Tsoukas, 2010) and focuses on the dynamics of trust,

interactions and unfolding value. The unit of analysis is the relationship between main contractor and subcontractor.

In order to take time into account, empirical research was inspired by the longitudinal study method (Pettigrew, 1990). Data were collected through three-wave interviews at the procurement and preconstruction, execution and completion stages of project delivery. In doing so, this research contributes to the understanding of trust and value in the domain of construction project and supply chain management that is unavailable from variance-based research. The latter tends to either ignore time or treat it as a variable (e.g., comparing effects of long-term and short-term relationships) (Mohr, 1982; Langley and Tsoukas, 2010). This thesis takes an interpretative approach to investigate the phenomenon (cf. Isabella, 1990; Pratt, Rockmann and Kaufmann, 2006; Monin *et al.*, 2013). Specifically, this thesis focuses on individuals' perceptions of events and processes and strives to understand the informants' views of the topics under research, such as their perceptions of certain events and experiences, and their attitudes towards the other party. The interpretative process helps produce conceptual products at different stages of analysis, which were used as the basis of further analysis.

Theory is constructed in an abductive way, meaning that generative mechanisms for patterns of events and activities were identified by interactions between local findings and theories. Throughout, the thesis focuses on what Merton (1968, p. 39) called "*theories of the middle range*", theories that lie between working hypotheses in day-to-day practices and the all-inclusive systematic grand theories. The key to building middle-range theories is to explain local findings by using social, organisational or psychological mechanisms drawn from grand theories; in doing so, explanations are distinguished from can otherwise be spurious associations (Hedström and Swedberg, 1998).

The theoretical lens of analysis: structuration theory

Chapter 5 introduces structuration theory, which was emergent at the early stage of data analysis. It was found in the initial interpretation that patterns of data accorded with structuration theory, which offers theoretical mechanisms for analysing and interpreting empirical data from case studies. Structuration theory (Giddens, 1984) is one of the theories able to reconcile the interplay of structures and agency and accommodate more open, dynamic and reflexive management approaches and process-based organisation studies (Sydow, 2017). The concept of duality of structure provides a dynamic lens for

viewing the recurrent interactions between structures and interaction processes. According to Giddens (1984), structure consists of rules and resources; rules of signification and legitimation constitute the interpretative and normative aspects of structure, and resources are constituted from authoritative and allocative resources from social systems. Furthermore, rules and resources in the institutional, social and organisational environment then constrain and enable practices in interactions. Knowledgeable actors, on the other side, reflexively choose among multiple rules and resources in interactions with others, hence reproducing or transforming rules and resources. Sydow (1998) explained the constitution of trust from the perspective of structuration theory (Giddens, 1984), and this is also our view: that generating trust needs interactions between actors and collective actors that raise the perception of trustworthiness (interpretative rule), use trust relations as resources to allocate resources (facility of resources), and legitimate relational norms that constrain opportunism and encourage trusting and trustworthy behaviour (normative rule). The phenomenon of trust, in return, influences communication, power relations and sanctioned behaviour in interactions, hence service process and project performance.

Notably, the search for a middle-range theory of trust uses the theoretical lens, mechanisms and concepts as a general guideline that is subjective to revision; meanings of concepts can be revised and refined according to empirical findings (Blumer, 1954; Merton, 1968; Dubois and Gadde, 2002a).

Contribution to the body of knowledge

This study contributes to knowledge in that it theoretically and empirically demonstrates the value of trust and relationship, and responds directly to a call for empirical examination in the construction project and supply chain management domains (Smyth *et al.*, 2016). It advances the relational approach and supply chain integration (Pryke and Smyth, 2006; Smyth and Pryke, 2008; Kumaraswamy, Anvuur and Smyth, 2010) in construction project and supply chain management disciplines by highlighting the role of relational norms in developing trust and co-creating value. Construction project management research has addressed relational governance and collaborative mechanisms such as partnering and relational contracting in client-contractor relationships at the front end (e.g., Eriksson and Laan, 2007; Ling *et al.*, 2015), but supply chain relationships in the project execution have attracted little interest. On the other hand, structural integration

of supply chains such as lean construction has gained a great deal of interest (e.g., Bygballe and Jahre, 2009; Bankvall *et al.*, 2010), whereas the dialogue of relational integration is emerging (e.g., Kumaraswamy, Anvuur and Smyth, 2010). This thesis extends the latter line of thought by pointing out the dynamics of supply chain relationships and perceived value over time. The research highlights the role of relational norms such as equity, bounded solidarity and reciprocity in forming and sustaining the phenomenon of trust and value co-creation in construction supply chain relationships, indicating a move beyond transaction cost theory towards the social capital side of the relationship management approach.

In the domain of S-DL, this thesis strengthens the eighth foundational premise (FP8), “*a service-centred view is inherently beneficiary oriented and relational*” (Vargo and Lusch, 2016). It integrates trust as a relational concept into the S-DL theorisation. Explicating how service manifests itself within and among relationships in the service provision and generates value for both main contractors and subcontractors extends the understanding of service experiences, value co-creation and value-in-use. Extant S-DL research has mainly focused on service beneficiary’s use experiences and perceived value-in-use (e.g., Sandström *et al.*, 2008; Edvardsson, Enquist and Johnston, 2010). Centring on service interactions over time enables the research to identify what activities are conducted when and how value is created or co-created for either or both parties. Zooming out of the dyadic relationship between main contractors and subcontractors, this research also explores the structural influences of service ecosystems on service interactions.

Overall, drawing upon construction project and supply chain management, S-DL and the structuration theory as a lens of analysis, this thesis builds a holistic and dynamic theory of trust that combines trust development, phenomenon and value in one single study and emphasises the interactive and iterative relationship of trust and value. This holistic and dynamic view of trust is, to the author’s knowledge, one of the first among trust theories in various disciplines.

Layout of the thesis

The thesis is arranged in chronological order; the layout is illustrated in Figure 1.

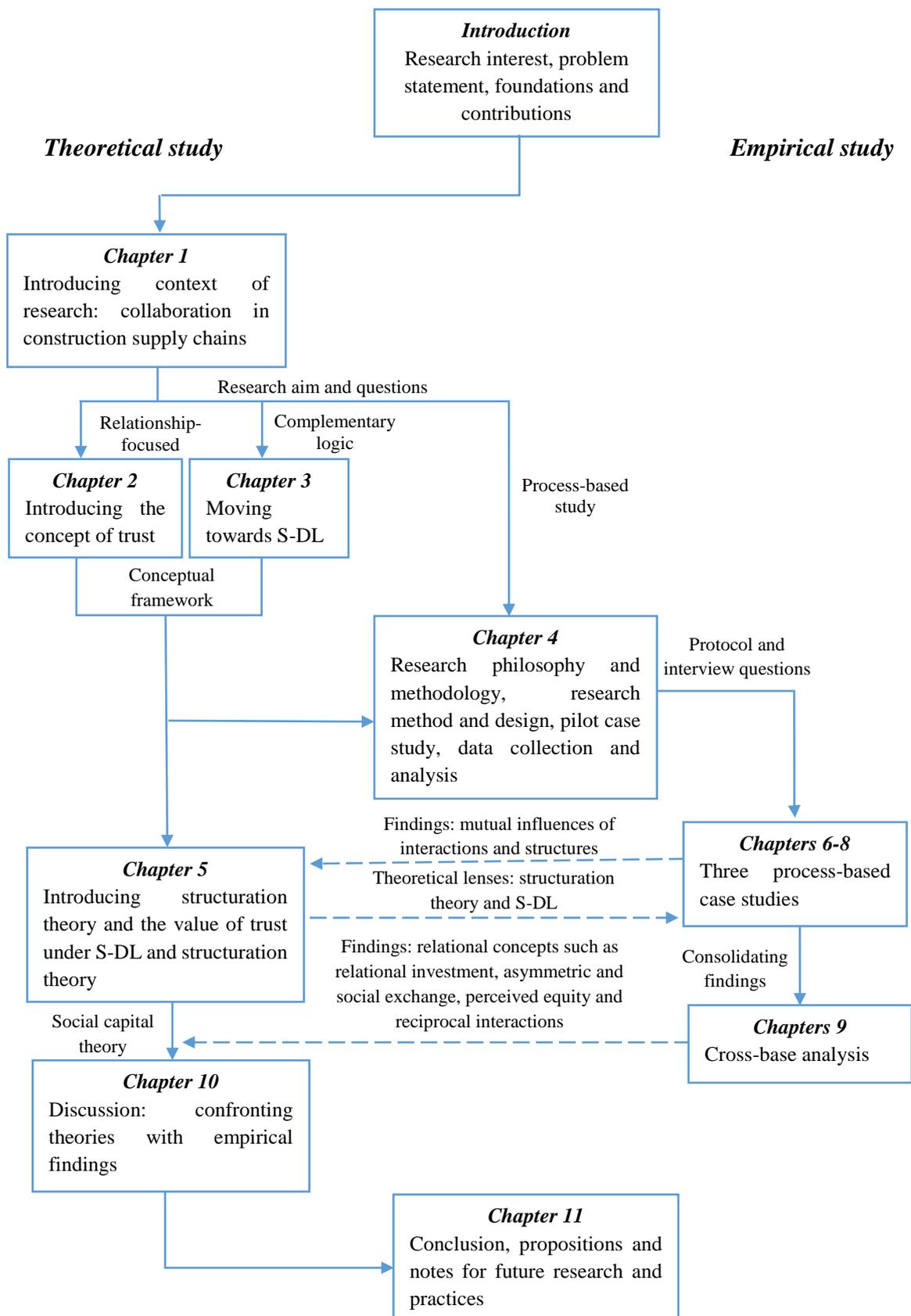


Figure 1 Layout of the thesis: arranged in chronological order

Chapter 1 Collaboration in construction supply chains

Collaboration rose up the agenda of construction in many countries for reasons of culture, government and client demands, and performance drivers (Egan, 1998; Phua and Rowlinson, 2003; Wolstenholme *et al.*, 2009; Chalker and Loosemore, 2016). Collaboration is fundamental to delivering value in construction projects (Poirier, Forgues and Staub-French, 2016). Despite its significance, it is commonly recognised that collaboration in construction projects is hard to initiate between actors or collective actors representing their own organisations. Various forms of collaboration and management interventions have been promoted in the construction industry, but the outcomes of collaboration vary (Mason, 2007). There are qualified empirical successes such as Heathrow Terminal 5 and the London Olympics 2012 (Pryke, 2009; Brady and Davies, 2014). Other research, however, identified no difference between partnering and non-partnering projects in terms of flexibility, time delays, the number of disputes, financial outcome and trust (Mason, 2007; Nyström, 2008; Lau and Rowlinson, 2009; Venselaar, Gruis and Verhoeven, 2015).

Why has it been so difficult to induce and sustain collaboration, especially among the supply chain? This chapter strives to answer this question by investigating the context of construction supply chains. There are multiple reasons. Finance and short-term organisational self-interest are factors (Kadefors, 2004). Time pressures and temporality are factors (Jones and Lichtenstein, 2008; Swärd, 2016). These factors reflect a goods-dominant and project-focused logic that has been institutionalised in the construction industry, largely by the recursive use of transactional approaches to managing projects. Complexity is certainly another important factor in terms of both management and content (Cicmil and Marshall, 2005). A review of the difficulties of collaboration points to the fundamental role of inter-organisational relationship and trust, an under-researched area in construction project and supply chain management disciplines. Based on the research context, the overarching aim of the thesis is broken down into detailed objectives, and primary research questions are formulated by the end of this chapter.

1.1 Why does collaboration matter in construction?

Construction projects are usually mentioned as being complex systems not least because of the perceived difficulties in coordinating and integrating different yet interdependent parts into a coherent entity (Baccarini, 1996; Gidado, 1996). Recent research also points out the effects of uncertainties and dynamics of both environment and systems on project complexity (Geraldi, Maylor and Williams, 2011; Brady and Davies, 2014; Davies and Mackenzie, 2014). The term dynamics refers to changes that might occur in the process of project delivery. Uncertainty implies the inability to provide an accurate prediction and the lack of knowledge of alternative courses of action, including ‘the unknown unknown’ (Sydow, 2017). Uncertainty is different from risk. The latter is calculable or at least implies certain knowledge and thus accessibility and controllability; risk is ‘the known unknown’ (Knight, 1921). By collaboration, actors and organisations form a system to manage complexity in terms of environmental and systemic uncertainties and dynamics, differentiation and interdependence (Poirier, Forgues and Staub-French, 2016).

Environmental uncertainties and dynamics are normally from local and market conditions, macro economies and stakeholder perspectives (Bosch-Rekvelde *et al.*, 2011). Construction projects usually involve a high level of uncertainty from both demand and supply markets. Demand for construction projects fluctuates and is unpredictable. In their analysis of the UK construction industry, Morton and Ross (2008) pointed out two reasons for the fluctuation and unpredictability. The first is that the number and types of projects depend on public and private needs and available finance, goods and services related to other industries. Another reason is that, compared with producers in many other industries, construction firms have few opportunities for stimulating and managing demand for their products through proactive marketing, for example. The slumps and booms of the macro-economy and unstable political environments also induce uncertainties in supply chain relationships (Manu *et al.*, 2012).

The development of technology, globalisation, and economic, political and social conditions have resulted in more stakeholders who might have different or even conflicting demands on construction projects (Walker, 2015). These divergent demands are dynamic, co-evolving in the project lifecycle. Moreover, as per authors such as Latham (1994) and Egan (1998), industrial reports have led to the recognition that it is necessary to transform industrial vision towards value for society as the end-user of

construction projects, hence increasing the level of demand for the value delivered through construction projects (Saxon, 2005).

Under these increasing and also divergent demands, in order to survive, clients who are often not sophisticated in construction prefer integrated solutions with higher standards from contractors (Brady, Davies and Gann, 2005b). Construction clients have higher requirements and have perceived that service improvements are important and possible in project delivery (Fewings, 2013). With the help of fast-developing technologies such as information and communications technology (ICT) and building information model (BIM), clients have become more informed and proactive than frequently recognised and are no longer satisfied with the basic package of tangible products and services (Smyth, 2015a). Some construction firms appear content to merely survive by meeting the minimum requirements by providing products and services in a self-sufficient way. But it is increasingly difficult to adapt to and adopt new means to meet the demands (Skitmore and Smyth, 2007, 2009; Smyth, 2015a). The increasing dynamics and uncertainties of the construction environment cause difficulties in project planning and execution to reconcile unfolding uncertainties and maintain or lever value in service exchange (Winch, 2015). It is less likely, if not impossible, for a single firm to have sufficient resources to meet all contingent requirements and manage the full scope of project delivery.

The prevailing trend has been for value propositions to be put forward by a range of specialist providers who can meet the complex minimum requirements and enhance potential value through their specialisation, supporting capabilities (Holti, Nicolini and Smalley, 2000), and decentralised task and risk management, including the ability to manage labour flexibly and respond to rapidly changing demands – the subcontracting system. Specialisation and subcontracting enable project businesses at each level to concentrate on their own core businesses and share risks and liabilities with other actors, so they become more flexible and capable of meeting changing demands and providing an effective service (Lai, 2000; Manu *et al.*, 2013).

The content of a project is divided into specialised packages and delivered through multiple-tier supply chains. A supply chain is “a network of organisations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer” (Christopher, 2005, p. 17). In the UK construction industry, a supply chain has multiple tiers, including the first-tier main contractors who are responsible for

the delivery of project as an integrated system, the second- and lower-tier subcontractors who deliver specialised subsystems such as foundation and piling, suppliers who provide goods and services to support the integrated system or subsystems and professional firms who offer solutions and advice for clients (Pryke, 2009). Different from supply chains in the manufacturing industry where exchanges are continuous and activities are sequential, supply chains in the construction industry are complex due to the discontinuity of project demand, uniqueness of each project, uncertainty of requirements, specialisation and interdependencies between main contractors, specialised contractors, suppliers and their activities (Vrijhoef and Koskela, 2000; Dubois and Gadde, 2002b; Eriksson, 2015; Walker, 2015). In construction supply chains, the relationship between main contractors and second-tier subcontractors are key to the creation and delivery of value; yet they are believed to be weak due to the reliance on competitive tendering in order to pursue lowest possible cost (Eriksson, Dickinson and Khalfan, 2007; Broft, Badi and Pryke, 2016). Healthy interdependence is needed to achieve effective resource planning, allocation and integration (Eriksson, 2010) but also develop dynamic capabilities to keep strategic advantages so that businesses and market can survive (Brady, Davies and Gann, 2005b). 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 (Jones and Lichtenstein, 2008; Manning and Sydow, 2011; Ligthart, Oerlemans and Noorderhaven, 2016). It is notable that both environmental and systemic uncertainties, if project actors reflexively learn in context and are proactive towards the environment rather than reactive to it, can also become opportunities for leveraging value in service experience (Perminova, Gustafsson and Wikström, 2008), which requires dynamic capabilities within and across projects (Brady and Davies, 2004).

Moreover, the increasingly higher demands for the value delivered through construction projects mean that project businesses need to go beyond satisfying minimum requirements by delivering goods and services *per se*, if businesses are to survive and lever value (Saxon, 2005). Value creation is the driving force behind project businesses, and, in construction, value is inevitably co-created or co-destroyed between multiple project actors and organisations. Collaboration is a raw material for effective interactions and a source of co-creating value. Clients, designers, contractors, suppliers and other stakeholders need to work together so that projects can be delivered, value can be created, and the market is sustained (Anvuur and Kumaraswamy, 2008; Poirier, Forgues and Staub-French, 2016).

1.2 Why is collaboration difficult to induce and sustain?

Though the subcontracting system helps deal with uncertainties and dynamics in the environment, the system is also a source of uncertainty and has its own dynamics (Sydow, 2017) – that is, organisational and relational complexity. Successful supply chain collaboration requires effective management intervention to address organisational and relational complexity. This thesis draws upon the perspectives of construction project management, construction supply chain management and institutional logic to examine the question: Why is collaboration difficult to induce and sustain?

1.2.1 Construction project management perspective

Pryke and Smyth (2006) classified four approaches to managing projects, including construction. *Traditional project management* applies tools and techniques to deal with two principle problems: 1) how to structure and plan project activities in order to meet goals and objectives, and 2) how to ensure activities conform to the plan (Engwall, 2003). Problems and tasks are usually resolved through formal control and procedures such as scheduling tools, earned value analysis, critical chain, quality management and performance management (Smyth and Morris, 2007). In this line of thought, project success relies on the skills of the project manager and on formal procedures as a basic and necessary condition for gaining legitimacy and authorised control within the organisation (Engwall, 2003). The classic project management literature predominantly focuses on calculable risks and instruments of execution rather than emergency and uncertainty aspects of managing projects (Perminova, Gustafsson and Wikström, 2008). In this vein, the planning-and-conformance-oriented approach falls short in terms of managing uncertainties and dynamics of collaboration; the adaption of a plan is as important as the conformity to it (Sydow, 2017).

The second project management approach in Pryke and Smyth (2006), the *information processing approach*, mostly focuses on the critical success factors and best practices such as communication systems, trust, contract forms and specific conditions of projects (Black, Akintoye and Fitzgerald, 2000; Akintoye and Main, 2007; Hughes, Williams and Ren, 2012; Schöttle Haghsheno and Gehbauer, 2014). The primary quest is project efficiency and success. Similarly, the *functional management approach*, which takes a strategic and ‘front-end’ perspective, emphasises the role of structures such as the

governance of projects at the organisation level in improving project performance. For information processing and functional approaches, collaboration is either viewed as an input to project efficiency or an output representing project success; the process of how collaboration is formed and sustained and how collaboration improves project performance remains unanswered (Poirier, Forgues and Staub-French, 2016).

Relational approach emphasises the role of relationships and the management of relationships in project success (Pryke and Smyth, 2006; Smyth and Pryke, 2008; Meng, 2012). Although it provides conceptual and practical scope for a proactive approach such as relationship marketing and management, most studies taking a relational approach are interested in relational contracting, which ties to collaborative procurement, partnering agreements, incentive-based payment and building integrated teams (Kumaraswamy, Anvuur and Mahesh, 2008; Ling *et al.*, 2013; Bygballe, Dewulf and Levitt, 2015; Austin, Pishdad-Bozorgi and De La Garza, 2016). Similar to information processing and functional approaches, extant research lacks detailed knowledge about how relational practices and collaborative behaviour are enacted, which has partly caused the challenges of realising partnering arrangements into real behaviour and consistent performance across projects (Bresnen and Marshall, 2000; Bresnen, 2007). It has been argued that relational contracts and agreements are not sufficient to establish and maintain collaboration; they need to be accompanied by relationship management at multiple levels of project organisations to form an environment of trust in execution (Kadefors and Badenfelt, 2009; Smyth, 2015b).

Furthermore, most relational research focuses on client and main contractor relationships and relationships with supply chains have largely been under-researched (Dainty, Millett and Briscoe, 2001; Bygballe, Jahre and Swärd, 2010; Hartmann and Caerteling, 2010). Despite relational contracting and various collaborative mechanisms between client and tier-one contractors, lower-tier subcontractors are still expected to compete based on price (Broft, Badi and Pryke, 2016), resulting in the perception that partnering projects “*are only paying lip-service to the principles of partnering*” (Brown *et al.*, 2001, p. 195). However, main contractor and second-tier subcontractor relationships were identified to be worse than client and main contractor relationships (Alderman and Ivory, 2007). It has been argued that second-tier subcontractors and suppliers have less understanding of partnering or collaboration, what it is, how to operate it and – most importantly – what benefits they can get through collaborating with main contractors (Mason, 2007). There

is a need for broadening the scope of the relational approach to include lower tiers of the supply chain (Meng, 2012; Broft, Badi and Pryke, 2016), not least because subcontracting occupies a large portion of the total value of projects. Supply chains are embedded with specialist knowledge and skills that can be used to improve value propositions (Pryke, 2009; Khalfan and Maqsood, 2012; Ahola, Vuori and Viitamo, 2017).

1.2.2 Construction supply chain management perspective

In the domain of construction supply chain management, supply chain collaboration is closely related to the concept of supply chain integration (SCI) (Crespin-Mazet and Portier, 2010; Hartmann and Caerteling, 2010; Eriksson, 2015). Both involve coordinating structures and collective processes among supply chain partners to support and manage the flow of resources and service (Vijayarathy, 2010). In the face of fragmented supply chains, SCI has been proposed to achieve optimal balance among the strength, scope, duration and depth of integration in order to increase project effectiveness and efficiency (Egan, 1998; Bygballe and Jahre, 2009; Pryke, 2009; Bankvall *et al.*, 2010; Davies and Mackenzie, 2014; Eriksson, 2015). While inspired by supply chain management in manufacturing industries (e.g., Vijayarathy, 2010; Cao and Zhang, 2011), SCI in project-based contexts, which include construction, is distinct and challenging due to the unpredictable demands, the uniqueness and complexity of projects, divergent interests and inconsistent supply chain relationships across projects (Briscoe and Dainty, 2005; Broft, Badi and Pryke, 2016). The latter is a result of transactional management approaches that rely on competitive tendering to minimise costs and manage projects in a project-by-project way (Kadefors, 2004; Briscoe and Dainty, 2005).

A considerable body of research has stressed methods for structural integration to eliminate redundancy and increase operational efficiency (Vrijhoef and Koskela, 2000; Bygballe and Jahre, 2009; Bankvall *et al.*, 2010; Flynn, Huo and Zhao, 2010). Structural integration involves coordination of resources, supporting systems and operational processes (Leuschner, Rogers and Charvet, 2013). At the organisation level, integration can take place within organisation boundaries between different functions and departments, enabling them to work together and support activities across boundaries. It can also take place between organisations, for instance, integrating ‘design’ and ‘build’ in construction projects (Flynn, Huo and Zhao, 2010). At the inter-organisational networks level, SCI investigates a number of suppliers and the interdependencies among

them. Integration is achieved through coordinating different types of interdependencies and associated economic logics to mitigate technical difficulties and workflow disruption because of site conditions, achieve concurrency, and reduce buffers and lead times (Vrijhoef and Koskela, 2000; Dubois and Gadde, 2002b; Bygballe and Jahre, 2009; Bankvall *et al.*, 2010; Pala *et al.*, 2014). Structural integration at the networks level is inclusive of techniques such as lean construction, modularisation and prefabrication.

Although functions and systems in theory can be integrated, getting coherent teams is not self-evident (Kumaraswamy, Anvuur and Smyth, 2010). Relational integration therefore has been proposed as a complementary approach to integration of supply chains to form an atmosphere of mutual trust and generate value among the actors and organisations involved (Pryke and Smyth, 2006; Kumaraswamy, Anvuur and Smyth, 2010; Vijayasarathy, 2010). Many integrative activities have been identified in research such as early supplier involvement (Eriksson, 2015; Ahola, Vuori and Viitamo, 2017), joint developing of routines and processes (Söderlund, Vaagaasar and Andersen, 2008; Ruuska *et al.*, 2011), investing in long-term framework agreements and supplier training (Errasti *et al.*, 2007; Gosling *et al.*, 2015), co-location and ad hoc meetings dedicated for integration (Davies and Mackenzie, 2014; Gosling *et al.*, 2015). Apart from activity-based integration, Kumaraswamy, Anvuur and Smyth (2010) proposed a value-based approach to supply chain integration that identifies and aligns divergent goals of multiple organisations in projects, including those in supply chains, in order to form an integrated value network.

Despite the rich insights from extant research, studies have highlighted the implementation difficulties and the lack of detailed knowledge about how contractors and supply chains achieve integration, establish and sustain a common goal, and develop collaborative relationships in the dynamic project lifecycle and under which circumstances (Alderman and Ivory, 2007; Eriksson, 2015; Ahola, Vuori and Viitamo, 2017). Also, the contribution of integrative activities to value creation and project performance remains ambiguous. Furthermore, the role of suppliers has been portrayed as passive. Relational contracting is mostly promoted by markets or clients to benefit clients (Akintoye and Main, 2007), thus is largely reactive from the perspective of supply chains (Smyth, 2015b). Furthermore, supply chains' motivations of preserving and expanding resources to support a certain client's value have received little interest, as Dainty, Millett and Briscoe (2001, p. 170) remarked: "*This assumption relies upon the*

notion that those involved in the construction process have an inherent preference to be integrated”.

1.2.3 The institutional logic: G-DL and P-FL

Apart from management approaches, the difficulty of establishing and maintaining collaboration has resulted from the current institutional logic in the construction industry – that is, goods-dominant logic (G-DL) and project-focused logic (P-FL). G-DL is a concept originally from the marketing domain and stresses the way that value is created. Under G-DL, value is added in goods and services by producers before selling and is determined at the point of transaction or series of transactions, which is value-in-exchange (Vargo and Lusch, 2004). *Value-in-exchange* is the negotiated figures that customer and supplier agree to pay and receive, and is furnished by accounting systems that capture this limited form of value (Vargo and Lusch, 2006). P-FL is a concept specifically in project management, including construction project management, and drives the management of projects in a project-by-project way to maximise value-in-exchange (Kadefors, 2004). G-DL and P-FL led to the interpretation that supply chains are a vehicle to increase project efficiency and relationships terminate with the project; projects have no memory and collaboration is mostly built from scratch (Dubois and Gadde, 2002b). Within short time-frame goals and interests, G-DL and P-FL drive project actors and organisations to focus more on the immediate benefits and tasks and manage projects in a project-by-project way, instead of seeing the collective value across projects. However, as it will be argued in the next section, the G-DL and P-FL view is a narrow one in the context of construction. Projects are temporary, yet typically have more stable and permanent organisations as sponsors or in support as part of the broader network or ecosystem (Winch, 2014). Few projects emerge from a vacuum and some relational contact is typically present, directly or indirectly (Engwall, 2003).

G-DL and P-FL enable the recursive use of fragmented approaches to managing projects, which, in turn, strengthen and eventually institutionalise G-DL and P-FL. Fragmented approaches are inclusive of practices such as isolating design and build phases, competitive procurement processes that focus on lowest cost and individual organisations’ capability rather than their collective capability to integrate and work together effectively, human resource allocation to minimise transaction costs, management and assessment in a project-by-project way, and performance criteria

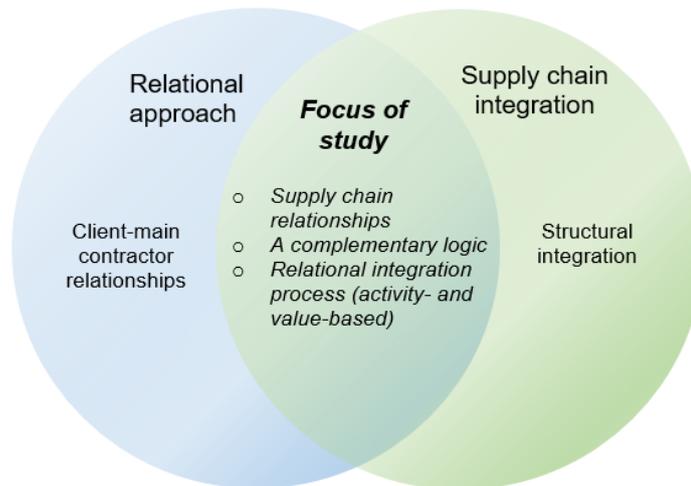
focusing on the efficiency of individual projects (Kadefors, 2004; Smyth, 2015a). These approaches have been repeatedly employed in the construction industry as they are perceived, especially by clients, to help reduce their own risks and bring about project efficiency, which have caused divergent perceptions of value between different organisations, inefficient production and communication, arms-length relationships, blame cultures and opportunistic behaviour within projects (Egan, 1998; Dubois and Gadde, 2002b; Bresnen *et al.*, 2003; Cicmil and Marshall, 2005; Fulford and Standing, 2014). Relational contracting and partnering have been promoted as a solution. However, without addressing the transactionally-rooted logic behind practices, relational contracting and partnering are insufficient for maintaining effective and healthy relationships, especially among supply chains (Bresnen, 2007; Kadefors and Badenfelt, 2009). In some cases, relational contracting and partnering were found to be used as a veneer for the underlying traditional power relationships, a guise used by main contractors to reap the profits from supply chains (Dainty, Briscoe and Millett, 2001; Packham, Thomas and Miller, 2003; Alderman and Ivory, 2007; Bresnen, 2007), resulting in reluctance of supply chains to enter partnering (Crespin-Mazet and Portier, 2010).

From the perspective of main contractors, under G-DL and P-FL, collaboration initiatives have tended to be project-specific and dissolve after project completion, which causes loss of knowledge after project teams are dissolved and members are assigned to different projects, and hence failure to transfer lessons from successful partnering projects to support continuous improvement (Davies and Brady, 2000; Smyth, 2010). From the perspective of supply chains, practices under G-DL and P-FL make it difficult to jointly create value with stakeholders, clients and main contractors. Supply chains are burdened with the demands from main contractors, clients and stakeholders, which, as demonstrated before, are divergent, dynamic and therefore hard to satisfy. Moreover, the emergence of a large number of specialist companies as part of the subsystems providing similar goods and services for a relatively small number of large main contractors means that, to maintain and lever value through delivering construction projects, supply chains require more specialised knowledge, technical expertise and equipment and thus more investments in both tangible and intangible resources (Pryke, 2009; Walker, 2015). The industry generally lacks a sufficient understanding of value in the broader sense (Brady, Davies and Gann, 2005a) and the engagement in terms of financial links has been identified as weak between main contractors and supply chains (Pala *et al.*, 2014). The burden of risks, lack of investments and constraint of resources collectively hinder

continuous collaboration and improvement across projects on the side of supply chains (Smyth, 2010). Figure 2 summarised factors that make collaboration among construction supply chains difficult.

3. Institutional logic: goods-dominant logic and project-focused logic

↓
 Short-term goals focusing on value-in-exchange
 Project-by-project management approach
 Transferring risks and profiting from supply chains



1. Construction project management

- Planning-and-conformance-oriented approach: not account for uncertainties and dynamics of project organisation
- Input-output approach: lack of knowledge about the process and context of collaboration
- Supply chain relationships under-researched

2. Construction supply chain management

- Lack of detailed knowledge about the process and context of integration
- Ambiguous relationships between integrative activities and value creation and performance
- Reactive role of supply chains
- Value for supply chains

Figure 2 Why is supply chain collaboration challenging?

1.3 Collaboration among supply chains: a relational approach

Combining the perspectives of construction project management, construction supply chain management and the institutional logic, Figure 2 points to the need for conceptual and empirical research that:

- 1) Puts supply chain relationships at the centre of analysing and theorising;
- 2) Offers a complementary logic to G-DL and P-FL that goes beyond value-in-exchange;
- 3) Addresses detailed knowledge about the process and context of inducing and sustaining supply chain collaboration and value for all parties involved.

1.3.1 Supply chain relationships at the centre of analysis

Collaboration between supply chain members and value creation is less likely to succeed without the support from inter-organisational relationships (IORs) that are featured as mutual adaptations and orientation, interdependency and a collaborative atmosphere (Gadde and Dubois, 2010). However, IORs are usually mentioned in the context of projects, which downplays their distinctive role and importance (Sydow and Braun, 2017).

At the project level, inter-organisational relationships are an important factor in joint problem solving, flexible resource allocation, and coping with uncertainties and dynamics (Jones and Lichtenstein, 2008; Manning and Sydow, 2011; Ligthart, Oerlemans and Noorderhaven, 2016). IORs bridge distinct projects in time and space and can create continuity (Engwall, 2003; DeFillippi and Sydow, 2016). Actors and organisations delivering projects have earlier experience and future orientations; most projects have processors and successors as well as simultaneous peers (Jones and Lichtenstein, 2008; Manning, 2008). Despite the ‘institutionalised termination’ (Lundin and Söderholm, 1995), relationships between main contractors and subcontractors typically tend to remain at least as ‘sleeping relationships’ until they are reactivated for future projects (Smyth, 2015b; Sydow and Braun, 2017). At the organisation level, IORs help transfer knowledge, reduce cognitive distance, manage structural and dynamic complexity, and offer economies of repetition and recombination across projects (Brady and Davies, 2004; Bresnen, Goussevskaia and Swan, 2004; Grabher, 2004; Manning and Sydow, 2011). Further, relationships between organisations in project networks stabilise and strengthen practices in projects (Manning and Sydow, 2011).

On the other hand, it has been argued that prior successful collaboration and relationships may lead to path-dependent development that reduces flexibility and value in collaboration over time because of both structural and relational inertia (Sydow, Schreyögg and Koch, 2009; Sydow, 2017). Path dependence, in general, refers to self-reinforcing processes triggered by contingent events, subsequently intensified such that the options for action are constrained, and eventually leading to lock-in situations (Manning and Sydow, 2011). In path-dependent development, relational and structural persistence hinder effective management and, in extreme cases such as lock-in situations,

might lead to following the development path that has already been determined by certain events.

The managerial paradox between the positive and negative effects points to the importance of understanding IORs, and only then reaping the benefit from past experience and preventing path-dependent development. In this line of thought, this thesis agrees with Sydow and Braun (2017, p. 3), “...*the interorganizational dimension deserves to be perceived as being in the centre rather than in the context when theorizing temporary organizations.*”

The call for more focus on IORs, which include supply chain relationships, accords to the relational approach in construction project management (cf. Smyth and Pryke, 2008; Pryke and Smyth, 2012).

1.3.2 A complementary logic to G-DL and P-FL

Apart from value-in-exchange, actors and organisations can gain non-financial benefits from collaboration with other parties; the latter has been argued as key to successful collaboration (Akintoye and Main, 2007). Knowledge and relationship have been widely recognised in both practice and research as strategic advantages for firms and are as, if not more, important as goods and services (Smyth, 2015b). In construction projects, value is jointly and dynamically created in relationships between actors, between actors and organisations, and between organisations (Pryke and Smyth, 2006). Knowledge learnt in service interactions with other parties enriches actors’ experience, improves value propositions and levers service value. Furthermore, knowledge and relationships might develop future dynamic capabilities at both project and firm levels and benefit future business through the economies of repetition and recombination (Brady and Davies, 2004). To lever value derived from knowledge and relationships, therefore, requires at least a complementary logic to G-DL and P-FL that goes beyond value-in-exchange and transactional performance criteria such as cost, time and quality.

1.3.3 A process-based perspective

Taking a process-based perspective of studying collaboration among supply chains helps demonstrate the process of collaboration and the value created or destroyed in the process. Relational contracting and partnering have been used to encourage continuous

collaboration and relationships in a series of projects. Nevertheless, as mentioned before, only relying on collaborative arrangements initiated at the front end and contractual level by no means ensures collaborative practices and effective relationships at the operational level (Cicmil and Marshall, 2005; Lau and Rowlinson, 2009; Suprpto *et al.*, 2016). The challenge of partnering as it appears in contracts and agreements is partly due to the assumption of static equilibrium conditions that ignores temporal dynamics and emergence (Langley and Tsoukas, 2010). A process-based perspective provides another approach to studying collaboration and relationships as situated sequences of events and complexes of processes unfolding in time. On the other hand, environmental and systemic uncertainties and dynamics render difficulties in specifying future conditions *ex ante*, pointing to the need for process research that considers ongoing interactions between actors and organisations, experiential and reflexive learning, and emergency (Langley, 1999; Sydow and Braun, 2017).

Apart from interactions, a process-based approach also focuses on how things that unfold and change over time and tend to associate with social and relational contexts (Langley *et al.*, 2013). IORs, in particular supply chain relationships, are embedded multilevel service ecosystem including projects, organisations, inter-organisational networks and organisational fields (Manning, 2008; Sydow, 2017). Structures of the service system enable and constrain interactions between actors and organisations (Bresnen, Goussevskaia and Swan, 2004). The term ‘organisations’ here refers to client organisations and construction firms as well as those in supply chains that are relatively stable and more ‘indeterminate’ than projects (Winch, 2014). Projects are part of a project series or even an entire programme (Brady and Davies, 2004; Brady and Davies, 2014). Unique project tasks can consist of several non-unique technical components and highly standardised procedures (Engwall, 2003). Furthermore, organisations equip project actors with organisational goals, rules of conduct, norms and values that can influence actors’ interpretations and decisions when they engage in project activities. Inter-organisational networks induce network goals, power relations, resources, roles and responsibilities between multiple actors representing different organisations (Manning, 2008). The organisational field comprises institutional life in which clients, construction firms, designers, regulatory agencies and other stakeholders are engaged with each other in the face of institutional environment (Bachmann and Inkpen, 2011).

1.4 Research aim and objectives

This chapter introduced the research context of the construction industry and construction supply chains. It particularly explored the question, ‘Why is collaboration difficult to induce and sustain, especially among supply chains?’ The review of collaboration from the perspectives of construction project management, construction supply chain management and institutional logic points to the importance of supply chain relationships, a complementary logic to G-DL and P-FL, and a relational and process-based approach to managing supply chain collaboration.

Trust is fundamental to supply chain relationships and collaboration. The ability to develop and maintain trust is believed to be valuable for collaboration in construction projects because it can enhance communication, enable flexible operations, sustain partnering and increase project performance (Kadefors, 2004; Ligthart, Oerlemans and Noorderhaven, 2016; Swärd, 2016). To promote and improve supply chain collaboration in construction projects, this research aims to investigate the value of trust in construction supply chains. Detailed objectives under the overarching aim are:

- (1) Identifying the process of trust development in construction supply chains;
- (2) Providing an institutional logic at least complementary to G-DL and P-FL as a lens of analysing value and value-creating activities beyond points of transactions towards value-in-use (Vargo and Lusch, 2004; Saxon, 2005) in construction project lifecycles;
- (3) Shedding light on the unfolding value of trust over time for those involved, including main contractors and subcontractors.

To achieve the aim and objectives, primary research questions are formulated as follows:

- (1) Whether and if so how does trust from main contractor to second-tier subcontractor develop during service interactions between the two?
- (2) Whether and if so how does trust from main contractor to second-tier subcontractor dynamically help increase service value during service interactions between the two?

Taking a critical realist approach, as will be demonstrated in the Chapter 4, this thesis studies the dynamic process of trust development and the unfolding value by investigating the generative mechanisms and associated phenomenon. In other words,

the mechanisms affecting trust development and thus value, and the dynamic phenomenon of trust in the process are the foci of the investigation.

The above questions lead to our literature review on theories of trust and service-dominant logic (S-DL) as a complementary lens to G-DL and P-FL.

Chapter 2 Trust in construction projects and supply chains

Trust is fundamental to relationships (Smyth, Gustafsson and Ganskau, 2010). Putting supply chain relationships at the centre of analysis and theorising means a close examination of trust in supply chains. In construction, trust had not gained much interest until the prevalence of partnering following the Egan Report (1998). In the traditional project management approach where transaction efficiency and cost minimisation are the priority, relationships and trust have been treated, if at all, as a frictional drag. Egan (1998) explicitly pointed out the potential relationship value in construction supply chains by ‘partnering supply chains’ and hence stimulated interest in the role of trust relationships and the mechanism of trust building (Zaghoul and Hartman, 2003; Kadefors, 2004; Wong *et al.*, 2008; Pishdad-Bozorgi and Beliveau, 2016).

This chapter introduces trust theories into the research context. Our review first investigates the concept of trust from different perspectives and then narrows down to the specific context of construction projects and supply chain relationships. The literature review identifies three dimensions of trust: trust perceptions, trust orientations and trusting behaviour. On the basis of these dimensions, the following sections then explore how trust develops in general social contexts and in construction projects and supply chain relationships specifically.

2.1 Trust: what is it?

“Trust, in the broadest sense, is a basic fact of social life.”

(Luhmann, 1979, p. 1)

Despite the broad relevance of trust in various areas (e.g., Deutsch, 1962 and Rotter, 1967 in psychology; Luhmann, 1982 and Lewis and Weigert, 1985 in sociology; Williamson, 1993 in economics; Mayer, Davis and Schoorman, 1995, Sydow, 1998 and Rousseau *et al.*, 1998 in organisational studies; Kadefors, 2004 and Smyth, Gustafsson and Ganskau, 2010 in project management), no definition is commonly accepted among these areas. Trust is at the centre of webs of concepts (Table 1).

Table 1 Trust and its relatives

Concept	Literatures	Definition
Behaviour	Deutsch (1962, quoted in Zand, 1972, p. 230)	<i>Trusting behaviour is defined here as consisting of actions that (a) increase one's vulnerability, (b) to another whose behaviour is not under one's control, (c) in a situation in which the penalty (disutility) one suffers if the other abuses that vulnerability is greater than the benefit (utility) one gains if the other does not abuse that vulnerability.</i>
	Zand (1972, p. 230)	<i>...the conscious regulation of one's dependence on another that will vary with the task, the situation, and the other person.</i>
	Schlenker, Helm and Tedeschi (1973, p. 419)	<i>...reliance upon information received from another person about uncertain environmental states and their accompanying outcomes in a risky environment.</i>
General expectation	Rotter (1967, p. 653)	<i>...generalized expectancy that the oral or written statements of other people can be relied upon...</i>
Perception of confidence in or expectation on the other's trustworthiness	Bradach and Eccles (1989, p. 104)	<i>...a type of expectation that alleviates the fear that one's exchange partner will act opportunistically.</i>
	Sako 1992, p. 32)	<i>Trust is a state of mind, an expectation held by one trading partner about another, that the other behaves or responds in a predictable and mutually expected manner.</i>
	Cummings and Bromily (1996, p. 303)	<i>Trust will be defined as an individual's belief or a common belief among a group of individuals that another individual or group (a) makes good-faith efforts to behave in accordance with any commitments both explicit or implicit, (b) is honest in whatever negotiations preceded such commitments, and (c) does not take excessive advantage of another even when the opportunity is available.</i>
	Doney and Cannon (1997, p. 36)	<i>...trust as the perceived credibility and benevolence of a target of trust.</i>
	Young-Ybarra and Wiersema (1999, p. 443)	<i>...trust as a construct based on three components- dependability, predictability, and faith.</i>
	Dyer and Chu (2000, p. 260)	<i>...trust as one party's confidence that the other party in the exchange relationship will not exploit its vulnerabilities.</i>

Subjective probability	Gambetta (1988, p. 217)	<i>...trust (or, symmetrically, distrust) is a particular level of the subjective probability with which an agent assesses that another agent or group of agents will perform a particular action...When we say we trust someone or that someone is trustworthy, we implicitly mean that the probability that he will perform an action that is beneficial or at least not detrimental to us is high enough for us to consider engaging in some form of cooperation with him.</i>
	Coleman and Coleman (1994, p. 91)	<i>...a subclass of those involving risk. They are situations in which the risk one takes depends on the performance of another actor.</i>
Intention to rely on	Anderson and Narus (1986, p. 320)	<i>...the firm's belief that another company will perform actions that will result in positive outcomes for the firm, as well as not take unexpected actions that would result in negative outcomes for the firm. The strength of this belief may lead the firm to make a trusting response or action, whereby the firm commits itself to a possible loss, depending upon the subsequent actions of the other company...</i>
	Mayer, Davis and Schoorman (1995, p. 712)	<i>...the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party.</i>
	Zaheer, McEvily and Perrone (1998, p. 143)	<i>trust as the expectation that an actor (1) can be relied on to fulfil obligations, (2) will behave in a predictable manner, and (3) will act and negotiate fairly when the possibility for opportunism is present.</i>
	Rousseau <i>et al.</i> (1998, p. 395)	<i>Trust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another.</i>

To answer the question ‘What is trust?’, it is useful to draw a boundary between ‘what trust is’ and ‘what trust is not’ in the context of this research. Trust is originated between people. Actors are able to develop trust in other actors, collective actors such as organisations and institutions (Doney and Cannon, 1997; Fulmer and Gelfand, 2012). The conceptualisation of trust starts with an individual’s trust. Trust can also be inter-organisational based upon the sum of the key interactions and individuals (Zaheer, McEvily and Perrone, 1998). Conceptualising trust at the individual level can shed light on inter-organisational trust.

Trust is not entirely about actions. Trust has often been associated with the choice of social alignment, cooperation, dependence and reliance (e.g., Deutsch, 1962; Zand, 1972). Cooperative behaviour and reliance can be driven by factors other than trust, such

as power or ignorance. Reliance is a broader concept than trust (Nooteboom, 2002). Actors and collective actors might rely on the other party because trustors are protected by legal orders such as laws or private orders such as close monitoring (cf. Jiang, Henneberg and Naudé, 2009). Trusting behaviour needs to be studied in relation to trust attitudes (Nooteboom, 2002). Behaviourally, to trust is to undertake a risky course of action based on the positive expectation that is gained and adapted in a social context over time (Mayer, Davis and Schoorman, 1995). Behavioural enactment of trust is an important facet of trust, especially trust between organisations, and demonstrates the practical significance of trust (Lewis and Weigert, 1985).

Trust is not entirely about the perception of, confidence in or expectation of trustworthiness. Trustworthiness is a characteristic of the trustee and consists of a series of qualities differentiating one trustee from another such as competence, integrity and benevolence (Mayer, Davis and Schoorman, 1995). Trustworthiness can be conceptualised as the opposite of opportunism, and an exchange partner worthy of trust is one that is perceived not to behave opportunistically (Lyons and Mehta, 1997). Instances of opportunistic behaviour include providing inaccurate informational resources or goods and services of lower quality than agreed and holding up resources such as payment. In the business-to-business context, value creation potential is one of the determinants of perceived trustworthiness and the right degree of trust to maintain and promote positive outcomes (Fawcett, Jones and Fawcett, 2012; Manu *et al.*, 2015). Perceived trustworthiness does not necessarily lead to trust (cf. Doney and Cannon, 1997). Based on the belief in the other party's trustworthiness, trust involves an underlying disposition or intention towards relying on the other party and undertaking a risky course of action (Mayer, Davis and Schoorman, 1995; Rousseau *et al.*, 1998; Smyth, Gustafsson and Ganskau, 2010).

The difference between expectation and trust is that trust requires a certain level of dependence or interdependence between two parties, whereas expectation does not. Expectation is normative as one cannot live without expectation on contingent events and trust is only available in selected objects in certain contexts. Trust differs from power in that the latter usually involves unilateral dependence. Furthermore, according to Luhmann (1988), trust differs from confidence in that the latter depends on contingency and danger whereas the former depends on a situation of risk. Risk is different from danger in that it emerges only as a consequence of decisions and actions. Risk does not

exist by itself: if one refrains from decision or action, one has no risk. Both trust and confidence might entail disappointment. The disappointment associated with confidence is likely to be attributed to external contingencies and that with trust is to one's own trusting attitudes and behaviour. In other words, if one prefers one actor to another, despite the possibility of disappointment by the actions of the actor selected, one is in a situation of trust.

Trust is not a subjective probability or predictability. Defining trust as a subjective probability “with which an agent assesses that another agent or group of agents will perform a particular action” that “is beneficial or at least not detrimental to us” (Gambetta, 1988, p. 2017) means to reduce trust to a form of rational calculation. In this vein, trust is the highest when the probability of another party performing beneficial or at least not detrimental actions is unity, so that no risks are perceived. However, trust is generated and develops where things are uncertain and cannot be seen (Luhmann, 1988; Mayer, Davis and Schoorman, 1995; Smyth, 2008). Trust involves an acceptance of risk in uncertainties; if there is no risk, we can no longer speak of trust (Gulati, 1995; Smyth, 2008). Further, the notion of subjective probability leads to the concept of prediction.

Nor is trust a prediction, the correctness of which could be measured when the predicted event occurs and after some experience reduced to a probability value. These types of techniques which are significant within the framework of decision-making models have, as does trust, the function of reducing complexity. They are functional equivalents for trust but not acts of trust in the true sense.

Luhmann (1979, p. 88)

The calculation of probability presupposes the predication of the party's behaviour. Predication builds upon an accumulating of information while trust enables an overdraw of information available in context. “*Trust begins where prediction ends*” (Lewis and Weigert, 1985, p. 976).

Trust is not familiarity. Familiarity provides a sense of assurance by drawing a distinction between familiar and unfamiliar fields and enabling actors to live with the familiar while acknowledging the unfamiliar as opaque. Familiarity might breed trust through repeated interactions (Gulati, 1995). Nevertheless, building trust mainly relying on familiarity requires time, which might not always be possible in temporary organisations such as

construction projects. In the context of inter-organisational projects, institutional arrangements and role assignment are used as complementary to familiarity to build trust in a short time period (Meyerson, Weick and Kramer, 1996; DeFillippi and Sydow, 2016; Swärd, 2016).

The literature review on trust in social science demonstrates that trust is generated and develops where things are uncertain (Mayer, Davis and Schoorman, 1995; Smyth, 2008). In construction, uncertainties might reside in the environment but also in the other party's action and intention (Dubois and Gadde, 2002b). These uncertainties might cause environmental and relational risks (Das and Teng, 2001) as well as opportunities. In the situation of trust, the presence of risks is known and can be avoided, yet at the expense of waiving the associated opportunities (Luhmann, 1988). To trust is to reduce perceived environmental risks by engaging in relationships with others, and to accept the risk of loss if the trusted one falls short of the trust bestowed. The other party's freedom of action to be trustworthy or opportunistic is acknowledged, which makes reflexive learning and contextual adapting in projects meaningful.

Based on extant research (Mayer, Davis and Schoorman, 1995; Rousseau, Sitkin, Burt and Camerer, 1998; Smyth, Gustafsson and Ganskau, 2010; Sydow, 1998), this study uses 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.

This thesis focuses on inter-organisational trust from main contractor to second-tier subcontractor. A relationship can be interpersonal. It can also be inter-organisational based upon the sum of the key interactions and individuals. Interpersonal trust accumulated in business interactions can be transformed to trust in the organisation represented by trusted actors (Doney and Cannon, 1997). The behaviour and attitudes of a project manager, for example, might be assumed to reflect the values and attitudes of his or her organisation in general. With respect to inter-organisational trust, this thesis follows Zaheer, McEvily and Perrone (1998), who conceptualise inter-organisational trust to reflect the collectively-held trust intention by members in one organisation towards another organisation, in this case, trust intention by actors in main contractor organisations towards subcontractor organisations.

2.2 How does trust develop?

2.2.1 The bases of trust development

Trust between people and organisations at least partly arises from the ontological security provided by institutions and institutional arrangements – that is, systems trust or institutional-based trust (Zucker, 1986; Giddens, 1990; Bachmann and Inkpen, 2011). Relationships are embedded in a multilevel service ecosystem that enables and constrains interactions and trust between collectives of project actors (Grabher, 2002; Bresnen, Goussevskaja and Swan, 2004; Manning, 2008). The organisational fields supply institutional arrangements that include formal and informal structural arrangements such as laws, legal regulations, cultures and norms (Zucker, 1986; Bachmann and Inkpen, 2011). Inter-organisational networks and organisations offer obligations, norms and routines inherited in industries, project networks and organisations (Meyerson, Weick and Kramer, 1996; Manning and Sydow, 2011). At the project level, formal contracts, project routines, resources, programmes and relational norms formed in day-to-day interactions influence trust development (Kadefors, 2004; Maurer, 2010).

Authority and sanction derived from structures of the service ecosystem induce accountability and drive the fulfilment of contractual obligations and commitment (Williamson, 1985; Woolthuis, Hillebrand and Nooteboom, 2005). On the other hand, accountability beyond a healthy level, building excessive safeguards in the form of close monitoring, for instance, may negatively influence a relationship and the level of trust (Woolthuis, Hillebrand and Nooteboom, 2005). Formal and informal rules furnish common knowledge and roles are appropriate for the systems in which they are involved. This applies to programme management, where the programme system is found on the supply or demand side or both. Role assignment is based upon training, industry or professional certifications of competency, and the record of performance in previous project engagement (DeFillippi and Sydow, 2016). These roles define institutionalised behaviour that is stable and enduring and connect individuals to the large organisational system. Hence, rules and resources facilitate interactions between actors and organisations of different knowledge domains but also enable the suspension of judgement on the trustworthiness of the other party at early stages of a relationship and allow a ‘leap of faith’ under uncertainties (Meyerson, Weick and Kramer, 1996; Bechky, 2006).

In construction, as discussed in Chapter 1, rules and resources from stakeholders in the ecosystem are divergent, including organisational policy, communication system, contracts, agreements and joint decision-making structures (Ngowi and Pienaar, 2005; Wong *et al.*, 2008; Lahdenperä, 2012). Formal procedures and arrangements can strengthen communication channels between partners, facilitate organisational functions and improve organisational relationships (Wong *et al.*, 2008). On the other hand, the cost-saving initiative driven by the organisation level or transactional norms of the industry, can impede trust development (Kadefors, 2004). Bases of power also disperse. Project organisations are decentralised and authorise project actors power at use, but whether and how to use power depends on interests of organisations but also power relationships and resources in the projects (Bresnen, Goussevskaia and Swan, 2004).

Projects are connected by past experiences and future expectations of actors and collective actors in the ecosystem (Grabher, 2002; Jones and Lichtenstein, 2008; Manning, 2008; Elfenbein and Zenger, 2014). Past experiences form initial conditions that can foster cognitive learning of how cooperation should take place and behavioural learning of how to make the cooperation work (Doz, 1996; Poppo, Zhou and Ryu, 2008). When two parties have no prior experiences, third-party recommendation and the integrity of the third party are important to the formation of trust at an early stage of the relationship (Mayer, Davis and Schoorman, 1995). In construction projects, the effects of past experiences depend on organising practices, staffing practices and role assignment, for instance (Maurer, 2010; Ligthart, Oerlemans and Noorderhaven, 2016). Future relationships and business opportunities affect the motivation to collaborate and invest in trust-based relationships (Kadefors, 2004; Nordqvist, Hovmark and Zika-Viktorsson, 2004; Poppo, Zhou and Ryu, 2008; Swärd, 2016).

2.2.2 Trust in interactions

Despite the importance of institutional-based trust, trust built upon indirect interactions and third-party sources is ‘thin’ and needs interactions between individuals and organisations to maintain and develop (Barney and Hansen, 1994). For instance, individuals might not fully fulfil their assigned roles (Goffman, 1961) and thus trust initiated based on role assignment needs adaption in day-to-day interactions. Institutional-based trust focuses on the fulfilment of formal obligations and accountabilities. Apart from formal relationships specified in the contract, informal relationships established in

day-to-day interactions also can also be attributed to trust between actors and organisations. Trust exists and develops in relationships among people and organisations rather than within isolated individuals; the latter would have no occasion or need to trust apart from engaging in relationships (Lewis and Weigert, 1985). In a business context, interaction is a mutual or reciprocal process in which two or more parties are involved in each other's practices or in contact with each other (Grönroos and Ravald, 2011). This subsection focuses on trust in direct interactions, in which interacting parties are co-present in a context and can simultaneously influence the process (Echeverri and Skålén, 2011; Grönroos and Voima, 2013).

The development of trust needs cognition (McAllister, 1995), based on which a cognitive decision can be made about "*whom we will trust in which respects and under which circumstances*" (Lewis and Weigert, 1985, p. 970). In construction, communication, transparency, past performance, and financial status are key factors for activating cognition-based trust in another organisation (Wong and Cheung, 2005; Wong *et al.*, 2008; Lahdenperä, 2012; Pishdad-Bozorgi and Beliveau, 2016). The cognition process is not static. Lewicki and Bunker (1996) demonstrate the evolution of the cognitive process in which trust develops. At an early stage of the relationship, trust might be calculus-based or deterrent-based. The former is based on the belief that the other party will behave as promised because of the fear of the sanctions or loss from not behaving well (Lewicki and Bunker, 1996), whereas the latter considers both the loss from not being trustworthy and the possible gains from granting trust (Shapiro, Sheppard and Cheraskin, 1992). As interactions continue, actors gather information and knowledge and the development of trust at this stage relies on the predictability of the other party and offering reasons for increasing or withdrawing trust (Sheppard and Sherman, 1998). This stage of trust is called knowledge-based trust (Lewicki and Bunker, 1996) or relational trust (Rousseau *et al.*, 1998).

However, this does not mean that trust development or erosion is a result of cognitive calculation (cf. Williamson, 1993). According to Williamson (1993), calculativeness means that actors engage in a transaction with each other based on probabilities of possible outcomes and associated net gain, and actions are driven by cost-effectiveness and profit maximum. Calculative trust in this vein is a subset of calculated risk resulting from dependencies and can be enacted only when risk is minimised. Research (McAllister, 1995; Nooteboom, 2002) has pointed out that trust development involves

intentional, experiential and reflexive learning. Intentional learning means that actors and organisations assess the other party's trustworthiness in a purposive way (Giddens, 1984). Experiential learning means learning in shared experiences whereas reflexive learning monitors actions and perceptions afterwards in a reflexive way. Experiential and reflexive learning enable actors to gain tacit and practical knowledge that is largely intuitive (Smyth *et al.*, 2010). Tacit knowledge refers to the part of knowledge that is hard to formalise and communicate and explicit knowledge is the part that can be codified and transmitted in formal and systematic ways (Polanyi, 1962; Nonaka, 1994). Increased knowledge helps adapt actions and practices for better resource integration. "*Learning, in all, involves acquiring identities that reflect both how a learner sees the world and how the world sees the learner*" (Brown and Duguid, 2001, p. 200), and therefore actors learn *about* but also learn *to be*. Actors learn *about* the changing demands and requirements in context, process, technical skills and capabilities required for service delivery, and learn *to be* a partner by seeking their partners' preferences, values, routines and competence. Also, they can learn *about* the appropriateness of their goals in context, the sustainability of the process and sufficiency of the resources.

Experiential and reflexive learning involve a cumulative process that helps form a common basis conducive to knowledge generation, internalisation and use (Cohen and Levinthal, 1990; Nonaka, 1994; Inkpen, 1998). Through repeated interactions, patterns of trusting and trustworthy behaviour, under structural conditions, can eventually be routinised (Sydow, Schreyögg and Koch, 2009). Relational norms might emerge and help tie actors and organisations together by contributing to positive expectations and forming the desire to uphold the relationship with each other (Macneil, 1980; Pervan, Bove and Johnson, 2009). This facilitates actors and organisations to build relational bonds by expressing and receiving care and respect (McAllister, 1995), hence creating identities. This stage of trust accords to identification trust in Rousseau *et al.* (1998). Psychological contracts are initiated, under which actors voluntarily stay trustworthy as they understand the importance of maintaining relationships (Sheppard and Sherman, 1998). Trust is sustained not least because of institutional arrangements but also who the actors are (Sydow, Schreyögg and Koch, 2009). In other words, identification-based trust forms and increases the value of such relationships (Coleman, 1988; Lewicki and Bunker, 1996; Smyth, Gustafsson and Ganskau, 2010). This view contradicts the assumption of transaction cost economics that "*opportunistic agents will not self-enforce open-ended*

promises to behave responsibly” (Williamson, 1993: 469) and risk can only be reduced by contractual safeguards.

Although the emotional component is strongest in close interpersonal trust, mutual identification can present in inter-organisational relationships through ties and bonds between actors. For instance, care and help between project team members can initiate and strengthen identities between organisations, if they are translated to the organisation level through systems of relationship management, behaviour programme and codes (Smyth, 2015b). In construction, to generate identification trust and induce long-term relationships and relational investment needs mutual understanding, care, consideration of mutual benefits and consistency (Kadefors, 2004; Wong *et al.*, 2008; Pishdad-Bozorgi and Beliveau, 2016).

Interactions enable actors and organisations to know more about the other party’s ability, benevolence and integrity (Mayer, Davis and Schoorman, 1995), which can lead to trusting behaviour to demonstrate the practical significance of trust (Lewicki and Bunker, 1996). Behaviourally, to trust is to undertake a risky course of action based on the positive expectation placed on the other party (Mayer, Davis and Schoorman, 1995). Apart from reflecting attitudinal trust, trusting behaviour also creates interaction opportunities for gathering more information, reinforcing or eroding relational ties and adapting the extent of trust, pointing to the dynamic nature of trust development (Lewis and Weigert, 1985; Huang and Wilkinson, 2013; Jarratt and Ceric, 2015).

2.3 What is the phenomenon of trust?

Trust dynamically develops in multiple dimensions, forming the phenomenon of trust in interactions. This section demonstrates trust from three perspectives: perception, orientation and behaviour.

2.3.1 The perception of trustworthiness

The perception of trustworthiness in terms of the other party’s competence and intention has been recognised as one dimension (Sako, 1992; Mayer, Davis and Schoorman, 1995). In construction, competence trust relates to technical and organisational capability such as supply chain reliability, financial stability, insurance, past project performance and health and safety (H&S) records, whereas intention trust relates to honesty, integrity and

benevolence, such as refraining from opportunism when an opportunity arises, performing to the best of their ability in dealing with challenging tasks and working as a team (Hartman, 2000; Zaghoul and Hartman, 2003).

2.3.2 The orientation of trust

With the same interpretation of the other party's trustworthiness, trust and trust-based relationships might be driven by different orientations. The second dimension of trust is the trustor's motivation for engaging in trust relations, which might be self-interested or socially-oriented. Self-interested trust is essentially forward-looking, actors only looking at the transaction-end payoffs against their own narrow short-term interests (Lyons and Mehta, 1997). Trust relations are initiated within the boundaries of transactions that are treated as isolated even when they are serial. The fundamental question is 'What can the other party do for me?' (Smyth and Edkins, 2007). Socially-oriented trust is built upon recognising social relations and systems beyond the boundaries of the transactions. It considers the process of pursuing the end (Lyons and Mehta, 1997). In other words, social orientations can be seen as a suspension of self-interest for the benefit of both parties as a whole (Nooteboom, 2002). The fundamental question is 'What can I do for us?' (Smyth and Edkins, 2007). In this vein, socially-oriented trust raises the asset value of social capital between organisations (Coleman, 1988; Smyth *et al.*, 2010).

2.3.3 Trusting behaviour

To fully understand the phenomenon of trust, "*behavioural trust should be conceptualised as situationally activated cognitive and/or emotional trust*" (Lewis and Weigert, 1985, p. 977). Moreover, trust needs behavioural manifestation to underwrite the practical value in context (Lewis and Weigert, 1985). Repeated patterns of trusting behaviour can result in relational norms that can be perceived through interactions and inform the subsequent behaviour of actors and collective actors such as organisations (Macneil, 1980; Rousseau *et al.*, 1998). Exchange relations, therefore, depart from "*pure economic motives*" and "*become overlaid with social content that carries strong expectations of trust and abstention from opportunism*" (Granovetter, 1985, p. 490).

In this vein, trust can be viewed as an organising principle or governance mechanism that enables and constrains the allocation of resources, coordination of activities and integration of service (Bradach and Eccles, 1989). McEvily, Perrone and Zaheer (2003)

demonstrated two causal pathways by which trust can influence organising. On the one hand, trust can affect the relative positions and links among actors and organisations, hence structures between organisations. For instance, trust entails serial equity and reciprocity (Dyer and Chu, 2003; Swärd, 2016), which builds more stable and durable relationships. Trust can also motivate actors and organisations to invest, integrate and coordinate resources towards collective endeavours (McEvily, Perrone and Zaheer, 2003). For instance, trust encourages knowledge sharing, builds identities, strengthens commitment, and grants flexibility and adaptability to the organising process (Lewicki and Bunker, 1996; Teece, Pisano and Shuen, 1997; Nahapiet and Ghoshal, 1998; Dirks and Ferrin, 2001; Ligthart, Oerlemans and Noorderhaven, 2016). With increased technical and relational knowledge, actors can better internalise, mobilise, transform, adapt and integrate resources with other actors in shared systems to deal with uncertainties and dynamics.

Regarding trust as a governance mechanism leads to an issue concerning the relation between trust and control. Some studies view trust as an alternative to control that reduces the level of control (Inkpen and Currall, 2004; Gulati and Nickerson, 2008). Others point out that, the higher the degree of trust in a relationship, the easier it is to implement control such as enacting detailed contracts. This is because the actors are more likely to cooperate. Trust and control complement each other (Poppo and Zenger, 2002; Olsen *et al.*, 2005; Benítez-Ávila *et al.*, 2018). Also, it has been argued that the relation between trust and control is not static or linear; instead, it is dynamic and changes through time (Woolthuis, Hillebrand and Nooteboom, 2005).

Construction projects are organised under a hybrid mode of governance, or 'quasifirm', according to Eccles (1981), which consists of multiple mechanisms including price, authority and trust (Bradach and Eccles, 1989; Winch, 2001). Project governance has been conceptualised as a structure corresponding to types of contract (Reve and Levitt, 1984), a process of decision making (Abednego and Ogunlana, 2006), but also as the management of relationships between various actors and organisations engaged in the project (Cherns and Bryant, 1984; Winch, 2006). Formal mechanisms, such as collaborative procurement and relational contracting, have been used to promote trust as the predominant mechanism that works with other mechanisms to lever project value (Eriksson and Laan, 2007; Rahman and Kumaraswamy, 2008; Bygballe, Dewulf and Levitt, 2015). The form of governance is chosen not least for cost minimisation; the use

of hybrid governance facilitates the pursuit of greater joint value (Zajac and Olsen, 1993). The choice of governance structure influences and, at the same time, is influenced by behaviour, interactions and value created at the behavioural level (Winch, 2006). It has been commonly agreed that trust generates an environment where project actors are more willing to communicate with each other, share risks, solve problems in a collaborative manner, and commit resources to ensure service delivery and maintain relationships (Zaghloul and Hartman, 2003; Kadefors, 2004; Smyth, 2005; Smyth and Thompson, 2005; Doloi, 2009; Pinto, Slevin and English, 2009). Project outputs such as cost, time and quality, and value propositions may also be improved. The better experience and value creation in turn generate higher expectations and reinforce trust as a norm (Shiu, Jiang and Zaefarian, 2014). Trust in this vein works in a self-sufficient way (Wong and Cheung, 2005; Laan *et al.*, 2011).

2.4 Research gaps and theoretical points of departure

The literature review on trust theories in various domains and disciplines has offered rich insights on understanding trust in construction project and supply chain management. This section demonstrates the research gaps and theoretical points of departure of this research, pointing to a process-based study as the way forward.

1. From static to dynamics

A considerable body of trust research in construction project and supply chain management has taken a variance-based view and sought to investigate the causes and effects of trust or trustworthiness (e.g., Doloi, 2009; Lau and Rowlinson, 2009; Chalker and Loosemore, 2016). For instance, many studies on trust development have built upon sociological or organisational models to identify antecedents to trust (e.g., Hartman, 2000; Kadefors, 2004; Wong *et al.*, 2008). Also, current studies on trust in project governance mainly focus on the role of formal mechanisms in building trust, such as procurement, relational contracting and other collaborative arrangements (Rahman and Kumaraswamy, 2005; Eriksson and Laan, 2007; Ling *et al.*, 2015; Benítez-Ávila *et al.*, 2018). The epistemological view implied in this body of research is that trust is an important element in relationships that can be changed by cause variables (e.g., communication and commitment) or act on a unit of analysis (e.g., organisations and projects) to produce outcome variables (e.g., organisation and project effectiveness) (Smyth, Gustafsson and Ganskau, 2010).

While variance research provides explanations for phenomena in terms of relationships among dependent and independent variables, it ignores the time ordering and patterns among events and activities (Mohr, 1982; Van de Ven and Poole, 2005). For instance, studies on mechanisms of building trustworthiness as an antecedent to trust shed little light on how perceived trustworthiness leads to trust and its behavioural manifestation over time. Moreover, the findings of variance-based research are static and illustrated snapshots of trust at the moment of survey. The dynamic aspects of trust development and the unfolding value of trust over time have been ignored in variance-based research. Yet the dynamics of supply chain relationships and trust remain a significant topic in the construction project and supply chain management domain. Focusing on the dynamic process of trust development in supply chain relationships offers an opportunity for investigating the execution of formal but also informal and emergent collaborative practices in projects and their effects on trust, which can shed light on solutions to the difficulty of transferring trust at the governance level to the behavioural level (Bresnen, 2007, 2009; Smyth, 2015a). Moreover, from the service-dominant logic (S-DL) point of view, as Chapter 3 will discuss, value is constituted by a series of co-created value propositions with implications for later execution and realisation post completion (Smyth, Lecoivre and Vaesken, 2017), which is also a dynamic process.

2. From risk to value

Many studies have viewed trust as a mechanism for reducing perceived risks and transaction costs (Winch, 2001; Doloi, 2009). Reducing risks is important for project organising, but value creation is the fundamental driving force behind business activities. Creating value differentiates trust from calculation of risks and power. Whereas power can reduce risks and transaction costs through imposing contractual mechanisms and close monitoring (Williamson, 1993; Nooteboom, Berger and Noorderhaven, 1997), trust enables collaborative relationships, spontaneous knowledge sharing, flexible resource allocation and commitment (Zaghloul and Hartman, 2003; Smyth and Thompson, 2005; Shiu, Jiang and Zaefarian, 2014). These activities can reduce perceived risks but also lever value, which can hardly be achieved by using power and formal control. Trust enables actors to progress in larger systems with more resources and proactively participate in value-creating activities with others. As Luhmann (1988, p. 99) mentions: *“Mobilizing trust means mobilizing engagements and activities, extending the range and*

degree of participation". Therefore, to investigate the value of trust, it is necessary to link trust with value-creating activities between construction supply chain partners.

3. From projects to ecosystem

Trust research in construction project and supply chain management has mostly focused on projects and had few implications for the ecosystem (e.g., Kadefors, 2004; Laan, Noorderhaven, *et al.*, 2011). Social contexts that enable and constrain trust development are largely neglected. The project-focused approach leads to the difficulty of transferring trust between the project level and organisation level and across projects. This problem is more severe when the project involves different teams responsible for procurement and execution respectively, which is not uncommon in construction project businesses. Taking a broader view to emphasise project activities but also multilevel systems complements the zooming-in perspective of observation, offering a more comprehensive view on the dynamics of trust.

Research gaps point to a process-based approach as the way forward to exploring the dynamics of trust and value over time. A process-based approach deals with events and mechanisms rather than variables and focuses on ongoing interactions between actors, organisations, and between actors and organisations and multiple-level contexts rather than static states and structures (Langley and Tsoukas, 2010; Langley *et al.*, 2013). Unlike the variance-based perspective, the process-based perspective builds explanation in terms of meaning, diachronic patterns and generative mechanisms rather than the synchronic presence of higher or lower levels of specific attributes (Mohr, 1982; Van de Ven and Poole, 2005). In other words, a process-based approach enables the exploration of the unfolding value of trust in construction supply chain relationships situated in ongoing interactions and multiple-level contexts. In doing so, it contributes to theories of trust in construction project and supply chain management by demonstrating the dynamic aspects of trust and value in the project lifecycle.

Chapter 3 Moving towards a service-dominant logic view

The changing place of service and higher demands on the value that construction projects deliver distance the delivery of projects from G-DL and P-FL. This chapter introduces service-dominant logic (S-DL) as a complementary logic to the current institutional logic in construction, the goods-dominant logic (G-DL) and project-focused logic (P-FL). S-DL emphasises service as the unit of exchange and the significance of relationships in creating value that improves the wellbeing of service beneficiaries. However, the literature review identified that relational concepts such as trust and power have not been the central focus of the S-DL community. The second half of this chapter introduces trust in S-DL. On the basis of research gaps in trust theories and S-DL, a conceptual framework for researching the value of trust in construction supply chains is proposed.

3.1 Managing construction projects and supply chains from G-DL and P-FL perspectives

The traditional view that construction is mainly about coordination of site-specific tasks and activities (Cox and Thompson, 1997), and value is embedded in products, material, components and project inputs and assessed in terms of price in the transaction, has formed a G-DL and P-FL in approaches to managing construction projects. As discussed in Chapter 1 (see 1.2.3), G-DL and P-FL enable the recursive use of transactional project management approaches, which, in turn, reinforce and eventually institutionalise the logic.

Under G-DL, value is added in goods and services by suppliers before selling and determined at the point of transactions or series of transactions – that is, value-in-exchange. They are static promises delivered by producers projecting benefits that can be delivered through products and/or services along with the associated approximate price that customers are willing to pay (Lanning and Michaels, 1988). G-DL views value propositions as ‘quantifiable evidence’ of value (Skåln *et al.*, 2015). Value propositions that resonate more with customer need form the competitive advantage for firms since they enable firms to be differentiated from their competitors and hence help them gain more value-in-exchange in markets (Anderson, Narus and Van Rossum, 2006). The

emphasis is on how a firm can display the attractiveness of its offerings in the market (Skålén *et al.*, 2015). Furthermore, value propositions are active from the supplier's side as the supplier chooses, provides and communicates the value through its internal 'value delivery system' that in some cases is directed to be customer-oriented to fulfil the supplier's generic strategies (Lanning, 1998). On the customer's side, value propositions are largely reactive, involving limited interaction and direct participation; they passively or reactively accept the offering or not. G-DL does not implicitly address the role of customers in creating value propositions, hence interactions and relationships between customers and suppliers in the production, because of the focus on the exchange of manufactured goods and services (Skålén *et al.*, 2015). Therefore, G-DL and derived practices are transactional.

Nevertheless, for projects in general little can be accurately quantified as nothing has yet been produced prior to execution. Selling and bidding, hence the formation of the value proposition, occur prior to production or delivery. The process of value co-creation may be initially formed by the putting together of value propositions through interactions at the front end of the construction project. Value propositions can be shaped through interactions and early involvement of main contractors and supply chains (Cova and Salle, 2008). Conceptually, this involves business development managers, procurement, bid managers and project managers, although time and functional or silo constraints may result in weak internal and external interactions (Smyth, 2015a). Value propositions harbour the scope for future value actualisation in use, although the scope is not automatically as actualised value in the future. The latter depends on actors' resources and capabilities of co-creating value in using the service. One feature of service delivery in construction projects is that there is a gap between selling stage and use stage where the project's value is realised. This is a function of working to contract, by selling first and then producing (Smyth, 2015a). Main contractors as the intermediate customer of specialised projects, more often than not, participate in the service provision. Interactions between main contractors and subcontractors continue beyond the formation of value propositions at the front end and might even become intensified in project execution. In order to manage changes and uncertainties, both main contractors and subcontractors may take the role of service provider during delivery to collaboratively coordinate interactions, solve problems and reduce risks (Dubois and Gadde, 2002b). Taking a broader view, the nexus of clients as the intermediate customer of overall projects and external stakeholders

may also engage throughout project lifecycles to various degrees (Ballantyne *et al.*, 2011; Morris, 2013; Frow *et al.*, 2014).

P-FL emphasises the temporary nature and uniqueness of projects. Projects are usually conceptualised as temporary systems with *ex ante* built-in time of termination (Lundin and Söderholm, 1995). By involvement in projects, project teams representing their own organisations might have short-term transitions to fit in the phenomenon of project working until the institutionalised termination. As project results are recoupled to organisations after completion, projects are also viewed as a temporary agency for organisations to manage change, utilise resources, create value, and deal with risk and uncertainty (Turner and Müller, 2003; Brady and Davies, 2004). Since projects are contingent upon their contents and related activities, they are perceived as unique in time (Shenhar and Dvir, 1996; Shenhar, 2001).

Relationships and any associated trust are regarded as temporary and dissolve with project delivery (Dubois and Gadde, 2002b). Trust relations are viewed as a vehicle to increase project efficiency and terminate with the project; projects have no memory and trust is mostly built from scratch (Dubois and Gadde, 2002b). Yet, as argued in Chapter 1 (see 1.3.1), this is far from the case in supply chain networks and where repeat business exists. The shadow of the past and future and actors, rules and resources at multilevel service ecosystems influence perceptions, actions, practices and power relations in current interactions and hence their performance in knowledge transfer and capability building (Brady and Davies, 2004; Bresnen, Goussevskaia and Swan, 2004; Manning and Sydow, 2011; Ligthart, Oerlemans and Noorderhaven, 2016). To reap the benefit from the broader service ecosystems, a 'relationship-orientation' is adopted in construction in the form of relational contracting, partnering projects and alliances across supply networks. Trust in this vein is imported to the extent that it resides in the supply chain and its network. However, these practices simply move the singular transactions to multiple transactions over time and use supply chains as vehicles to increase project efficiency (Lusch and Vargo, 2014; Smyth, 2015b), hence still reflecting the limitations and shortfalls of G-DL and P-FL (cf. Wood and Ellis, 2005; Alderman and Ivory, 2007). They are market driven and are reactive from the perspective of the supply side.

Table 2 illustrates the management of construction projects from the perspective of G-DL and P-FL. The distance between G-DL and P-FL and the delivery of construction projects points to the necessity of moving towards a complementary logic offering a different lens

of value and focusing on supply chain relationships. Relationships are the basis for supply chain management, supported through effective transactions, contracts and project support mechanisms. They are part of programmes and the portfolio of the project-based construction firm. In terms of the specific research focus, relationships between main contractors and second-tier subcontractors should not be seen as project specific. They are nested in the broader operations of both the project-based organisations and networks in the broader service ecosystem. Value is evaluated against the benefits gained from using the service and normally goes beyond the transactional value of individual projects.

Table 2 G-DL, P-FL and S-DL in delivering construction projects

	The delivery of construction projects	G-DL/P-FL perspective	S-DL perspective
Creation of the value proposition	Before delivery	After production	A balancing mechanism that links actors at different times and positions in the service ecosystem
	Little can be accurately quantified	Quantifiable evidence of transactional value, such as cost, programme and quality	
	Continuously shaped before and during the delivery	Static promises from the producer to customer	
Role of customer	Main contractor as the intermediate customer of specialist projects participating in the delivery and providing service	Reactive recipient of goods and services	Customers co-create value by integrating their own resources with others'
	Some clients as the intermediate customer of overall projects participating in the delivery	An operand resource to be profited from	An operand resource to co-create value with
Firm-customer interaction	Intensive interactions between the main contractor and subcontractors in delivering the project	Active producer and reactive customer in making value propositions and production	Interchangeable role of service provider between the customer and producer
	Service secured in the delivery process can be recombined and reused in future	Producer may provide facilitating services as added value	Service beneficiary co-creates value in use experience through direct or indirect interactions with the service provider as well as other actors in the service ecosystem
Firm-customer relationship and trust	An integral part of project success	Not addressed in G-DL	Inherently relational
	Related to repeat business and economics of repetition and recombination	Temporary and an operand resource for project efficiency in P-FL	An operand resource determining the meaning of goods and services

Source: original

3.2 Managing construction projects and supply chains from the S-DL perspective

Businesses have been more service driven than before (Grönroos, 2007), focusing more on overall functionality than the delivery of stand-alone goods or services (Wikström *et al.*, 2009). This is evident in construction project businesses where main contractors as system integrators provide the service of management for clients whilst they do not conduct any ‘real construction’ tasks (Smyth, 2015a). The management of projects has become a major service in construction projects and subcontracting systems enable previous in-house production to become a type of service in construction project delivery. The changing place of service has gained increasing interest in both production and project businesses (Brady, Davies and Gann, 2005b; Edvardsson, Gustafsson and Roos, 2005) – pointing towards the necessity of at least a complementary logic of business.

This section demonstrates the key concepts and premises of S-DL in relation to practices in construction projects and supply chains. Table 2 summarised the delivery of construction projects from the perspective of S-DL.

3.2.1 Service

Service-dominant logic (S-DL) represents a shift in marketing theorisation away from a goods-dominant logic (G-DL) (Vargo and Lusch, 2004, 2008, 2016). It has been widely discussed, developed, refined and used for analysis and in implementation in a wide range of areas, such as tourism (Grisseemann and Stokburger-Sauer, 2012), logistics (Randall, Pohlen and Hanna, 2010), service science (Vargo and Akaka, 2009), and recently in project management (Wells and Smyth, 2011; Smyth, 2015a; Smyth, Lecoivre and Vaesken, 2017). S-DL shifts the focus away from goods and services towards service and relationships in service ecosystems (Vargo and Lusch, 2008, 2016). This inherently relational feature links S-DL with the construction industry. As mentioned repeatedly, collaboration between main contractors and supply chains is necessary for project delivery and value is jointly created in networks of relationships (Pryke, 2009).

Particularly in construction project management, S-DL is viewed as an institutional logic counterpart to G-DL and P-FL (Smyth, 2015a). The central argument of S-DL is that in an actor-to-actor (A2A) context the basis of exchange is service, “*service is exchanged*

for service” (Bastiat and de, 1964, as quoted in Vargo and Lusch, 2004: pp. 6-7), and goods and projects are only mechanisms for service exchange. Service is more than what was traditionally meant in G-DL as an activity or a set of input activities resulting in a singular output aimed at assisting the customer’s practice. Under S-DL, service is the *“application of specialised competencies (skills and knowledge) through deeds, processes, and performances for the benefit of another party or the entity itself”* (Vargo and Lusch, 2004, p. 2). The application of knowledge and skills to achieve the benefit for another party or oneself means that service (singular) is a process, which is different from services (plural) as units of output (Vargo and Lusch, 2008). In the construction industry, the division of labour and subcontracting systems enable previous in-house production to become a type of service and main contractors as system integrators to provide the service of management for clients (Winch, 2014). Construction projects then become less about production, even for subcontractors as system sellers that produce and deliver integrated solutions (Davies, Brady and Hobday, 2007); projects are a delivery channel of service exchange for the wellbeing of clients, main contractors, supply chains, other stakeholders, and ultimately end users and society (Saxon, 2005).

The changing place of service and the increasingly higher demands for the value delivered through construction projects have led to the preference for integrated solutions, pointing to the importance of collaboration, hence relationships between main contractors as system integrators and subcontractors and suppliers and knowledge sharing among supply chains (Brady, Davies and Gann, 2005b; Edvardsson, Gustafsson and Roos, 2005). To deliver a subcontracting project, the main contractor as the intermediate customer for the subcontractor – the main dyadic relation in this ecosystem of provision, usually participate in the process of project delivery. Hence, the role of service provider might change in the construction project delivery and the main contractor and subcontractors facilitate the co-creation process across different and serial interactions. This means that the ultimate service delivered consists of a series of mutual service bundles provided by the supply chain and integrated by the main contractor. In this sense, service is more than what was traditionally meant as an activity or a set of input activities resulting in a singular output aimed at assisting the customer’s practices.

3.2.2 Resources

Resources can be physical, human, organisational, informational and relational (Hunt and Derozier, 2004). Actors and organisations draw on resources to create value. Under S-DL, goods and services are operand resources. *Operand resources* are one type of resources, on which an operation or act is performed to produce an effect. The meaning of operand resources depends on the service those resources provide since customers do not buy goods or services *per se*, but rather service rendered that creates value (Vargo and Lusch, 2004). *Operant resources* are employed to act on operand resources as well as other operant resources (Vargo and Lusch, 2004). Human knowledge and skills, organisational routines and capabilities, information about markets and relationships in ecosystems are operant resources that “*are the fundamental source of strategic benefit*” (Vargo and Lusch, 2016, p. 7). The same resource might generate different value for actors and organisations in service ecosystems, depending on action and appraisal that transform potential resources into realised value. As Zimmermann (1951) pointed out, resources *are not*; they *become*. Relationships and hence trust are one type of operant resources that determine the resourcefulness and accessibility of a certain resource. Therefore, S-DL regards relationship value beyond bringing repeated transactions.

3.2.3 Value propositions, value and value co-creation

Value is the core organising principle, or order parameter, of service ecosystems that integrates actors into a coherent system (Edvardsson, Tronvoll and Gruber, 2011; Meynhardt, Chandler and Strathoff, 2016). S-DL emphasises value-in-use and regards this as a higher-order concept that results in value-in-exchange (Kowalkowski, 2011). *Value-in-exchange* is the negotiated figures that customer and supplier agree to pay and receive, which is furnished by accounting systems that capture this limited form of value (Vargo and Lusch, 2006). In the long term, value-in-exchange only exists if value-in-use is generated, because customers who perceive no or low value-in-use are less likely to return, and value-in-exchange is confined to the discrete transaction for the supplier and thus there is no projected customer lifetime value to the supplier. Hence, value-in-use as a concept is not only important for customers but also for suppliers (Grönroos, 2008). Value-in-use is not embedded in operand resources as goods and services as inputs, but rather co-created between multiple actors and organisations. In S-DL, value can only be determined by the service beneficiary when the service is used, and the value potential is

actualised and becomes value-in-use. In this sense, *value (-in-use)* can be conceptualised as phenomenologically perceived benefits for current and/or future use (Vargo and Lusch, 2004). What is valuable is not the goods or projects *per se*, but the benefits perceived out of them through actors' experience (Payne, Storbacka and Frow, 2008), which can be functional, social, relational or emotional (Sweeney and Soutar, 2001; Baxter, 2008).

S-DL views value propositions as a balancing mechanism that links actors at different positions in service ecosystems (Vargo and Lusch, 2010) and aligns the offers with expectations through interactions. As such, the ecosystem is dynamically maintained through value propositions and it changes over time (Frow *et al.*, 2014). Value propositions are not simply unidirectional from suppliers to customers or other stakeholders (cf. Lanning, 1998; Frow and Payne, 2011). Nor are they crafted to satisfy the supplier's own generic strategies, which might include customer intimacy, so they are directed to be customer-oriented (cf. Day, 2006). Customers can either passively accept the propositions, thus the service provision, and then integrate resources to use and assess the value (e.g., Kowalkowski *et al.*, 2012; Payne and Frow, 2014), or they can participate in the communicative interactions with suppliers to create reciprocal value propositions until service is delivered and value can be evaluated in service use (e.g., Ballantyne *et al.*, 2011; Truong, Simmons and Palmer, 2012). The role of supply chains is to integrate the resources into value propositions and support the value-creating processes enabled by service exchange (Grönroos, 2008; Lusch, Vargo and Tanniru, 2010), since firms "*cannot deliver value but can participate in the creation and offering of value propositions*" (Vargo and Lusch, 2016, p. 4). This is not to say supply chains cannot gain value; instead, value might be co-created and/or emerge in service experiences. Given the reciprocal nature of service exchange, supply chain members as service providers also have the role of "beneficiary" (Vargo and Lusch, 2016, p. 4). In the construction industry, by involving in project organisations, second-tier subcontractors can build relationships and gain knowledge from main contractors, clients and other contractors, which are fundamental sources of strategic benefits and beneficial to future businesses. All organisational actors are co-creators, combining resources for mutual advantage, ultimately adding to the potential value co-created with customers.

Value co-creation consists of two dimensions, co-production and value-in-use (Ranjan and Read, 2016). Co-production occurs in direct firm-customer interactions – that is, customers participating in the design and/or delivery of the core offerings and value

propositions (Vargo and Lusch, 2006; Grönroos, 2008; Grönroos and Gummerus, 2014). This includes subcontractors, whose customer is the main contractor. Main contractors and subcontractors co-produce construction projects as core offerings for clients; the latter deliver service through projects to the ultimate customers of projects, such as road users and building occupants. Value-in-use stresses the service use process and depends on the core offering and value propositions (potentially) delivered and service beneficiaries' capability of integrating resources in market, public and private sources in the use context (Ranjan and Read, 2016; Vargo and Lusch, 2016). From the perspective of customers of construction projects, value-in-use is realised when projects are completed and used. This is different from main contractors and supply chains, whose value-in-use depends on the service experience of co-producing projects and post-completion (Smyth, 2015a). The former refers to the experience of mutual service in delivering projects, in which main contractors and subcontractors can secure knowledge and develop relationships. Service experience determines the extent to which an aligned and integrated service outcome is evident and thereby value realised in service use post-completion. In summary, the context of value co-creation between main contractors and subcontractors provides the thesis focus, which consists of:

- (1) service experience of co-producing;
- (2) service outcomes beneficial for future use.

3.2.4 Service ecosystems and service interactions

Value is co-created between multiple actors in shared systems of exchange or service ecosystems (Edvardsson, Tronvoll and Gruber, 2011; Akaka, Vargo and Schau, 2015; Vargo and Lusch, 2016). A service ecosystem is “*a relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange*” (Vargo and Lusch, 2016, p. 10). Shared systems tie actors together through institutional arrangements and denote a wider perspective than firm and customer. Vargo and Lusch (2016, p. 19) emphasise this understanding in their newest foundational premise: “*Value co-creation is coordinated through actor-generated institutions and institutional arrangements*”. This perspective is related to, yet different from, the concept of project ecology in the project management field that consists of projects, organisations, inter-organisational networks and organisational fields (Manning, 2008). Both recognise the constraining and enabling

effects of the layered structures of wider stakeholder ecosystems. The difference is that the former emphasises interactions between actors, organisations, resources and rules at micro-, meso- and macro-levels of systems in terms of value co-creation (Akaka, Vargo and Lusch, 2013). Particularly in project management, the meso-level includes project and firm levels. The concept of project ecology lends weight to the influence of structures of projects, organisations, inter-organisational networks and the organisational fields on the *project* organisation.

The sustaining and self-adjusting properties of service ecosystems relies on the reproduction and transformation of structures of systems (Chandler and Lusch, 2015; Edvardsson, Skålen and Tronvoll, 2015), which relies on service interactions at different levels and across systems. In turn, these interactions are enabled and constrained by structures of systems (Berger and Luckmann, 1966; Giddens, 1984; Edvardsson, Tronvoll and Gruber, 2011). To deliver construction projects, actors and organisations mobilise resources from markets, whether private and/or public sources, which is influenced by and influences structures of projects, organisations, inter-organisational networks and organisational fields. Actors need to use authoritative, economic and relational mechanisms at different levels of the service ecosystem to allocate resources (Edvardsson, Skålen and Tronvoll, 2015). These mechanisms can be driven by structures but are also emergent in situations (Bhaskar, 1975; Sayer, 2000), which, under certain conditions, can induce different practices, processes and outcomes of value co-creation (Biggemann and Buttle, 2009; Akaka *et al.*, 2014; Akaka, Vargo and Schau, 2015).

The dynamics of service ecosystems depend on interactions within and between different levels, which incur “*a sea of change, making all the systems inherently dynamic*” (Lusch and Vargo, 2014, p. 170) over time and space. At the micro-level, by participating in service interactions, actors have more opportunities for mutual learning, knowledge sharing and relationship building. The accumulation of resources at the micro-level has implications for projects, such as more resource access and better resource mobilisation (Laud *et al.*, 2015). Furthermore, through continuous interactions, actors might establish routines, recognise relative roles, and form shared intentions and meanings that enable the emergence of norms at the project level (Penaloza and Mish, 2011; Taillard *et al.*, 2016). From projects, organisations can gain resources and service rights that improve current value-creating activities, help realise more value-in-use and contribute to generic service experiences (Brady and Davies, 2004; Payne, Storbacka and Frow, 2008;

Söderlund, Vaagaasar and Andersen, 2008; Truong, Simmons and Palmer, 2012), although in construction projects operant resources are not always transferred to parent organisations due to the weak systems between the two levels (Smyth, 2015a). Actualisation at this point, from the subcontractor’s viewpoint, occurs post-completion of their work, but not of the total project undertaken by the main contractor. At the inter-organisational networks level, operant resources such as knowledge and inter-organisational relationships can form practices between organisations, and the effectiveness of such practices can promote repetition, which eventually leads to routinisation and normative practices at the organisational field level (Manning, 2008). In other words, the sustaining and self-adjusting service ecosystem is the outcome of a duality of structures (Giddens, 1984) that involves the mutual effects of interactions and structures at different levels of the system.

Table 3 summarised key concepts in S-DL.

Table 3 A summary for S-DL concepts

Concepts	S-DL conceptualisation
Service	Application of specialised competencies (skills and knowledge) through deeds, processes, and performances for the benefit of another party and the entity itself (Vargo and Lusch, 2004).
Operand resource	A resource on which an operation or act is performed to produce an effect (Vargo and Lusch, 2004).
Operant resource	A resource that is employed to act on operand resources as well as other operant resources (Vargo and Lusch, 2004).
Value-in-use	Phenomenologically perceived benefits for current and/or future use (Vargo and Lusch, 2004)
Value-in-exchange	The negotiated figures that customer and supplier agree to pay and receive, which is furnished by accounting systems that capture this limited form of value (Vargo and Lusch, 2006).
Value propositions	A balancing mechanism that links actors at different positions in the service ecosystem (Vargo and Lusch, 2010) and aligns the offers with expectations through interactions.
Service ecosystem	A relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange (Vargo and Lusch, 2016).

3.3 Research gaps: introducing the concept of trust in S-DL

Although S-DL is inherently relational (Chandler and Wieland, 2010; Vargo and Lusch, 2011), relationship-related concepts such as trust, equity and power have gained sparse attention in S-DL theorisation (Fyrberg and Jürriado, 2009). Reciprocity and equity are necessary for sustaining value-co-creating activities as well as inter-organisational relationships and hence trust (Ballantyne and Varey, 2006; Aarikka-Stenroos and Jaakkola, 2012; Swärd, 2016). Current research mostly focuses on customer perceived value-in-use (cf. Ulaga, 2003; Heinonen, Strandvik and Voima, 2013). The value for supply chains is largely neglected (Walter, Ritter and Gemünden, 2001; Smyth *et al.*, 2016). Research on the value simultaneously perceived by both customer and supplier is scant. This imbalance of research interests is consistent with the client-centred project management studies. However, overemphasising customer value limits the meaning of value co-creation processes. Value-in-use needs to focus on the value perceived by service providers, especially when the customer contributes to service processes and facilitates the provider's delivery.

The experience and perceived value in using the service have gained broad interest (e.g., Sandström *et al.*, 2008; Edvardsson, Enquist and Johnston, 2010), but how service dynamically manifests itself within and among relationships over time and generates value for those involved remain unknown and need further investigation (Chandler and Vargo, 2011; Leroy, Cova and Salle, 2013; Makkonen and Olkkonen, 2017). Most research embraces a zooming-out perspective, pointing to the need for a closer examination of the process of value co-creation in the S-DL community to avoid the "*risk of black-boxization of the value co-creation concept*" (Leroy, Cova and Salle, 2013, p. 2).

Research has recognised different dimensions of interactions for value co-creation between customers and suppliers (Grönroos, 2008, 2011; Payne, Storbacka and Frow, 2008; Ballantyne *et al.*, 2011; Echeverri and Skålén, 2011; Grönroos and Ravald, 2011; Aarikka-Stenroos and Jaakkola, 2012). The social construction school of S-DL research has taken a practice-based approach to examining interactions and value co-creation – that is, the structured aspect of interactions (e.g., Edvardsson, Tronvoll and Gruber, 2011; Edvardsson, Skålén and Tronvoll, 2015; Marcos-Cuevas *et al.*, 2016). Practices in these studies were treated as routinised ways of doing that are structured by rules, actors and resources at higher levels. Yet, the emergent and interactive aspect of service interactions

for value co-creation has been under-researched and needs examination (Echeverri and Skålén, 2011; Makkonen and Olkkonen, 2017).

Zooming out, a service ecosystems' view points out the multiple-layer feature of value co-creation (Akaka, Vargo and Lusch, 2013; Frow *et al.*, 2014; Akaka, Vargo and Schau, 2015). Value is co-created in interactions across different levels of service ecosystems, especially in contexts where resources, actors and rules are widely dispersed (Cova and Salle, 2008; Aarikka-Stenroos and Jaakkola, 2012; Russo-Spena and Mele, 2012; Marcos-Cuevas *et al.*, 2016), such as the construction industry. Value cannot be understood by focusing only on a single level of service ecosystems (Corsaro, 2014; Akaka, Vargo and Schau, 2015), such as inputs at the operational level. For project businesses, apart from organisations and inter-organisational networks, the meso-level consists of projects or programmes as the main contexts of micro-level activities. The interplay between the organisation and project levels is vital to value co-creation in project businesses and requires attention.

However, most research, while it acknowledges the multilevel system, ignores the interactions between different levels (e.g., Payne, Storbacka and Frow, 2008; Chandler and Vargo, 2011; Akaka, Vargo and Lusch, 2013) – although exceptions can be found in recent studies (e.g., Frow *et al.*, 2014; Edvardsson, Skålén and Tronvoll, 2015; Laamanen and Skålén, 2015; Makkonen and Olkkonen, 2017). Value co-creation involves multiple levels of service ecosystems that are interdependent and synergetic with each other. Value formed at the micro-level creates order for the meso-level in the form of habituation and routinisation. Meso-level value further influences macro-level in the form of the institution. Macro-level in return enables and constrains meso- and micro- levels to abide by the rules of the game (Berger and Luckmann, 1966; Haken, 1984; Meynhardt, Chandler and Strathoff, 2016).

In summary, the relational, zooming-in, interactive and multilevel aspects of service interactions and value co-creation that include both customer's and producer's service experiences and value need investigation – pointing to the necessity of embodying a relational and process-based approach in the S-DL community. To fill in this gap, this section seeks to conceptually link trust, an important relational concept, with S-DL and value co-creation.

3.3.1 Trust in service experiences

The process of service provision is where the service is configured, produced and delivered after the sale is secured. It is particularly important to specific assets where service is exchanged business-to-business (B2B) before and after the sale, such as construction projects (Smyth, 2015a). In construction, exchange is a process, broken down into stage payments. How this is managed is an important part of the relationship and trust is a key part of the service experience across these serial transactions within a project. Between selling and project completion, the components of value propositions and perceptions of value may alter. To capture the dynamics of perceived value and value propositions during delivery requires the formation and adaption of shared intentions and meanings formed in shared experience and systems (Maglio and Spohrer, 2013; Akaka *et al.*, 2014; Taillard *et al.*, 2016). These shared intentions and meanings, in turn, help sustain the continuity of interactions and trust between actors and organisations (Ballantyne and Varey, 2006; Edvardsson, Skållén and Tronvoll, 2015). In some cases, meanings are gained through communicative intent that expresses meanings, either intentional or non-intentional (Aarikka-Stenroos and Jaakkola, 2012). Trust is key to this process. It can generate an environment of integrity and openness where actors are willing to share information and knowledge, sustain communication, form common goals and work jointly (Nooteboom, 2000; Kadefors, 2004; Smyth and Thompson, 2005; Berggren, Sydow and Tell, 2017). At other times, meanings are comprehended from structural orderings of sign systems that exist between but also beyond the current relationship (Giddens, 1984; Akaka *et al.*, 2014). In the construction project delivery, shared meanings might be from the standard form of contract and norms of conduct in the industry as well as day-to-day formal and informal interactions between actors and organisations.

Apart from the perception of value and value propositions, power relations between main contractors and subcontractors are dynamic in delivering construction projects, depending on which business has most leverage at any one time, particularly over costs and payments (Cox, Ireland and Townsend, 2006). Imbalanced power may result in value realisation enhanced for some yet reduced for other organisational actors. This points to the importance of complementary objectives, mutual understanding on the basis of shared meanings, resource commitment and access to mobilising other actors' resources and reflexive learning in experience (Lusch, Vargo and Tanniru, 2010; Kowalkowski *et al.*, 2012). All these are founded upon trust-based interactions at different levels of service

ecosystems that align actors' value expectations as reciprocal promises “*to and from suppliers and customers seeking an equitable exchange*” (Ballantyne and Varey, 2006, p. 344). On the one hand, equitable exchange means that main contractors and subcontractors apply and integrate resources, hence taking the role of service provider, to facilitate each other's work and ultimately to lever the potential value that can be fulfilled later on (Grönroos, 2012). On the other hand, equity also refers to the reciprocity of value propositions. The phenomenon of trust sustains mutual service as it nurtures relational norms such as reciprocity and equity that stabilise relationships (Macneil, 1980).

3.3.2 Trust in service outcomes

Service provision inevitably results in service outcomes that are subjective in evaluation. Actors in the phenomenon of trust may perceive better service experiences that enable higher performance, not least project outputs regarding costs, time and quality. Trust helps maintain the reciprocity of value propositions and levers value beyond present projects as trust-based interactions enable main contractors and subcontractors to gain more resources such as knowledge and relationships that can be used in and benefit future service. Reciprocal value propositions emphasise value-in-use for both main contractors and subcontractors. Value-in-exchange is also an integral part of value creation, indeed intense co-creation. Hence, it is important to deliver a balanced emphasis on value-in-use and value-in-exchange in value propositions (Michel, Brown and Gallan, 2008).

From the perspective of main contractors and supply chains, the value-in-use post-completion comes in monetary form to benefit the businesses, their owners and staff, in the form of reputation in the market and specifically repeat business opportunities. In some cases, maintenance and operational contracts may also flow and this brings in other operational factors for the business. Apart from profits and work volumes, main contractors and subcontractors might also benefit from insurance against crises or difficulties, technological and organisational knowledge, market insight, resource access and referral business (Walter, Ritter and Gemünden, 2001; Bettencourt *et al.*, 2002). Operant resources gained in service interactions can help address uncertainties and risks in subsequent phases of delivery and/or businesses beyond the current service, should they be translated to the organisational level for future use (Teece, Pisano and Shuen, 1997; Staber and Sydow, 2002; Brady and Davies, 2014; Berggren, Sydow and Tell, 2017),

3.4 Summary: the conceptual framework

Chapter 2 reviewed trust theories in various domains and disciplines and conceptualised the meaning of trust in construction supply chains. Trust first and foremost is about freedom of choice: actors have the choice to trust as well as to be trustworthy or not. Trust presupposes uncertainties. Freedom of choice involves risks but also opportunities for leveraging value through collaborations between trusting and trustworthy actors and organisations. To trust is to submit one's own vulnerability to another party and potentially vice versa for it to build in a relationship. This research uses a working definition of 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. Trust arises in individual members, but it can be inter-organisational depending on key interactions. The overall focus is inter-organisational trust from main contractor to second-tier subcontractor. Interactions between individuals provide evidence that builds to represent the inter-organisational trust. Inter-organisational trust therefore reflects the collectively-held trust intention by members in one organisation towards another organisation (Zaheer, McEvily and Perrone, 1998). Trust develops in interactions between actors and organisations in an institutional environment (Zucker, 1986; Mayer, Davis and Schoorman, 1995; Bachmann and Inkpen, 2011). Trust is dynamic; the perception of trustworthiness, the orientation of engaging in trust-based relationships and trusting behaviour may change during interactions. On the other hand, the process of trust development in projects is subjective to structures of multilevel service ecosystems (Grabher, 2002; Manning, 2008).

The value of trust unfolds while trust develops. Nevertheless, the value of trust has not been well recognised in construction project and supply chain management. Most research and practices in this field are based on the goods-dominant (G-DL) and project-focused logic (P-FL). Under G-DL and P-FL, trust is viewed as intangible, heterogeneous, inseparable and perishable, and not an output contributing to the value-creating activity in construction; or as an input necessary for achieving relationship-orientation and efficiency of a project or series of projects (Smyth, 2015a). The view is a narrow one. Chapter 3 offered S-DL as a complementary logic to G-DL and P-FL that goes beyond value-in-exchange. Combining S-DL with trust permits trust to be seen as a contributor to value creation and specifically co-created value. Co-creating value with construction supply chains, from the perspective of S-DL, needs a series of reciprocal value

propositions and mutual service between main contractors and subcontractors. It also needs actors, resources and rules from different levels of service ecosystems. Between selling and project completion, the components of value propositions, perceptions of value and power relations may alter. S-DL is inherently relational (Vargo and Lusch, 2004, 2008, 2016). However, relational concepts such as trust have gained little interest in the S-DL literature at any detailed level. The relational, zooming-in, interactive and multilevel aspects of service interactions and value perceived by main contractors and subcontractors in service ecosystems are under-researched.

Despite the rich insights from literature, research shortcomings and gaps were identified as theoretical points of departure (see 2.4 and 3.3). In combination, the limited understanding includes:

- (1) The dynamic process of trust development in construction supply chain relationships;
- (2) The unfolding value of trust in terms of service experiences and outcomes;
- (3) The relational, zooming-in, interactive and multilevel nature of service interactions;
- (4) The influences of time and multiple-level service ecosystems on trust and value.

The limited understanding is further related to problems in practices, such as the reactivity of supply chains in engaging in partnering, the difficulty of transferring trust at the governance level to the behavioural level and vice versa, and inconsistent service within and across projects (Brown *et al.*, 2001; Bresnen, 2007; Mason, 2007; Crespim-Mazet and Portier, 2010; Smyth, 2015a).

Trust informs and is part of service interactions. It can encourage communication and learning between main contractors and subcontractors, create and adapt shared meanings in uncertainties and dynamics, ensure reciprocity and equity in the service process and outcomes, and nurture relational norms between actors and organisations (Nooteboom, 2000; Kadefors, 2004; Smyth and Thompson, 2005; Berggren, Sydow and Tell, 2017). Under S-DL, trust can be viewed as an operant resource that acts upon goods and services in order to improve resource bases, mobilisation and transformation (Laud *et al.*, 2015). By participating in service interactions, actors and organisations have more opportunities for mutual learning, knowledge sharing and relationship building, hence gaining resources and service rights that lever value for future service exchanges. Better service experiences are both evidence of and lead to higher performance.

In short, trust does ‘add’ value to projects and their organisations through the actors in two ways:

- (1) Trust improves the service experience for those involved during delivery based upon any past experience and the quality of the current project experience, which is execution based;
- (2) The better service enables actors to reach higher performance levels as service outcomes (cf. Smyth, Gustafsson and Ganskau, 2010), which has its origins in executions and is realised post-completion.

The research gaps and problems point to a relational and process-based study as the way forward. Therefore, to advance trust theories, apply S-DL in construction project and supply chain management disciplines, and improve collaborative practices in construction supply chain relationships, the conceptual framework of this research is built upon five elements:

- (1) *Trust as a phenomenon* consists of the perception of trustworthiness, orientation of trust and trusting behaviour;
- (2) *Interaction*, a process in which trust develops or is eroded and hence the value of trust unfolds over time in iterative ebbs and flows to potentially build overall, although critical interactions can rapidly erode trust and confidence;
- (3) *Structures* of service ecosystems consist of rules and resources at micro-, meso- and macro-levels, which mutually influence the process of trust development or erosion. For project businesses, the meso-level constitutes projects and their organisations;
- (4) *Time* dimensions of past and future, which constrain and enable trust development;
- (5) *Value* as perceived by both main contractors and subcontractors in service experiences and outcomes.

The conceptual framework helps organise the empirical work of this research. The next chapter will discuss the philosophical and methodological foundation of the research. The framework will be further specified in Chapter 4 as it was refined by findings of the pilot project.

Chapter 4 Research philosophy and methodology

The theoretical foundations have been set down for this research. Research gaps have been identified in both trust theories and service-dominant logic (S-DL), which are taken as theoretical points of departure for building a theory of trust in construction supply chains. Equally, if not more important, is the consistency between the theory and underlying ontological understanding of trust. All theories are based upon a philosophy of science, the assumptions concerning the very essence of the phenomena under investigation and the grounds of knowledge (Burrell and Morgan, 1979). The above sets of assumptions have direct influences on the way of questioning, investigating and obtaining knowledge about the social world. This chapter will address our philosophical assumptions and the associated methodology underlying our research. On the basis of the philosophical and methodological standing, the rest of the chapter will further outline and justify the research design and methods.

4.1 Research philosophy, methodology and methods

4.1.1 Process research: a critical realist view

It has been argued that this research takes a process-based perspective to explore 1) the dynamic process of trust development in construction supply chains, 2) the unfolding value of trust in the process of trust development (see 1.3.3 and 2.4). This perspective recognises the interplay between interaction process and structures of service ecosystems over time in terms of constituting trust and creating value (see 3.4). The value of trust is investigated as an on-going process.

Thus, it can be said that, in essence, this research is in line with process theorists who view the movement, change and thereby process as reality itself (Bergson, 1946; Rescher, 1996). Process is fundamental, “*there are changes, but there are underneath the change no things which change: change has no need of a support. There are movements, but there is no inert or invariable object which moves*” (Bergson, 1946, p.173). Seemingly stabilised and concrete entities such as organisations are momentary outcomes or effects of historical processes, “*stability waves in a sea of process*” (Rescher, 1996, p.53). That reality is always becoming implies chaos, dynamics, uncertainties and ambiguity as fundamental, and organisation as the exception to stabilise, regularise and order what would otherwise be a wild world in which living would be extremely difficult if not

impossible (Chia, 2002). In this vein, organisation, including project organisation, is a ‘world-making’ process rather than a unit (Tsoukas and Chia, 2002). Notably, this thesis does not deny the existence of substances but treats them as processual activities and stabilities, or, in short, manifolds of process. Even for physical objects, they are marked not by their material components but by a processual unity – the service delivered through them and the value-in-use.

On the basis of a ‘becoming’ ontology, this thesis takes the perspective of critical realism and regards the reality as consisting of three domains – the real, the actual and the empirical (Bhaskar, 1975). The process, be it natural or social, occupies the domain of the real that is independent of human perception, regardless of whether it is empirically experienced by individuals and whether individuals are capable of understanding its nature (Sayer, 2000). The real has mechanisms that might be productive of different events under conditions – that is, causal powers – or, alternatively, susceptible to certain kinds of changes – that is, passive powers. The analysis of underlying mechanisms behind the process is the creation of theories that are not just a complex of data. Science, thereby, is a product of the social, “*but the mechanisms that it identifies operate prior to and independently of their discovery*” (Bhaskar, 1998, p. xii). The domain of the actual constitutes those events that take place when mechanisms are activated under certain conditions and transpires independently of the observer who might record it. The domain of the empirical is defined by what individuals observe and experience, which is a manifestation of the other two domains (Sayer, 2000).

Something is real if it can have a causal effect and makes a difference. For critical realists, causal relations are not universal and measurable cause and effect as assumed by positivists; rather, they generate tendencies rather than certainties (Danermark, Ekstrom and Jakobsen, 2001). Whether these powers are actualised depends on other conditions. Causation is in essence contextual, emergent and varied. Events are therefore not pre-determined before they happen (Sayer, 2000).

The above philosophical position has implications for this thesis. First, the thesis views trust as foundational to establishing and maintaining relationships. Viewing trust as a relationship foundation does not mean that trust is an absolute; it means that any value of trust enacts through relationships in given contexts (Smyth, Gustafsson and Ganskau, 2010). The task of the thesis is to explore trust and its unfolding value between “*what we experience, what actually happens, and the underlying mechanisms that produce the*

events in the world” (Danermark, Ekstrom and Jakobsen, 2001, p. 21). The emphasis is on the generative mechanisms and emergence that entail the presence of phenomena (Sayer, 2000). Second, both the process orientation and critical realism are sensitive to the central role of embedded agency in the constitution of the world that is experienced as an independent structure (Sayer, 2000; Langley and Tsoukas, 2017). The *experience* of action, which include interactions and the consequences they produce, changes agents and the phenomena they help co-create (Langley and Tsoukas, 2017). Therefore, experience is critical to actors as well as the service systems and ecosystems in which they are embedded, pointing to the importance of capturing and understanding experiences of those involved in supply chain relationships in terms of trust and value.

The process-based view notes what is necessary for segmenting experience into discrete and *temporally*-structured events to fit pragmatic needs and projects (Moore, 1996). Yet it is the continuity of experience that is fundamental to process thinkers, as Rescher (1996, p.29) argues, “*the idea of discrete ‘events’ dissolves into a manifold of processes which themselves dissolve into further processes*”. Therefore, events of trust are investigated not as isolated entities but in relation to their predecessors; in this sense, the past is also part of the present (Langley and Tsoukas, 2010).

Moreover, just as the Heraclitan individual cannot step into the same river twice, experience is heterogeneous (Guerlac, 2006). This accords to the S-DL argument that the creation of value is not through the repeat production of ‘value-adding’ goods and services but through the integration of resources with actors in service ecosystems (Akaka, Vargo and Lusch, 2013; Vargo and Lusch, 2016), which involves endless reflexivity of previous service experiences and reproduction or transformation of these into the present (Edvardsson, Tronvoll and Gruber, 2011). Value is not an objective attribute but is constituted and reconstituted over time through representative, integrative and normative practices (Lusch and Vargo, 2014). The heterogeneity of experience points to what is necessary for investigating the *conditions* for trust and value, such as the constraining and enabling effects of structures and time.

In terms of human nature, this thesis combine the views of Giddens (1984) and Van de Ven and Lifschitz (2013) and claim that actors are knowledgeable and prudentially reasonable sense makers, who select appropriate choices in the light of collective norms of reasonable behaviour. At this point, this thesis tends to distance itself from

methodological individualism. For the thesis recognise the constraining and enabling effects of structures, unacknowledged conditions and unintended consequences.

To explore the value of trust requires looking into the dynamic process of trust development or erosion over time in which the value unfolds. Theorising trust in this way leads to a rethinking of the methodology of trust research, which will be discussed in the next section.

4.1.2 Qualitative approach

This thesis seeks an in-depth understanding of generative mechanisms for patterns in a social context, focuses on processes and concerns emergent issues. The philosophical position guides the research to a qualitative and process-based nature. Qualitative methodology offers a zooming-in opportunity for looking for mechanisms in a local situation, sorting out complexity and temporality dimensions of events and processes and showing loose sequences either through direct observation or retrospection (Miles and Huberman, 1994). Process theories, as mentioned (see 1.3.3 and 2.4), provide explanations in terms of temporal patterns, generative mechanisms and meanings of experiences and concerns interactions, multiple-level contexts, reflexivity and emergency instead of static states and structure (Weick, 1979; Mohr, 1982; Langley, 1999; Tsoukas and Chia, 2002; Van de Ven and Poole, 2005; Langley and Tsoukas, 2010), although it is recognised that empirical approaches to process vary (cf. Isabella, 1990; Pratt, Rockmann and Kaufmann, 2006; Bresman, 2013; Bruns, 2013; Swärd, 2016 and see Langley and Tsoukas, 2017).

In this vein, the thesis focuses on the dynamics of trust, interactions and unfolding value over time. As mentioned (see 2.4), in the context of construction, extant research on trust has mostly addressed the snapshots of trust either by using quantitatively-based surveys or cross-sectional case studies (exceptions can be found in Laan *et al.*, 2011 and Swärd, 2016). It is not uncommon that trust is treated as a taken-for-granted input of operations or an output of certain events or behaviour (e.g., Doloi, 2009; Chalker and Loosemore, 2016; Benítez-Ávila *et al.*, 2018). Although these studies contribute to rich insights into trust at any given moment, the dynamics of trust are deluded (Van de Ven and Ring, 2006). As Langley and Tsoukas (2017, p. 6) note,

However, because we segment the world and chronologically arrange our discrete experiences to fit whatever pragmatic needs we happen to have, it does not mean that what we apparently perceive is all there is.

Think of Zeno's arrow, as illustrated in Box 4.1. This thesis focuses on the process as generative mechanisms and conditions that bring about different degrees of trust and value. For, by doing so, the essence of trust can be unfolded.

Box 4.1 Zeno's Arrow Paradox

As described by Aristotle (Physics VI: 9, 239b5), Zeno's arrow paradox states that if a moving arrow, during any indivisible moment or instant of time, is at rest when it occupies an equal space and if it is always occupying such a space at any given instant, the moving arrow is motionless. Although contemporary physics theory well resolved the paradox, it is Aristotle's objection that is interesting here: "Time is not composed of indivisible nows any more than any other magnitude is composed of indivisibles" (Physics, VI: 9, 239b5). That a thing is static in a given moment does not mean it is static in any other moment.

Zeno's arrow paradox can be viewed as an analogy to snapshots-focused methods employed in extant trust research. We cannot obtain knowledge about a moving arrow, its speed, direction and height, given that we look only at an instantaneous photo of them. Similarly, we cannot obtain the essence of trust – that is, dynamics in the course of time – by snapshots-focused methods. An alternative way is to investigate the process, bringing about series of snapshots of the arrow as events. By doing so, the full picture of the moving arrow can be more or less captured (see Figure 3).

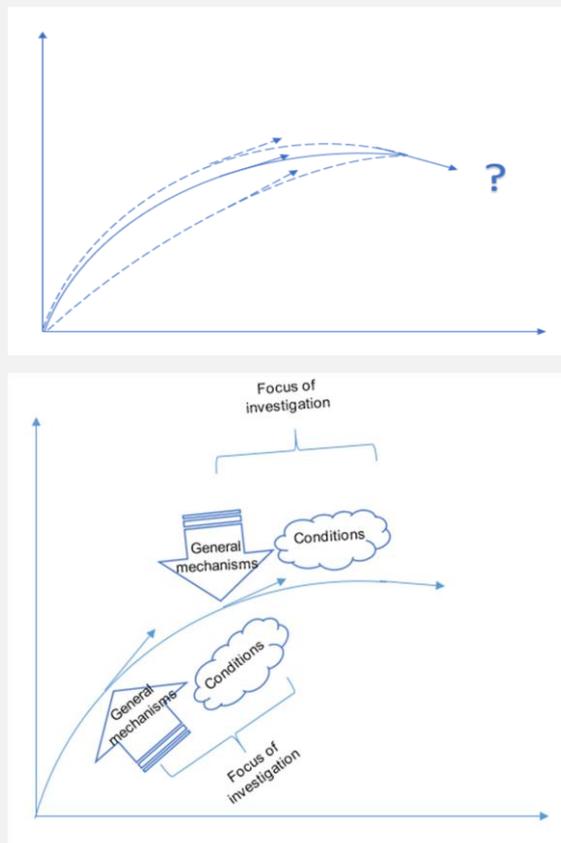


Figure 3 Zeno's arrow paradox and process-based research
Source: original

This thesis focuses on building a middle-range theory that “*involves abstractions... but they are close enough to observed data to be incorporated in propositions that permit empirical testing*” (Merton, 1968, p. 39). In this vein, a theory of trust in construction supply chains is built upon first answering queries grounded in specific contexts and then consolidating special answers into more general sets of concepts and mutually consistent propositions. Middle-range theories are not derived from a single all-embracing grand theory, although it is possible that once they are developed they are more consistent with one than another (Merton, 1968). The search for a middle-range theory has implications for the abductive logic across the research process and strategies of analysing the data. Abductive logic builds a technical account, the researchers’ categories, upon participants’ own language and meanings (Blaikie, 2007).

Specifically, the research started with existing theories and research, which led to the development of a conceptual framework that helped plan the study and design fieldwork. In the fieldwork and early stage of analysis, the thesis focused on the informants’ perceptions and experiences in service interactions. Description and explanation were grounded in and supported by informants’ own accounts. This stage of analysis sought to identify temporal patterns among activities and events (Langley, 1999; Langley and Tsoukas, 2010), answering questions such as ‘Who did this and when?’, ‘What was the participant’s perception of this experience or attitudes towards the other party?’ and ‘How were events ordered and related?’. While constructing the chronology of each case story, the author gave room to narratives of both main contractor and subcontractor organisations and interpreted the meanings of events and activities from both parties’ perspectives (cf. Buchanan and Dawson, 2007).

Meanwhile, initial empirical findings were found to be in accordance with structuration theory (Giddens, 1984). A theoretical framework based on structuration theory then emerged and was employed to build explanations for patterns of findings. At the later stage of analysis, the author related findings back to theories and existing knowledge in order to identify generative mechanisms to distinguish the thesis from spurious associations (Hedström and Swedberg, 1998; Langley and Tsoukas, 2010). It is notable that theoretical mechanisms and concepts, either used at the start or end of the study, were used as a general guideline that is subjective to revise (cf. Blumer, 1954; Langley, 1999). As suggested by Dubois and Gadde (2002a), the author remained open to the meanings of concepts that can give rise to and refined concepts according to empirical findings.

A “*temporary bracketing*” strategy was used throughout the analysis (Langley, 1999, p. 703) to decompose the time scale of cases into three successive stages. At the early stage of analysis, decomposition helped structure the description of events; at the latter stage, it enabled exploring and replicating theoretical ideas in successive time periods, analysing how changes from previous periods impact interactions and perceptions in current periods, and identifying theoretical mechanisms recurring over time (cf. Doz, 1996; Monin *et al.*, 2013; Stevens, MacDuffie and Helper, 2015; Swärd, 2016).

This research aims to achieve empathic neutrality, meaning that the author tried to avoid obvious and conscious bias in the research process while recognising that all research will be influenced by the researcher (Ritchie *et al.*, 2013). Based on this recognition, the author strived to be reflexive about the role and influence of one’s own beliefs and knowledge on the research and transparent about the potential sources of bias alongside procedural details of the study’s conduct.

4.1.3 Case study

“A case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident.”

(Yin, 2009, p. 18)

A case study approach is the primary method employed in this research. It provides opportunities for understanding the dynamics present within single settings (Eisenhardt, 1989). Case study is desirable for this study in that the study aims to explore trust dynamics and trust value in the on-going service interactions between main contractors and subcontractors in construction supply chains. Whether and how interactions between collectives of actors help trust development strongly depends on the context in which these relationships are embedded (Stevens, MacDuffie and Helper, 2015). Multiple case studies were used to compare and detect patterns across contexts, develop richer description and evidence, and hence advance knowledge by developing stronger theoretical constructions (Eisenhardt, 1989; Yin, 2009; Langley *et al.*, 2013). For case studies to serve to make analytical generation – that is, to compare previously developed theory with empirical results of the case study (Yin, 2009) – cases were purposively chosen because they represented particular features that allow for refinement of existing

theories (Dubois and Gadde, 2002a; Ritchie *et al.*, 2013). Case selection and data collection process are discussed in detail in the next section. This thesis mainly followed Yin (2009) to initiate a logical model of proof in the methods design to guide data collection and analysis, building explanations, and drawing inferences and conclusions. Specifically, a database was established that consists of a case study protocol, a topic guide, interview questions, data collected from fieldwork (interview records and transcripts, site notes, photos, project documents), frameworks and charts for case analysis, indexed transcripts and case reports.

4.2 Research process

This section will detail the research process, which consists of 1) the pilot case study, 2) the development of the case study protocol, topic guide and interview questions, 3) case selection, 4) data collection and 5) data analysis.

4.2.1 The pilot case study

Before selecting cases and collecting data, a pilot case study was conducted to refine the conceptual framework and help develop the case study protocol, the topic guide and interview questions. Another reason for carrying out the pilot case study was the easy access by a personal contact of the main contractor organisation. The case involved a five-year collaborative relationship between a main contractor, referred to herein as Road Ltd., and one of its supply chain partners, referred to herein as Communication Ltd. Road Ltd. and Communication Ltd. jointly delivered three consecutive highway projects from 2011 to 2016 and were about to complete the last project by the time of the study. The relationship improved over the five years and has been mentioned as an exemplar of collaborative relationships between Road Ltd. and their supply chain partners.

The case fitted the purpose of our study because the long-term, consistent and collaborative relationship enabled the author to identify the key features of the trust phenomenon as well as influential factors contributing to trust. Moreover, the near-completion project offered a full picture of the value of trust throughout the project lifecycle. The primary data collection method was semi-structured interview. Interviewees were project managers, quantity surveyors and operatives from both Road Ltd. and Communication Ltd. The author also obtained the contract between Road Ltd. and Communication Ltd. and archived project information published on the government

website by the client, herein referred as HA, which is a UK government agency. Additional data sources helped triangulate data for interviews. It is notable that the pilot case study is to help develop relevant lines of questions, rather than a rehearsal for the final data collection plan (Yin, 2009) or for developing pre-structured hypotheses to be tested (Dubois and Gadde, 2002a). The scope of the inquiry was therefore broader, and the findings were used to narrow the relevant interview topics and questions. Based on the conceptual framework, the pilot project was to identify:

- 1) Interactions attributing to trust;
- 2) Conditions for trust development;
- 3) The phenomenon of trust;
- 4) The value of trust for both main contractor and subcontractor

The context of the pilot case

The pilot case study, P1, involves an inter-organisational relationship in three highways construction projects in the northern region of England from 2011 to 2016 (see Table 4). The main contractor, Road Ltd., was a construction firm in the UK; the subcontractor, Communication Ltd., specialised in providing communication systems, traffic signs, signals, street lighting and associated civil engineering to construction projects. Specifically, for projects in P1, Communication Ltd. delivered communication systems, ducting and chambers, street lighting and footpath steps and guardrails.

Table 4 Case P1 overview

Project name	P1a	P1b	P1c
Start date	October 2011	January 2014	November 2013
End date	September 2013	March 2015	July 2016
Type	Highway major scheme	Highway pinch points improvement scheme ¹	Highway major scheme
Cost	£136 million	£20 million	£120 million
Overall project contents	1) Transforming the hard shoulder between five junctions into a temporary fourth lane for use during congestion periods; 2) Installing smart motorways technology 3) Creating emergency refuge areas	Installing: 1) Closed circuit television cameras (CCTV) 2) MIDAS automatic signalling traffic monitoring equipment 3) Variable message signs 4) Communication ducting	1) Transforming the hard shoulder into a permanent fourth lane for traffic; 2) Installing smart motorways technology
Specialist project contents	1) Communication systems; 2) Ducting and chambers; 3) Street lighting; 4) Footpath steps and guardrails.		

Case findings and topics

1. The phenomenon of trust

Road Ltd. perceived Communication Ltd. as capable of managing risks, and having openness, integrity and honesty. A predominant feature of the relationship between Road Ltd. and Communication Ltd. was the high degree of shared understanding of risks, mutual benefits, project requirements and each other's requirements. In return, trust increased the willingness to communicate, leading to more mutual understanding. Moreover, the case study found both parties behaved collaboratively to sustain the solidarity, reciprocity and equity of the relationship. Road Ltd. focused on the relational impacts of using contractual mechanisms, so contracts were rarely used to impose control. In this vein, trust was socially-oriented.

Under socially-oriented trust, Road Ltd. was more willing to share risks and benefits, "*We don't want to see our subcontractors lose. We don't want to lose either. Provided we were working together... then everybody has got the share*" (Quantity Surveyor, Road Ltd.). This was evident in the way Road Ltd. managed delays suffered by Communication Ltd.

¹ The pinch point programme is designed to deliver smaller scale improvements to the strategic road network that will help to stimulate growth in the local economy and relieve congestion and/or improve safety.

In delivering P1c, frequent changes of the overall project delayed Communication Ltd.'s operations. Under the New Engineering Contract 3 (NEC3) re-measured contract, changes needed the re-measurement of the quantities, formal procedures of communication and approval, which further delayed the process. To reduce Communication Ltd.'s burden of contract management and reduce the risk of delay, Road Ltd. changed the re-measured contract to cost reimbursable, which meant Road Ltd. reimbursed all costs occurred in Communication Ltd.'s works and relied on Communication Ltd.'s honesty and integrity to deliver on time while ensuring that the project stayed on budget. In other words, socially-oriented trust led to a sense of responsibility and tolerance of uncertainties in interactions. Findings related to the phenomenon of trust accorded to the conceptual framework that views trust from three dimensions, the perception of trustworthiness, the orientation of trust and trusting behaviour.

2. Interactions attributing to trust

The phenomenon of trust is found to be more emergent than purposely created. The perception of trustworthiness and social orientations emerged through learning during or after joint activities. The implication is that, instead of directly asking how trust is formed, investigating informants' perceptions and attitudes in joint activities can shed light on the phenomenon of trust. As for joint activities key to trust development, in P1, managing changes and risks immediately came to the fore. In risk workshops as well as during operations, Communication Ltd. tried to mitigate risks not only in its own contract but also in the overall project. Short-term programmes and resource plans were regularly planned and re-planned to adjust changes. These plans were agreed by both parties. For Road Ltd., implementing mutually-agreed programmes improved the effectiveness of the execution; for Communication Ltd., jointly developing programmes ensured fair payment and increased Road Ltd.'s understanding of their works. In other words, the value proposition was reciprocal to both parties even though the project contents frequently changed. When emergent changes occurred, Communication Ltd. was willing to increase resources for Road Ltd. The perception of competence and benevolence emerged in joint risk and change management, although it was not necessarily an intended consequence of such activities. Therefore, risk management and change management were recognised as two main subtopics under the topic of interaction process.

Apart from joint risk and change management, another joint activity was found unexpectedly. Road Ltd. offered various training opportunities for Communication Ltd. Whilst delivering Pla, Road Ltd.'s engineers introduced Communication Ltd.'s operatives to smart motorways technology and its installation. The knowledge gave Communication Ltd. an advantage over its competitors when tendering for projects P1b and P1c. From the perspective of Road Ltd., training Communication Ltd. and maintaining continuous collaboration made projects P1b and P1c more efficient. Road Ltd. also offered health and safety (H&S) courses that increased Communication Ltd.'s awareness of safety issues on site as well as the understanding of Road Ltd.'s requirements. Through these joint activities, Road Ltd. had more trust in Communication Ltd.'s capability of completing projects to the requirements. The provision of service was based on future business opportunities, which were secured by the collaborative agreement between the two parties. This pointed to two subtopics that required future investigation, the shadow of the future and supply chain management systems within main contractor organisations.

As stated in the first point, Road Ltd. and Communication Ltd. had good shared understanding of risks, mutual benefits, requirements and each other's priorities. Shared understanding can be attributed to the proactive communication of both parties. Apart from formal communication through project meetings, Road Ltd. valued supply chain partners' feedback on operations and management. An instance was in P1a when Road Ltd. assigned link managers to manage all subcontractors' works between two junctions. Subcontractors fed back that this practice led to inconsistent operations since they had to deal with different managers who might have different requirements and methods after completing a junction. The relationships built between subcontractors and link managers were also disrupted. Road Ltd. took the advice and assigned each subcontractor a package manager in project P1c as the boundary person between the two parties, which improved relationships and efficiency. Continuous communication reduced perceived risks, helped the emergence of common knowledge and strengthened ties between the two parties. Thus, communication, knowledge management and relationship management were identified as subtopics.

3. Conditions for trust development

The shadow of the past was found to form the first condition for trust development. The phenomenon of trust in P1c was mostly inherited from shared experiences in P1a and P1b. The shadow of the past furnished familiarity between actors as they repeatedly

interacted with each other and security in operations as service processes became routines. Routines reproduced and hence consolidated the collaborative way of managing projects.

Collaborative procurement increased the involvement of the client, which positively influenced the relationship and trust. The client initiated a common system and an open project account to mitigate issues such as main contractor holding-up payment and facilitate information flow within projects. These practices increased Communication Ltd.'s sense of security and willingness to cooperate. Further, the involvement of the client helped balance the power relations between Road Ltd. and Communication Ltd., which offered the perception of fairness between the two parties. In short, findings pointed to the significance of the shadow of the past and procurement route.

4. The value of trust for both main contractor and subcontractor

In the process of service provision, trust first encouraged service communication between Road Ltd. and Communication Ltd. Contractual mechanisms were rarely used; both parties relied on their relationships at the individual level and organisational level to manage emergent changes. Both parties were able to react to changes quickly and spontaneously and deal with changes in a collaborative way. By working in the phenomenon of trust, actors perceived a sense of pride when they achieved the common goal. In terms of service outcomes, the project was delivered on time and within budget, despite the contract change. Both parties gained reputation and market status through the five-year collaboration and expected continuous business through their collaborative arrangements.

Implications for the research

Concepts derived from the pilot case study were employed to create a reference point and were treated as a guideline for the remaining data collection (Dubois and Gadde, 2002a). The pilot case study shed light on the primary topics and subtopics below:

- (1) Interaction process: risk management, change management, communication, routines and other joint activities;
- (2) Structures: procurement, organisation systems (e.g., knowledge management, relationship management, supply chain management), the shadow of the past and the shadow of the future;

- (3) The phenomenon of trust: the perception of trustworthiness, the orientation of trust and trusting behaviour (e.g., taking responsibility, risk sharing);
- (4) The value of trust: service experience (e.g., pride), service provision (e.g., communication, adaptability of service) and service outcomes.

Despite the rich findings, the one-shot case study lacked the power to explore the process of trust development and the unfolding value in service interactions. This points to the significance of multiple-wave data collection in the lifecycle of projects.

4.2.2 The development of the case study protocol, topic guide and interview questions

This research used a case study protocol and topic guide to keep coherence of data collection and analysis among the different cases (Yin, 2009; Ritchie *et al.*, 2013). After the pilot case study, the case study protocol was developed (Appendix I), which consists of six parts, research introduction, data collection procedures, outline of case study report, interview topic guide, interview questions and participant information sheet. The topic guide listed the key themes to be explored in interviews.

4.2.3 Case selection

A case study method serves to make analytical generation – that is, to compare previously developed theory with empirical results of the case study (Yin, 2009). Cases need to be purposively chosen to represent particular features that allow for refinement of existing theories (Dubois and Gadde, 2002a; Ritchie *et al.*, 2013). Process-based studies have investigated trust development in projects by focusing on the interplay of trust and various relational factors (e.g., prior ties in Buvik and Rolfsen, 2015; reciprocity in Swärd, 2016), but how collectives of actors interact and develop trust in multilevel service ecosystems (Grabher, 2002; Manning, 2008) remains under-researched. Therefore, cases varied by structure of service ecosystems. The UK construction industry serves as the empirical field; therefore, cases were under the same conditions at the level of organisational fields. At the inter-organisational networks and organisation levels, the pilot case study pointed to the significance of procurement routes and organisational systems. To conduct a process-based study and compare trust development over time, projects of the chosen cases should be at the stage of procurement and have similar durations. The unit of

analysis is the inter-organisation relationship between main contractors and second-tier subcontractors. Primary case selection criteria were:

- (1) The chosen cases differ in terms of the procurement route of the overall project;
- (2) The chosen cases differ in terms of organisation systems;
- (3) The subcontracted projects in the chosen cases are at the stage of procurement;
- (4) The subcontracted projects in the chosen cases have similar durations.

After the first-round screening and initial contact with construction firms, the author found that it was rather difficult to obtain access to projects at the procurement stage. This was because it was uncertain which subcontractor could secure the project. A further consideration was the time constraint of this research programme. Therefore, the last two criteria were revised:

- (3) The subcontracted projects in the chosen cases are about to start or have just started the execution;
- (4) The subcontracted projects in the chosen cases have a similar execution duration, ideally four to six months.

Three cases were eventually selected (see Table 5).

Table 5 Case overview

	Alpha	Beta	Gamma
Context	Surfacing for a highway improvement project	Piling for an office building project	Piling for a multiple-use building project
Main contractor	Road Ltd.	Office Plc.	Build Gamma
Subcontractor	Surface Ltd.	Found Gamma	Found Gamma
Procurement route	Collaborative framework procurement: long-term collaboration	Competitive procurement	Two-stage procurement: one-time collaboration
Organisation systems	Independent systems	Independent systems	Shared systems: belonging to the same parent organisation
Subcontract procurement	Limited bid invitation	Limited bid invitation	Limited bid invitation
Execution duration	5 months	7 months	6 months
Main contract	NEC3 Target cost	JCT ² 2011 lump sum	JCT 2011 Pre-Construction Agreement (PCA)
Subcontract	NEC3 Re-measured	JCT 2011 lump sum (changed to remeasured during execution)	JCT 2011 lump sum

4.2.4 Data collection

To investigate the sequence and flow of events and understand processes in the course of time, data collection involved three waves of semi-structured interviews at the procurement/preconstruction, execution and completion stages of the subcontracted project, in order to capture both historic and contemporary processes and track changes in small steps (Pettigrew, 1990). By doing so, the author gathered data about past experiences that dated back to five years ago as well as on-going experiences in present projects. Conducting repeated, multiple-wave interviews also mitigates the possibility of bias due to incomplete, misinterpreted and mistakenly reported memories (Saldaña, 2003). To capture a more detailed and balanced picture of the phenomenon, during each visit, the author interviewed informants from different functional units and hierarchical levels of both main contractors and subcontractors. To examine changes, the author tried to interview the same informants in multiple visits, but, due to the handover of the project from the procurement or bid teams to project teams and redistribution of staff, some informants were substituted by others with similar roles. For instance, due to the handover of the project from the procurement or bid team to the project team, the bid manager and

² Joint Contracts Tribunal

supply chain manager were substituted by project directors. Table 6 lists roles of interviewees. Figure 4 illustrates the chronology of case studies.

The unit of analysis was inter-organisational relationships between main contractors and subcontractors. Interview questions were therefore designed to ask informants' views on *own organisation and the other organisation*, such as practices of own organisation, interactions between the two organisations, and attitudes towards the other organisation. Individual views and attitudes were aggregated to form collective views and attitudes representing their organisations.

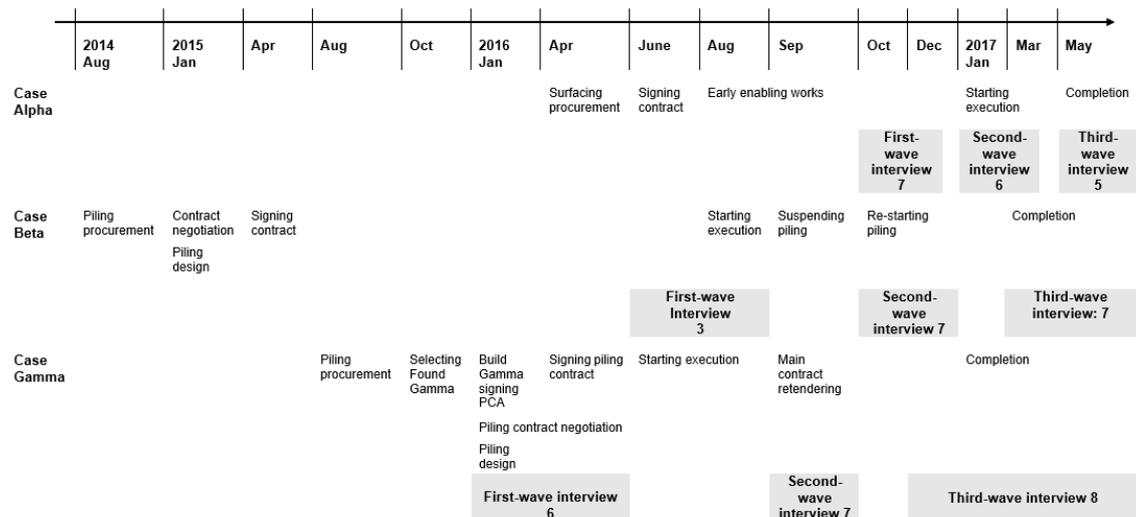


Figure 4 The chronology of the case studies

In total, 71 semi-structured interviews were conducted, comprising six interviews for the pilot case study, 56 for the three case studies and nine for general organisation information such as organisation systems and management approaches. The average interview time was 45 minutes. While the length and focus of the interviews varied, they were all guided by a research protocol with interview topics and questions. The author was flexible in relation to detailed interview questions to allow for identifying and exploring emergent findings.

Table 6 Interview information

Interviewee roles	Alpha	Beta	Gamma
Managing project programmes, incl. bid manager, project director, supply chain manager, operations director	5	6	7
Project operatives, incl. project manager, project engineer, site agent, supervisor, project planner	7	7	10
Commercial, incl. commercial manager, quantity surveyors	6	4	4
Interview numbers	18	17	21

Apart from interviews, the author gathered archival material published online by clients to help build a sequence of events. The author also attempted to obtain contracts between main contractors and subcontractors, which did not receive responses. Interview data were supplemented by non-participant observation during site visits. In case Alpha, the site agent of Road Ltd. invited the author to participate in their first pre-start meeting with Surface Ltd. The author also asked subcontracts in all three cases but did not receive a positive response. In summary, our methods design follows the four tests illustrated in Yin (2009, p. 41) to ensure the validity and reliability of the case study (Table 7).

Table 7 Case study validity and reliability

Validity and Reliability	Case study tactic in this research
Construct validity	Multiple-wave data collection Dyadic interview with both main contractors and subcontractors Interviewees with diverse roles and at different hierarchical levels Chain of evidence
Internal validity	Pattern matching between theoretical mechanisms and empirical findings Explanation building
External validity	Conceptual and theoretical frameworks
Reliability	Case study protocol Interview topic guide Case study database

Source: adapted from Yin (2009, p. 41)

4.2.5 Data analysis

All interviews were recorded and transcribed by the author. Transcription was stored and managed through MAXQDA 12. Data analysis was conducted in four steps. The first step was constructing chronological histories of the cases, based on themes and events expressed in interviews as well as the online archival material of projects (Langley, 1999;

Van de Ven and Poole, 2005). The focus was on what two organisations did in interactions, and informants' interpretations of events, progress and performance.

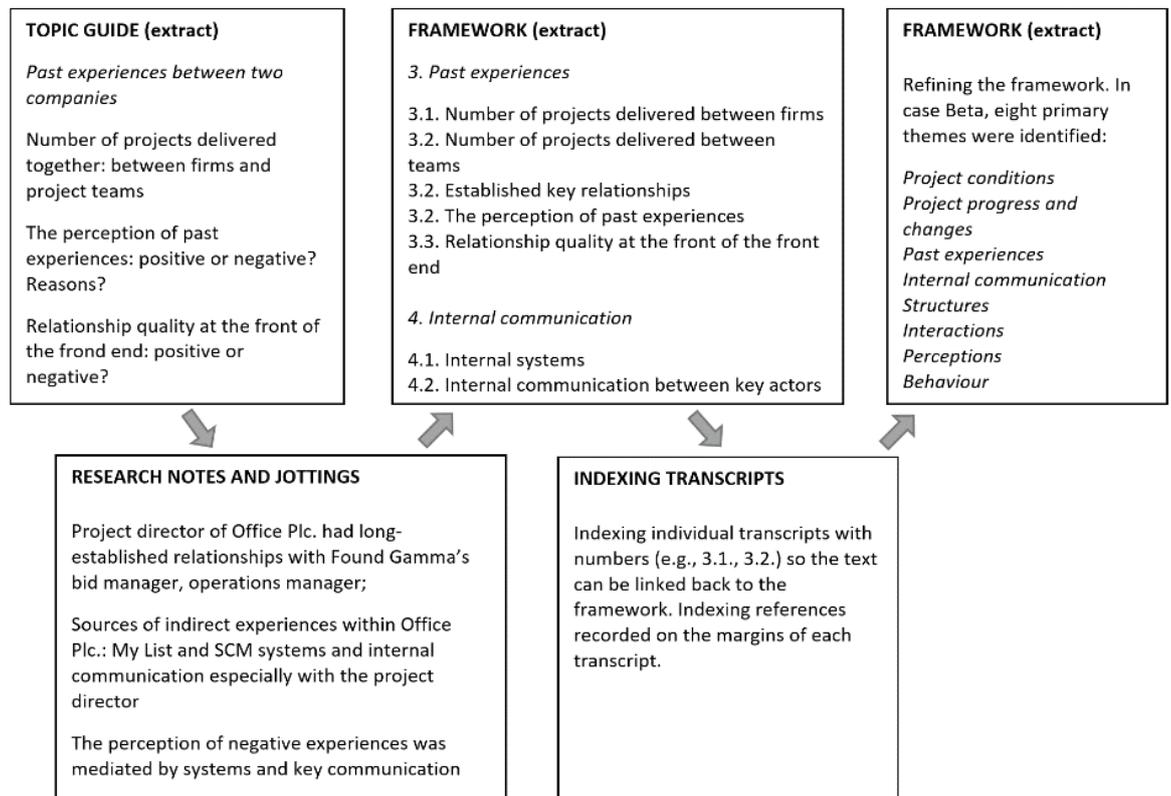


Figure 5 Development of a thematic framework (adapted from Ritchie and Spencer, 2002, p. 181)

A framework analysis approach (Ritchie and Spencer, 2002; Ritchie *et al.*, 2013) was then used to uncover processes of interactions that influenced trust development at different stages of project. The development of the framework was illustrated in Figure 5. A framework was developed for each case. The first framework version drew upon the interview topic guide but also on the first round of analysis (e.g. 'Internal communication' in Figure 5). The framework was then applied to the interview data in its textual form, during which new themes emerged and enriched the framework. All interview transcripts were indexed with numbers that linked back to themes. The framework consisted of themes within which the material can be sifted and sorted.

After indexing individual transcripts, data were lifted from the original context and rearranged in charts (Figure 6). The author then began to pull together the data and interpret the data set as a whole. Indexing and sorting data were facilitated by MAXQDA 12.

CHART 4. INTERNAL COMMUNICATION (extract)				
OFFICE PLC.			STAGE: PROCUREMENT	
	4.1 Internal systems		4.2 Internal communication	
Project director (extract)	‘We have a preferred supply chain. We have people that we have vetted, [and] we are ok to use. Although they have to tender it, from a financial point of view, they’ve got capability, H&S, to carry out the work we need. So, it follows this process to answer that supply chain.’	Learning from the past through My List and SCM systems Infor. from the past +Perceived competence	‘And I did a discussion with our MD at the time. And we went on previously from a job that ... [Found Gamma] have done, which is gone well as well.’	Learning from the past through internal communication Firm level perception influenced by key actor’s experiences +Perceived trustworthiness

Figure 6 An extract from the charts

The author tried to identify and trace three types of interaction, from the lens of structuration theory (Giddens, 1984), which will be introduced in Chapter 5. The first was interaction processes that stimulated the perception of trustworthiness. The second type was processes that drove the use of trust relations to allocate and integrate resources in organising projects. The last type of interactions helped form the normative practices that collectives of actors behaved trustworthily and were willing to maintain the relationship with each other. We studied the phenomenon of trust from three dimensions, main contractors’ perception of subcontractors’ trustworthiness (competence and intention trust), orientations of collaborating with subcontractors (self-interested and socially-oriented trust) and the behavioral manifestation of trust. The value of trust was examined through benefits from service provision and outcomes, as perceived by both main contractors and subcontractors. Up to this point, various interaction processes that developed or eroded trust, phenomenon of trust and the value of trust at different stages of respective cases were identified as first-order concepts (Gioia, Corley and Hamilton, 2013).

Lastly, the thesis used the chronological stories to conduct cross-case analysis and found recurrent situations and perceptions as well as differences between two cases. The process of systematically combining patterns with the literature was iterative where empirical findings directed attention to theories and vice versa (Dubois and Gadde, 2002a). Through this process, the author identified patterns among the concepts that lead to second-order themes that represented theoretical concepts at a more abstract level (Gioia, Corley and Hamilton, 2013; Ritchie *et al.*, 2013). Further analysis of the interplay between these

second-order themes over time revealed a model for understanding trust development and value in construction supply chain relationships under different structural conditions.

The research process was itself dynamic as the theoretical framework emerged at the early stage of data analysis. Before starting the case study analysis, Chapter 5 will introduce the framework and its underpinning theory, structuration theory (Giddens, 1984). The framework provided the analytical tool of interpreting data and building theoretical explanations.

Chapter 5 Structuration theory and the theoretical framework

The focus of dynamics of trust, the interplay of interaction and structures, and unfolding value requires more open and reflexive management and organisation theories. Whereas Luhmann (1995)'s systems theory has shaped our conceptualisation of trust, particularly the function of trust in the face of complexity, the theory's predominant focus on the level of systems, or macro-level offers few explanations for the process at meso- and micro-levels. On the other hand, social network theorists construct the social reality at the level of structures, leaving the process of actors constituting their networks obscure (cf. White, 1992). It is Giddens (1984)'s structuration theory that offered useful explanations for initial data patterns.

Structuration theory concerns knowledgeable actors in the more or less autonomous dynamics of a social system that influences actors' choices in more than just a very selective fashion (Staber and Sydow, 2002; Manning, 2008; Sydow and Braun, 2017). Based on structuration theory, a theoretical framework emerged and offered theoretical mechanisms for analysing, interpreting and explaining empirical data. As mentioned, the theoretical framework was also subjective to revise. The interplay of data and theories has led to the refined framework, which will be discussed in Chapter 10.

This chapter first introduces structuration theory (Giddens, 1984), particularly in context of construction projects and supply chains and service ecosystems. The discussion provides a synthetic picture and forms the theoretical framework of this thesis.

5.1 Theoretical framing

Giddens' structuration theory is part of a group of theories that stresses the interrelation of structure and agency (e.g., Bourdieu, 1977; Archer, 1996; Sayer, 2000). The concept of 'structuration', in Giddens' sense, involves "*the structuring of social relations across time and space, in virtue of the duality of structure*" (Giddens, 1984, p. 376). The main argument of his structuration perspective is that knowledgeable actors are capable of producing and reproducing social structures and continue to do so through the flow of interactions that are enabled and constrained by social structures (Sydow and Staber, 2002). Berends, Boersma and Weggeman (2003, p. 1041) state that structuration is "*the*

construction and reconstruction of structure by the interaction of knowledgeable actors.”

Structuration highlights that knowledge is distributive in nature and exists within a larger social context, in that organisational members share only a portion of available knowledge (Berends, Boersma and Weggeman, 2003). This points to the significance of relationships in the service exchange and can shed light on a relational approach in construction project and supply chain management.

A lot of literature on project management, including construction project management, emphasises technical-efficiency and takes a static and contingency perspective assuming that there is one best organisational form in response to particular conditions. Such particular conditions are viewed as given and the management of projects is implemented rationally and intentionally. More recent approaches (e.g., information processing and relational approaches) have focused on systemic character and relational aspects of project organisations, taking into account project ecologies, organising processes, learning, sensemaking, culture, norms, knowledge and dynamic capabilities (Manning, 2008; Smyth, Gustafsson and Ganskau, 2010; Kusuma, 2014; Bygballe, Swärd and Vaagaasar, 2016; Davies, Dodgson and Gann, 2016; Swärd, 2016; Sydow and Braun, 2017). These studies come closer to capturing relations and conflicts within and beyond projects and associating project organisations with a timeline and multiple contexts including business context but also social systems. Despite the rich insights into the management of projects, few address the simultaneous and mutual influences of structure and action, in particular the context of construction projects and supply chains.

In this section, the interplay of structure and agency will be examined by reviewing key concepts of the thesis from the lens of structuration theory.

5.1.1 Structures and service ecosystems

In structuration theory, social phenomena are constituted by the interaction between structure and agency. Social structures and individual actors are inseparable.

Structure is not ‘external’ to individuals: as memory traces, and as instantiated in social practices, it is in a certain sense more ‘internal’ than exterior to their activities.

(Giddens, 1984, p. 25)

For Giddens, structures are empirically unobservable rules and resources and exist in memory traces and social practices. While structures can enable and constrain actions, they are sustained, reinforced and, in some cases, changed by actors' interactions. Knowledgeable actors draw on rules and resources embedded in structures to build relationships, organise projects, exchange service and co-create value and possess the capability of ignoring, replacing or recreating rules and resources in ways that differ from the original (Manning, 2008). Structure is endogenous to individual actors, *“is what gives form and shape to social life, but it is not itself that form and shape”* (Pozzebon, 2004, p. 253).

Above conception of structure is the duality of structure, a central message of Giddens' theory of structuration, as illustrated in Figure 7.

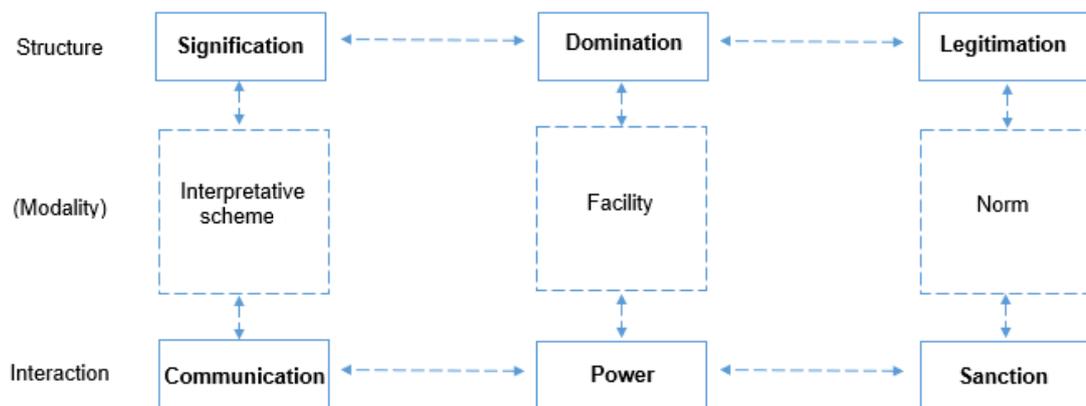


Figure 7 The duality of structure (reproduced from Giddens, 1984, p. 29)

The theorem of the duality of structure consists of two dimensions, the dimension of structure and the dimension of action. Structures of signification are rules that enable and constrain actors' sensemaking of the context they are placed and communicating of meanings created and emerged in the context (Staber and Sydow, 2002). In construction project businesses, rules of signification are embedded in formal contracts, agreements, organisation policies and project requirements that lend meaning to actors. Structures of legitimation are rules that legitimise behaviour and actions, namely what and how actors should do in a particular context (Staber and Sydow, 2002). For instance, organisational cultural programmes guide how actors should act in organisations.

Structures of domination are means of production that actors use to actualise their purposes, which take two forms (Giddens, 1984). First, structures of domination involve

the distribution of allocative or material resources, the free market being one example (Edvardsson, Skålén and Tronvoll, 2015). Second, structures of domination involve the use of authoritative resources, which are embedded in hierarchical relationships but also trust-based relationships. Structures of domination furnish actors with power that can be mobilised to realise their own interests. However, the actual mobilisation of power depends on agency as well as rules of signification and legitimation. Conversely, structures of domination can shape norms of conduct and actors' interpretations (Sydow and Windeler, 1998). The client's market power enables their requirements (mobilisation of power) normally influence supply chains' conduct perceived as legitimate and interpretation of what is value.

Structures equip actors with rules and resources that they integrate in order to co-produce core offerings and value propositions, exchange service and co-create value; in doing so, they form dynamic service ecosystems of resource-integrating actors connected by shared institutional structures (Grönroos, 2008; Chandler and Vargo, 2011; Akaka, Vargo and Lusch, 2013; Frow *et al.*, 2014; Vargo and Lusch, 2016). Therefore, the continuity of service ecosystems relies on the production and reproduction of structures in order to support value co-creating processes.

5.1.2 Agency and service interactions

The duality structure has the dimension of action that shapes practices as observable expressions of structures. Rules and resources in the institutional, social and organisational environment constrain and enable practices in interactions. Knowledgeable actors, on the other hand, are capable of choosing among multiple rules and resources to communicate meanings, deploy power and invoke sanctions, which might also modify original rules and resources (Giddens, 1984). The implications for trust theories is that although trust in the reliability of systems lays a good foundation for trust in actors embedded in systems, it is acknowledged that actors can act otherwise, which calls for interactions to sustain, develop or reduce trust. In structuration theory, agency refers not to intentions or motivations within individuals, but to their capability of acting otherwise (Giddens, 1984). Actors do draw upon pre-existing rules and resources to act, thus reproducing structures. But they are first knowledgeable of pre-existing rules and powerful of using resources to reproduce or transform their setting through flows of actions (Manning, 2008). Relating to service-dominant logic (S-DL), actors can be

understood as knowledgeable and capable of exerting themselves structurally and interacting creatively in order to co-create value in the given context (Edvardsson, Tronvoll and Gruber, 2011).

Furthermore, the continuity of flows of actions relies on reflexive monitoring. That is to say, understanding the conditions of system reproduction becomes part of those conditions of system reproduction as such. Giddens (1984) differentiated reflexive monitoring from rationalisation of action. The latter refers to actors' capability of giving reasons for their actions such that if asked by others they can explain their actions. Reflexive monitoring refers to the intentional character of human behaviour with regard to the flow of activity of the actor. Reflexive monitoring operates largely in practical consciousness that consists of tacit and practical knowledge without being able to discursively explain (Giddens, 1984).

The flow of action continually produces consequences which are unintended by actors, and these unintended consequences also may form unacknowledged conditions of action in a feedback fashion. Human history is created by intentional activities but is not an intended project; it persistently eludes efforts to bring it under conscious direction.

(Giddens, 1984, p. 27)

Therefore, in structuration theory, service interactions as one type of social interactions have a dual nature. They are purposive and emergent (Edvardsson, Skålen and Tronvoll, 2015). In both cases, they feed back into systems to form conditions for future service, hence either reproducing or modifying properties of structures. It also relies upon the actors to use the systems in effective ways. In this way, how actors use the systems and develop their interactions can improve over time.

5.1.3 Recursiveness of value co-creation in service ecosystems

It has been argued that value co-creation in construction supply chains is a function of core offerings and value propositions and of purposive resource integration (see 3.2.3). From the lens of structuration theory, to understand the recursiveness, or continuity of value co-creation needs to examine it within multilevel service ecosystems. Both co-production of core offerings and value propositions and resource integration to use service

are actor driven. For it is through actors that value propositions and core offerings are developed, resource are integrated, and value is co-created in service ecosystems. Zooming out, actors refer to structures of signification, legitimation and domination at different levels of service ecosystems to gain rules and resources for value co-creating activities; in doing so, they recreate structures of rules and resources.

On the other hand, the recursiveness of value co-creation relies on the interrelationships between the three dimensions of structure and the three dimensions of action. The concept of resource needs notion here. As mentioned (see 3.2.2), S-DL conceptualises operand and operant resources and recognises the dynamic aspect of resources in relation to actions; resources are *not* but rather they *become* (Zimmermann, 1951). Structuration theory emphasises the *control* of resources, which is similar to, but does not resemble, the notion of ‘resource becoming’ in S-DL (Edvardsson, Skålén and Tronvoll, 2015). As implicitly mentioned in previous subsection, Giddens (1984) distinguishes two types of resources, authoritative resources to coordinate human activities and allocative resources to control material goods and services. Structuration therefore can be viewed as a process in which 1) the availability of resources can be either authoritative or economic and 2) access to resources is governed by rules of signification and legitimation of particular systems (Edvardsson, Skålén and Tronvoll, 2015). Hence, to continuously draw on resources for value co-creation, actors need to have shared understanding of meanings and norms in context in order to communicate and conduct in a collectively-accepted way.

In summary, the recursiveness of value co-creation in service ecosystems rely on the duality of structure (illustrated as vertical arrows in Figure 7) and interrelations between three dimensions of structure and of action (illustrated as horizontal arrows in Figure 7). Trust is of importance for both categories as will be explained in next section.

5.2 Synthesis: the theoretical framework

Based on literature review on structuration theory, S-DL and trust theories, this section provides a synthetic picture of the theoretical framework of this thesis.

Trust is fundamental to relationships and can be viewed as a structural property of relationship systems (Powell, 1990; Sydow, 1998; Smyth, Gustafsson and Ganskau, 2010). In the theorem of the duality of structure, generating trust is to raise the perception

of trustworthiness (interpretative rule), use trust relations to allocate resources (facility of resources) and legitimate relational norms that constrain opportunism and encourage trusting and trustworthy behaviour (normative rule). This occurs in the dimension of action. In service interactions, frequent and open communication, effective and efficient resource mobilisation and collectively-accepted conduct may attribute to the perception of trustworthiness in terms of competence and intentions. Using trust relations to allocate and integrate resources may arise from perceived trustworthiness, service efficiency or equitable service exchange in terms of the process and outcomes. The recursive patterns of trusting and trustworthy behaviour may generate norms in day-to-day interactions (Macneil, 1980) between main contractors and subcontractors, which, in turn, legitimate patterns of trust-based behaviour. Experiences from past and expectations on future relationships may also influence the way of interaction, hence trust. Apart from interaction processes, rules and resources from projects, organisations, inter-organisational networks and organisational fields form structural conditions for interactions that may develop or erode trust. Experiential and reflexive learning ensures the reproduction and transformation of trust in service interactions. The phenomenon of trust, in terms of trust perceptions (competence trust and intention trust), orientations (self-interested trust and socially-oriented trust) and trusting behaviour, is consequently constituted.

Service manifests itself within and among relational processes and the co-creation of value might be intensified with trust (Fyrberg and Jürjado, 2009; Makkonen and Olkkonen, 2017). Exchange relations in essence are “*overlaid with social content that carries strong expectations of trust and abstention from opportunism*” (Granovetter, 1985, p. 490). In the theorem of the duality of structure, trust as rules of signification and legitimation and authoritative resource of domination may improve service experiences by enhancing service communication, facilitating resource allocation and stabilising relationships in relational risks (Sydow, 1998). As such, project actors may perceive better service experiences that enable them to achieve higher performance as service outcomes. For project businesses, meso-level service interactions with supply chains may occur at the project level, organisation level or both. Good service experiences and performance at the project level may also induce future business and long-term relationships at the organisation level and social recognition and reputation at the inter-organisational networks level, hence a ‘bottom-up’ structuration process.

Apart from the perspective of duality (vertical relations between structure and action), trust can affect collaboration and value co-creation through interactions between the three elements of structure and of action (horizontal relations between elements). The perception of trustworthiness and relational norms may influence the way of mobilising power in resource integration. Conversely, trust as an authoritative resource of domination may shape actors' interpretations and norms of conduct in value co-creation.

Trust, according to structuration theory and S-DL, is as much an outcome as a medium of collaboration and value co-creation.

5.3 Summary

The theoretical framework provides an analytical lens of investigating how trust develops and unfolds value in service ecosystems. The recursiveness of trust and value co-creation can be understood from the theorem of duality (top-down and bottom-up processes) and the interrelations between elements of structure dimension and action dimension.

Chapter 6, 7, 8 and 9 will use the framework to analyse empirical data from the case study.

Chapter 6 Case Alpha

Case Alpha tells the story of an inter-organisational relationship between Road Ltd. and its surfacing contractor, referred to herein as Surface Ltd., in a highway construction project.

6.1 Project overview

Alpha was a highways improvement scheme costing £7 million, which aimed to mitigate queuing and congestion due to increase in traffic levels from local housing and business growth, improve road safety and help create opportunities for local development. The project widened the road to include additional lanes in approaches from different directions to a roundabout and increase the size of the roundabout controlled by traffic signals. The overall project began in January 2016 and was completed in May 2017. Surfacing was the largest specialist package in the project, and it consisted of two phases. The first phase included widening the road and the roundabout, profile planing³ the roundabout, and laying the binder course onto the roundabout and roads to the roundabout. The second phase was to lay the surface course onto the roads to the roundabout, which was also the completion of project Alpha.

2016 Jan	Apr	June	Aug	Oct	Dec	2017 Jan	Feb	Mar	Apr	May
Main contract procurement	Signing main contract	Signing surfacing contract	Early enabling works		Completing early enabling works	Starting 1 st phase execution	Binder course change	Starting 2 nd phase	Early warning	Completion
Surface Ltd. early involvement	Surfacing procurement					Defect repair	Profile planing change		Joint building claim	

Figure 8 The process and events of project Alpha

This chapter particularly concerns the Alpha surfacing project, which was delivered by Road Ltd. as the main contractor and Surface Ltd. as the surfacing subcontractor. The process and main events are illustrated above in Figure 8.

³ Profile planing, also called cold planning or profiling, is the process of removing at least part of the existing surface prior to application of a new surface course. The aim is to improve the shape of an existing road (Mineral Products Association, 2009).

6.2 Service ecosystems

6.2.1 Project participants

Road Ltd. was a UK construction company and had businesses across various sectors such as highways, aviation and energy. Case Alpha involved the highways sector of Road Ltd. For pinch point programmes, which were designed to deliver smaller-scale improvements to highways, Road Ltd. had a project manager to manage a programme of projects. At the project level, Road Ltd. directly employed most of the on-site operatives including a site agent managing the project, quantity surveyor, engineers, supervisors and foremen. Direct employment of operatives enabled Road Ltd. to closely engage with supply chains at the project level.

Surface Ltd. was an independent surfacing company operating nationally in the UK and delivered in sectors such as highways, airports and defence. Surface Ltd. divided its organisation into different geographic branches; each branch had a general manager and functional managers such as commercial manager and operations manager as the management team responsible for all projects in the local area. At the project level, a supervisor managed the site team to deliver construction works. Alpha was one of the projects delivered by Surface Ltd.'s West Midlands branch. The West Midlands branch was newly initiated to expand businesses across the Midlands and North.

The client, HA, is a UK government agency charged with operating, maintaining and improving motorways and roads in England.

6.2.2 Structures

Procurement systems

To achieve the best value for highways projects, HA proposed a series of procurement and supply chain strategies and then procured different collaborative procurement frameworks for different types of motorway and road construction projects. A limited number of appointed main contractors were then able to bid on projects within the framework. The framework ensured a relatively stable load of jobs for main contractors. More importantly, it increased the main contractors' confidence to collaboratively manage supply chains, at least in a similar way to HA, which was the case of Road Ltd., as discussed in the next subsection. From the perspective of the supply chains, main

contractors having a long-term relational contract with the client may be perceived as more reliable.

Each project within the framework was under the adapted form of New Engineering Contract 3 (NEC3) Main Option C, target cost with activity schedule together with relevant percentages and rates. The completion price was compared to the target price, usually adjusted due to compensation events. HA and the main contractors shared the gain from saving or the pain from overspending. Incentive payment promoted cooperation and shared intention to meet the target. However, the effect is not automatic; it depends on how realistic the target is and the agency of the actors. The collaborative framework also extended to supply chains to some extent. The framework required NEC3 as the standard form of subcontracts; yet the specific option was decided by the main contractors. HA initiated open accounts with contractors and supply chains within projects and they could monitor the payment from main contractors to supply chains. Open account mitigates opportunistic behaviour towards supply chains, particularly late payment, and increases client involvement in projects. The latter can influence relationships between main contractors and subcontractors.

Asset support framework (ASF) was one of the procurement routes under HA collaborative strategies and was used for road improvement projects with relatively small value⁴. Road Ltd. was one of the companies appointed to the ASF, which enabled Road Ltd. to secure the main contract of project Alpha.

The surfacing contract was under NEC3 Main Option B, remeasurement of bill of quantities. Under Main Option B, Surface Ltd. was paid for the actual quantity of work carried out at the rates in the bill of quantities, meaning that Road Ltd. took on the risk of cost increase as any inaccuracies in the bill of quantities would be corrected through remeasurement. Remeasured contract and open account increased the supply chain's sense of security, which is key to inducing trustworthiness. On the other hand, in this scenario supply chain partner might lack the incentive to increase efficiency and achieve the target price of the main contractor, which calls for efforts to motivate the supply chain to meet the agreed price.

⁴ Generally with value <£20 million (The National Archives)

Organisational systems

Road Ltd. categorised their subcontractors and suppliers into four tiers based on criteria such as organisational values and visions, health and safety (H&S), welfare and wellbeing, quality, environment and financial status. Subcontractors and suppliers were also assessed against these criteria post completion. Supply chain management was supported by information and communication systems. Tier-one suppliers were awarded strategic agreements with planning works for three or four years ahead and expected to help research, develop the main bid and value engineering at the front end, and swiftly adapt to changes during execution. Specialist subcontractors were selected from shortlisted supply chain partners by a procurer from the business development department, the project manager and site agent. The strategic agreement and long-term relationship gave Road Ltd. confidence in sharing risks with the supply chain. According to Road Ltd.'s project manager:

...we haven't tiered much risk down to the subcontractor, which is why we all need confidence in them delivering, I suppose. We don't want to get to the situation where we are pursuing a large amount of money from subcontractors. They are usually small companies. We try not to put them in that situation.

From the perspective of supply chains, the main contractor refraining from imposing risks induces perceived reliability and being burdened with fewer risks furnishes a sense of security. Both elements are conducive to trustworthy behaviour.

The collaborative framework of HA and the strategic framework of Road Ltd., working together, made the continuity of supply chain relationships possible. Reliability and continuity increased the supply chain's commitment to the relationship and motivation towards learning for the future and investing in the relationship. From the perspective of the main contractor, the supply chain's commitment expanded their resource base and can increase their competence in the market. This way of managing relationships is closely aligned with management approaches taking the perspective of transaction cost theory.

Surface Ltd. was expanding its market in the Midlands area, meaning that building relationships and obtaining repeat businesses was especially important for the company. This was evident in the 'can do' ethos that Surface Ltd. was oriented to satisfying the

main contractors' requirements by maximising operational flexibility. However, this way of organising projects and building relationships was largely reactive from the perspective of Surface Ltd., as mentioned by the general manager:

We do react, like, very flexibly and probably our biggest problem is that we don't say "no" enough... it is hard to guarantee continuation, continuous resources, allocation of resources. Because you are just reacting and trying to fit the pieces... considering what it needs to be really.

The "can do" ethos in essence was to maximise economic value at the expense of resource continuity and integrity that was vital to developing trust and relationships.

Surface Ltd. regarded Road Ltd. as the key client in the Midlands region because it was one of the main contractors under collaborative frameworks with HA and the strategic framework brought about sustainable jobs and hence incomes, saved the cost of competitive procurement and provided the opportunity for shaping value propositions by early involvement at the front end.

[Road Ltd.] have got really a strong hold in this market... we are just in that market and it could be anywhere in the country... So, whoever has main contracts with [HA], [Road Ltd.] or another, we target it.

(General manager, Surface Ltd.)

Main contractors were targeted as a bundle of operand resources with no identities, indicating a highly transactional approach to managing relationships that accords to the perspective of transaction cost theory.

6.2.3 The shadow of the past and future

Surface Ltd. as a whole company has worked with Road Ltd. for 14 projects throughout the UK over the past two years. Road Ltd. was considering including Surface Ltd. as one of its tier-one supply chain partners. Project Alpha was regarded as a test before the decision. A (potential) shadow of the future was established, which could influence service interactions in project Alpha. The newly-established West Midlands branch had just completed a major project with Road Ltd., during which they had resource and supply problems. This was partly because the West Midlands branch used Surface Ltd.'s main

resource base, which was remote and thus took longer to allocate resources. Surface Ltd. recognised the negative impact of the last project and the importance of project Alpha. Before project Alpha, the West Midlands branch started to resource from various local contractors and suppliers. The learning was cognitive- and behaviourally-based and future-oriented. It revealed Surface Ltd.'s willingness to invest in the relationship with Road Ltd.

6.2.4 Case analysis

Conditions for trust

The service ecosystem has been illustrated. This section focuses on structures and time dimensions that can enable and constrain interactions for trust and value co-creation.

At the inter-organisational networks' level, HA's collaborative framework procurement increased Road Ltd.'s confidence in structuring supply chain relationships on a relative long-term basis. The framework ensured the continuity of resources and the experience of involvement in the framework and collaborating with the client helped increase Road Ltd.'s capability of implementing the strategic framework, leading to the company's confidence in collaborating with supply chain members. Such confidence lays a good foundation for trust in that it increases the trustor's general propensity to trust. Following up, the strategic framework at the organisation level depicted a shadow of the future – the possibility of continuing relationships and commitment to supply chain members. From the perspective of Surface Ltd., resource continuity increased their perception of the main contractor's reliability in collaboration and motivated them to build relationships at the organisation level, manifested as learning from past experiences, foreseeing and addressing Road Ltd.'s possible concerns such as resource issues. Supply chain members' cognitive and behavioural learning set a positive condition for mitigating the negative influence of past experiences and stimulating competence trust.

Finally, the power relation between Road Ltd. and Surface Ltd. was severely imbalanced as Road Ltd. had relatively stable resources in the local market on the one side and Surface Ltd. was expanding its business on the other side. Power can be used in various ways that have different implications for trust, as is discussed below.

Initial trust

The shadow of the past raised Road Ltd.'s awareness of Surface Ltd.'s previous incapability to provide consistent and reliable resources. Therefore, the initial competence trust was low. Yet this is different from distrust, in which case Road Ltd. would be less likely to involve Surface Ltd. in project Alpha. A low level of competence trust means that trust is suspended until further evidence that induces the perception of incapability, opportunism or trustworthiness.

The orientation was self-interested. The attitude towards the supply chain was, "What can you do for me?", as mentioned by the supply chain manager of Road Ltd.,

So, we expect them to help us on tenders; we expect them to put us high in priority for servicing our jobs. If there are performance issues, we want them to be able to resolve very quickly... so if we say we want some cement, they don't always just give us cement. They will say, "We can give you that. But if you think about those other options, these other options might be safer, cheaper, greener, quicker to install and all the rest of it." Less maintenance cost for the client, for the future.

The approach to managing relationships was transactional, implying the intention of using Surface Ltd. as an operand resource to satisfy needs and burden risks.

6.3 Procurement and preconstruction stage

6.3.1 Early involvement in main bid submission

Road Ltd. started to prepare the main bid for project Alpha in January 2016. The procurement unit involved and shared project information with Surface Ltd. early on, to improve the programme and lower the bid price. Surface Ltd. allocated a specific general manager who had successfully delivered projects for Road Ltd. and worked with Surface Ltd.'s site agent and quantity surveyor before. Staffing facilitated interactions and trust development at the micro-level, as indicated by the following quotation:

It [the previous 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. So, although we did know that was key to success, it made us more aware.

(General manager, Surface Ltd.)

The involvement of a general manager raised the awareness of the relationship with Road Ltd., which can lead to the perception of commitment on the main contractor's side.

Surface Ltd. provided a bill of quantities and a price quotation, which was cheaper than if Road Ltd. delivered the surfacing works by themselves. The bill of quantities and the rates were thus adapted and included in the main bid, which helped Road Ltd. win the main contract in April 2016. Although driven by the main contractor's self-interest in cost efficiency, early involvement of supply chain partners in the main bid submission increased Surface Ltd.'s knowledge about the project and Road Ltd. that could be used in surfacing procurement and generate competence trust.

6.3.2 Limited competitive procurement

Shortly after winning the main contract, Road Ltd. invited Surface Ltd. and another subcontractor to competitively bid for the surfacing package. Limiting the number of bidders facilitated the restructuring of the negotiation process to satisfy Road Ltd.'s advantage. Surface Ltd.'s general manager was involved in the procurement. His knowledge about Road Ltd., together with the project information secured through early involvement, enabled Surface Ltd. to show their good understanding of the project, which can generate the perception of competence. The interpersonal relationship with Road Ltd.'s site agent, who was also involved in the procurement, increased familiarity and confidence at the micro-level.

I worked with a couple of them before, so I know they are good [at] their jobs, anyway. I'm familiar with how they work, knowing that their work would suit our work to a degree.

(Site agent, Road Ltd.)

Micro-level confidence and relationships are conducive to the perception of trustworthiness at the meso-level.

Nevertheless, Surface Ltd.'s price was higher than that of their competitor. To balance the needs of strengthening the supply chain at the organisation level and of achieving lowest costs at the project level, the buyer from the business development unit and the project manager of project Alpha hid the other subcontractor's price and tried to lower Surface Ltd.'s price as much as possible. The capability of ensuring short-term efficiency was key to establishing collaboration at this stage, even if it might be at the expense of long-term effectiveness. During procurement, information was very asymmetric. Opportunism was revealed at this point, which replaced trust. Surface Ltd. complied with Road Ltd.'s requirements, largely to increase the likelihood of gaining the strategic agreement. Nevertheless, the use of power to control Surface Ltd.'s actions against their willingness generated the perception of inequity and insecurity on the supply chain's side.

If our competitors certainly were 5% cheaper than us over the whole scheme, we wouldn't be able to win the job without matching that... It was never kind of, "Hey, it is the best price. If not, you won't win it." If we were higher or lower, we were never told a specific number. But we were always guided to where our price should be before the contract. So, we always felt like we had the last shout, so to speak.

(General manager, Surface Ltd.)

Perceived unfairness and insecurity caused defensive attitudes and behaviour that substitutes trustworthiness.

In contract negotiation, Road Ltd. raised two specific issues regarding Surface Ltd.'s resources, a consistent project team and resource reliability. Surface Ltd. assured Road Ltd. that they would maintain the same project team throughout the project and had already strengthened their supply chains by using local suppliers. Structuring and planning at the organisation level potentially ensured consistency and reliability of resources at the project level in execution. Consistency and reliability are conducive to building shared meanings and trust at micro- and project levels

After understanding Surface Ltd.'s 'can do' ethos, Road Ltd. agreed a two-week notification for changes with the supplier. Also, little indemnity and liquidated damage was charged, meaning that Road Ltd. took on the majority of risks relating to delay. Adapting the contract to include the supply chain's specific needs and reducing the risk

to the supply chains can ensure the effectiveness and reliability of resource allocation, hence value co-creation at the project level, but also encourage trustworthy behaviour on the supply chain's side.

6.3.3 Early enabling works

During August to December 2016, Surface Ltd. delivered surfacing works for a car park and trench crossing as additional packages. Road Ltd. reviewed Surface Ltd.'s risk assessment and method statement (RAMS) and held a pre-start meeting with the general manager, commercial manager and supervisor to instruct them on the overall programme. Surface Ltd. checked in detail to ensure that the programme conformed to the contract and made resource plans based on the programme. During delivery, Road Ltd. monitored Surface Ltd.'s performance through site diaries and Surface Ltd. asked for formal consent before every change. Communication was highly contractual and task-focused, mainly through exchange of RAMS, site dairies and resource plans.

I think on a particular contract like this is, we heavily rely on [it] because it's substantially our money, substantially our risk for either party. We all rely on correct terms being in place which are jointly agreed... it's essential. It's such a large amount of money.

(General manager, Surface Ltd.)

Surface Ltd. used contractual mechanisms to protect their own benefits. This defensive attitude and behaviour imply that Surface Ltd. was insecure in collaboration, which rendered difficulty for structuring trust relations at the project level.

Nevertheless, the highly-structured formal interactions, as they were repeated, ensured regular face-to-face communication between actors, in which familiarity at the individual level and security at the project level can emerge. Also, the good performance of Surface Ltd. also maintained competence trust, which paves way to value co-creation.

At the later stage of delivering the trench crossing works, in order for more efficient resource use and lower costs and risks, Road Ltd. suggested changing the existing programme and resource plans. The change was beyond the contract specification and required Surface Ltd.'s collaboration; Surface Ltd.'s attitude towards this change and how they managed it were key to the relationship in the future. Surface Ltd. cooperated with

Road Ltd. and the two parties engaged with each other to optimise the current resource plan to be more efficient as well as reciprocal to both parties.

And 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.

(General manager, Surface Ltd.)

Whereas the efficiency and effectiveness of delivery led to perceived competence, the process of jointly managing the change provided opportunities for shared learning about each other.

Apart from signalling Surface Ltd.'s capability to manage planned changes and commitment, the delivery of enabling works also demonstrated Road Ltd.'s strong operations capability.

The team they've got on site is quite knowledgeable on what they are doing. Sometimes you are going to meetings and the company you go with are not used to building roads. Whereas [Road Ltd.] seem quite knowledgeable on what they do. They can see the similar sorts of risks we are against... Which makes our jobs easier. Because sometimes, when you get on site, if they don't understand the risks you are looking at, they are trying to point out you are just trying to create problems and to get extra money.

(Commercial manager, Surface Ltd.)

From the perspective of the supply chain the main contractor's good level of operational knowledge and understanding encouraged communication and knowledge sharing, which can increase competence and benevolence trust.

...with the trench crossing, the material we are going to use, they came to us and said, "This is actually more expensive. There are alternative, cheaper materials you can use, which also meet your specification." So, in advance we are able to save some costs.

(Quantity surveyor, Road Ltd.)

Although communication was still task-focused, Surface Ltd. became more proactive than at the beginning of the enabling work. The supply chain's knowledge appeared to improve the efficiency of resource integration and project outputs in terms of time and cost.

The relationship between Road Ltd. and Surface Ltd. developed in the shared experience of co-producing trench crossing works and encouraged future value co-creation. It is evident that the two parties jointly remeasured the works and settled down the final account of enabling works within one week, which was perceived as rare and proof of a good relationship.

From the perspective of Road Ltd., Surface Ltd.'s cooperation induced intention trust.

And from what I'm aware at the moment in terms of on site, they just make sure they are available when we need them to be. That ticks the box.

(Quantity surveyor, Road Ltd.)

Nevertheless, the above quotation indicated the orientation of trust was still self-interested, which was "What can you do for me?"

From the perspective of Surface Ltd., the sense of equity increased in the experience of joint planning, managing and measuring trench crossing works as well as the fair payment for enabling works. Perceived equity reduced safeguarding and increased confidence in subsequent value co-creation.

6.3.4 Case analysis

Interactions

This section focuses on the bottom-up direction of duality, namely interaction processes that constitute trust as structures of signification, domination and legitimation.

At the micro-level, boundary agencies such as Surface Ltd.'s general manager and Road Ltd.'s site agent were heavily relied on to increase mutual understanding and confidence, hence laying the foundation for trust development at the organisation level. Moreover, boundary agencies helped transfer knowledge from past to present projects, early involvement to procurement and from the organisation level to the project level when

enabling works started. On the supply chain's side, such knowledge enabled them to consistently understand and satisfy the main contractor's requirements, generating the perception of trustworthiness. Apart from familiarity, mutual understanding was further improved by the equivalent knowledge between project actors. As mentioned, Road Ltd. directly employed most of their operatives who could understand operational problems. Equivalent knowledge bases enhanced communication and can reduce suspicion and perceived opportunism that negatively influence trust, because actors are able to make sense of and internalise each other's meanings.

Interactions before and during procurement occurred at the organisation level. The suspension of trust in Surface Ltd.'s resource reliability was cancelled by Surface Ltd.'s future-oriented learning that strengthened its supply chain.

So, they've got more locally-based resources than the previous job. Because we knew [about the] problems we had previously, we got assurances that they've done things to make sure that would not happen again. So, because we knew them already, we knew the questions to ask to get the right answers or to put the security in place when you order with them.

(Project manager, Road Ltd.)

The cognitive and behavioural learning from the past demonstrated Surface Ltd.'s efforts to take the responsibility in the present, which offered the main contractor a sense of security. In this vein, negative past experiences turned into a positive condition for trust and value co-creation.

Involvement in the main bid submission provided Surface Ltd. opportunities for securing explicit and implicit knowledge about project Alpha and Road Ltd. Such knowledge was transferred to the bid team through agency, namely Surface Ltd.'s general manager, which, together with the general manager's relationship with Road Ltd., increased Surface Ltd.'s competitiveness in the procurement.

They gave me the best feedback and they gave me the best indication that they would do that job for us. You know, I get some confidence from meeting their people.

(Site agent, Road Ltd.)

Competence trust increased, to the extent that Road Ltd. was confident that Surface Ltd. had the capability to complete the project.

Nevertheless, collaboration at this stage was to use Surface Ltd. as an operand resource to maximise project efficiency, indicating that the essence of value co-creation, hence trust, was self-interested. Self-interested trust is evident in the use of market power to manipulate and control Surface Ltd.'s price to Road Ltd.'s own advantages in the bidding process. At this point, power substituted trust as an authoritative resource, hence hindering the structuration of trust. On the supply chain's side, the perception of insecurity and inequity that resulted from manipulating and opportunistically using power raised Surface Ltd.'s awareness of opportunism and caused a defensive attitude and behaviour; this is evident in the service interactions at the early stage of enabling works. Communication largely stayed at the level of transmitting planned messages such as changes in programmes and prices and took place when either party received information and derived meanings that might be different from what the other intended. Contract was utilised to effectuate consents and transfer liabilities, as the commercial manager of Surface Ltd. commented, "*Things go well as long as you stick to what we've got on the contract*". This was in contrast to the future-oriented learning before procurement, indicating the negative influence of manipulation. In other words, controlling the other party against its wishes results in manipulation-safeguard patterns of behaviour in service interactions, which can render a 'win-lose' situation and hinder trust and value co-creation.

Power can also be used to help in structuring the perception of trustworthiness, hence trust as a rule of signification. Controlling at the structure level, formalising project procedures and processes, clarifying roles and responsibilities, and planning resources can ensure consistency and reliability of service provision at the project level. The inclusion of the supply chain's needs in structuring the project mitigated potential resource conflicts at the organisation level, hence facilitating resource allocation and integration at the project level. From the supply chain perspective, they are able to better plan and allocate resources between projects or adapt programmes to support service provision at the project level, which can mitigate opportunism. Moreover, as actors repeated the highly-structured patterns of interactions, they built up familiarity at the micro-level and shared understanding of technical and organisational issues at the project level. Structuring at the organisation level helps establish common knowledge in

interactions and generate a sense of security at the project level, laying a good foundation for developing trust and value co-creation.

The perception of competence at the project level emerged as a result of monitoring Surface Ltd.'s performance and was rapidly developed in joint activities that improved project efficiency, such as the delivery of trench crossing, and footpath works.

It's a small risk coming out of the project but it's two parties agreeing opportunities to do more works and assurances that the night works would be delivered in the timeframe we are allowed. And we have four-night shifts, and all performed well... we achieved it! ...There are lots of benefits but just being able to have that discussion, what other opportunities are there, improves quite a good relationship... Because the two items they've come to site to do have gone well. So, our confidence is increasing in [Surface Ltd.'s] ability.

(Project manager, Road Ltd.)

Apart from satisfying requirements, cooperative intention was signalled and perceived in shared experiences, which increased intention trust. Competence and intention trust can develop or erode as a consequence of intended learning about the other party's trustworthiness, such as during the procurement, but also as an unintended consequence of monitoring and joint activities.

The phenomenon of trust

This section focuses on the three elements in the dimension of structure and their interrelations. Trust as a rule of signification, especially the perception of competence, was generated as Surface Ltd.'s cognitive, behavioural and future-oriented learning mitigated the suspicion about resource reliability, good understanding of the project and performance in delivering enabling works. Whereas competence trust can develop through indirect interactions, monitoring and reviewing site diaries, for instance, intention trust develops particularly in the shared experience of joint problem solving, in which the commitment can be signalled and comprehended through actor-to-actor (A2A) interactions.

The increasing perception that Surface Ltd. was trustworthy in terms of competence and openness was associated with Road Ltd.'s increasing engagement with Surface Ltd., where the two companies shared problems and produced solutions in order to increase project efficiency. Trust as a rule of signification and value co-creation formed a virtuous cycle, in which competence and intention trust drove Road Ltd.'s actors to co-produce the core offering with Surface Ltd., and the associated efficiency and equity in service experiences and outcomes in turn reinforced trust and value co-creation. The structure of domination started to move from the side of power relationship to the side of trust.

The orientation of Road Ltd. was largely self-interested at this stage, though the orientation was ready for transformation after the shared experience of delivering trench crossing and footpath works.

The value of trust

This section focuses on the 'top-down' process of duality, namely the effects of trust as rules and resources on service communication, resource integration and service coordination.

First, competence trust increased communication at the organisation level such that perceived trustworthiness in terms of competence motivated Road Ltd. to use Surface Ltd.'s knowledge and skills to enhance project efficiency and outputs. The main contractor's openness and equity increased the supply chain's confidence in knowledge sharing and thereby further intensified service communication. From the perspective of Road Ltd., they gained specialist information and knowledge that were used to improve immediate outputs such as the main bid and trench crossing works. From the perspective of Surface Ltd., they gathered information about Road Ltd.'s requirements that helped them win the contract. Trust as a rule of signification leads to informative experiences for both main contract and the supply chain.

Apart from project outputs, informative service experiences generated shared understanding between the two parties, at both project and organisation levels. Shared understanding facilitated resource integration in the subsequent phase, hence leveraging future service value in use, as discussed in the next section.

6.4 Execution stage

The execution of surfacing started in January 2017. Although Surface Ltd. maintained the involvement of their general manager, interactions between the two parties at the execution stage largely stayed at the project level. The involvement of Surface Ltd.'s general manager at the project level indicated the company's investment and commitment to the potential long-term relationships. On the other hand, the project manager of Road Ltd., who managed a programme of projects and represented the organisation level, reduced their involvement in project Alpha because of the project's relatively small value. This indicates that the organisation level of Road Ltd. took a transactional approach to managing supply chains and relationships.

At the micro-level, confidence maintained between the general manager and site agent, which can support trust and trustworthiness at the project level. Trust-based communication in delivering the enabling works was maintained at the project level. Consistency can maintain familiarity and the level of trust. As mentioned by the general manager of Surface Ltd.,

...there was a consistent set of people delivering for [Road Ltd.] and a consistent set of people delivering for [Surface Ltd.]. The familiarity encourages the whole relationship and encourages honest and open speaking throughout, which encourages their planning, which encourages mitigating of risks. So that [consistency] is probably the key to each other.

Consistency and familiarity increased the effectiveness and efficiency of value co-creation.

The positive influence of consistency and familiarity on the co-creation of value can also be seen in the clear roles and responsibilities in service exchange and routines established in service interactions. For instance, in pre-start meetings both companies jointly planned sequences of works and levels of resources for the first-phase execution. Road Ltd. and Surface Ltd. had weekly collaborative meetings to review progress and jointly make weekly programmes. Road Ltd. forecasted quantities of works and provided engineering information, based on which the two parties jointly made short-term programmes, sequences of works, activities and resource plans. Road Ltd.'s site agent or subagent had daily progress meetings with Surface Ltd.'s supervisor. Project routines can sustain

security and trustworthiness in operations. In other words, Road Ltd. and Surface Ltd. co-produced the core offering as project contents – a type of value co-creation from the perspective of the client. The service outcome of co-producing, such as knowledge and relationships, was useful for value co-creating in the supply chain relationship.

Furthermore, the open and communicative way of resolving problems, which was driven by competence and intention trust during delivering enabling works, had been gradually routinised at this stage. At a meeting in which the researcher attended, Road Ltd.'s supervisor was observed to often lead the conversation about how to solve Surface Ltd.'s problems, which contrasted with the early stage of delivering enabling works. This indicates that an enhanced co-producing process resulted from the development of trust. Also, Road Ltd. introduced and employed GPS measurement to measure quantities of works, which furnished more accurate and fair measures. The communicative and collaborative approach and objective measurement indicate more equitable interactions at the project level, which can prevent the potential erosion of trust.

At the early stage of execution where few changes occurred, Surface Ltd. kept achieving the programme requirements, which maintained the level of trust. Road Ltd. maintained fairness in both the process and payment; the sense of security and trustworthiness was sustained. A series of changes then emerged, as discussed below, during which trust continued to develop.

6.4.1 Emergent defect repair

Soon after execution started, HA asked Road Ltd. to repair existing damaged road surfacing. Due to the emergency nature of the work, Road Ltd. did not formally issue the instruction; instead, the site agent telephoned Surface Ltd.'s general manager to ask about the company's availability for the emergent task. At this point, Road Ltd. relied on Surface Ltd. to deliver the service in a short period of time; that is, using trust relations to facilitate resource allocation. As the informal request was within the two-week notification specified in the contract, Surface Ltd. had the right to refuse. Also, Surface Ltd. might lack the capability to manage emergent change and complete the work within the required timeframe. Surface Ltd. prioritised resources for project Alpha and adapted its existing programmes of projects to cooperate with Road Ltd. Such relationship-specific investment can induce competence and intention trust.

6.4.2 Binder course⁵ change

Closely following the defects' repair, the delivery of the binder course was changed from daytime to night-time. Road Ltd. made a mistake in procurement that included the binder course as daytime works. Although rates for night works and quantities of works were well specified in the contract, both parties did take risks as they did not formally invoke the information change procedure as required by the NEC3 contract and hence relied on each other's intentions and actions. For Road Ltd., the risk was Surface Ltd. asking for the formal procedure to take action, not coming at night, or coming with insufficient resources. For Surface Ltd., the risk mainly related to Road Ltd. not paying night work rates, which were higher than day works ones.

However, none of these risks occurred; both parties acted in a collaborative and honest way and successfully delivered the binder course works. Road Ltd. first admitted their mistake and promptly informed Surface Ltd. of the change. Surface Ltd. cooperated with Road Ltd. to minimise any negative consequences. The two parties jointly adapted the programme, resources and activities in the weekly collaborative meeting. While supervisors and engineers of both parties delivered the project together, commercial teams completed the formal procedures in accordance to the contract. The core offering was co-produced by the two companies. After completion, Road Ltd. quickly agreed Surface Ltd.'s payment application. Both the process and outcome of value co-creation in the binder course change demonstrated Road Ltd.'s openness, honesty and fairness at the project level, which appeared to reduce perceived risks and encourage trustworthiness on the supply chain's side.

6.4.3 Profile planing change

Profile planing was originally to be delivered in four nights. In order to accelerate the overall programme, Road Ltd. and Surface Ltd. jointly decided to shorten the duration to two nights, agreed methodologies and a working programme, and allocated resources accordingly. The above series of actions depended on the accumulation of competence and intention trust, especially in the shared experience of joint managing the defect repair and binder course changes. Nevertheless, the client, HA, changed the information, which

⁵ The binder course is also known as the base course, the layer under the surface course or wearing course.

extended the duration of profile planning by two days. This information change, if not well managed, would severely cost both parties since resources for the related activities had been planned based on the two-night programme.

Instead of blaming each other and referring to the contract to safeguard their own positions and transfer liabilities, Road Ltd. and Surface Ltd. shared the risk and discussed the information change and its consequences in an open and honest way. They adapted plans to minimise the cost for both parties, regardless of whose risk it was. They also agreed to re-programme the second part of the surfacing beginning in April and conduct more works each night. Supervisors of both parties produced, coordinated and measured the works together. In dealing with the profile planning change, the two parties demonstrated their shared intention to try to deliver on time. For instance, in an area where Road Ltd. could not provide the quantities of works and thus make the short-term programme, Surface Ltd. sent engineers to work with Road Ltd.'s engineers to solve the problem and build a model together to forecast the quantities. Co-creating activities started to emerge in the shared experience of managing profile planning, which goes beyond co-producing of core offerings.

After the first-phase execution, Road Ltd. and Surface Ltd. had a review meeting, which presupposed trust-based relationships at the micro- and project levels. Surface Ltd.'s general manager, commercial manager and supervisor and Road Ltd.'s project team formed a shared understanding of how the process went in order to learn for the next phase execution, which can benefit service use in the future.

6.4.4 Case analysis

Interactions

The inconsistent involvement of the project manager on the main contractor's side and the transactional approach taken by the main contractor organisation impeded trust development at the organisation level. Nevertheless, at the project level, competence and intention trust were maintained by consistent project teams, enabled by resource programming and coordinating, which avoided shuffling core staff between projects. Consistent core actors maintained ties and also shared understanding between the two parties. Although explicit knowledge can be transferred through documents, tacit

knowledge such as the other party's preferences and ways of thought might be hard to transfer and need time to internalise in day-to-day communication.

Moreover, consistency helped clarify roles and responsibilities and form routines. Roles, procedures and process of resolving problems formed common knowledge that implied rules of conduct in interactions between Road Ltd. and Surface Ltd. This common knowledge sustained security and trust at the project level.

Everyone knew their role within the project to make it a successful project. We knew our position through communication meetings, emails, correspondence. I agreed drawings. And then the way we measure that throughout the scheme is through regular communication during the visit, before the visit... through meetings after [the visit] with the site teams to review how the visit went, so that we can learn to get the benefits for the next visit. And then commercially, I and [Road Ltd.'s] QS [quantity surveyor] would speak regularly. 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.

(General Manager, Surface Ltd.)

Regular communication and addressing problems and doubts in an open and communicative way have been comprehended as 'business as usual' and embedded in day-to-day interactions.

In short, maintaining consistency sustains the sense of security, confidence and trust at micro- and project levels.

At the early stage of execution, apart from efficiency, equity became the other factor that sustained and developed value co-creation. On Surface Ltd.'s side, the perception of equity nurtured the perception of Road Ltd.'s reliability.

From an operational point of view, I think the way in which they use GPS equipment on site to record volumes of quantities... takes any arguments away.

So, they are proactive on that, which shows me they are an honourable contractor because they want to pay for what we've done... They are very fair.

(General manager, Surface Ltd.)

The GPS measurement as a clearly-defined and mutually-accepted measure which serves as a common ground that can prevent trust erosion due to different interpretations and muddled communication. More importantly, from Surface Ltd.'s perspective, Road Ltd.'s willingness to use GPS measurement was interpreted as demonstrating integrity and fairness.

The belief, together with the expectation of a strategic relationship and future business, motivated Surface Ltd. to prioritise resources to repair defects within one night, deliver binder course change during nights before formal instructions were received, and jointly deal with profile planning change with Road Ltd.

They knew they would get compensated. And they will. 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.)

From the perspective of Road Ltd., knowing the 'faith' that the other party had in itself induced responsibility, "*they will [get compensated]*", which reciprocated that faith. In this vein, the relationship management approach started to move from the side of transaction cost economics towards the side of social capital theory.

Reciprocity emerged in service interactions. Specifically, the equity and integrity of Road Ltd. was reciprocated by Surface Ltd.'s cooperation and risk taking; the latter, in turn, generated Road Ltd.'s responsibility to maintain integrity and compensate Surface Ltd.'s efforts. Reciprocity here was in an economic sense: actors sharing resources and helping each other with the expectation that the investment will be reciprocated by good project performances that lead to higher transactional value. The exchange of small-scale actions nurtured the perception of honesty and integrity. Competence and intention trust developed as Surface Ltd. effectively allocated resources and repaired the defects to meet the requirements.

And that needed to be repaired at night... 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] 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.)

Surface Ltd.'s relational investment, in the form of prioritising resources to help Road Ltd. through difficulties, generated the perception of benevolence, hence intention trust.

The effective management of the defect repair demonstrated Surface Ltd.'s resource reliability and commitment to the project, which paved the way to using trust relations to deal with the binder course change. Although still at a nascent stage, opportunities for transformation of the domination structure emerged at this point.

Following up, on managing the binder course change, which resulted from Road Ltd.'s own mistake, Surface Ltd.'s integrity in management and delivery increased intention trust.

...at nights, we have planned closures. They are not changing. "We need you on these dates." They turned up, carried out their works and completed them. So, I think that's when you get a good idea how reliable they are. It's night works when you've got a strict timetable.

(Quantity surveyor, Road Ltd.)

Surface Ltd.'s cooperation and flexibility raised Road Ltd.'s perception of their integrity.

In managing a series of changes, trust relations were used to facilitate resource allocation and integration, instead of contractual mechanisms. In other words, trust as a resource of domination was generated in service interactions, signalling an increase in social capital and thus relationship value. The effectiveness of using trust relations to facilitate resource integration reinforced trust as a resource of domination in service interactions.

The phenomenon of trust

Trust as a rule of signification was reinforced and sustained by small steps, or ‘business as usual’ in day-to-day interactions, which, in the face of uncertainties and risks, promoted the use of trust relations as authoritative resources. In other words, trust as a rule of signification helps generate trust as a resource of domination. The structuration of trust as a resource of domination relied on reciprocal service exchanges. The effectiveness of using trust relations to allocate resources, especially in a series of changes and uncertainties, in return developed competence and intention trust. At this point, Road Ltd. trusted that Surface Ltd. would maintain competence, integrity and benevolence in the future should they face the opportunistic opportunities that were unspecified *ex ante*. The most obvious improvement is the interpretation of Surface Ltd.’s intentions. After the delivery of trench crossing works in December 2016, when asked if there was a probability that Surface Ltd. would take advantage in the process of measurement, the quantity surveyor of Road Ltd. thought that,

Because I will be there, measuring with them that they cannot really take an advantage... So, it's up to us really to make sure that we don't just bend over and agree to that... there's a scope there if you are not on the boat [to jointly measure the job].

When asked the same question after completing the first part of the works in March 2017,

They might put a forecast together and say, "This is what we believe it will need to take." In reality, sometimes it can be different for varieties of reasons... You could say, "This is going to take five men on this job. Only four came because one guy was not available for whatever reason." ... I do believe they will be honest.

(Quantity surveyor, Road Ltd.)

With the trust that Surface Ltd. was not opportunistic, Road Ltd. accepted its own mistakes in delivering the binder course.

...if I've got a problem, I will tell them... Just by the way I act with them, they can see that I trust them. And I think if they didn't, they wouldn't tell me the things that they do.

(Site agent, Road Ltd.)

The perception of competence, integrity and benevolence sustained Road Ltd.'s willingness to share and learn with Surface Ltd. The communication initiative was driven by a series of emergent changes and risks, but also out of what had been embedded in service interactions at the procurement and preconstruction stage around trust.

Intention trust also enabled Road Ltd. to tolerate more uncertainties in the service provision.

They're supposed to do things like testing and provide us [with] resources within 24 hours. Sometimes it has been two weeks before they sent it. Part of the requirements of our information which we gave them is to supply this... So, their paperwork could be better. But since I've been annoying them, annoying them, annoying them [by telephone], it has got better.

(Site agent, Road Ltd.)

Apart from intention trust, trust as a resource of domination also mitigated the use of contractual mechanisms in service interactions. To sustain trust relations, uncertainties were addressed in a relational way.

The orientation of trust started to transform from self-interested to socially-oriented with the emergence of shared intentions, as discussed in the next subsection.

The value of trust

Trust as a rule of signification sustained two-way communication in daily interactions but also encouraged openness and integrity in emergent changes and uncertainties. As mentioned, perceived trustworthiness motivated Road Ltd. to share informative resources and learn with Surface Ltd. On Surface Ltd.'s side, project actors perceived the sharing, learning and no-blaming actions as the willingness to engage with them and thus a signal of trust.

So, if we feel that we've got a good enough relationship, if we feel there's a better way, more efficient, or a more cost-saving way of doing something which would benefit all parties... we are confident to be able to say, "I think we should do this. I think we should have at least a discussion about how we go on from here", which [Road Ltd.] embrace, I think. They enjoy the collaborative nature of it, because I think really this is how they manage their supply chain... 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 because, like I said, sometimes some contractors may prefer you to just keep below their part... just turn up and do it. But that doesn't necessarily create the best way for the environment [nor is it] most beneficial for all parties.

(General manager, Surface Ltd.)

The perception of being trusted increased Surface Ltd.'s confidence in service interactions. Confidence mitigates the danger of exposing information beyond accountability, especially problems to main contractors, which is perceived to induce blame or increase the supply chain's costs. Surface Ltd. therefore became more open to sharing knowledge, problems and solutions, making service experiences more informative. Attitude and behaviour described above were in contrast with those in delivering enabling works, where communication was to effectuate consent and hence transfer liabilities.

Shared understanding accumulated as trust enhanced service communication at the project level. Shared understanding made resource allocation and integration more adaptive and absorptive to changes. This was because actors were able to quickly understand the situation undergoing changes and adapt resources to each other's expectations. In other words, shared understanding as a service outcome accumulated in previous interactions levers value in the present service use.

Trust as a resource of domination also made resource allocation and integration more adaptive. The use of trust relations to allocate resources mitigates the use of contractual mechanisms. In delivering binder course works, for instance, both companies were able to focus on delivering service contents instead of contractual procedures, which contrasted with the previous stage where the contract was heavily relied on to make sure "things go well" (Commercial manager, Surface Ltd.). Reciprocity enabled serial equality

that eliminated the necessity of immediate return for any inputs, although the overall balance was expected within the project lifecycle.

Furthermore, shared intention emerged in the shared experience of managing changes.

Theoretically, that [binder course change] does put us in a risk. Because we never instructed them to come at night and they could turn around and say, "We are not coming at night. You never instructed us to do the binder." Theoretically, that could have [been] done. Again, [we] worked together for a common goal... They carried out the work, working with us rather than against us... It's good to have that good relationship that when you are behind on bits of paper that works still go ahead. Paperwork can just follow afterwards.

(Quantity surveyor, Road Ltd.)

Likewise, on the supply chain's side,

Because, like I said, it feels, especially on this site, the shared responsibility... It really feels like we took a joint interest of shared responsibility in the whole project to ensure that we deliver it well.

(General manager, Surface Ltd.)

Shared intentions as a service outcome induced shared responsibility and joint interests at the project level, indicating the emergence of value co-creation in the supply chain relationship. Shared intentions can increase the willingness to mobilise one's own resources and thereby enhance resource integration and value co-creation.

Finally, under shared intentions and understanding, service coordination was more effective.

...the key thing to that is the communication between the two companies... Stuff like that [the informant pointed to a wall of collaborative plans], the diaries... we are coming to be part of this. [Road Ltd.] are particularly good at this. By getting everyone involved, they understand the importance of the supply chains... not all contractors do that.

(General manager, Surface Ltd.)

Supply chains were involved and became “*part of this*” project organisation, indicating a cohesive service experience at the project level. The above also indicates that the identity of Road Ltd. started to emerge in the engaging environment, which can encourage a higher level of relationship-specific investment, hence social capital in the future. Social capital is associated with the structure of relationships such as trust and can be used to benefit service outcomes post service experiences.

6.5 Completion stage

6.5.1 Early warning of compensation

At the beginning of the last stage, Surface Ltd. initiated an early warning of compensation for profile planning, which was a formal procedure to apply for compensation under NEC3 contract. Under NEC3, compensation is issued through the process of early warning, communication and decline/instruction. Initially, Road Ltd. and Surface Ltd. were not in agreement with the amount to be compensated.

There are a couple of changes... which now have caused a little bit [of] discussion [on how] to handle it commercially about money: we think they owe us, but they may not get paid [from HA]. So, that potentially might have a lightly negative influence on the relationship... at the minute we are still trying to work collaboratively, so we can both get paid for the changes.

(General manager, Surface Ltd.)

Early warning put the relationship between the two companies at risk.

Trust helped stabilise the relationship, at least to some extent. Instead of blaming and relying on the contract to safeguard their own benefits, the two parties had a meeting to build mutual understanding of each other’s position and try to find a middle ground that best suited them both. In this manner, Road Ltd. and Surface Ltd. co-created the shared intention to develop a claim of mutual benefits that was acceptable to HA. While largely based on Surface Ltd.’s original claim, the new one was adjusted to HA’s requirements according to Road Ltd.’s knowledge. This way of managing the relational risk indicates social orientations of both main contractor and subcontractor. HA accepted the claim and paid the compensation for profile planning.

6.5.2 Second-phase surfacing works

To mitigate delay due to the profile planning change and achieve the programme on time, Road Ltd. and Surface Ltd. adapted and agreed the short-term programme, resource plans and activities in the second phase, which presupposed shared understanding between the two parties. Service communication became more intensive at the project level. The open and communicative way of interactions and associated patterns of behaviour were sustained, such as maintaining a fair process and payment, agreeing measures, taking responsibilities, sharing risks and no blaming. These routinised interactions can maintain trustworthiness between two parties. At the micro-level, actors respected each other's opinions and suggestion. Supervisors and engineers of both companies worked together on site. They jointly confirmed engineering information, delivered contents and remeasured quantities. During execution, Road Ltd.'s site agent and subagent spontaneously gave daily feedback to Surface Ltd.'s general manager through emails, telephones and face-to-face discussion, communicating problems but also expressing their satisfaction. This can maintain shared understanding but also Surface Ltd.'s confidence in interactions.

Learning became more future-oriented and focused on the organisation level, such as Road Ltd.'s requirements regarding tier-one suppliers, which can be applied in future service. Road Ltd. and Surface Ltd. also had mutual feedback through review meetings, survey and report post completion. Surface Ltd.'s performance was assessed against tier-one criteria, which were transferred to the business development and supply chain management units through supply chain management systems. The aim was to increase mutual understanding and thus continuous improvement in future business.

Road Ltd. and Surface Ltd. achieved the programme and successfully delivered project Alpha. After completion, both parties expressed satisfaction about the project performance but also their experiences with each other. Surface Ltd. gained the tier-one strategic agreement after project Alpha, meaning that relationship, trust and learning, which were established in the project lifecycle, can realise value in the future.

6.5.3 Case analysis

The conditions for trust

The shadow of the future formed future thinking that sustained cognitive and behavioural learning in interactions since relationships and knowledge obtained in the present might be transformed and reused in the future.

So, we kind of learnt different methods that [Road Ltd.] have and their programme of work and their way of organising ... [The benefit was] for future work with [Road Ltd.]. Obviously, we can go into their next project, hopefully and know exactly how especially their management structure works... So, it is just being able to cooperate effectively on the next job.

(Commercial manager, Surface Ltd.)

Future-oriented learning goes beyond project-specific tasks and problems; it is a prelude to enhanced co-creation.

Interactions

Continuous learning at the micro-level, such as informal feedback between managers, enabled behavioural learning at the project level.

And because [Surface Ltd.'s] general manager worked with me for a while, he sorts of knows what I want. That has sort of changed the way the team works a little bit [, for example,] when they gave me information, we both know what each other expected.

(Site agent, Road Ltd.)

Again, agencies and ties at the micro-level maintained mutual understanding, confidence and thereby trust at the project level.

Trust as the structure of domination promoted and was strengthened by the bounded solidarity that Road Ltd. and Surface Ltd. formed while dealing with early warning. Solidarity was bounded in that it was based on the shared intention to minimise negative impacts of profile planning change and the shared recognition that to guarantee mutual

benefits required collaborating with each other instead of safeguarding their own self-interests and using contractual mechanisms.

So, we went through that [early warning]. We agreed on the number... which satisfied all. We just talked around the table, and we agreed on the figure. It didn't go any further. It was rectified amicably... We just recognised the change in the works information between us and then we spoke to the client. And they agreed and we all got paid.

(Site agent, Road Ltd.)

The legitimacy of relational norms generated trust as a rule of legitimation at the project level. The open and communicative way of interactions, as they were continuously repeated, eventually formed relational norms at the project level, which in turn sustained trustworthy behaviour and thereby relationship stability under relational risks.

...we will talk through [the early warning] this afternoon. We will tell them our position on it. And they will tell us their position on it. We will talk through. We will listen to what they have to say, and they will listen to [what we] have to say. Hopefully we can come to a mutual agreement.

(Site agent, Road Ltd.)

Relational norms induced the relational obligation that sustained trustworthiness but also constrained the opportunistic behaviour that broke the obligation. In other words, relational norms, as they were legitimated in A2A interactions, formed relational control and structured trust as a rule of legitimation at the project level.

...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, really.

(General manager, Surface Ltd.)

The legitimacy of a “*fair and reasonable, considered manner*” described above formed “*gentlemen’s agreements*” that controlled actors’ and organisations’ behaviour in a relational way different from controlling them through contractual mechanisms.

The latter involved control of the other party’s behaviour to achieve one’s own expectations whereas the former was more about self-control in accordance to relational norms formed in the actor-to-actor interactions. In this manner, relational control sustained the virtuous cycle of trust and value co-creating. The relationship management approach at the project level has been on the side of social capital theory.

Furthermore, in the shadow of the potential strategic agreements and thus a long-term relationship, reciprocity started to go beyond the economic sense. Social reciprocity emerged that drove mutual service with the expectation of returns in future service.

The phenomenon of trust

Trust as a rule of signification and a resource of domination continued to mutually influence each party. As competence and intention trust grew as the result of successfully managing a series of emergent changes at the execution stage, Road Ltd. were more willing to engage with Surface Ltd. in operations and take responsibilities and use trust relations in the co-creating of value. The effectiveness of value co-creation, in turn, induced more intention trust, as confidently specified by the site agent of Road Ltd.,

...if they said they were going to do something, I believed they are going to do it. And I also do believe they will do it competently. They will do [it] how they said they are going to do. And I trust they are going to give me all the information saying that they’ve done it, how they are going to do [it], not just doing the work.

Trust in Surface Ltd.’s integrity helped Road Ltd. tolerate uncertainties in Surface Ltd.’s performance and sustain co-creating activities in relational risks.

Continuously mobilisation of trust relations shaped relational norms in supply chain relationships, hence generating trust as a rule of legitimation. Social orientations developed, which is evident in the continuous learning for the future and considering mutual benefits when dealing with disagreement on early warning.

The value of trust

Competence trust, under the shadow of the future, motivated communication beyond the current project. The depth of communication increased in that both parties shared knowledge not least to find a voice for co-determining solutions for current problems. Knowledge and relationships gained in the service experience can lever value for future service because both parties have gained a shared understanding and stronger relationship that can better inform their interactions.

Trust as a rule of legitimation increased the cohesion of service interactions. The legitimacy of relational norms and relational control helped stabilise the relationship by encouraging a communicative and open way of resolving disagreement and refraining opportunism. It also enabled the suspending of judgement in the interactions and sustained value co-creation in uncertainties. This is evident in that, while the early warning was not resolved, both parties maintained their progress in delivering Alpha. Dealing with relational risks in this way helped shape and reshape shared intentions. Under shared intentions, actors proactively took responsibilities, allocated their own resources and jointly transformed resources for the benefits of both parties, as the case of co-developing claims for compensation. Cohesive experience ensures the efficiency of service provision.

Furthermore, Road Ltd. and Surface Ltd. co-created shared identities through the service experience in project Alpha. For Surface Ltd., Road Ltd. changed from ‘anyone’ “*whose main contract is with [HA]*” 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.). For Road Ltd.,

I don't think they [Surface Ltd.'s rank] were very high. Within [Road Ltd.], you know, someone would say, “Who is the best surfacing contractor?” It wasn't [Surface Ltd.]. [Surface Ltd.] wouldn't have been anyone near the top. I think they've definitely got closer to [the] top [of] that list now. So, I think [Surface Ltd.] is definitely somebody that we will use again.

(Site agent, Road Ltd.)

Shared identities, knowledge and relationships can lever value in future service, should they be transferred from the project level to the organisation level.

Finally, better service experiences led to higher performance. Trust at the project level, as they were transferred to the firm level through agency and supply chain management systems, helped Surface Ltd. become first-tier partner and secure a strategic agreement for future business.

In summary, case Alpha demonstrated an external supply chain relationship in the shadow of a potential long-term relationship at the organisation level. At the network level, the main contractor was under the long-term collaborative framework with the client. This chapter has analysed case Alpha by using the theoretical framework that emerged at the early stage of data analysis.

In the theorem of duality, bottom-up interactions that generate trust as structures of signification (e.g., reflexive and experiential learning from shared experiences of managing a series of changes generated perceived competence and integrity), domination (e.g., reciprocal service exchanges) and legitimation (e.g., forming “*gentlemen’s agreements*”) were found. Particularly, the relationship of trust and power was found to be more complicated than substituting or complementary in interactions. If exercised in a certain manner, structuring project procedures and clarifying roles, for instance, power can offer opportunities for developing trust relationships, which, in turn, can strengthen organisations’ or actors’ powerful position. On the other hand, mobilisation of power to manipulate the other party against their wishes can damage trust and trustworthiness. For project businesses, service interactions in theory simultaneously occur at micro-, project and organisation levels throughout the project lifecycle. However, the involvement of organisation level, especially on the main contractor’s side, was inconsistent, indicating a management approach aligned with transactional cost theory. The structuring of the trust relationship was mostly at the project level. Actor-to-actor (A2A) interactions in execution generated relational norms such as equity, reciprocity and bounded solidarity that supported collaboration and motivated value co-creation, an emergent phenomenon that strengthened relationships in a self-efficient way, which is aligned with social capital theory.

In turn, trust as a rule of signification, a resource of domination and a rule of legitimation improves service communication (e.g., sharing achievements but also problems), resource integration (e.g., allocating an engineer to co-develop the model with Road Ltd.), service coordination (e.g., dealing with early warning according to mutual benefits) and

service outcomes leveraging value in use (e.g., shared identities and long-term relationships), which are better service experiences and outcomes from the lens of S-DL.

In terms of the interrelations between elements of structure dimensions, the perception of trustworthiness increased the confidence in using trust relations as authoritative resources to facilitate resource allocation. The process of structuring trust as a resource of domination strengthened competence and intention trust on the one hand, and, on the other hand, legitimated relational norms and thereby generated trust as a rule of legitimation in service interactions.

Chapter 7 Case Beta

Case Beta tells the story of an inter-organisational relationship between a UK construction firm, referred to herein as Office Plc. and its piling and foundation contractor, referred to herein as Found Gamma, in an office building project.

7.1 Project overview

Beta was one of the office buildings in the first phase of a city redevelopment scheme in the UK. The scheme aimed to transform the area into a vibrant mixed-use development of commercial, civic, retail, leisure and hotel space. The scheme consisted of three phases and is delivering 1.8 million square feet of space for up to 10 new buildings including offices, shops, bars, café, restaurants and a hotel in the next decade. The first phase started with a programme of enabling works, infrastructure, and two office buildings including Beta. Enabling works and infrastructure started in the third quarter of 2015 and two office buildings started in 2016. Beta was completed in 2018 and the other building in 2019. The processes and main events of Beta are illustrated in Figure 9.

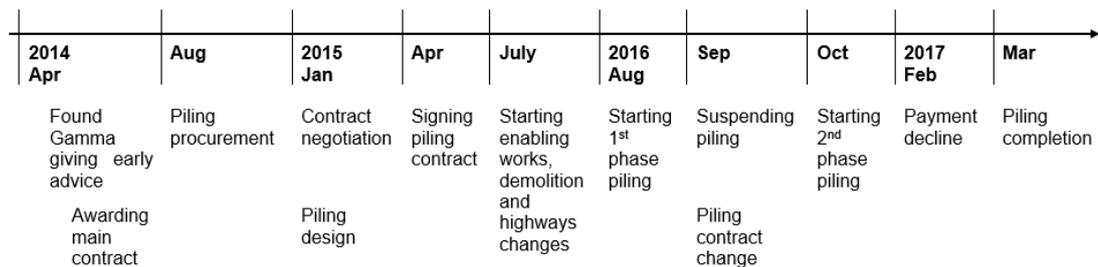


Figure 9 The process and events of project Beta

This chapter particularly concerns the piling project of Beta, which was delivered by Office Plc. as the main contractor and Found Gamma as the piling subcontractor. The ground condition of project Beta was uncertain. Several service tunnels were under the construction site. There was a high risk that the piling project could damage the service tunnels.

7.2 Service ecosystems

7.2.1 Project participants

Office Plc. was the main contractor of enabling works, infrastructure and the office building Beta. Office Plc. was a UK major construction firm providing facilities management and construction services. Their business was across various sectors such as aviation, commercial, retail, residential, transport, healthcare and education. For the building Beta, Office Plc. had a project director who also oversaw other projects such as infrastructure within the programme. At the project level, they had a quantity surveyor, project manager and package manager who was contracted from an agency. The package manager was specifically assigned to work with Found Gamma. Using contracted operatives makes establishing and hence reusing interpersonal relationships at the project level more difficult.

Found Gamma was the piling and ground engineering unit of Gamma UK, a major construction firm in the UK. Found Gamma had several business streams in different locations throughout the UK. Each stream had a project director who was responsible for all projects in that region, and functional managers who were responsible for operations, commercial, production, preconstruction, project bids, etc. At the project level, each project was managed by a project team including a project manager, engineers, a quantity surveyor and a supervisor. Project Beta was procured and operated by Found Gamma's Southern business stream.

The client was a private-public joint venture, referred to herein as BetaJV, consisting of the City Council and two private sector partners managing private sector funding and development of the scheme.

7.2.2 Structures

Procurement systems

Three phases of the city redevelopment scheme were further divided into programmes of projects and each programme was competitively procured among various main contractors, meaning that the relationships between BetaJV and the main contractors might be inconsistent between programmes. In this case, Office Plc. competitively bid for the main contracts of the infrastructure, enabling works and the office building Beta.

However, for the other building in the first phase, Office Plc. lost to their competitor. Therefore, the client and main contractor relationship was transactionally-based, and no future relationship was structured after project Beta.

Office Plc. and BetaJV agreed on a lump sum contract for on-site works including the demolition, foundations, podium and the office building Beta. The contract was under Joint Contracts Tribunal 2011 (JCT 2011) with 30-day payment. The client was responsible for planning and design. The lump sum contract transfers risks from the client to the main contractor, which can drive main contractors to pass these risks further down to supply chains. The burden of risks can induce insecurity and opportunism in supply chains when uncertainties arise during operations. Partly because of the lump sum contract and one-time relationship with the main contractor, BetaJV had limited involvement in the supply chain, hence little influence on supply chain relationships. The design and build (D&B) of the piling and foundations was competitively tendered among three piling contractors that had been invited by Office Plc. The D&B piling contract was under JCT 2011 with 45-day payment. Originally, the contract was a lump sum, but it was changed to remeasurement during execution. Changing a contract from lump sum to remeasured means that risks are transferred from the subcontractor to the main contractor, indicating the main contractor's willingness to take the risk for the subcontractor's actions, hence increasing the level of trust.

Competitive procurement systems cannot ensure the continuity of relationships, either between the client and main contractor or between the main contractor and supply chain. The initiation of trust and trustworthiness thus mainly relies on agency and ties at the micro-level.

Organisational systems

Office Plc. had a supply chain management (SCM) system to ensure that their suppliers were qualified for bidding projects. Suppliers had to register on an online system if they wanted to become part of Office Plc.'s supply chain. The online system stored suppliers' information such as finances, quality, health and safety, sustainability and commitment to transparency. The SCM system also had a scoring system regularly assessing and recording suppliers' technical, relational and organisational performance during execution and post completion. When Office Plc. needed to procure specialist projects, the SCM unit selected three or four suppliers based on supplier information and scores

and the procurement team invited these suppliers to the competitive bidding process. SCM systems can transfer information at the project level to the organisation level and vice versa. Potentially, this ensures links between the project and organisation levels in the project lifecycle and can at least maintain ‘sleeping’ relationships with supply chain members until the next project is activated.

As mentioned before, Found Gamma was the piling and ground engineering unit of Gamma UK, a major construction firm. Found Gamma’s operations were supported by the enabling functions of Gamma UK, such as finance, communications, and health and safety systems. Support from the parent organisation can ensure resource continuity and increase the reliability of Found Gamma.

7.2.3 The shadow of the past

At the organisation level, Found Gamma as a whole company conducted businesses with Office Plc. every year. A recent project with Office Plc. completed by the London business stream had quality issues and reduced Office Plc.’s competence trust in Found Gamma. The Southern business stream had successfully completed two building projects several years ago.

In the face of problems in the recent project, Found Gamma admitted its own mistakes:

The previous contract, we didn’t help ourselves where we didn’t achieve what we said we were going to achieve, contractual wise and [in] the programme. And there’s a number of quality issues on that job as well.

(Quantity surveyor, Found Gamma)

The acceptance of mistakes was associated with learning from lessons and identifying and correcting problems. It also raised a spirit of improving the reputation, which can help sustain trustworthy behaviour in interactions.

At the micro-level, Office Plc.’s project director in project Beta had worked with Found Gamma on more than five projects and had maintained active ties with the Southern business stream’s managers over a number of years. They had continuous informal business interactions to ask each other’s advice on their own projects. Such continuous

relationships and interactions can sustain mutual understanding of each other's requirements and interpersonal trust.

7.2.4 Case analysis

Conditions for trust

Past experiences reduced Office Ltd.'s competence trust in Found Gamma, particularly the capability of ensuring quality. From the perspective of Found Gamma, partly because of the long-term relationships between key actors, Found Gamma had the spirit of improving their reputation in the face of the negative experiences and outcomes of the London project. Such spirit added an element of relational orientation, a sense of responsibility and the awareness of proactive relationship management at the micro-level, which was conducive to trustworthy interactions. Moreover, the spirit of improving reputation can facilitate a transformational approach at the project level. A transformational approach differs from a transactional approach, which predominantly focuses on costs and project efficiency, even if it is at the expense of the collective value of programmes of projects. The former, in contrast, relies on leadership, norms, cultures and codes of behaviour to achieve effectiveness and continuous performance in a self-sustained way. However, the effect of a transformational approach at the project level can be constrained by a transactional approach at the organisation level. The discontinuity of relationships and a lump sum contract implies the management of projects in a project-by-project way, although SCM can help sustain weak relationships between projects. Without well-structured relationships or relationship management systems across projects, the transformational approach needs to be built from scratch in each project and the effect tends to be inconsistent.

Initial trust

At the organisation level, the threshold of competence was low: Office Plc. was concerned about Found Gamma's capability to manage projects to the quality standards. In contrast, at the micro-level, the project director's trust in Found Gamma and long-term interactions and relationships between key actors maintained a high degree of competence and intention trust between the two parties.

7.3 Procurement and preconstruction stage

7.3.1 Proactive involvement in main bid submission

In the main bid submission, Found Gamma proactively engaged with Office Plc. and gave professional advice. At the micro-level, Found Gamma allocated a bid manager who had a long-term relationship with Office Plc.'s project director as the main contact between the two parties. Familiarity and mutual understanding at the micro-level can facilitate service interactions and trust development at the project level. The proactive engagement was also supported by the spirit to “*make a good impression*” and “*get back into [Office Plc.'s] good books*” (Project engineer, Found Gamma).

At the organisation level, Found Gamma helped improve the main bid, and foresee and address potential problems in project Beta. The shared experience of early involvement optimised value propositions on the one hand, and, on the other hand, built a shared understanding of project requirements and risks between organisation levels. The process of intense interactions at the front end and the outcomes in terms of winning the main contract, knowledge and relationships can induce trust at the project level and lever service value in future use.

7.3.2 Limited competitive procurement

Office Plc. started to procure the piling D&B and, in August 2014, piling works were tendered among three subcontractors prequalified by Office Plc.'s supply chain management (SCM) system. Found Gamma had a good overall performance score that enabled them to tender for project Beta, despite the London project. The SCM system was also used in selecting suppliers. By looking at the information and scores in the system, key actors who had no prior experience with Found Gamma, such as Office Plc.'s quantity surveyor and project manager, were able to know about Found Gamma beyond the recent project. As mentioned, SCM systems transfer knowledge between the organisation and project levels and thereby support a more comprehensive way of learning about supply chains. Thus, in this case, the negative influence of the London project on trust and relationship at the meso-level was reduced.

Knowledge secured in the early involvement, when combined with Found Gamma's own specialist knowledge and skills, demonstrated Found Gamma's technical, organisational and financial capabilities in procurement. Mutual understanding at the micro-level,

knowledge about main contractor's value and the shared understanding of project risks can generate the perception of trustworthiness and enhance service interactions at the meso-level.

Found Gamma's bid was not the lowest. However, the project team preferred Found Gamma due to the complexities and uncertainties of project conditions that required experienced subcontractors with reliable resources and insurances such as Found Gamma.

...we picked [Found Gamma] because they've got the expertise and competence there [to deliver] this type of piling. There are not many [that] can do this. There are maybe four or three.

(Project director, Office Plc.)

The project requirements limited the number of choices in the market, potentially leading to a more balanced main contractor and subcontractor relationship.

Nevertheless, at the organisation level, senior management was suspicious about Found Gamma's capabilities due to the problems in the London project. To persuade senior management, Office Plc.'s project director had meetings with the managing director and shared his experiences with Found Gamma – how they collaborated to deliver projects and maintained goodwill for mutual benefits over the years. They also discussed causes of the problems in the London project and how to mitigate these problems. In doing so, confidence at the organisation level increased.

On Found Gamma's side, apart from the bid manager, Found Gamma allocated estimators who had experience with Office Plc. They also had the project manager participate in the bidding process to create continuity between the procurement and execution phases. None of the actors in project Beta had been involved in the London project. These staffing and relationship management practices indicated that Found Gamma learned from the past, foresaw potential problems and mitigated relational risks in advance, which can increase familiarity and reduce potential conflicts, hence reducing the possibility of trust eroding at the project level.

In early 2015, Office Plc. directly informed Found Gamma of their decision and did not try to lower or manipulate Found Gamma's price, even though the price was not the lowest amongst the bidders. From the perspective of Found Gamma, this signalled Office Plc.'s

trust in them and increased the reliability of Office Plc. From the perspective of Office Plc., the collective faith was that Found Gamma were able to understand project requirements, ensure operations, provide flexibility and produce solutions to complex issues.

However, at the beginning of contract negotiation, Office Plc. attempted to impose risk terms of the main contract to the piling contract in order to transfer its own risks to Found Gamma, even though they knew that subcontractors would reject certain terms, which indicates the opportunistic intention of the main contractor. An example was the liquidated damage charge for delay. This term was unfair in that some delays might be caused by factors out of Found Gamma's control. Also, the amount was high considering the value of the piling contract. Found Gamma responded to the action with a defensive attitude, for instance, *"We have [stated] very firmly that we are not going to engage in doing that"* (Project director, Found Gamma) and *"If there is something that we cannot accept, we will not take the job"* (Bid manager, Found Gamma). Both opportunism and defence are harmful to trust and trustworthiness in service interactions.

Instead of persisting with these terms, Office Plc. was willing to negotiate with Found Gamma to reach *"somewhere in the middle"* and *"a fair conclusion"* (Quantity surveyor, Office Plc.). The practice of imposing risk terms first and negotiating later implies a transactional approach to managing supply chain relationships and hinders trustworthiness and trust in supply chains. The subsequent negotiation was open and fair as perceived by both parties. Different opinions were expressed with reasons and discussed until agreement was reached. Terms and conditions were largely co-determined. Two-way communication can induce the perception of equity and reciprocal value propositions, which is conducive to initiating and sustaining trust and trustworthiness in interactions.

7.3.3 Early involvement in the design

While contract terms were still in negotiation, Found Gamma were involved early to help design and apply value engineering. They set up design meetings and risk workshops to share project information, identify risks and discuss solutions, and, in this way, optimise piling design as well as the overall scheme. Intense interactions prior to execution can optimise value propositions and core offerings, which is a type of value co-creation in a broader sense and potentially leads to value for the client. More importantly for the supply

chain relationship, it can create operant resources such as knowledge and relationships that can lever service value in future use.

For instance, the ground condition of Beta was uncertain, and the risk of disturbing service tunnels was high. In order to gain better solutions and mitigate the risk, Found Gamma shared their specialist knowledge and remained responsive to Office Plc.'s requirements. They produced variable risk assessment and methods statements (RAMSs) and, as Office Plc. reviewed, demonstrated their rigorous procedures and systems. On the other hand, Office Plc. proactively engaged with Found Gamma and shared quality information to facilitate Found Gamma's design. Mutual service is built upon trust relationships. Through joint activities, risks were mitigated and design was optimised. Shared understanding and improved relationships can enhance value co-creation and trust at later stages.

7.3.4 Case analysis

Conditions for trust

The SCM system created a condition for better learning about supply chains by providing information about suppliers' overall performance. As actors referred to the information, the SCM system helped mitigate the negative influence of the London project. Moreover, the status and reputation of Gamma UK, Found Gamma's parent organisation, reduced perceived external risks.

I think [Found Gamma] probably do reduce the risks... We know they are big... If you get a cheap price with a small company, they could go into liquidation halfway through. That is a big risk for us... I think having a company like [Gamma UK] to do it certainly makes us more comfortable. Because we know their experience and they have the right level of PI [professional liability] insurance as well to cover everything that might have or could happen.

(Quantity surveyor, Office Plc.)

The above quote indicates the systematic information about Found Gamma's financial capability and the reputation of their parent organisation provided a sense of security that made Office Plc. "more comfortable".

The complexity and uncertainty of project Beta led to there being fewer alternatives equivalent to Found Gamma in the market and hence a more balanced power relation between Office Plc. and Found Gamma. Although the use of power depends on agency, actors in balanced power relations have fewer opportunities for opportunistically imposing power on the other party. Hence, fewer alternatives in the market potentially created a conducive environment for establishing trust and trustworthiness.

Interactions

At the micro-level, boundary agencies such as the bid manager of Found Gamma and project director of Office Plc. induced familiarity and mutual understanding in service interactions at the organisation level.

I've done piles with them before and I understood what they need to do and how they need to go by doing it... It's having those relationships once you've finished. [If] you have a good job, if you've got good people, you always keep relationships with people... Because at some stages you might come across something that you want somebody that can give you some advice... I've done that with [Found Gamma] since 2007, 2008... [Found Gamma] know what I expect on my projects.

(Project director, Office Plc.)

Continuous interactions and mutual understanding increase confidence in the supply chain's capability and intention, which can have implications for trust at the meso-level. In this case, interpersonal trust influenced trust at the organisation and project levels through interactions between Office Plc.'s project director, senior management and project team.

At the organisation level, Found Gamma's cognitive and behavioural learning from the past and proactive involvement in the main bid mitigated the negative influence of the London project prior to the procurement stage. The shared experience of co-producing the main bid demonstrated Found Gamma's specialist knowledge and experience but also showed their commitment to Office Plc.

Early understanding of what they are doing can make a big difference to what we do. Because sometimes they say, "Here's the price", and we will say, "You are doing this and this. But if you just change that a little bit, we could do this, which

will improve the programme by half.” You won’t get that if you don’t have the early involvement to try to understand what is going on around, not just we are going to do but what other people are going to do around us.

(Bid manager, Found Gamma)

Intense interactions at an early stage benefited core offerings but also generated operant resources such as knowledge and relationships that can lever service value in the future.

Knowledge gained through early involvement was transferred to the procurement stage through the boundary agency, together with long-term interpersonal relationships, reduced perceived external and relational risks, and generated competence trust.

I think that [trust in Found Gamma] has been [increased by] putting the right staff on it. And early engagement with us to understand what our drivers are, what restrictions are for the project. They just understand the project. And they [were] involved early on, before the bid, to give us some early advice.

(Project director, Office Plc.)

Shared experiences such as design meetings and risk workshops provided opportunities for mutual learning, though such learning was not necessarily intentional. The primary intention of joint activities was to resolve project-specific tasks and problems. The perception of competence and integrity emerged reflexively as Found Gamma maintained their integrity in providing effective solutions. In other words, project actors engaged with each other to address emergent changes or identify risks, but, through these experiences, Found Gamma gained competence and intention trust.

During the tendering, they were with us. When they won the job, they worked with us to make sure that we’ve got a) the right solution, b) understood the problem of the main tunnel... There’s been a lot of communication, coordination and consultation about working close to that road tunnel underneath. So, before and after they won the job, in terms of communication and working with us and solving problems, they’ve been really good.

(Project manager, Office Plc.)

The above quote also indicates that trust was mainly built upon the capability of improving project efficiency. Up to this point, maintaining the collaborative relationship was to utilise Found Gamma's resources to reduce costs and external risks, avoid rushed plans and have an early start, hence trust being largely self-interested.

Self-interested orientations are evident in contract negotiation when Office Plc. attempted to impose risk terms on Found Gamma. The opportunistic behaviour of transferring risks might be partly attributed to the lump-sum main contract, no relational continuity post completion and associated transactional approach to managing projects at the organisation level. The mobilisation of power as an authoritative resource to control the other party against their wishes hindered the structuration of trust as a resource of domination. Moreover, it formed a 'win or lose' situation in which the other party was defensive and threatened the supply chain relationship.

The tension in the contract negotiation was alleviated in two ways. The first was the project condition discussed above. The fact that there were fewer alternatives to Found Gamma in the market, hence a more balanced power relation, was conducive to initiating equitable communication. The second was the two-way communication.

We would generally either speak to them on the phone or email them but with reasons why: "...however, we don't feel it's safe because... we will suggest this might be a better way to do it." And they obviously will review that and either agree or they might come up with another solution... just conversation that happens between the two parties to try to make sure everybody is happy with what we are going to do.

(Quantity surveyor, Office Plc.)

The dialogic communication, or a "*conversation*", indicates an equitable relationship between the main contractor and subcontractor. In dialogues, the main contractor and subcontractor expressed their own views, listened to the other's views and, in doing so, co-produced value propositions reciprocal to both parties.

The phenomenon of trust

At the organisation level, trust as a rule of signification was largely built upon established interpersonal relationships and trust at the micro-level. The latter provided a sense of

familiarity and mutual understanding that increased confidence at the meso-level, including project and organisation levels. Competence and intention trust further developed in shared experiences of co-producing value propositions. The collective perception was that Found Gamma was experienced, professional and knowledgeable, hence capable of completing project Beta to the contract requirement, and had integrity.

Competence trust and intention trust motivated actors to ask for Found Gamma's specialist advice and share quality information to facilitate Found Gamma to find solutions and mitigate risks in design.

We expect to have some open and honest two-way conversation, really, to be provided with the technical information that we need to actually design and price the works properly. And then, really, it's a good level of quality information.

(Project director, Found Gamma)

Office Plc's openness and responsiveness to Found Gamma's requirements indicates their reliance on Found Gamma to deliver technical solutions. At this point, trust relations were used as authoritative resources for resource allocation and integration – the structuration of trust as a resource of domination.

Nevertheless, the orientation of maintaining trust relations at the procurement and preconstruction stage was largely self-interested. This was particularly evident in the contract negotiation where Office Plc. tried to transfer risks by imposing unfair terms. Maintaining a collaborative relationship was to utilise Found Gamma's resources to reduce costs and external risks, avoid rushed plans and had an early start.

The value of trust

Trust as a rule of signification, or the perception of trustworthiness, encouraged more service communication. As mentioned, the dialogic communication emerged as competence and intention trust developed and resulted in an equitable relationship and reciprocal value propositions. From the perspective of Found Gamma, perceived equity and reciprocal benefits, as well as relationships at the micro-level, increased their confidence in sharing knowledge and offering advice. Service experience therefore became more informative. Shared understanding of project requirements and risks and

each other's organisations increased as a service outcome at this stage, which can benefit future service use.

The effectiveness of value co-creation, in terms of both core offerings and shared understanding, strengthened competence and intention trust and encouraged using trust relations in interactions, hence trust as a rule of signification and resource of domination. In other words, trust and collaboration formed a self-reinforcing cycle, or positive path dependency.

7.4 Execution stage

7.4.1 First-phase piling works

The piling project started in August 2016. The original programme was 15 weeks with two phases. The first phase was seven weeks. When execution started, Found Gamma allocated an operations manager who had a good relationship with Office Plc.'s project director to project Beta in order to develop a solid relationship at that level of the hierarchy. The same project manager remained throughout the project. Office Plc.'s project director also continued to engage in the piling operations. The consistency of key relationships can sustain mutual understanding and trust at the micro-level. Apart from established ties, Found Gamma were proactive to initiate and develop new relationships through face-to-face communication, such as the relationship between quantity surveyors.

Multiple routes and levels of communication were built between the two parties during execution. At the organisation level, Office Plc.'s SCM unit made monthly and quarterly assessments of subcontractors and suppliers' performance. Results were retained in the SCM system as well as fed back publicly on a board on site, which can align understanding between organisation and project levels. On the operations side, project directors from both companies maintained regular contact. The project director of Office Ltd. had his office on site and thus co-located with operatives, which enabled him to communicate with project actors and know about project issues. Also, Office Ltd.'s director had an engineering background and so was able to understand Found Gamma's technical operations. At the project level, Office Plc. and Found Gamma, as well as other subcontractors and suppliers delivering services at the same time, had various formal and informal meetings. Specifically, all supervisors had daily meetings before operations commenced. Project managers had weekly logistics meetings and fortnightly

collaborative planning meetings. Quantity surveyors had informal meetings each week, during which disagreements or questions were resolved. Office Plc. had a contracted package manager to work with Found Gamma on site, keeping site dairies, reviewing Found Gamma's progress and reporting weekly progress to the project management. The package manager had weekly progress meetings with Found Gamma's project manager.

Structured formal interactions ensured regular communication between actors and the multiplexity of communication ensured shared understanding across hierarchical levels within the organisation, different functions and organisation boundaries. Communication in this way can provide a sense of security that is conducive to trust development at the project level.

Through multilevel direct and indirect communication, Office Plc. learned that Found Gamma continuously achieved goals, provided effective solutions, mitigated risks related to damaging service tunnels and tried to exceed the daily programmes whenever possible, which increased their perceived competence. They completed the first stage of piling operations in the first five weeks, two weeks in advance of the programme.

7.4.2 Method and contract change

In delivering the first phase, Office Plc. and Found Gamma found existing foundations that obstructed piling operations and were hard to remove because doing so could damage the service tunnels. On the basis of the competence trust established in previous interactions, Office Plc.'s project director asked Found Gamma for a solution to continue piling while minimising the risk of damaging the tunnels. Found Gamma proposed to change the existing method and use coring piles, which saved the effort of removing any obstructions. This method change further led to contract change. The first option was to keep the lump sum contract and adapt the price to the coring operations. A lump sum contract meant Found Gamma took most of the risks. However, the estimated price was very high due to the uncertainties about the ground conditions and the difficulties of predicting the quantity and length of coring piles required. The lump sum price included various changes and risks that might or might not occur.

Office Plc. took the second option, remeasured contract. While Office Plc. could have tried to negotiate a lower cost and keep the lump sum contract to transfer most of the risks to Found Gamma, instead they openly discussed their own financial difficulties with

Found Gamma and the two parties jointly formulated the contract. The use of a remeasured contract meant Office Plc. being burdened with the external risks since payment was made on the basis of the actual amount of work Found Gamma carried out or the time Found Gamma spent and the rates for a unit of work. The decision, although partly due to the high price of a lump sum contract, reflected a high level of trust in Found Gamma because Office Ltd. relied on Found Gamma's capability and integrity to deliver and also to reduce the risk of going over budget.

7.4.3 Suspension of piling works

After completing the first phase, Office Plc. could not provide sufficient areas for piling operations due to the demolition delay. Found Gamma had to suspend their operations in September 2016 and agreed to leave the site for one month so that Office Plc. could save some costs. During their leave, Found Gamma reserved piling equipment that was hard to book for Office Plc., a signal of their commitment to Office Plc. that is associated with intention trust.

On Found Gamma's side, the problem of a lack of working areas persisted and delayed Found Gamma's operations. Relational risks were perceived by Found Gamma at this point, as illustrated by the company's project director,

I think what is going to happen is that they are going to finish this quite restricted area and we are going to a wider area where our production should increase. I think at that point what we are going to do is to save all the delays... when the deal is done, they wouldn't want to pay [for] our delays and they will argue, "Well, you've gone faster in this bit. You have not really lost any money. All you lost is your opportunity to go quicker and better in your programme and make more profit." ... But that's the prejudging of the situation based on my experience. But we will see how that develops.

Despite the perceived risks, Found Gamma maintained production and delivered as much as they could under the constraints, instead of stopping operations and claiming for compensation. This action, as perceived by Office Plc., was relational and indicated Found Gamma's integrity.

7.4.4 Case analysis

Interactions

Maintaining the consistency of key ties sustained familiarity and shared meanings established at the front end. Boundary agencies such as Found Gamma's project manager and Office Plc.'s project director transferred shared meanings at the organisation level to the project level. Ties and trust at the micro-level ensured the effectiveness of service interactions at the project level.

We are always aware that big rigs are quite a scarce commodity. You should get them secured quite early. To be fair, [Found Gamma] worked quite well on that. So, when we finished visit one after four, five weeks, [and] the pile rigs are for three to four weeks, they agreed to leave [the] pile rigs there... It's just about people being honest and practical.

(Project director, Office Plc.)

The relationship-specific investment relied on agency and mostly from Found Gamma's side, indicating Office Plc.'s self-interested orientation at this stage. Yet it signalled Found Gamma's commitment and, as perceived by Office Plc., increased perceived benevolence.

Also, the two parties structured regular communication at both project and organisation levels. Multiple routes and levels of communication created abundant connections that ameliorated the need for 'safety nets' to prevent communication breakdown, which raised the sense of security in interactions. Moreover, repeated communication built new ties and the multiple routes and levels of connections ensured a shared understanding at different levels between the two parties. For instance, assessment results at the organisation level were fed back to the project level.

People are very pleased to see the scores we receive in terms of performance of the site team and everything. So, it has been given a positive feeling in [Found Gamma] that we can actually work with [Office Plc.].

(Project director, Found Gamma)

The increase in morale and satisfaction of service experiences can sustain trustworthiness on the supply chain's side.

The shared understanding was further ensured by equivalent knowledge bases between the two parties. The allocation of the package manager and the involvement of the project director (both had engineering knowledge and experience) ensured the effectiveness of communication from operations to management levels.

We've got [the project director] who is a very experienced engineer and very experienced with piling. He knows a lot about piling. He's able to have that high-level engineering conversation. We make sure that the person looking after them is equally knowledgeable about piling... we've made sure that they get an engineer that does know about piling [so] that they can have that sort of high-level discussion, especially when they hit a problem – you need to have two people having the same knowledge talking to each other. Also, we've got the director to back up his knowledge.

(Quantity surveyor, Office Plc.)

Equivalent knowledge bases helped Office Plc. make sense of and internalise Found Gamma's technical problems and solutions, reducing perceived risks and suspicion due to cognitive distance. The potential for trust erosion was thus mitigated.

Regular and multilevel communication, consistent ties and the capability of understanding the other party fostered a sense of security in service interactions that trust can be built upon.

Structured formal communication, such as project meetings, short-term programmes and regular performance assessment and feedback, enabled Office Plc. to monitor project performance and through this process know whether and how Found Gamma delivered the project. Multiple routes and levels of communication increased the reliability of results. On Found Gamma's side, they signalled their competence by providing reliable records and achieving and excelling in respect of the programmes. The perception of competence increased. As appraised by the project manager of Office Plc.,

We can rely on them doing what they say they are going to do. If they are going to do 10 piles a week, they did 12 piles a week, which is good. So, they always

slightly exceeded the expectation. So, that is a benefit, doing a little bit more than what [was] planned, which is great.

The indirect interaction, such as monitoring, increased competence trust. In terms of intention trust, it was generated in actor-to-actor (A2A) interactions in joint activities such as solving tasks and problems. For instance, after Found Gamma helped Office Plc. solve problems caused by demolition delay, the project manager of Office Plc. commented,

We've had some problems on the project because of tunnels and other things. [Found Gamma] have worked with us to solve any problems on site, which has been very good. They are certainly not looking to take advantage of situations.

Direct interactions increased the confidence in the other party's intentions, which was 'certainly' not opportunistic. In other words, trust as a rule of signification can be formed in the direct as well as indirect interactions.

Furthermore, trust as a rule of signification partly drove the choice of remeasured contract, as discussed in the next subsection, indicating that trust relations were used as an authoritative resource for service delivery. Moreover, the shared experience of co-determining contract terms sustained perceived equity, especially on the supply chain's side, which encouraged reciprocal interactions between the two parties.

It is about making as [little] pain as possible. But also making sure that we get paid [as] we are entitled to... You've been proactive, you are helping. "You scratch my back, I'll scratch your back."

(Quantity surveyor, Found Gamma)

Reciprocity at this stage was economically-based. The expectation was to gain economic returns through service exchanges. For instance, Office Plc. provided resources for Found Gamma's requirements and needs, therefore better assisting the piling operations, and expected an efficient and effective delivery process and outputs. Found Gamma achieved programmes and tried to satisfy Office Plc.'s needs, expecting to obtain fair payment and profits in delivering the service. Reciprocity and perceived trustworthiness ensured the recursive use of trust relations to deal with uncertainties. In this vein, reciprocity generated and maintained trust as a resource of domination in the supply chain relationship, which, in turn, reinforced reciprocal interactions for economic value.

The phenomenon of trust

Competence trust increased as Found Gamma continuously achieved goals but also excelled in the programme during the first-phase piling works. Found Gamma's consistent service quality, willingness to cooperate with Office Plc. and help in solving Office Plc.'s problem, as perceived by Office Plc. in service interactions, generated the perception of integrity and benevolence. Intention trust encouraged Office Plc. to be open and honest with problems and tolerate more uncertainties such as changing to a remeasured contract.

Trust as a resource of domination was reinforced by the perception of trustworthiness. Specifically, the perception of integrity and benevolence, together with ties and trust at the micro-level, motivated Office Plc. to manage contract change jointly with Found Gamma, hence using trust relations as a facility of resource allocation. From Office Plc.'s perspective, the remeasured contract might mean they ended up either saving the costs of not-happening or non-existing risks or spending more than the lump sum price due to the emergence of unexpected changes and risks. Found Gamma's opportunism might also increase costs. The final cost depended on project conditions but also Found Gamma's capability and integrity. In other words, Office Plc. relied on Found Gamma to deal with project uncertainties. Although partly because of the financial problem, the decision was driven by perceived trustworthiness accumulated in previous interactions.

We trust them to get on with them [the tasks] because they are specialists... I'm pleased with them that way... So, we take the risk on that [remeasured contract].

(Project director, Office Plc.)

The choice of a remeasured contract avoided a 'win or lose' situation and thereby reduced the potential to erode intention trust.

Increased competence and intention trust and the use of trust relations in resource allocation motivated Office Plc. to give more flexibility to Found Gamma.

They rarely step in to stop us, to say that, "I think something could have been done better." So, on many jobs you could be stopped regularly by the client who thinks we could be doing this in a different way or safer way or another way to produce a better product. But this doesn't happen [here] as they monitor our work,

to step in to express some kind of concern or disappointment or something. They basically let us get on [with] the job and don't meddle too much in what it is and how it is doing. There's a trust from them that we have the skills and the knowledge of the company and we get it [to] go the way they want.

(Project manager, Found Gamma)

Giving flexibility was perceived as a sign of trust, which can induce trustworthy behaviour to ensure that “*we get it [to] go the way they want*”.

Furthermore, this trust-trustworthiness interaction resulted in Office Plc.'s perception of Found Gamma as “*...taking great pride in delivering a quality product in time*” (Project manager, Office Plc.). The perception of “*taking great pride*” mitigated opportunism and strengthened the perception of trustworthiness. Therefore, the mobilisation of trust relations supported the structuration of trust as a rule of signification.

Lastly, the orientation of trust was still self-interested, which was to use Found Gamma to achieve Office Plc.'s goals. As mentioned, this is evident in the limited relationship-specific investment of Office Ltd. at this stage, though the emergence of shared intentions laid the foundation for transformation, as discussed in the next subsection.

The value of trust

Two-way communication and the phenomenon of trust ensured the intensity but also increased the content of communication as Office Plc. shared information beyond project Beta *per se* and included information about the company.

Office Plc.'s willingness to share and learn with Found Gamma, as perceived by Found Gamma, motivated Found Gamma to be open and honest and go ‘the extra mile’. As the project director of Found Gamma observed,

We felt like we will be listened to when we have problems and that makes you want to go on and do the extra bits to be able to help solve the problems... We

were open and honest when we had mistakes... we had to put something right and we do it. Such two-way communication and behaviours all the time.

The perceived trusting behaviour was reciprocated by trustworthiness. Thus, service experience was more informative than the last stage and knowledge secured can help produce or optimise solutions.

Using trust relations reduced the use of contractual mechanisms as safeguards when faced with uncertainties. This was evident at the beginning of the second phase of piling works. Although Found Gamma were uncertain about whether Office Plc. would compensate them for delays, they kept cooperating with Office Plc. and producing as much as they could to achieve the programmes. In this vein, the phenomenon of trust made service experiences more flexible and ensured the continuity of delivering service contents and the value proposition.

The structuration of trust as an authoritative resource induced shared intentions as a service outcome, which can be inferred by the repeatedly mentioned phrase, “*you are only as good as your last job*”, by interviewees from both parties.

It's the phrase, “You are only as good as your last job.” If you are as good as your last job and that's a good job, that's a reputation.

(Quantity surveyor, Found Gamma)

...we all get on, we all want to make it successfully... You are only as good as your last job, so why don't we make it work... The other thing is we've got pride in what we do... If you've got pride, you want to do a good job anyway.

(Project director, Office Plc.)

Shared intentions increased Found Gamma's confidence and satisfaction in the service provision.

I think that's been very positive within the business for [Found Gamma] to see [positive feedback] after we had a... big problem [in the] contract with [Office Plc.] in London.

(Project director, Found Gamma)

Shared intentions and satisfaction in service experiences, or “*taking great pride*”, laid the foundation for sharing responsibilities, co-creating value in the supply chain relationship, and transforming self-interested orientation to social orientations at the completion stage.

7.5 Completion stage

7.5.1 Second-phase piling works

Throughout the project, Office Plc. and Found Gamma maintained consistent project teams. Consistency can sustain ties, shared meaning and trust at the micro-level but also the way of interactions and service quality at the project level.

The collaborative way of interactions was sustained and routinised at the project level, which supported as well as was supported by the phenomenon of trust in previous interactions. In the face of the difficulty of having sufficient working areas and operating productively, Found Gamma maintained trustworthiness by providing a consistent service, trying to achieve programmes under constraints and finding the best solutions. On Office Plc.’s side, they did not blame Found Gamma for the delay and tried to resolve problems according to Found Gamma’s needs, a signal of competence trust. They maintained fairness in service interactions. Reciprocally, when Office Plc. had difficulties in setting up certain areas for piling operations during weekdays, Found Gamma proactively proposed to work at weekends in order to facilitate Office Plc.’s works and achieve the programme. The management of project and relationship at the project level moved towards an approach based on social capital theory.

Found Gamma’s perception of relational risks as demonstrated at the beginning of the second phase was mitigated. This is evident when Office Plc. declined Found Gamma’s monthly payment application in the middle of the second-phase execution. In the face of uncertainties, Found Gamma’s operational actors maintained production while their commercial actors sought constructive communication with Office Plc.’s commercial team. Through formal and informal communication between their commercial teams, Office Plc. and Found Gamma resolved the misunderstanding and the payment issue. Rather than blaming or relying on the contract to transfer liabilities, the disagreement was eventually resolved in a relational way.

7.5.2 Project completion

However, the effects of the relational approach on trust and value co-creation at the project level were constrained by the discontinuity of the relationship and transactional approach at the organisation level. As project Beta came to an end and no future business was secured, both parties tended to focus on profits that could be actualised in the project. On Office Plc.'s side, they reduced their involvement in the piling works and started to prepare for specialist projects following the piling project. Office Plc. authorised Found Gamma to make most of the decisions related to the piling operations. Although an indication of trust, less involvement can hinder further trust development. On Found Gamma's side, they had no further interactions with Office Plc. at the organisation level. Learning was largely based on project-specific tasks, "*whatever [was necessary] to get the job built quicker and more efficiently*" (Project manager, Found Gamma), which indicates a more transactional approach to managing relationships.

The piling project was completed in late March 2017. Found Gamma and Office Plc. applied, negotiated and settled the final account for project Beta within one week, indicating a good service experience. The programme had been delayed for nearly two months. Nevertheless, both parties were satisfied with the outputs and relationships with each other. Office Plc. saved £150,000 in coring operations. Found Gamma increased the scope of works by 30-40%, hence increasing the project's profits. However, despite the good performance, the two parties rushed to their next projects and had little reflexive learning, indicating a transactional approach at the organisation levels.

7.5.3 Case analysis

Interactions

Maintaining consistency had a two-fold meaning. The first was that both parties maintained the same teams throughout the project lifecycle. As discussed before, consistent personnel helped sustain shared meanings that ensure the effectiveness of service interactions at the project level; the latter induced trust in the supply chain. The second meaning was routinising the collaborative way of service interactions, hence maintaining the quality of service experience and value co-creating, especially under uncertainties.

...they were quite happy to keep going and trying to find different solutions for us... So, I think that is probably what made us feel more comfortable.

(Quantity surveyor, Office Plc.)

Maintaining a consistent service also provided a feeling of being “*comfortable*”, or a sense of security, that helped sustain trust at the micro- and project level.

Repeatedly going the extra mile, such as proactively working during weekends, strengthened the perception of integrity and benevolence.

...we were working together as a team... you got the same sort of values that you have... they understand the bigger picture... they want the project to be a success, not just get their work done and go.

(Quantity surveyor, Office Plc.)

Shared intentions were also reinforced and recreated trust as a rule of signification. In the last-round interviews with different informants on both sides, terms indicating shared intentions or mutual benefits, such as “*understand[ing] each other*”, having a “*two-way street*” and “*the same mind/level/bases/page/attitude/point*”, appeared as frequently as 28 times.

Furthermore, shared intentions drove social orientations. Under social orientations, Office Plc. considered Found Gamma’s value in order to uphold the relationship.

...having that good relationship would always be the best part for the job... trying to understand the other person’s point of view, where they are coming from and why they are arguing about something or [in] dispute about something.

(Quantity surveyor, Office Plc.)

Social orientations sustained the use of trust relations, reduced the use of contractual mechanisms but also encouraged taking responsibility in value co-creation. This is evident in the way and attitudes Office Plc. used in resolving piling delays. In other words, value co-creating activities intensified with the structuration of trust as rules and resources.

The effectiveness of value co-creating and economic reciprocity motivated actors to continue trusting and trustworthy interactions, which gradually fostered relational norms. These actor-generating norms, in turn, guided the behaviour of both parties at the project level.

...working together, collaboratively, understanding each other's drivers and trying to help each other... We have to do what we say on the table... if you are a gentleman, if you have a handshake, you have to stick to [it]. Integrity and honesty... it should go for both companies.

(Project director, Office Plc.)

Relational norms such as integrity and honesty motivated actors and organisations to work collaboratively, try to understand each other's drivers and help each other: “do what we say on the table” and take responsibility for their own mistakes. Actors and organisations would “stick to” a gentleman's agreement on creating value. In this vein, actor-generating norms emerged and were legitimated in day-to-day interactions at the project level, generating trust as a rule of legitimation. Relational norms raised relational thinking that emphasised the integral role of the relationship in exchange, hence maintaining the social orientation and constraining opportunism or coercive power in the service provision. These norms formed relational expectations that were fulfilled by collectively-accepted ways of delivering service and value. In other words, trust and value co-creation formed a virtuous cycle at the completion stage.

Conditions for trust

However, the cycle was counter-balanced by the foreshortening shadow of the future between the two parties. The inter-organisational relationship was largely constrained by the short-term transactional value and the project-by-project managing approach, as the project director of Office Plc. implied,

[Found Gamma] are stronger in some areas of works than the others. But other companies are probably better on other types of piling works... They won't want all the money in one basket, anyway.

With no business secured in the near future or a well-structured strategic relationship, social orientations at the last stage remained at the project level, which was to ensure

mutual benefits that could be co-created and distributed within project Beta. Learning was also constrained, as the project director of Found Gamma mentioned,

I wouldn't say we have a formal method [for learning with Office Plc.], such that it tends to go on a project-by-project process... We should probably try to sit down at higher level with [Office Plc.] and try to understand better why this project went really well or really bad... I don't think we are very good at doing that in construction, actually. It tends to wait until the next project comes along... particularly if you have problems... nobody wants to go back and think about them again.

On Office Plc.'s side, although project learning could be transferred to the organisation level through the SCM system, to use resources obtained in project Beta to achieve continuous improvement required well-structured relationships that ensured regular business interactions. Without such guarantees, the value of knowledge, relationships and trust in the future use largely depended on agencies. The project director might continue to regularly contact Found Gamma's director and managers after the completion; relationships kept leveraging value for the organisations in this case. But others might not. As the project director of Found Gamma demonstrated,

Not formally [learning with Office Plc. after completion]. It sounds crazy... what we rely on is actually their director's feedback into [Office Plc.] that "We worked well with [Found Gamma]." There's never an agreed incentive to go back to a client. Because everybody just wants to move on.

The transactional approach at the organisation level constrains the transferring of resources from the project level to the organisation level and the emergence of service ecosystems. Resources and processes that emerged at the project level can hardly influence processes and value co-creation at higher-level service ecosystems. In this vein, without organisational support and structured relationships for future business, relationship value and trust might easily be lost when individuals are redistributed, and trust relations are not embedded at the organisation level.

The phenomenon of trust

Using trust relations as authoritative resources in service interactions reinforced the structuration of competence and intention trust. Competence and intention trust gave

Found Gamma more flexibility, hence authority in the piling operations. The mobilisation of trust relations, furthermore, shaped the rule of legitimation as relational norms emerged and were legitimated in recursive trust-based interactions. Trust as a rule of legitimation sustained the use of trust relations and trust-based interactions, especially in uncertainties, through relational control.

Social orientations emerged and promoted actors to take responsibility and rely on established relationships rather than contractual mechanisms to deal with disagreements and misunderstandings. However, under the foreshortening future, social orientations at the last stage remained at the project level, namely ensuring mutual benefits that could be co-created and distributed within project Beta.

The value of trust

The two parties collaborated to jointly pursue mutual benefits, facilitating the co-creation of value both in terms of the service experience of the two parties and other organisations directly involved in the execution, and in terms of inducing the potential for project outcomes that realised greater value in use. The emphasis in the analysis below is on the service experience where trust was a key part of the developing interactions and hence the inter-organisational relationship.

As mentioned, trust as a rule of signification and resource of domination helped form an open and equitable environment where actors were receptive to opinions and addressed discontents in a professional, yet relational way and facilitated resource allocation and integration for value co-creation. In this vein, service experiences became more informative and flexible and created shared understanding and intentions, which levered value of service use in subsequent interactions.

At the completion stage, trust as a rule of legitimation increased the cohesion of service coordination. Cohesion first indicated the stability of the relationship especially under uncertainties.

And we've continued to find out that [Office Plc.] are not great payers, their cash flow is really [bad] ... that could be really frustrating sometimes... but... what we learnt from [Office Plc.], from my perspective, is about that team, the correct site

team. And [Found Gamma] as a whole has learnt we don't have to have that experience like the previous project. We can have a different and better experience.

(Project director, Found Gamma)

Relational norms furnished the relational thinking and avoided opportunism in uncertainties such as payment delay.

Moreover, cohesion meant that both parties maintained their integrity and focused on the mutual benefits, as illustrated by both parties when they negotiated the final account for project Beta,

In the end, we focused our final account onto delivering exactly that, no more no less. I didn't try to make the extra... I directed my guys you know, "We just want this amount of money."

(Project director, Found Gamma)

That was the quickest final account I've ever settled... So, we talked it through and managed to get to sort of how we win-win. We were both fairly happy with what we can settle [for].

(Quantity surveyor, Office Plc.)

Finally, shared identities emerged as a service outcome in trust-based interactions in which the other party's value was considered in one's own decision and actions.

So, they've got a saving on it and we got paid for the time and materials we did incur. So, I feel like we made a fair profit and they must feel like they knew they got a fair solution that was very transparent... We've proved that we can work very well with [Office Plc.]. Benefits are that internally we've proved that we can manage change on a project very well... And you know, satisfying the customer, I think that is just fantastic... I think we've done a good job for them.

(Project director, Found Gamma)

The relational elements such as shared identities, pride and reputation increased social capital that could lever service value in the future. Nevertheless, without structuring

relationships at the organisation level, the value of social capital relies on agency. It can be lost when actors are reallocated.

In summary, case Beta demonstrates an external supply chain relationship with no shadow of the future between the main contractor and the client or between the main contractor and the supply chain. The supply chain management (SCM) system of the main contractor facilitated learning about the supply chain at the front end by transferring information between the organisation and project level, hence the management of a 'sleeping relationship'. In the shadow of a negative past, a spirit of improving reputation formed among supply chain actors that drove the proactive communication at the organisation and project levels.

In the theorem of duality, the lack of structured relationship management was supplemented by agencies and ties at the micro-level and multiple routes and levels of formal communication. The former increased mutual understanding and confidence that benefited trust and value co-creation at the project level. The latter relied on structuring and ensured regular A2A interactions where relational norms can emerge. Shared learning and monitoring occurred at different hierarchical levels, across functions and boundaries, hence facilitating trust development and shared understanding at the project and organisation levels. The use of trust relations was driven by the contract change but was based on competence and intention trust at the project level, implying the influence of structure of signification on domination. That latter led to trust-trustworthiness patterns of behaviour, which further induced relational norms and the structure of trust as a rule of legitimation.

Top-down, trust as rules and resources influenced communication, resource allocation and coordination in co-creating value and delivering service, and generated social capital such as shared understanding, intentions and identities increased as an outcome of value co-creating. Yet, due to the foreshortening future, its value depended on ties and agencies and could be lost when actors were relocated post completion. In other words, to enhance value generated at the project level requires 1) linking systems between project and organisation levels and 2) structures to ensure the continuity of the relationship, hence the value of social capital, in order to influence events and processes at the organisation level and enhance value co-creation in the service ecosystem over time.

Chapter 8 Case Gamma

Case Gamma tells the story of an inter-organisational relationship between Found Gamma as the piling contractor and its sister company, referred to herein as Build Gamma as the main contractor, in a multiple-use building project.

8.1 Project overview

Gamma was a 27-storey building project in central London. Once completed, Gamma would provide nearly 150 residential apartments and 1,800 square metres of multi-use space on one of the busiest transport hubs in London. The construction site was next to two underground lines. The main risk was disturbing underground transport operations, which can have significant costs and social impacts. The main contract was procured in two stages and the first stage started in August 2015. To satisfy the client’s requirements for early involvement to start piling works, Build Gamma started to simultaneously source the piling contractor; the aim was to involve the piling contractor to jointly develop the main bid. Despite having an in-house sister company, Build Gamma went out to the market to ensure price competitiveness. The processes and main events of case Gamma are illustrated in Figure 10.



Figure 10 The process and events of project Gamma

This chapter particularly concerns the piling project for case Gamma, which was delivered by Build Gamma as the main contractor and Found Gamma as the piling subcontractor.

8.2 Service ecosystems

8.2.1 Project participants

The main contractor, Build Gamma, and piling contractor, Found Gamma, were two functional units of Gamma UK, a major construction company in the UK. Build Gamma was responsible for building projects whereas Found Gamma provided geotechnical engineering solutions and services.

As already mentioned (see 7.2.1), Found Gamma had several business streams in different locations throughout the UK. Project Gamma was delivered by the London business stream. In contrast, each of Build Gamma's project directors were assigned to one project at a time and were responsible for that project from the beginning to the end. The project Gamma team comprised a project manager, commercial manager, planner, construction manager and site engineers.

The client, referred to herein as Alliance Property, was a property company notable for developing iconic building projects. The main external stakeholder was a government body responsible for transport, herein referred to as City Ltd. As mentioned, the site was close to underground lines. Build Gamma and City Ltd. had frequent communication regarding the risk of disturbing underground operations.

8.2.2 Structures

Procurement systems

The client used a two-stage procurement process for the main building. The first-stage appointment was made mainly on the basis of 1) a preconstruction and construction programme, 2) preliminaries including staff costs, and 3) agreed fees for preconstruction services. The second procurement stage was to negotiate and agree on the price. Two-stage procurement can encourage the development of an integrative project team, but it depends on the management approach at the meso-level; it is either transactional or transformational. Moreover, two-stage procurement cannot ensure continuity of relationships or help structure relationships either between the client and main contractor or between the main contractor and subcontractor. Therefore, the client and main contractor relationship was in essence transactionally-based.

To start piling works early, as required by the client, Build Gamma procured the piling project and appointed Found Gamma while preparing the first-stage bid. Intense interactions at an early stage signalled a type of value co-creation – the co-producing of value propositions. Build Gamma succeeded at the first stage and was awarded a Preconstruction Agreement (PCA) under Joint Contracts Tribunal 2011 (JCT 2011). The standard PCA under JCT 2011 does not contain provisions describing a two-stage pricing process or pre-agreement of the contractor's profit and overheads in advance of its second-stage tender. The client has no obligation to accept the second-stage tender of the preferred main contractor. This leaves a considerable scope for misunderstandings and disagreements that can influence the client-main contractor relationship and potentially supply chain relationships as well.

After winning the PCA, Build Gamma started preconstruction services such as site management, traffic management and enabling works while preparing the second-stage bid with Found Gamma. The client paid a monthly management fee to Build Gamma. Meanwhile, Build Gamma and Found Gamma negotiated and signed the piling contract. The piling contract was under JCT 2011 and had a lump sum price, which would be included in the main contract if Build Gamma was awarded the contract at the second stage. A lump sum contract transfers risks to the supply chain and can cause conflicts of interests that negatively influence trust, trustworthiness and value co-creation.

At the second stage, Alliance Property and Build Gamma could not reach an agreement on price and the main contract was back to single-stage procurement in September 2016. Build Gamma re-tendered along with a number of new bidders; none of them could offer the price expected by the client. Failing to pass the second stage and losing the main contract caused uncertainties for Build Gamma and fluctuation of the client and main contractor relationship, which can influence the relationship with supply chain members. Alliance Property and Build Gamma agreed on an extension of the PCA to manage the piling works and preconstruction services until a main contractor was appointed. However, at the time of piling completion, the main contract remained unsettled

Organisational systems

The parent organisation, Gamma UK, is governed through a UK board, executive management team and senior management. The organisational structure comprises nine units operating in different sectors, each having its own managing director and leadership

team. Build Gamma and Found Gamma as internal units of Gamma UK shared common systems, procedures and standards such as finance, health and safety, environment and communications, which can facilitate joint activities and communication between sister companies and mitigate the potential for trust erosion due to conflicts of practices.

However, apart from sharing some resources from enabling functions, Found Gamma was relatively independent with other operating units as main contractors, such as Build Gamma. Found Gamma and Build Gamma had different business, profit goals and organisational structures. Found Gamma needed to bid as an external subcontractor for Build Gamma's project. In this sense, the relationship between Build Gamma and Found Gamma was inter-organisational at the project and programme levels. The organisational structure that separates internal businesses to achieve cost efficiency causes discontinuity of internal relationships. Furthermore, the hierarchical relationship as the structure of domination – that is, the mobilisation of internal relationship to allocate resources instead of trust relationship – can hinder the structuration of trust.

In order to fully utilise its collective knowledge and experience across operating sectors, Gamma UK promoted a 'One Gamma' policy to encourage service integration between internal units. This enabled Gamma UK to provide non-stop solutions in order to increase its competence and reputation. As 'One Gamma' is dispersed within the organisation and continuously communicated between actors, it can influence actors' interpretations such as the meaning of internal relationship, ways of utilising internal resources and the intention of collaborating with internal companies. In other words, organisational policy sets up a rule of signification that can affect the structuration of trust. On the other hand, actors' interpretations are also affected by their own experiences in interactions, in which trust might develop or erode.

At the middle management level, directors of Build Gamma and Found Gamma had biannual business-to-business (B2B) meetings. Routines between internal units provided opportunities for regular communication, developing relationships and co-creation of value between sister companies.

8.2.3 The shadow of the past

The most recent project the two companies delivered before Gamma was project Lemon. Both parties perceived the experience of project Lemon as negative. The potential for

conflicts and trust erosion was embedded by the time project Lemon started. The start date was delayed for nearly one year because of the delay in demolishing the previous structure. Although Found Gamma and Build Gamma spent a lot of time together to co-produce value propositions, jointly agreeing and understanding project requirements and contract terms, for instance, when the project started, the original project teams on both sides were moved to other projects. Inconsistency caused the loss of shared understanding of the project and ties at the micro-level. The new Build Gamma project team had recently joined Gamma UK from an external company, and the management approach was transactional in a sense that Found Gamma was treated as an external subcontractor. This caused disappointment and the perception of inequity on Found Gamma's side, which can reduce the motivation for value co-creation. As the project manager of Found Gamma commented, the Build Gamma project team was "*not [as] good as a 'One Gamma' manager*".

Furthermore, the lump sum main contract did not include the risk of demolition delay, meaning that Build Gamma could not be compensated by the client for the loss of time. In order to make up the time delay and mitigate the risk of delay, Build Gamma changed Found Gamma's programme and forced Found Gamma to accept it, in the name of Gamma UK – that is, mobilising a hierarchical relationship as the authoritative resource to control the other party. From the perspective of Found Gamma, the changed programme was impractical and inefficient, but their voice was neglected. The lack of communication caused a series of problems that negatively influenced the service experience and mutual trust.

During execution, a highly transactional approach was employed in that programmes were frequently changed and imposed on subcontractors to achieve short-term efficiency, even at the expense of long-term effectiveness. The causes of underperformance and effective solutions in the long term were largely ignored by Build Gamma in the face of the tight programme. The transactional approach to managing the project indicates the structure of domination was allocative-resource-based; that is, resource allocation according to cost efficiency. For instance, Build Gamma repeatedly asked Found Gamma to add an additional piling rig to accelerate production. From the perspective of Found Gamma, increasing resources and equipment was unhelpful and the root cause of delay was insufficient working area. From the perspective of Build Gamma, Found Gamma was uncooperative and unable to achieve programmes, so they had to control the programmes

by themselves. At this point, value was non-created in interactions in that neither party could reach a better value proposition and plan for value co-creation.

The use of power to transfer risks and liabilities caused resistance on Found Gamma's side. Power use and resistance formed a vicious cycle that ultimately led to an adversarial relationship and atmosphere.

...if there's any issues, problems, then [Build Gamma] were very much, "It's your issue you sort it out. Come back with the solution." ...They apparently watched us very closely... When there was a problem, it's quite negative... it was more hostile...

(Project engineer, Found Gamma)

Trust rapidly erodes in a hostile environment where constant changes, misunderstandings and underperformance result in suspicion and blame.

Communication eventually became contractual and the focus was "*just to execute obligations*" (Project manager, Lemon). Both parties increasingly referred to the contract and formalised everything to safeguard their own interests. However, claims and requests were repeatedly questioned, denied and unsolved. Value was co-destroyed at this point. The process of value co-creation, non-creation and co-destruction in project Lemon was associated with the worsening relationship between Build Gamma and Found Gamma.

When project Lemon was completed, Build Gamma and Found Gamma were in extensive disputes, which were unresolved by the time the new project Gamma started. Build Gamma charged Found Gamma 25% of the contract value for delay whereas Found Gamma asked for compensation for additional works resulting from changed programmes. The relationship at the organisation level was exacerbated by financial disputes.

In the biannual B2B meeting in March 2015, directors of the two parties supported their own project teams and could not reach a shared understanding of problems and responsibilities. As the operations manager of Found Gamma said, they wanted to "*cut ties*" with each other. The internal relationship complicated the issue as the two companies could not use legal orders to resolve their disputes. Ultimately, the issue was raised for investigation at the Gamma UK board level. The executive management team

urged Build Gamma and Found Gamma to minimise the negative influences on future business.

8.2.4 Case analysis

Conditions for trust

The experience of project Lemon negatively influenced the relationship and trust between Build Gamma and Found Gamma. Specifically, the difficult experiences of working with each other and resolving financial issues with an internal company increased perceived risks of interdependence and lowered the expectation in future business. The delayed programme and financial loss also reduced expectations in Found Gamma's capability to complete a contract to the minimum requirements.

The parent organisation, Gamma UK, influenced trust in two ways. First, it promoted interactions between Build Gamma and Found Gamma in order to repair the relationship at the organisation level after project Lemon. Additionally, routines between internal units such as the biannual business-to-business (B2B) director meeting provided opportunities for joint learning from the past.

But the effectiveness was constrained by the current organisational structure. The organisational structure of Gamma UK separated Found Gamma's business from other functional units' and allowed the contractual obligations to dominate the in-house relationship.

[Found Gamma] have to be careful because they work for other clients, so they work for other contractors. So, there has to be a balance, or otherwise other contractors will never ask them to price the work... And there's a fine balance of what they do. And it's the same for us. If we are doing piling and we ask other piling contractors to quote for us... if we are not seen to be... reasonable, then other piling contractors won't price for [Build Gamma], and we won't become possibly competitive. So, you have to balance that.

(Project director, Build Gamma)

The autonomy of internal units' business, though it seemed to mitigate complacency and maintain the competence of in-house service, encouraged main contractor units such as

Build Gamma to capture short-term profits, even if it was at the expense of long-term benefit across projects. Furthermore, the transactional approach at the organisation level promoted discreteness and transactional practices at the project level. The long-term benefits from trusting and well-structured relations between internal relations were largely ignored at both levels.

From the perspective of Found Gamma, this form of organisation induced a sense of insecurity at the organisation level.

It is a very contractual and transactional relationship. It shouldn't be, but it is... And, because we are the subcontractor, we are always at the bottom of the food chain.

(Project director, Found Gamma)

Such insecurity can lead to a transactional approach at the organisation level, as well as a defensive attitude and safeguarding behaviour, which prevent value co-creating activities.

The structure further constrained the implementation of the 'One Gamma' policy that was supposed to encourage service integrations and continuous relationships between internal units. Under the current organisational structure, and particularly after project Lemon, actors from Found Gamma perceived 'One Gamma' as a rhetoric of using their resources to facilitate other units as main contractors. To look better as a whole, Gamma UK's management might try out of self-interest to capture Found Gamma's profit but not adequately pay them. Found Gamma's project manager in the Lemon project made the following observation,

And when we said that in the first place it couldn't be done in 14 weeks but 16 weeks, they didn't believe us. They said, "As a [Gamma UK] company you need to first assist this." But when we couldn't complete this they said, "You are [Found Gamma] and we are [Build Gamma]"

Contractual relations dominating in-house relations generated the perception of unfairness at the project and organisation levels of Found Gamma, which can dramatically hinder the development of relationship and trust

Interactions

The middle management failed to establish shared learning and invoke actions to exploit the past for future benefits. Directors lacked first-hand experience in the project, and thus belief in the other party's competence and intentions was hard to form. As a consequence, directors avoided rather than dealt with problems.

The last one [B2B director meeting] was a little bit like this [gesture: two fists against each other]. Because [the Lemon project] was still very current. So, there was a lot of talk about [the Lemon project]. People got annoyed, and their voices started rising. But we moved on and talked about other things.

(Project director, Found Gamma)

Cognitively, both parties denied their own mistakes. Behavioural learning from project Lemon was more about building safeguards than exploiting past experiences to better future collaboration. Learning from the past therefore was not constructive to building trust or value co-creation.

Initial trust

The above analysis indicates a very low degree of competence and intention trust due to the experience of project Lemon.

So, at the very beginning of the job [Project Gamma], there was some resistance from [Build Gamma] to use us because of [the Lemon project]. And it took some higher-level people to say, "No, [Found Gamma] is our in-house company. We can't dismiss them because of [the Lemon project]. We have to fix it and move on."

(Project director, Found Gamma)

Service interactions relied on the hierarchical initiative of the parent organisation and routines between sister companies, which were obligation-based.

8.3 Procurement and preconstruction stage

8.3.1 Piling procurement

The main contract for Gamma was open to two-stage tendering in August 2015. To satisfy the client's requirement to start piling early, in October 2015, Build Gamma invited Found Gamma and other two piling contractors for competitive tendering. The low level of trust at the front end influenced actors' interpretations of each other. It is evident that inviting Found Gamma was regarded by Build Gamma as an obligation between internal units of Gamma UK under the 'One Gamma' policy. Most interviewees specifically stressed that appointing Found Gamma was because they offered the lowest price and Build Gamma would *"treat them again as a subcontractor in terms of the contract"* (Commercial manager, Build Gamma).

8.3.2 First-stage main bid submission

After Build Gamma had selected Found Gamma, the two companies formally engaged with each other at the organisation level to jointly develop the main bid. On Found Gamma's side, this stage included the project director, bid manager and bid team. On Build Gamma's side, the project director and his project team were involved at this stage. Early involvement to co-produce value propositions and the potential core offering, which is a type of value co-creation, can facilitate trust development. Found Gamma's actors for project Gamma were largely the same as for project Lemon, whereas Build Gamma's team was totally different. Therefore, there was the potential that Found Gamma's project team would be more influenced by project Lemon than Build Gamma's team.

Found Gamma delivered services for a number of buildings near building Gamma and had information about ground conditions and relationships with the key stakeholder, City Ltd. Based on previous experience and information, Found Gamma optimised the main bid, which helped Build Gamma win the first stage. The process and outcome of early involvement demonstrated Found Gamma's competence, which could cancel the suspension of competence trust due to project Lemon and induce the perception of trustworthiness.

8.3.3 Contract negotiation

Build Gamma and Found Gamma started to negotiate the contract after Build Gamma signed the PCA. Learning from project Lemon, contract negotiation was more about building safeguards, especially on Found Gamma's side.

I think maybe the only thing perhaps carried from [the project Lemon] was that we did very clearly defend our programme at very early stages, the contract negotiation. We defended our position quite strongly and even when we were pushed to perhaps give up a little time... we made it clear on day one that the programme was the programme we submitted with the contract.

(Operations manager, Found Gamma)

The defensive attitude and behaviour indicate Found Gamma's insecurity in collaborating with Build Gamma, which can hinder service interactions and value co-creation.

Found Gamma refused any changes in their programme when the client asked to shorten the duration. At this point, Build Gamma supported Found Gamma and obtained the client's approval to stick to Found Gamma's programme, a manifestation of competence trust in Found Gamma resulted from early involvement. Moreover, the two-stage procurement caused a more equitable supply chain relationship in contract negotiation.

...we probably got a better deal than we normally would do, because there's a possibility that we might have to do the piling for somebody else. So, our tender has to be capable [of] being accepted by another main contractor. So [Build Gamma] couldn't impose their own conditions on us because that might be what somebody else wouldn't want. So, we were in a position to negotiate a better subcontract on [project Gamma] than we might be generally.

(Bid manager, Found Gamma)

The piling contract was therefore jointly determined, which reduced the perception of inequity on the supply chain's side and can increase the reciprocity of value propositions. Co-creation started to grow, which paves the way to trust and for trustworthiness.

8.3.4 Piling design and preconstruction

On the other hand, the two parties started to co-produce the piling design. At the micro-level, the operations manager and project manager of Found Gamma started to be involved at this stage, which can create consistent ties between the preconstruction and execution stages. Consistency can prevent the loss of shared meanings and furnish a sense of familiarity in order to facilitate service interactions and trust at the meso-level. Joint activities increased at the organisation level. The two parties had risk workshops where designers and managers identified risks and identified solutions together. Co-creation optimised the potential core offering but also mutual learning about each other. For instance, based on ground information from past experiences, Found Gamma reduced the number of possible clashes and associated costs. Through the shared experience of developing the main bid and design, competence trust in Found Gamma increased, which can be inferred by Build Gamma's decision to involve Found Gamma in the client meetings and explain their design and technical solutions directly to the client.

Build Gamma assisted Found Gamma's site preparation and welfare, which was perceived as a signal of goodwill on Found Gamma's side.

[Build Gamma] were able to say, "Right we will go back to the client and get some more money for you to help pay for the welfare as well as these two cabinets." They take all the stuff on the walkways around here to help the architecture... It's good. It's a suggestion of goodwill almost. But it helps build a good working relationship with them.

(Project manager, Found Gamma)

Perceived goodwill of the organisation can induce the perceived reliability of the main contractor and thereby reduce safeguarding on the supply chain's side.

8.3.5 Case analysis

Conditions for trust

The policy and practice of the parent organisation helped maintain interactions between Build Gamma and Found Gamma under disputes, such as inviting Found Gamma for competitive tendering. Nevertheless, the shadow of the past kept influencing current

interactions. Perceived risks in collaboration resulting from project Lemon induced a transactional approach to managing relationships with sister companies. To safeguard their own profits, both parties limited relational factors in future service interactions and maintained discreteness from each other.

The two-stage procurement for the main contract provided opportunities for intense interactions and co-creation at an early stage. As discussed in the next subsection, although primarily to co-produce the core offering and increase cost efficiency, they learned about the project as well as each other in the shared experience. Increased knowledge mitigated perceived risks and opportunism, induced the perception of trustworthiness and can encourage trustworthy behaviour in future interactions.

Moreover, the two-stage procurement helped balance the power relation between the main contractor and subcontractor. Although the mobilisation of power depends on agency, a more balanced power relation constrains the opportunity for imposing control on others against their wishes and thereby creates a better condition for trust development. On the other hand, a more balanced power relation encouraged co-determination of contract terms and conditions between the main contractor and subcontractor, which is a co-creating activity. Co-determination can reduce the probability of conflicts due to ambiguity and misunderstanding and lead to reciprocal value propositions. In this vein, two-stage procurement induced a more equitable supply chain relationship and co-creating opportunity, which raised the perception of equity and alleviated the sense of insecurity on Found Gamma's side.

Interactions

Trust as a rule of signification was generated in shared experiences, mostly enabled by structures of service ecosystems such as the two-stage procurement, organisational policy and routines. On Found Gamma's side, they demonstrated their specialist knowledge, skills and resources in helping the main bid development and piling design. Through Found Gamma's technical solutions and advice, Build Gamma learnt about Found Gamma's specialist capabilities, although this was not an intended consequence. On Build Gamm's side, they signalled their goodwill by supporting Found Gamma's programme and welfare, which reduced Found Gamma's perception of insecurity in collaboration.

Value co-creation in these shared experiences was self-interested. From the perspective of Build Gamma, involving Found Gamma early on was done to use Found Gamma's resources, including ground information, technical knowledge and established relationships with City Ltd., to increase their own competitiveness as perceived by City Ltd. and reduce the risk of disturbing underground operations.

*It's a benefited asset to [Build Gamma] ... it's just an asset to have to win jobs...
We can use them to help for the technical systems... to pass on the risk.*

(Commercial manager, Build Gamma)

Found Gamma was perceived as an operand resource to be profited from. From the perspective of Found Gamma, being involved in the main bid development was to direct the main contract content to its own interests, increasing profits and reducing risks in the project.

Despite the self-interested orientations, competence trust increased reflexively as Found Gamma helped improve the value proposition. As commented by the project director of Build Gamma:

...they did give us advice on the logistics and programme, which we used in our first-stage tender submission. So, we put that information in our first-stage tender submission... [Found Gamma] are very educated. So, they understand risks more... [In contract negotiation] [Found Gamma] would ask searching questions. At the end of the day, it is good because it protects everybody.

Found Gamma's competence, past experiences in the local area and relationships with City Ltd. 'protect' Build Gamma, indicating the emergence of security and competence trust. In shared experiences, knowledge about the project and the other party accumulate that can generate the perception of trustworthiness and enhance service use in subsequent interactions.

The phenomenon of trust

The above analysis demonstrated that, through the shared experience of co-producing value propositions and the potential core offering, competence trust in Found Gamma increased. Competence trust developed to the extent that Build Gamma was confident in

Found Gamma's specialist capability to complete project Gamma to the requirements. The perception of competence motivated Build Gamma to consult with Found Gamma, share informational resources and involve Found Gamma in the client meeting. They were also responsive to Found Gamma's requirements and needs due to their trust in Found Gamma's knowledge and judgement. In other words, collaborating with Found Gamma reduced Build Gamma's perceived external risks.

Nevertheless, interdependence was perceived as necessary for successful project delivery but maintained at the level of being sufficient to complete the contract, within which behavioural risk was minimal and worth taking. This perception was shaped by the past experiences but also the organisational structure. Build Gamma was able to use the hierarchical relationship as an authoritative resource to use Found Gamma's resources and the contractual relationship to achieve cost efficiency. In other words, the structuration of trust perception was influenced by the structure of domination at a higher level of service ecosystems.

Trust was largely self-interested in that the expectation on Found Gamma was to "*push back as much as in [the] main contract to subcontractors to pass on the risk*" (Commercial manager, Build Gamma). Found Gamma was perceived as an operand resource to be profited from. The relationship at this stage was essentially transactional and unstable.

The value of trust

Competence trust increased the intensity of communication as Build Gamma shared information and consulted Found Gamma more frequently. The density of communication also increased in that Build Gamma involved Found Gamma in the meetings with the client, which further increased the effectiveness of service communication among multiple organisations in project Gamma. Enquiring, sharing and involving the supply chain in the client meetings indicated an increase in co-creating activities that were emergent and intensified with the quality of relationship, hence trust.

Service communication therefore became more informative. From the perspective of Build Gamma, Found Gamma increased the knowledge about the ground condition and project risks. The opportunity for direct communication with the client, from the perspective of Found Gamma, enabled them to obtain quality information about the

project and build relationships with the client. The client was also able to be better informed about risks and technical solutions. More informative experiences enabled project actors to optimise value propositions that were reciprocal and potentially brought about a good project. On the other hand, shared understanding among multiple organisations as the service outcome at this stage can realise value in use in the execution phase.

8.4 Execution stage

8.4.1 Secant wall delivery

The piling project started in June 2016. On Build Gamma's side, the project director and team were consistent between the preconstruction and execution stages; on Found Gamma's side, the project director, operations manager and project manager remained in the project. Consistent ties at the organisation and project levels can help maintain shared understanding. Found Gamma's project manager can transfer shared meanings co-created at the organisation level to the project team.

Project processes and procedures were structured. At the project level, supervisors jointly agreed daily reports and diaries. Project managers and engineers had weekly progress meetings on site to co-produce weekly programmes, resource plans, and risk assessment and method statements. Found Gamma also used rolling accounts to evaluate and predict the final account after each change and informed Build Gamma about their prediction. In this way, both parties jointly monitored project progress and dealt with issues immediately rather than leaving matters to the final account. Found Gamma's operations manager met Build Gamma's project manager fortnightly. At the organisation level, project directors of both parties were also scheduled to meet regularly. As actors follow formal procedures and processes in delivering the project, they can form shared understanding of roles and responsibilities and gain a sense of security in operations, which help maintain the level of trust. The regular actor-to-actor (A2A) communication can also build new ties and familiarity at the micro-level. In addition, as sister companies with shared systems and standards, Found Gamma and Build Gamma carried out a joint inspection on Health & Safety (H&S) and environmental issues, another shared experience enabled by the internal relation. Through direct and indirect interactions, Build Gamma learned that Found Gamma were able to achieve programmes and develop effective technical solutions, which can increase competence trust.

Yet, Build Gamma had little experiential and reflexive learning about Found Gamma's actions, which is evident in Build Gamma's insecurity when Found Gamma did not provide them with enough information.

Sometimes, we don't actually know how much float is in the programme... You don't get a straight answer. That's the thing they don't tell you. I can't understand... why you have a float in the programme. Is it because [a] machine breaks down? Things become unforeseen in some circumstances.

(Project manager, Build Gamma)

Lacking intended and unintended learning in direct interactions, actors and organisations could hardly form faith in each other. Relationships tended to become unstable when uncertainties occurred.

8.4.2 Second-stage main bid submission

In September 2016, as the client and Build Gamma could not reach an agreement on price, the main contract was back to tender. While delivering the piling works, Found Gamma and Build Gamma started to develop the main bid again. Apart from technical knowledge, Found Gamma used established relations to initiate relationships between Build Gamma and City Ltd. The relationship with City Ltd. was especially important for Build Gamma because City Ltd. was also the key stakeholder for their next project. Going the extra mile like this can induce the perception of benevolence.

Nevertheless, Build Gamma failed the retendering. Although disappointed by the result, Build Gamma agreed to extend the PCA until piling was completed. To save costs, Build Gamma reduced resources at both organisation and project levels and only maintained key actors at the project level. Both project directors withdrew from project Gamma and delegated the management of the project to project managers, which weakened the link between project and organisation levels. This implies a transactional approach at the organisation level that can influence project-level trust and value co-creation between Build Gamma and Found Gamma.

Despite resource reduction, Build Gamma and Found Gamma developed solidarity at the project level. They co-produced solutions and claims to ensure both parties' interests. The goals were aligned and the responsibility in project delivery was clear. Specifically,

Found Gamma delivered the piling works in a more self-sufficient way while Build Gamma dealt with client-facing issues. This manifests the use value of shared understanding as a service outcome in service interactions.

8.4.3 Case analysis

Conditions for trust

The shared systems and common knowledge about procedures and standards enabled joint activities between the sister companies.

We do rely on them to do a good job, and we trust them to deal with what they are supposed to do in terms of quality, H&S, everything else... because you know they are... [Gamma UK], they follow the same standard as we follow, we rely on them to make sure that if there are procedures to follow... they will do it. We rely on them to do it.

(Construction manager, Build Gamma)

With joint inspection, actors were able to identify, understand and solve project issues in A2A interactions, hence reducing misunderstanding and the perception of opportunism.

The role of internal relations was two-fold here. On the one hand, the internal relation reduced perceived risks in collaboration and thus supported the virtuous cycle of competence trust and value co-creation.

But then that risk would be less because it's [Found Gamma], not supposed to be another third-party piling contractor. So, you should imagine that the risk is going to be less there. Because [the] two companies have a better relationship. [We] talk to each other and sort out the problems we are getting. If the situation was with another company, they wouldn't have the same relationship.

(Construction manager, Build Gamma)

On the other hand, the belief in the internal relation substituted intention trust.

Because I know it's [Found Gamma] ...they follow the same standards as I do. I trust that he is doing the job that I would normally do... I don't do as much checking things as I normally do because we are [Gamma UK] together.

(Construction manager, Build Gamma)

Found Gamma was seen as not opportunistic because of the internal relation and associated obligation. Yet, experiential and reflexive learning about Found Gamma's intentions was not evident. Without intention trust, collectives of actors could hardly form faith in each other. Relationships tended to become unstable when uncertainties occurred. This was evident in circumstances where Found Gamma had incomplete information.

A tension was embedded in the internal relation. On the one side was the 'One Gamma' policy that promoted value co-creating activities between sister companies; on the other side was the organisation structure of Gamma UK that facilitated cost-efficient activities. Such a tension put co-creating at the project and organisation levels to chance, largely depending on agency, as the project manager of Found Gamma commented: "*when it works, it works.*" In essence, as implied previously (see 8.3.5, subsection '*the phenomenon of trust*'), injecting market elements into internal relationships formed a two-fold structure of domination in the relationship between Build Gamma and Found Gamma, the structure of allocative resource (market) and of hierarchical relationship as authoritative resource, which can compete with the structuration of trust as a resource of domination.

The 'One Gamma' policy helped sustain the bounded solidarity after Build Gamma lost the main contract. As discussed in the next subsection, the withdraw of resources at organisation and project levels motivated Build Gamma to build closer collaboration with Found Gamma in order to protect their collective benefits from the client.

They push hard with the ['One Gamma'] approach... But really, we are instructed to rely on them... There's a message that we are one [Gamma UK] and we should be working together all the time. It shouldn't get to that contractual way.

(Site engineer, Build Gamma)

‘One Gamma’ brought about norms sanctioning the use of legal orders against sister companies. Although driven by self-interests, bounded solidarity can drive shared intentions and social orientations.

In addition, the loss of the main contract mitigated the potential conflicts of interests under a lump sum main contract, such as cost and programme, which formed a working environment of less financial and time pressure and therefore a positive condition for developing common goals and value co-creation.

Interactions

Staffing at the organisation and project levels ensured consistency between the procurement and preconstruction and execution stages. Ties, familiarity and shared understanding at the micro-level facilitated service interactions at the project level, which laid a good foundation for trust and trustworthiness.

Before second-stage main bid submission, competence trust was generated in regular formal interactions from the project level to the organisation level. Formal interactions enabled monitoring and shared experiences. Monitoring project tasks and performance induced the perception of trustworthiness as Found Gamma achieved programmes and reduced external risks. Also, the shared experience of jointly developing the main bid for retendering, in which Found Gamma helped Build Gamma establish relationships with City Ltd. and provided solutions satisfactory to the client and City Ltd., increased competence trust. This way of interaction, as it improved service experiences and co-created outcomes beneficial for future serve use, was reproduced and gradually routinised, embedding competence trust in the relationship between Build Gamma and Found Gamma. In other words, competence trust and value co-creation formed a virtuous cycle where competence trust served as the medium and outcome of value co-creation.

After Build Gamma’s failure in the main bid, its transactional approach at the organisation level changed the structure of domination at the project level. In essence, reducing resources at organisation and project levels is to use Found Gamma’s resources at the project level in order to save its own costs and reallocate resources at the programme level. In doing so, Build Gamma can increase profits at the programme level.

In the face of reducing resources and on the basis of the internal relationship, bounded solidarity formed between Build Gamma and Found Gamma at the project level.

[Internal relationship] A bit better with collaborating... kind of against the client... working together to make sure that both companies are achieving as much as they can and not making any mistakes that are going to affect the other company.

(Construction manager, Build Gamma)

Bounded solidarity meant that Build Gamma and Found Gamma formed shared intentions of protecting their collective benefits from the client. Bounded solidarity was driven by the recognition of their own powerlessness relative to the client and the economic return from collaborating with each other. As mentioned, the ‘One Gamma’ policy helped maintain solidarity by constraining the use of contractual mechanisms.

Social orientations emerged as actors were concerned with their mutual benefits; the aim was to co-create value with the other party.

[Build Gamma] as a company on this site, they have been very helpful and supportive. And they really try to understand what it is, what we really do, what we need... we do our best to be helpful, and they do their best to be helpful.

(Project engineer, Found Gamma)

The above quote also indicates the emergence of reciprocity in service interactions. Although reciprocity at this stage was in an economic sense – that is, expecting balance of the exchange within the project lifecycle – contractual elements were mitigated in the interactions.

Also, the trust relationship started to be structured as an authoritative resource of domination at the project level – that is, allocating resources based on trust relations per se, rather than in-house or hierarchical relations. The co-creating of value emerged, as collectives of actors formed social orientations. Bounded solidarity and economic reciprocity supported the reproduction of value co-creating and hence competence trust and trust relations as facilities of obtaining resources; the more trust-based service reproduced, the more trust embedded in the relationship. In short, the process of structuring trust as a rule of signification and resource of domination reinforced value co-creation and vice versa.

The phenomenon of trust

Competence trust as a rule of signification was reinforced and encouraged more enquiries and information sharing with Found Gamma. On the other hand, the structuration of intention trust was still hindered by the two-fold structure of domination in the relationship between Build Gamma and Found Gamma, namely the structure of allocative resource (market) and of hierarchical relationship as authoritative resource. Relying on the internal relation constrained the development of intention trust and a sense of insecurity can emerge in the face of uncertainties, as in the case of incomplete information.

Build Gamma's loss of the main contract and reduction of resources changed the structure of domination at the project level. In forming and sustaining bounded solidarity to ensure collective benefits, social orientations and economic reciprocity emerged and promoted the structuration of trust as an authoritative resource of domination. The structuring of trust as a resource of domination enabled the delegation of authority to the supply chain in value co-creation, manifested in the increasing flexibility for Found Gamma. The effectiveness of value co-creation in turn led to the development of intention trust. In other words, trust as a resource of domination can influence trust as a rule of signification. Socially-oriented trust started to emerge as Build Gamma became concerned with mutual benefits in the service provision. Under social orientations, piling programmes, solutions and claims were jointly developed and were reciprocal to both parties. Build Gamma took on the responsibility for obtaining the client's approval and dealing with stakeholder issues so that Found Gamma were able to focus on technical issues and operations.

The value of trust

Trust as a resource of domination delegated authority to the supply chain. From the perspective of Found Gamma, delegation of authority signalled trust and raised the belief that Build Gamma would take the responsibility in the project delivery rather than blame or transfer liability. Such belief increased Found Gamma's confidence in service communication, as mentioned by their project manager,

The best thing is to do is to sit down and chat with people. Surprises tend to be where conflicts come when people are surprised [at] what is happening or not happening. So, continue to speak to the other company to update our progress...

Because we have a good relationship with them, we are very open and honest to say, “This is our contract, programme and date. We think we can finish on this date instead of by doing this and this.”

Found Gamma became more proactive in giving advice, which enhanced service experiences and potentially led to better core offerings. Also, frequent communication mitigated conflicts and “*surprises about what is happening or not happening*” (Project manager, Found Gamma), thus reinforcing shared intentions and bounded solidarity. In this vein, value co-creation became intensified with the development of trust.

Furthermore, enhanced service communication generated knowledge and relationships that can lever value for future service use. From the perspective of Build Gamma, knowledge about City Ltd. could be reused in the next project in which City Ltd. was the key stakeholder. From the perspective of Found Gamma, they built relationships with the client that can bring about future business.

Lastly, the use of trust relations reduced contractual mechanisms and suspending judgements in uncertainties. Resource integration became more flexible and the project became more absorptive and adaptive to changes and uncertainties.

8.5 Completion stage

At the project level, the collaborative way of interactions in which Found Gamma took the responsibility for delivering the contents and Build Gamma dealt with the client was routinised. Despite giving Found Gamma more flexibility in their operations, perceived risks reduced, and few contractual mechanisms were used at this stage.

The virtuous cycle of trust and value co-creating enabled more joint activities not only to resolve project-specific tasks but also to help each other’s future projects. At the project level, Found Gamma engineers introduced Build Gamma to different types of pile and the requirements for their operations. Build Gamma shared their knowledge and experience as a main contractor to help the future business of Found Gamma where the client required Found Gamma to act as the main contractor and deliver integrated solutions including piling and temporary works.

The project-level performance and relationship further improved the relationship at the organisation level. By the end of project Gamma, Found Gamma and Build Gamma had

secured future business with each other, an outcome of value co-creating activities. Furthermore, Build Gamma invited Found Gamma's project directors to their internal directors' forum in order to increase mutual understanding, produce better collaboration and identify potential business opportunities early. Value co-creation became intensified with the quality of relationship and can benefit services in the future. In other words, the relationship management approach at both the organisation and project levels moved towards the transformational side, which is based on social capital theory.

Furthermore, the interpretation of 'One Gamma' changed, a service outcome of the co-creating of value. Both parties formed a shared understanding of 'One Gamma' as openness, honesty, flexibility, listening, understanding, sharing and non-blaming.

Piling was completed in December 2016, two weeks prior to the programme. Found Gamma gained a 15-25% increase in the value of the work and improved their internal status in Gamma UK.

8.5.1 Case analysis

Conditions for trust

The shadow of the future encouraged the continuous learning at the project and firm levels. Learning was future-oriented so that resources gained in project Gamma might be reused and/or recombined in the future. Also, as discussed below, the shadow of the future facilitated the emergence of social reciprocity in the service interactions.

The organisational routines and practices between internal units, such as director forum and B2B director meetings, facilitated the reinforcing and transferring of the project-level relationship to the organisation level.

Interactions

Familiarity, reciprocity and competence trust promoted sharing learning at the micro-level, not only to resolve project-specific tasks. As mentioned above, learning was future-oriented. The shared experience of mutual enquiring and learning strengthened perceived competence and integrity.

Future-oriented interactions, such as service exchanges for future business and project director forum, indicated an element of social reciprocity in the service provision. As mentioned by the project director of Found Gamma,

What we expect is certainly to be approached for any job they have where they need piling or basement or foundations. The expectation is that at least they would approach us saying, "We've got this job. Can you help?" And I suspect conversely the expectation from them is that we would always do our bit to help... At least when these two people, [Build Gamma] and their competitor, both come to us, and say, "We've got this job", we need to put [Build Gamma] ahead of whoever else. I think that's the expectation from them. They expect us to give them the best service.

Social reciprocity induces actions with no specified return within the duration of the current project. The balance of exchange is expected in future business. More importantly, social reciprocity goes beyond economic returns and includes expectations on benefits such as establishing status and reputations.

The recurrent collaborative behaviour in using trust relations to allocate resources formed relational norms with which actors spontaneously complied. As mentioned by the quantity surveyor of Found Gamma,

...I will say in any project there's a chemistry of people managing it. So, the chemistry I would say is good enough to manage and establish trust... that you actually say what you would do. You are going to say as you do. Trust is built on that. You just have a far better working relationship.

The chemistry of "say as you do" indicated that relational norms mobilised a trusting and trustworthy way of interactions and constrained contractual and opportunistic behaviour towards the other party.

In other words, actors generated norms of conduct in the day-to-day interactions, which in turn formed relational control in interactions. Trust as a rule of legitimation was generated.

The phenomenon of trust

Intention trust was structured as a rule of signification and enabled Build Gamma to tolerate more uncertainties. This is evident in the changing attitude of Build Gamma's project manager towards Found Gamma's missing information, which showed less insecurity on Build Gamma's side.

Using trust relations to allocate resources, together with the perception of trustworthiness, reduced unnecessary micromanagement and delegated more authority to Found Gamma.

...we have full control of our own site and we've been able to do things and we order them as we want. And they kind of trust us for doing that. That's made our life much, much easier.

(Project engineer, Found Gamma)

The perception of being trusted was reciprocated by the trustworthy behaviour of Found Gamma, which generated relational norms at the project level. In other words, the structuration of trust as a resource of domination shaped norms of behaviour, hence the structure of legitimation.

Trust as a rule of legitimation encouraged trustworthy behaviour through relational control. As actors referred to relational norms, they were more likely to use trust as a mechanism for resource allocation. In this vein, trust as a rule of legitimation strengthened trust as a resource of domination.

The value of trust

As competence and intention trust maintained an open environment in which the main contractor, subcontractor and client shared information, service communication improved, not least between Build Gamma and Found Gamma.

The client would be open to or more likely to pay and accept claims in certain areas. And the main contractor is able to understand where their areas are and where they are not. Because we are always part of their information. So, by having that relationship with them... [knowing] what we want to get, when we get paid,

and working out the mechanism to get paid. So, it's to both our benefits. That comes about [from] having a good relationship with them.

(Project manager, Found Gamma)

Trust-based relationship and open communication at the project level strengthened shared intentions among all parties and enhanced the service experience of delivering outputs.

Furthermore, shared intentions and understanding accumulated in trust-based interactions clarified roles and responsibilities in the co-creating of value and enabled actors to understand the other party and find suitable solutions more quickly.

I think from both sides we were both quite open and honest with each other as to what the requirements were or what was important to the project. So, we were able to very quickly come to the best solution between all of us, [first] for the project, and second for each party, which avoids the conflict...It [good relationship] made an easier place to work. Everyone knew what everyone did. It made an enjoyable project to build.

Resource integration and coordination became more adaptive and cohesive. Shared intentions and meanings at the micro-level therefore contributed to service experiences at the project level. The adaptive and cohesive experience was further supported by the use of trust relations for resource allocation that reduced redundancy in collaboration.

Competence and intention trust also increased the confidence of the subcontractor such that they became spontaneous in knowledge sharing.

We've always been talking with [Build Gamma] about new schemes they are looking at. We are helping them, trying to give them an idea what the piling will look like, roughly at what cost. So, they got that information... consulting with [Build Gamma] about other jobs we are pricing was more about the fact that we've got a good relationship now and we feel we can ask them for help.

The depth of communication increase in that knowledge sharing was not only to solve problems and tasks within project Gamma but also to obtain a shared understanding of each other's operations and organisation. Whereas the former improved the present

experience of delivering the project, the latter indicated a service outcome that can realise value for value co-creating in the future.

Apart from mutual understanding, the co-creating of value and trust led to the shared meaning of 'One Gamma'.

The client is happy. [Build Gamma] are happy... because the client just sees [Gamma UK] here performing well... I think what this job has done is that it proved that we are not as bad maybe as they thought after [the Lemon project]. Because after [the Lemon project], they thought we were really bad and we were useless. They would rather not use us; they would rather use somebody else [for] this type of job... We proved to the doubters who still exist in [Build Gamma] that we can actually do this kind of work and we are competent.

(Project director, Found Gamma)

The identity of each other as sister companies improved relationships at the organisation level. Actors started to believe that the other party had goodwill not least because of the internal relationship; the belief was partly based on shared experiences of mutual service and reciprocal value propositions.

They were very helpful... They provided all the services we needed. And when we asked for additional ones, they were more than helpful to do that. The money side is agreed; the time we needed to add is agreed as well. So, that kind of faith in the process happens between us.

(Quantity surveyor, Found Gamma)

Relationship value increased as both companies benefited more than simply delivering piling as an end product, which can lever value in use in future.

In summary, case Gamma demonstrates the value of trust in an internal supply chain relationship. At the inter-organisational networks level, the client used two-stage procurement that helped promote an integrative team within the project by involving contractors and supply chain members early on. The shadow of the past negatively influenced the supply chain relationship at the individual, project and organisation levels. At the beginning of project Gamma, interactions at the organisation level were highly

structured by the internal practices and routines of the parent organisation. Nevertheless, the internal relation was embedded with a tension caused by the organisation structure of the parent organisation and negatively influenced value co-creating promoted by the organisational policy.

In the theorem of duality, A2A interactions at the organisation level provided opportunities for mutual learning and generating competence trust. Increased knowledge about the project and each other was transferred to the project level through boundary agencies. Interactions at the project level reinforced competence trust, whereas the structuration of intention trust was constrained by the structure of domination at higher levels of the service ecosystem. The structure of the parent organisation comprised hierarchy relationship and contractual relationship as structures of domination, hence hindering the structuring of intention trust as well as trust as an authoritative resource, the influence of interrelations between elements of structure.

The transactional approach on the organisation level drove Build Gamma to use Found Gamma's resources to save costs in project Gamma on the one hand, and on the other hand increase their own profits at the programme level. The change at higher levels of the service ecosystem, however, drove bounded solidarity and reciprocity between the two parties at the project level, which promoted the structuration of trust and intensified value co-creation in delivering the project. In other words, value co-creation enhances as trust develops and the quality of the relationship improves.

Internal routines and practices facilitated the bottom-up transferring of service outcomes generated at the project level, which influenced relationships and value co-creation at the organisation level. In this vein, case Gamma demonstrated not only top-down effects of higher-level structures of the ecosystem on value co-creation but also the possibility of transferring service outcomes at lower levels to higher levels and influencing higher-level events and processes including value co-creation.

Chapter 9 Cross-case analysis

Three cases have been presented covering the processes of generating trust, the phenomenon of trust and the value of trust in individual case studies (see chapters 6, 7 and 8). This chapter continues the analysis by comparing the similarities and differences between individual cases, presenting and consolidating findings, and building deeper explanations. The emergent theoretical framework provides mechanisms for understanding patterns of empirical findings and, by doing so, the framework is elaborated, refined and (re)contextualised for the research.

From the perspective of structuration theory (Giddens, 1984), this research views trust as a structural property of relationship. The duality of trust means that trust is recursively constituted by interaction processes of actors and organisations (Sydow and Windeler, 1998). Interactions are constrained and enabled by structures of multiple-level service ecosystems as well as time dimensions of past and future. The process of constituting trust generates, maintains or erodes the trust as a rule of signification (the interpretation of trustworthiness), a resource of domination (the use of trust or trust relations to facilitate resource allocation), and a rule of legitimation (the legitimacy of relational norms). The structuration of trust also relies on the mutual influence between elements of structure. In turn, from the lens of service-dominant logic (S-DL), trust as rules and resources influences service interactions, hence service experiences and outcomes. In short, the value of trust dynamically unfolds while interaction processes generate trust as rules and resources; the latter stimulates the generative mechanisms of trust in the interaction process.

The analysis is structured in accordance to the research questions, which are:

- 1) Whether and if so how does trust, from the main contractor to second-tier subcontractor, develop during service interactions between the two?
- 2) Whether and if so how does trust, from the main contractor to second-tier subcontractor, dynamically help increase service value during service interactions between the two?

9.1 The development of trust

9.1.1 Generative mechanisms of trust

The data structure of the generative mechanisms of trust is shown in Figure 11. The analysis of individual cases through the dimensions of ‘duality’ and ‘interrelations’ identified various processes that structure trust as rules and resources. These processes were consolidated and summarised as first-order themes. Cross-case analysis then aggregated first-order themes into second-order themes as shown in Figure 11. The aggregation was bottom-up in essence but the labels of second-order themes, such as “routinising”, were enlightened by extant research (e.g., the relationship of trust and routinisation in Nooteboom, 2002). From the procurement to completion, these processes interacted with each other and generated trust by forming security and confidence, maintaining learning, and sustaining and promoting self-reinforcing cycles of trust.

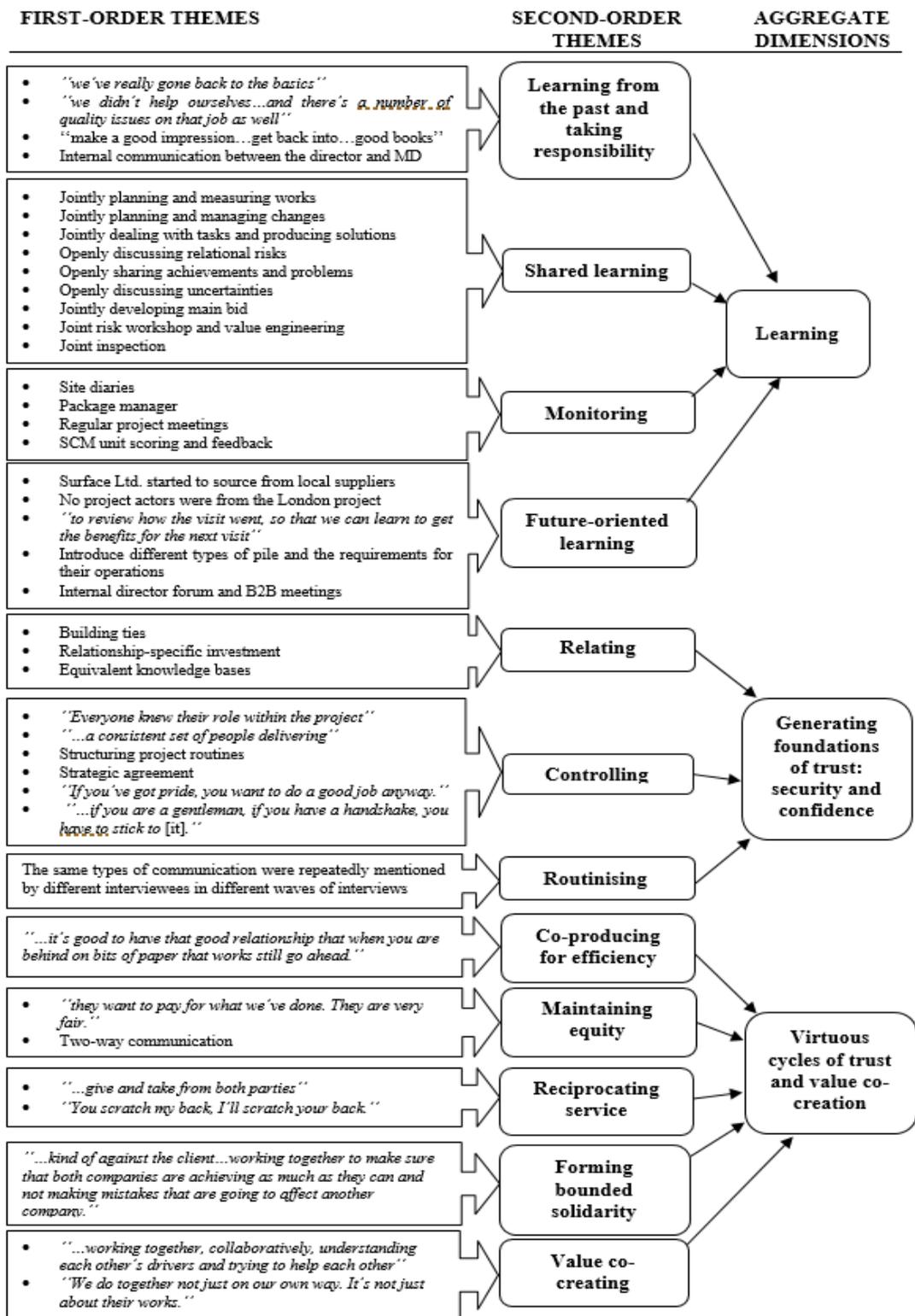


Figure 11 Data structure: trust development

Learning

Learning was the underlying process that promoted trust development. This is a mutually reinforcing process as learning and knowledge transfer are also initiated where there is a degree of trust present and may not induce defensiveness. Learning is both project-related and relational. To generate the perception of trustworthiness, legitimate relational norms and use trust relations to gain resources and co-create value, actors needed to learn about their partners as well as the project environment. The perception of trustworthiness could be a consequence of *intentional learning* from past experiences but also an *unintended* consequence of monitoring project performance, shared learning in joint problem solving and future-oriented learning that can lever value in service use. Through monitoring, shared learning and future-oriented learning, the perception of competence, integrity and benevolence emerged experientially and reflexively.

Learning from the past took place at the front end and involved organisation levels of both main contractors and subcontractors. Main contractors referred to their own experiences, information retained in the organisational systems and their managers and colleagues to know about their supply chains' financial and technical capabilities as well as collaborative intentions. However, learning from the past is insufficient to raise the perception of trustworthiness; it is also necessary to raise the willingness to take responsibility. Taking responsibility, particularly on supply chains' side, demonstrated the commitment to the present project and relationship, which increased the sense of security on the main contractors' side. In the Alpha and Beta cases, for instance, Surface Ltd. and Found Gamma cognitively admitted their own mistakes in the last projects and, behaviourally, improved their own service based on the lessons learnt. In contrast, in the Gamma case, both Build Gamma and Found Gamma were reluctant to accept their own mistakes, avoided liabilities and failed to reach shared understanding of problems in the project Lemon. The learning result was not to take responsibility but to adopt defensive attitudes and behaviour. The initial trust in the former two cases was higher than in the Gamma case.

On the other hand, learning about the other party's trustworthiness can be unintentional. The meaning of learning is twofold. On the surface is discursive learning, such as monitoring project performance and shared learning about tasks, risks and opportunities in joint activities. Monitoring refers to observing and reviewing project performance independent to the other party and implies a distance between main contractors and

subcontractors, which is indirect interaction in the service-dominant logic (S-DL) sense. In other words, the increased knowledge about subcontractors' competence and intentions is not necessarily a strategic intention derived from a rational calculation. It can be an unintended consequence of service interactions for delivering projects. Monitoring does not necessarily mean distrust or a low level of trust; it is a neutral position. It is the negative result of monitoring, such as observed opportunistic behaviour, that erodes trust.

Shared learning means gaining relational and technical knowledge in shared experiences, such as joint planning, risk identifying and problem solving – that is, direct interaction, or actor-to-action (A2A) interaction in S-DL. In shared learning, actors and organisations can express intent verbally and communicate the need for tactical action, which help increase mutual understanding and mitigate misunderstanding. Case findings reveal that the perception of competence emerged reflexively as main contractors learned through monitoring that subcontractors continuously achieved good performance. The perception of integrity and benevolence emerged experientially in shared experience in which subcontractors jointly resolved problems, reduced risks and went 'the extra mile'. Competence trust, it was shown, can develop in indirect and direct interactions and intention trust mostly develops in direct interactions.

Future-oriented learning means that actors and organisations foresee risks or opportunities in order to improve the status quo and lever value in future service use. At the front end of cases Alpha and Beta, actors and organisations foresaw risks based on the past experience, which demonstrated their commitment and induced the perception of reliability, hence the sense of security on the main contractors' side. Future-oriented learning at the completion stage is driven by the shadow of the future at the organisation level, as identified in the cases of Alpha and Gamma. In contrast, in case Beta, the fading future between Office Plc. and Found Gamma discouraged continuous learning and actors mainly focused on project-specific tasks by the end of the project, which hindered trust development.

Case findings point out that the learning process was supported by agency and ties at the micro-level and knowledge management systems at the organisation level. Both helped to an extent knowledge transfer between projects, and across hierarchical levels and organisation boundaries. However, both mechanisms were inconsistently used in the project lifecycle. At the front end, boundary agency and organisations systems helped create ties, familiarity, provide information and increased perceived trustworthiness at

organisation levels, as was the case in projects Alpha and Beta. During the execution, A2A interactions became weak at the organisation level and intensified at the project level. Future-oriented learning at the completion stage involved multiple levels, but it depended on the shadow of the future. In all three cases, knowledge transfer predominantly relied on agency and ties instead of knowledge management systems, which might cause the loss of the value of trust after project completion, especially if actors are reallocated.

Generating foundations of trust

To generate trust required a sense of security and confidence. *Controlling* is the process of reducing uncertainties and increasing confidence in the pursuit of value by influencing or maintaining influences on the behaviour of supply chains. One mechanism affording the ability to control is power, which is present in the market and embedded in the hierarchical structures of organisations. In all three case studies, power was used to structure positions, roles and procedures, providing formal mechanisms and connections that ensure regular communication and engender common knowledge between main contractors and supply chains. This is controlling at the structure level, which occurred at organisation (e.g., negotiating contract and forming strategic agreement) and project levels (e.g., establishing project meetings). Structural control also includes maintaining the same core members of project teams, communication and service quality throughout the project lifecycle. Expectations about formal roles and positions, the adoption of standard procedures, repeated interactions between actors and consistency across different stages of project lifecycle can mitigate perceived relational risks, form common knowledge and maintain shared meanings. Mutual knowledge maintained shared understanding in service communication but also facilitated the adaption of resources in emergent changes, which led to dynamics of meanings that require flexibility of routines and better performance, hence generating trust as a resource of domination.

Furthermore, collectively-accepted norms of conduct were found at the project level of all three cases, which constrained the use of contractual mechanisms and encouraged collaborative actions, indicating the emergence of actor-generating norms, hence relational control in actor-to-actor (A2A) interactions. Relational control generates trust as a rule of legitimation at the project level that actors and organisations self-control their own behaviour to maintain the relationship and value co-creating activities. Main contractors also structured supply chain relationships for future businesses, as in the cases

of projects Alpha and Gamma, which induced the shadow of the future and future-oriented learning. Structuring relationships provides opportunities for moving actor-generating norms from the project level to the organisation level, hence generating new properties at higher levels of the service ecosystem. Controlling, therefore, raises a sense of security and confidence that generates and sustains trust as rules and resources, and helps the emergence of a service ecosystem by transferring processes at the project level to influence events at the organisation and inter-organisational network levels. This management approach accords to social capital theory.

On the other hand, main contractors used power to impose risk terms and manipulate the price, as in the projects Alpha and Beta. Controlling in this way was based on the transactionally-based interpretations of supply chain relationships and practices. Using power to extract safeguards for self-interests hinders trust development and discourages trustworthiness. On the supply chains' side, controlling in this way leads to defensiveness and the perception of inequity. This management approach accords to transaction economics theory.

Relating provides informal socialisation mechanisms across different levels of service ecosystems. Case studies reveal the significant role of boundary agency at the front end in terms of building ties between hierarchical levels and across organisation boundaries, such as the general manager of project Alpha and project director of project Beta. In contrast, trust developed at a slower pace in the case of Gamma, where no boundary person was between the main contractor and subcontractor. Established ties convey shared understanding and mutual knowledge that increase confidence in service interactions, generating trust as a rule of signification at both organisation and project levels. However, since execution, ties between the two parties were weakly sustained at the organisation level, whereas ties at the project level were strengthened by structured interactions such as project meetings. Although consistent ties facilitate the co-creation of shared meaning, intentions and identities at the project level, weak links between organisation and project levels hinder the structuring supply chain relationships and trust at the organisation level. Moreover, due to the heavy reliance on boundary agency to transfer resources and value across levels, value co-created at the project level might be lost, especially when the boundary person is reallocated after the project completion.

Apart from ties, main contractors and supply chains can be related through relationship-specific investment. Relationship-specific investment in the case studies was more about

bounding two parties relationally than economically. On the supply chains' side, relational investment started with small actions such as surpassing goals and using a relational approach to deal with main contractors' mistakes. These small actions can contribute to main contractors' perception of benevolence. As relationships developed, subcontractors invested in enhanced actions such as prioritising the main contractor's needs, trying their best to achieve and surpass goals and mobilising more resources to cooperate with the main contractor in emergent changes. Such relational investment increases main contractors' confidence in using trust relations to allocate resources and deal with changes jointly, generating trust as a resource of domination. Main contractors' relational investment, on the other hand, motivates above enhanced actions, as demonstrated in the case of Alpha. The well-structured, long-term relationship and sustainable businesses increased both parties' commitment and raised a sense of reciprocity that helped maintain trusting and trustworthy behaviour. The investment in the interactions and the enhanced relationships are evidence of the growth of social capital.

Having equivalent knowledge bases, in the sense that actors are able to understand each other's specialised knowledge, can reduce main contractors' suspicion due to cognitive distance and thus the sense of insecurity. In the cases of Alpha and Beta, for instance, operatives and managers of the main contractors were able to understand technical requirements and causes of subcontractors' operations and performance and both main contractors and subcontractors had more confidence in service interactions. In contrast, the lack of equivalent knowledge bases in the Gamma case caused ambiguity and insecurity between the main contractor and subcontractor.

The effectiveness and efficiency of service processes and outcomes motivate actors and organisations to repeat the service interaction approach in order to benefit from collaboration continuously. *Routinising* service processes maintains security and confidence at the individual and project levels, hence sustaining virtuous cycles of trust and collaboration.

Virtuous cycles of trust and collaboration

On the basis of security and confidence, *value co-creation* creates shared experiences, in which trust as rules and resources can sustain, develop or erode. In turn, as it will be discussed soon, trust levers value either for current or future service through generating

the perception of trustworthiness, using trust relations to allocate resources and legitimating relational norms.

Project efficiency drives the initial collaboration between main contractors and supply chains, in the form of involving supply chains early on in the process in order to jointly develop the main bid for instance. The case studies demonstrate that early involvement provided opportunities for optimising value propositions in the main bid. They built shared understanding of the project as well as each other in the process. This is a type of value co-creation, *co-producing*, meaning that actors and organisations collaborate with each other to jointly create value propositions or core offerings as construction projects, and in doing so, they co-create service outcomes that can lever value-in-use in subsequent or future service. Co-producing was firstly driven by project efficiency that could not be achieved by either party working alone. To sustain co-producing, however, requires perceived equity especially on the supply chains' side.

Collaboration only for efficiency and equity was largely self-interested in that joint activities were to convey persuasive message, instruct on plans and obtain consent, and subcontractors were used as operand resources to achieve main contractors' own goals. Nevertheless, co-producing based on efficiency and equity can induce the perception of competence and intention as supply chains increase project efficiency, and perceived trustworthiness, in turn, sustains value co-creation. Trust as a rule of signification and value co-creation creates a positive path dependency that forms the belief in the other party's actions and encourages the use of trust relations in the pursuit of value under uncertainties, instead of being opportunistic.

The continuous use of trust relations in service exchanges requires reciprocity and bounded solidarity in supply chain relationships. It was found from the case studies that reciprocity emerged during project execution as actors and organisations continuously exchanged service in a trusting and trustworthy way. Actors and organisations might be driven by the expectation of gaining economic returns such as more profits or fewer costs in delivering the current project, hence economic reciprocity. Main contractors and subcontractors formed bounded solidarity in co-producing core offerings as projects to ensure that both parties were fairly treated by the client. In other words, the use of trust relations as facilities of resource allocation induces reciprocity and bounded solidarity, which in turn sustain win-win value co-creation. Furthermore, through mutual service or forming bounded solidarity, actors and organisations can co-create shared intentions that

concern both parties' value, hence social orientations and value co-creating. Social orientations mean sharing risks and responsibilities in service exchanges so that relationships can sustain, signalling an increase in social capital. Value co-creation under social orientations is more advanced than co-producing value propositions and core offerings. *Value co-creating* refers to collaboration that goes beyond 'win-win' and increases relationship value that can improve the wellbeing of those involved through service exchange and use.

Following up, the recursive use of trust relations enables the emergence and legitimacy of relational norms in A2A interactions. Relational control forms relational thinking and expectations that restrain opportunism and encourage trust and trustworthiness in order to keep the stability of relationships, strengthen trust-based rules of interactions and therefore ensure mutual benefits in collaboration. The shadow of the future, as will be discussed shortly, can induce social reciprocity in service interactions. Social reciprocity means service exchange with unspecified returns in the current project but expecting the balance of the exchange to be achieved in the future. In cases Alpha and Gamma, for instance, under the strategic agreement and internal relation, main contractors and subcontractors were motivated to continue learning and value co-creating activities at both organisation and project levels in order to invest in the long-term relationships that could yield benefits in the future. In contrast, with the foreshortening shadow of the future after project Beta, the main contractor and subcontractor focused on project-specific tasks and profits that could be gained from Beta. Although social orientations were sustained, Office Plc. and Found Gamma had less shared learning and interacted with each other to jointly address project-specific tasks, co-produce solutions and increase profits. Figure 12 illustrates the process of trust development.

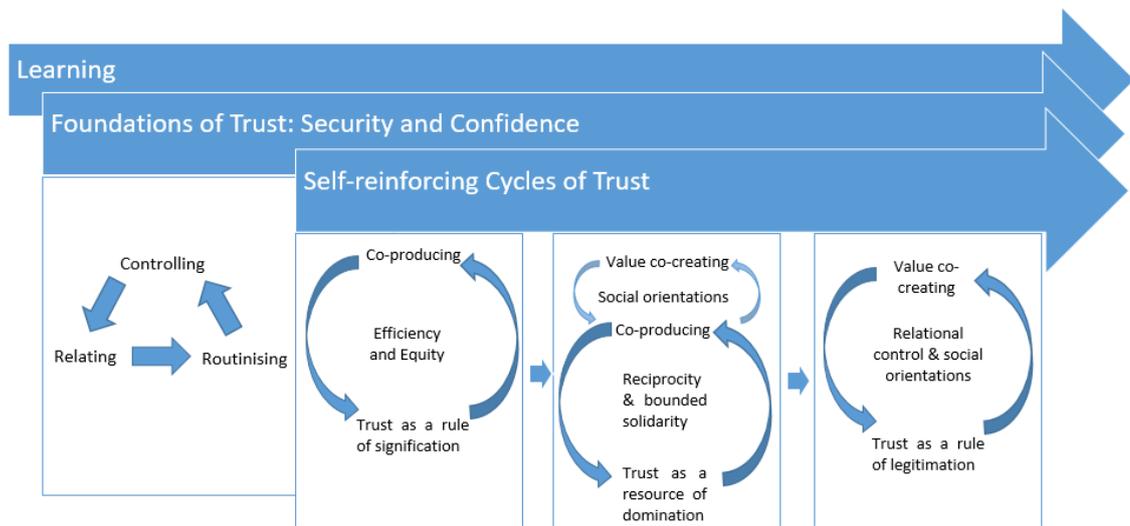


Figure 12 The process of trust development

9.1.2 The conditions for trust development

The development and unfolding value of trust are subjective to structural conditions of multiple-level service ecosystem and time dimensions of past and future. The case findings demonstrate structural influences at the project, organisation and inter-organisational networks levels and the influences of the past and future.

Structural conditions

Project conditions help balance the power relation between main contractors and subcontractors. Project complexity and uncertainty or specific requirements of the specialist project can reduce the number of qualified subcontractors, hence alternatives in the market. Although the use of power depends on contexts and embedded agency, a more balanced power relation can mitigate perceived inequity especially on the supply chains' side, which is conducive to trustworthy behaviour. For instance, the uncertainty of project Beta limited the number of qualified piling contractors in the market, hence creating a more balanced supply chain relationship than in project Alpha. The contract negotiation was perceived as fairer in project Beta than in Alpha.

At the organisation level, the case studies compared two types of organisational systems, shared systems between the main contractor and subcontractor as sister companies and independent systems. Comparing trust development between external and internal relationships reveals the positive influence of shared organisational systems. Shared organisation systems, including support functions, norms and practices, provide common

knowledge and standard procedures that facilitate joint activities. Organisational policies encouraging integration between internal units, as they are communicated between internal actors, can influence actors' interpretations such as the meaning of internal relationships, ways of utilising internal resources and the intention of collaborating with internal companies. Organisational policies can also restrict the use of contractual mechanisms against sister companies and thereby sustain solidarity in relationships.

However, actors' interpretations also depend upon communication, power relations, and temporary norms and practices in A2A interactions. The positive effect of shared organisational systems and collaborative policy upon trust and value may be constrained by the organisational structure. Specifically, injecting market mechanisms and competition between internal units, though claiming to reduce complacency and maintain competitiveness, can hinder the structuring of internal systems and connections. In this vein, the mixed structure reduces the value of internal relationships and hence trust, on the one hand, and, on the other hand, facilitates the production, reproduction and eventual institutionalisation of the transactionally-based view of the internal relationship. In other words, the mix, if not well organised and structured, might promote discreteness and transactional practices.

A tension can be created. On the one side is the recognised meaning of the internal relationship as long term, based in nature, and on the other side is capturing short-term profits in transactions even if it is at the expense of long-term benefits across internal units and for the parent organisation. Such tension can hinder trust and its value, especially intention trust. The belief in the internal relationship replaces intention trust in that the internal relationship and arrangements can facilitate resource allocation, hence social capital in the absence of intention trust. Sister companies might rely on the internal relationship, instead of the internal partner *per se*. However, a lack of intention trust can lead to suspicion, insecurity and relational risks when uncertainties occur. Moreover, contractual and hierarchical relations dominating trust relations can generate the perception of inequity on the supply chain's side, which dramatically hinders the development of relationship and trust. For instance, in case Gamma, One Gamma's policy was interpreted by the subcontractor as a rhetoric for using their resources to facilitate other units to be main contractors.

From the perspective of structuration theory, the tension is caused by the twofold structure of domination. First, injecting market mechanisms enables allocative-resource structure

of domination, which is allocating resources based on price. Second, the hierarchy within the parent organisation forms an authoritative structure of domination, which allocates resources based on authority of the hierarchical relationship. The twofold structure influences interpretations and norms on the one hand and on the other hand, hinders the structuring of trust relations as an authoritative resource of domination.

In summary, injecting market mechanisms into the internal relationship can cause the perception of inequity in actor-system interactions at the front end, especially in the shadow of a negative past, which hinders trust and value co-creation at organisation and project levels. The perception is also influenced by A2A interactions. Compared with external relationships, shared systems provide common knowledge, joint activities and facilitate shared understanding in A2A interactions at the project level. Organisational policies also help sustain solidarity in relationships by constraining the use of contractual mechanisms against sister companies. Organisational practices between sister companies sustain the continuity of the relationship but also help transfer value such as shared identities co-created at the project level to the organisation level. In this vein, processes at lower levels are able to influence events at higher levels of service ecosystems and shape a positive future for value co-creation.

Furthermore, the case finding reveals the role of organisational systems, particularly knowledge management systems that are supported by information and communication technology (ICT) in generating trust as a rule of signification. ICT-supported systems gather, transfer, retain and transform supplier information across project and hierarchical levels. Such organisational systems supply reliable and comprehensive information about supply chains, hence creating a better condition for actors learning about their supply chains. For instance, in project Beta, the supply chain management systems provided an overview of the subcontractor's past experiences and mitigated the negative influence of the recent project. In contrast, the lack of similar systems partly caused the prolonged influences of the recent project on the supply chain relationship in project Gamma.

At the inter-organisational network level, the case studies compared three types of procurement systems: collaborative framework procurement for long-term collaboration between client and main contractor, two-stage procurement for collaboration within one project, and traditional competitive procurement.

In general, collaborative procurement routes create a better condition for trust than traditional competitive procurement. The case findings demonstrate that, under collaborative procurement, the clients of the Alpha and Gamma projects had more involvement at the project level. Client involvement can raise shared understanding of problems, risks and resource needs among the three parties, which increases the effectiveness of communication, value co-creation and the perception of trustworthiness. Also, client involvement can encourage openness and bounded solidarity between main contractors and subcontractors, especially in periods of considerable uncertainties. Power relations between main contractors and subcontractors are found to be more balanced in collaborative procurement systems, which induces the perception of equity and trustworthiness.

Between collaborative procurement for long-term collaboration and for one-time collaboration, the former can furnish main contractors with a sense of confidence in terms of managing supply chains on a long-term basis. The experience of involvement in long-term collaboration with the client ensures sustainable resources and increases the capability of structuring collaboration with supply chains at the organisation level. For instance, in project Alpha, the main contractor imitated the client's collaborative framework to establish their own strategic framework with their supply chains. Although this indicates a relationship management approach based on transaction cost economics, relational contracting forms motivation for collaborative practices in A2A interactions at the project level and thereby lays a good foundation for moving towards the social capital side of the management approach. On the supply chains' side, stable client-main contractor relationships can increase their perception of the reliability of main contractors and motivate proactive actions that signal trustworthiness at both organisation and project levels.

The shadows of the past and future

The shadow of the past created conditions for trust at the front end. Past relationships at the individual level can facilitate key interactions and mutual learning at the organisation level, such as the cases of Alpha and Beta. At the organisation level, the influence of past experiences is mediated by cognitive and behavioural learning. The key is to identify problems in the past, accept mistakes and take responsibility – that is, learning from the past to exploit positive experiences while mitigating the negative ones. Learning at the organisation level can be carried to the project level, which was through boundary agency

or ICT-supported organisational systems. In all three cases, the shadow of the past negatively influenced the initial trust in supply chains. Whereas main contractors and subcontractors in projects Alpha and Beta cognitively and behaviourally learnt from the past, those in project Gamma refused to accept their responsibilities. As a consequence, while the negative past had few effects on the supply chain relationships in cases Alpha and Beta, it had a prolonged influence in project Gamma.

The shadow of the future creates conditions at the completion stage. Case Beta illustrated that the foreshortening future mitigated the scope of joint activities and shared learning as actors focused on project-specific tasks and profits that could be gained in the current project. Moreover, without a well-structured inter-organisational relationship or future business, it was hard to move value co-created at the project level to the organisation level and lever value for future service. Agency can be relied upon; but the value can be lost when actors are reallocated. In contrast, in projects Alpha and Gamma, actors and organisations were motivated to engage in future-oriented learning since relationships and knowledge obtained in the present might be transformed and reused in the future. Social reciprocity also emerged in service interactions. However, value co-created at the project level still faced the challenge of transferring to the higher levels, especially for external relationships, due to the weak system between the organisation and project levels.

9.1.3 The phenomenon of trust

As trust is recursively constituted by interaction processes – that is the bottom-up part of duality of trust, the phenomenon of trust is formed. The phenomenon of trust consists of trust perceptions, orientations and trusting behaviour, which, from the perspective of structuration theory (Giddens, 1984), can influence communication, power relations and normative practices between main contractors and subcontractors.

Trust perceptions

The case findings reveal that, at the organisation level, competence trust and intention trust were generated through learning from the past at the front end. After execution, trust perceptions were transferred to the project level through boundary agencies on the one hand, and on the other hand, discontinued at the organisation level. In other words, the development of trust after procurement mostly relies on service interactions at the project

level. Furthermore, whereas competence trust can be initiated in indirect interactions, or agency-structure interactions in the S-DL sense, intention trust is found to emerge in direct interactions, or actor-to-actor (A2A) interactions. Competence and intention trust, under the shadow of the future, can be transferred to the organisation level and influence the structuring of supply chain relationships.

The case findings differentiate three levels of competence trust and intention trust. Low competence trust means that main contractors have discursive learning about at least one aspect of the subcontractor's capability. Competence trust is suspended until further evidence that develops or erodes trust. Medium degree of competence trust means that main contractors perceive the subcontractor as capable of completing the contract to the minimum requirements and managing planned changes. Planned changes are changes specified *ex ante*, either formally or informally. Under a high degree of competence trust, main contractors believe that the subcontractor can manage emergent changes not specified *ex ante*.

Under low intention trust, the emphasis of interactions is on openness, meaning that main contractors seek transparency in service interactions. Medium degree of intention trust is featured as perceived honesty and integrity. No deception and opportunism are key to maintaining intention trust at the medium degree. A high level of intention trust involves perceived benevolence. Main contractors believe that the subcontractor is willing to go the extra mile and help in the face of problems, such as prioritising resources and adapting their own programmes. Table 8 illustrates different degrees of competence and intention trust.

Table 8 Different degrees of competence trust: illustrative quotes

The degree of competence trust

Low competence trust

“We also brought up issues we had had on the previous project. And we knew that they addressed those... because the two items they’ve come to site to do have gone well. So, our confidence is increasing in ... [Surface Ltd.’s] ability. But they are sort of small bits of work. The big bit of works [are] still yet to come.” (Project manager, Road Ltd.)

Medium competence trust

“I think ... [Found Gamma] probably do reduce the risks. We know that they can do the job. We know they are big and are not going to go under.” (Quantity surveyor, Office Plc.)

“Because the piling was very close to ... [City Ltd.] assets... [Found Gamma] have done that, have worked in those conditions before. So technically they were ahead of their competition... [Found Gamma] are very educated... Whereas you may get other contractors that are not technically aware of what the contract conditions really mean, so they don’t ask questions...But ... [Found Gamma] would ask searching questions. At the end of the day, it is good because it protects everybody.” (Project director, Build Gamma).

High competence trust

“I think they’ve got quite a good structure within their organisation. They resource jobs properly. They don’t take on too much work, just take on what they can handle... So we relied on them to come in and fix a problem... their help to plan the works with the profile planning and everything. That is where we need their expertise: to tell us how to do that.” (Site agent, Road Ltd.)

“[Found Gamma] They are good at doing the big or abnormal piling works. They got the key; they got the backup, they got the resources.... And they have brought solutions [to] the table to keep the project moving forward along with ourselves...” (Project director, Office Plc.)

“If it was another company and we have the same situation where the design is open there, and the project is in an uncertain phase, we could have a lot of problems with the subcontractor because other people might not be able to turn around the design quickly. They might not be able to adapt to the changes quickly.” (Construction manager, Build Gamma)

The degree of intention trust

Low intention trust

“...we speak openly on anything, any issues coming up. So, I feel that they seem a good team down there. We all talk, and I think this is the most important thing.” (Commercial manager, Build Gamma)

“They are transparent with us about that [technical] stuff. Very easy to talk to. And from us, we share with them how we deal with [a] client if there’s an issue that affects ... [Build Gamma] and ... [Found Gamma], probably more than we would if it is a third-party contractor.” (Construction manager, Build Gamma).

Medium intention trust

“I trust them not to apply anything that I wouldn’t believe is true... you just know that they raise a question straight away and in front... Straight away. They are not trying to hide anything” (Site agent, Road Ltd.).

“We’ve had some problems on the project because of tunnels and other things and... [Found Gamma] have worked with us to solve any problems on site, which has been very good. They are certainly not looking to take advantage of situation. You know we’ve had various problems, which haven’t been solved [by] a long way. So, they’ve been working with us to solve those problems.” (Project manager, Office Plc.)

High intention trust

“...they are trying their best to do it... they put together their best people to do the job, what they can do for us. And they will be used [again], I have no doubt, and perform very well” (Site agent, Road Ltd.).

“... [Found Gamma] were prepared to work with us in keeping the works moving forward... You know what you get in [the project], you know you can have a sensible conversation, you know people are open and honest, you know that they won't leave your life, try to screw you for more money when they are not down to [get any more]. And you know that they say what they are going to do. They can do it and they will do it' (Project director, Office Plc.)

Trust orientations

Apart from trust perceptions, trust is differentiated by main contractors' orientations of investing in trust relations, which can be self-interested or socially-oriented. Self-interested trust does not necessarily mean profiting from subcontractors, but it implies the possibility of taking advantages from supply chains when opportunities arise, hence opportunistic behaviour in interactions. While self-interested main contractors do not consider supply chains' value, socially-oriented main contractors recognise social and relational influences in the pursuit of value and thereby consider mutual benefits. Furthermore, social orientations can be project-based, which considers the benefits that can be realised within the duration of project delivery. It can also develop beyond the current project towards future service, thus involving the organisation level. Table 9 illustrates self-interested and socially-oriented trust. Table 10 summarises different degrees of trust attitudes.

Table 9 Examples of self-interested trust and socially-oriented trust

Self-interested trust

“So, the level of attention you paid to the subcontractors is probably related to the value of the subcontract, how critical it is [in] meeting your programme.” (Project manager, Road Ltd.)

“...we know that when we get a price from... [Surface Ltd.] we don't have to have extra money for risk or anything else. So that should allow us to deliver more competitive tenders when we try to win future work.” (Project manager, Road Ltd.)

“So, whatever terms and conditions we have with the client we would try to make sure that subcontract is back to back with our terms and conditions. There, often [what] we are finding is that we do get some kicked back, perhaps with some items we've agreed to but they don't want.” (Quantity surveyor, Office Plc.)

“...it's just an asset to have to win jobs. We've got the resources and we can do this through working together. We can use them to help [with] the technical systems. I wouldn't say we rely on them because we can still run it competitively.” (Commercial manager, Build Gamma)

Socially-oriented trust (Project-based)

In the second-round interviews in project Alpha, an interviewee talked about how to manage early warning of compensation for profile planing from Surface Ltd.:

“We will tell them our position on it. And they will tell us their position on it. We will talk [it] through. We will listen to what they have to say, and they will listen to us, what we have to say. Hopefully we can come to a mutual agreement.” (Site agent, Road Ltd.)

In the last interview of project Alpha, the interviewee talked about the result of early warning:

“So, we went through that. We agreed on the number basically at the end of the day, which satisfied [us] all. We just talked around the table, and we agreed on the figure. It didn't go any further. It was rectified amicably.” (Site agent, Road Ltd.)

To deal with disagreement:

“We would generally either speak to them on the phone or email them but with reasons why: ‘...we don't feel it's safe because...we will suggest this might be a better way to do it.’.... But generally just conversation that happens between the two parties to try to make sure everybody is happy with what we are going to do.” (Quantity surveyor, Office Plc.)

“And there's always got [to be] a bit of give and take from both parties to make it work. You cannot all be one way.” (Project director, Office Plc.)

“We told them [Build Gamma] that and they completely understand, and they come back to ask, ‘What can we do to help?’ So that's the kind of thing we have.” (Site engineer, Found Gamma)

Socially-oriented trust (Future-based)

“We have agreed that the metre squared with GPS is the future. That is the way forward. It worked very well on this project. It will work on other projects.” (Site agent, Road Ltd.)

“They don't get people working against them but together with them. We are not only looking at for ourselves; we are looking at the whole... [Gamma UK] together.” (Construction manager, Build Gamma)

Table 10 A summary of trust attitudes

Trust Attitudes	Description	Degrees
Competence trust	In the procurement: depending on the price, programme, financial and technical capabilities, resource reliabilities In the execution: depending on the project performance and the capability of managing planned and emergent changes	Low degree: main contractor perceives specific aspects of subcontractor's capability that might negatively influence the project delivery. Medium degree: main contractor perceives subcontractor to be able to complete the project to the minimum requirements and manage planned changes. High degree: main contractor perceives subcontractor to be able to complete the project but also manage emergent changes.
Intention trust	Emerging in direct interactions	Low degree: main contractor perceives subcontractor as open and seeks transparency in communication. Medium degree: main contractor perceives subcontractor as not deceptive, honest and has integrity. High degree: main contractor perceives subcontractor as benevolent and willing to help when needed.
Trust orientation	Drivers for investing in trust relations	Self-interested: using subcontractors for own benefits with little concern about subcontractors' value; indicating the possibility of opportunism when opportunities arise. Socially-oriented: recognising social and relational influences on value; concerning mutual benefits; the perception of mutual benefits might be project-based or beyond the project and including future business.

Trusting behaviour

Figure 13 illustrates the data structure of trusting behaviour.

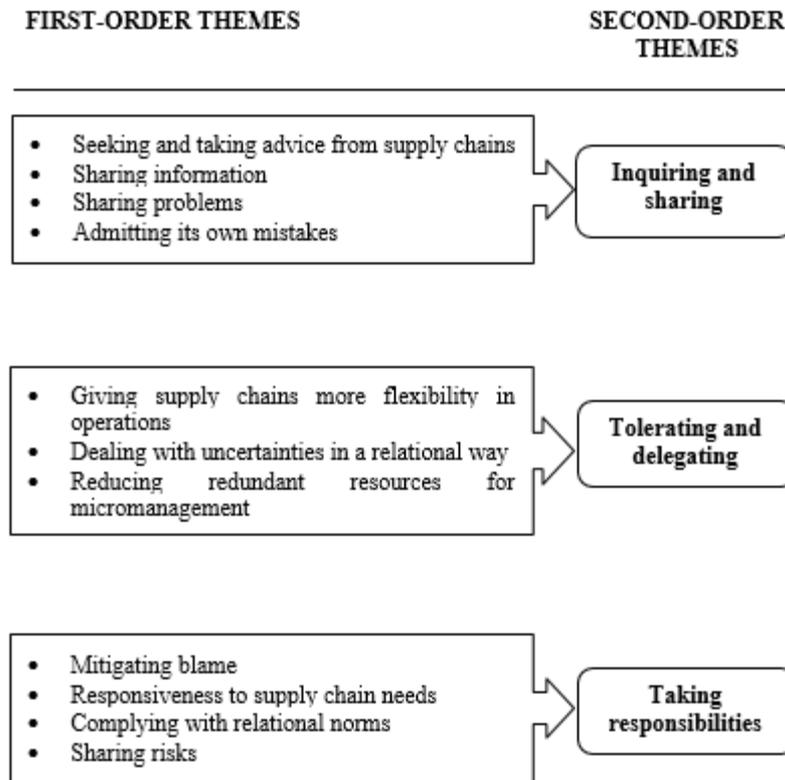


Figure 13 Data structure: trusting behaviour

Competence trust is related to main contractors' openness to seeking and taking advice and responsiveness to subcontractors' needs and requirements. For example, in the case of Beta, the main contractor provided quality information as required by the subcontractor during the design stage. The belief was that by having sufficient resources the subcontractor was able to mitigate risks and improve the value proposition. In the case of Gamma, the main contractor frequently asked for the subcontractor's technical advice and suggestions in building relationships with stakeholders. They also persuaded the client to accept the subcontractor's programme. The belief was that the subcontractor was capable of completing the programme and that the programme produced by Found Gamma was optimal to the overall project. In contrast, in case Alpha, though the main contractor asked Surface Ltd. about the programme, rates and bill of quantities for surfacing works, the main contractor had their own research. The communication was one-way prior to and during the front end.

Intention trust is related to main contractors' openness about their own problems and mistakes and tolerance of uncertainties in the subcontractors' actions. For instance, with high intention trust during the execution of project Alpha, the main contractor admitted their own mistakes, and doing so was built upon the belief that the subcontractor would not take advantage of their mistakes and problems. The intention was to stimulate open discussion and find solutions suitable for both parties. Further, when the subcontractor delayed test information as specified in the contract and failed to produce the required paperwork, the main contractor chased the information in an informal way and formatted the paperwork for the subcontractor. Competence trust and intention trust also encourage delegating operational authorities to supply chains. At the completion stage of the three cases, subcontractors perceived more flexibility in operations in that they were able to decide about more specialist issues by themselves.

Trust orientations are related to the use of trust relations to facilitate resource allocation and integration in the pursuit of value. Specifically, with social orientations, main contractors are willing to share risks, and maintain and comply with relational norms such as equity, reciprocity and bounded solidarity. Social orientations also mitigate blame culture in the service interaction. In the case studies, main contractors' orientations developed from self-interest to a social orientation, which was accompanied by a change of behaviour from manipulating or maintaining discreteness to sharing risks and taking responsibilities.

From the perspective of structuration theory, the above behaviour can be further consolidated into three types, learning and sharing, tolerating and delegating, and taking responsibilities, which influence the communication, power and sanction of service interactions respectively.

9.2 The value of trust

From the perspective of structuration theory, trust as rules and resources, as it is recursively constituted by interaction processes, reflexively fed back into service interactions and influenced communication, power relations and normative practices between main contractors and subcontractors. The value of trust unfolds in this process. From the lens of service-dominant logic (S-DL), trust levers service value as it induces informative service communication, effective resource integration and cohesive service coordination in service experiences. Better service experiences are linked to and feed back

to enable higher performance by reducing transaction costs, enhanced knowledge application and other effective ways of working at the project level as actors and organisations gain shared understanding, intentions and identities that benefit current and future collaboration and value co-creation. This improves outputs at different stages of the project lifecycle and ultimately the project as service outputs. Figure 14 illustrates the data structure of the value of trust.

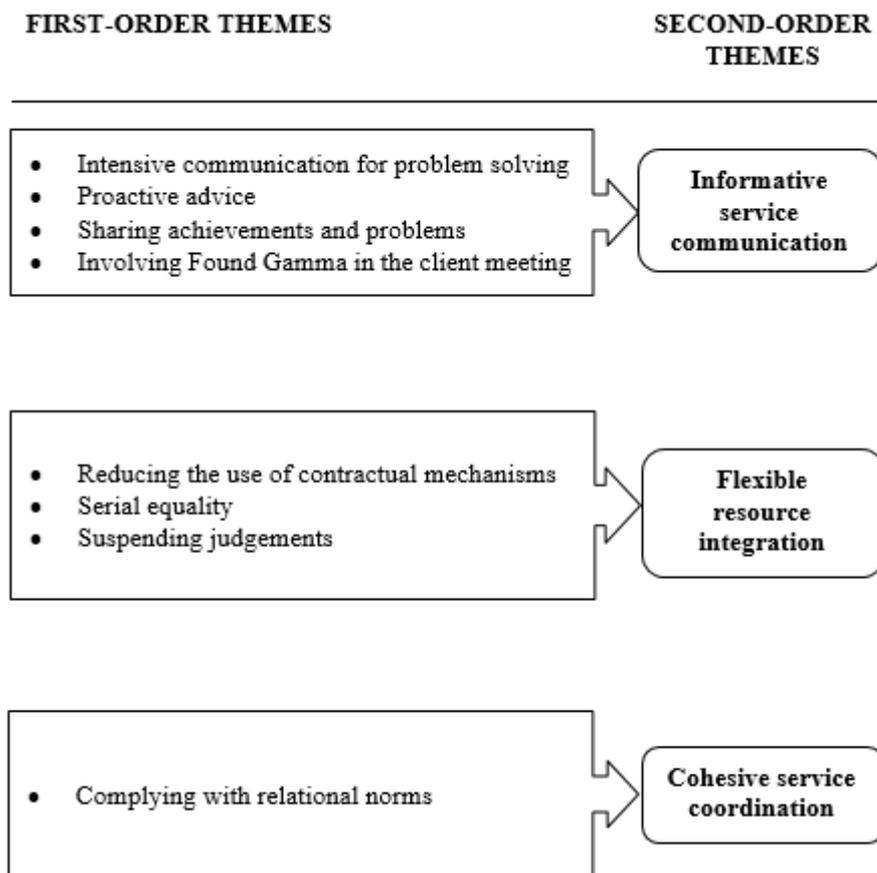


Figure 14 Data structure: the value of trust in construction supply chains

9.2.1 Informative service communication and shared understanding

Trust as a rule of signification induces the interpretation of trustworthiness and drives main contractors to seek advice and learn from subcontractors. Service communication becomes more intensified. Competence trust encourages main contractors to explicate problems and issues verbally in order to help their partners better interpret and internalise meanings. Trust in the supply chain's integrity and benevolence increases main contractors' openness, admitting their own mistakes and sharing problems in order to be straight forward in communication. From the subcontractors' perspective, main

contractor openness is perceived as one of the first signals of trust, which gives them confidence to question the main contractors' plans and methods, advise on better solutions, and share project problems and their own difficulties. In this vein, communication goes beyond conveying one-way information towards two-way A2A dialogue and increases the depth of communication. With a higher level of trust at the procurement and preconstruction stage of project Beta, communication at the organisation level was more open and proactive than that in projects Alpha and Gamma.

Dialogic communication combines reasons and enquiries, so it can increase shared understanding of project issues, and also of the other party's preferences and ways of organising businesses, which facilitates the internalisation of the other party's communicative intent in interactions. For instance, in case Alpha, the main contractor and subcontractor formed a good shared understanding at the project level, through jointly managing a series of changes. Such shared understanding enabled them to quickly understand the changes, reach solutions and adapt resources to ensure mutual benefits as well as the effectiveness of outputs for stakeholders. Therefore, shared understanding makes collaboration and value co-creation more absorptive to changes.

Moreover, the perception of trustworthiness can increase the density of communication at the project level – that is, to build communication with wider stakeholders. For instance, in case Gamma, the main contractor's trust in the subcontractor's knowledge and experience motivated the main contractor to involve the subcontractor in the client meeting. The subcontractor was able to directly communicate with the client about their needs and requirements, which increased the effectiveness of communication and the viability of solutions. In this case, the level of interactions between these businesses was trust based, enabling enhanced interactions between the subcontractor and client, also with the potential for value co-creation.

In other words, trust as a rule of signification specifically levers service value by making the service experience more informative and increasing shared understanding between main contractors and subcontractors.

9.2.2 Flexible resource integration and shared intentions

As discussed, trust enables main contractors to delegate authority to subcontractors and tolerate uncertainties in subcontractors' actions. Using trust relations as facilities of

resource allocation affects the power relation between main contractors and subcontractors. Delegating authority and eliminating excessive monitoring reduces redundant resources, for instance. From the perspective of supply chains, they have more autonomy in their own operations. Equity, reciprocity and bounded solidarity can emerge while resources are allocated through relationships, which drive serial equality. Serial equality means exempting immediate returns of relational investment but expecting a balance of exchange within the project lifecycle or long-term relationships. Furthermore, relational control and the perception of trustworthiness can suspend judgements and restrain the use of contractual mechanisms under uncertainties.

Shared intentions can emerge as actors and organisations continuously use trust relations to allocate resources, provide mutual service and exchange reciprocal value propositions. Under shared intentions, resource allocation and integration become more adaptive to changes. Actors and organisations are more willing to mobilise and adapt their own resources to achieve common goals. From the perspective of subcontractors, main contractors provide effective services to facilitate their operations under changes, such as giving sufficient notice, keeping them informed about site issues and coordinating other operations to give them safe areas for operations. From the perspective of main contractors, subcontractors are able to give them viable solutions and help them satisfy clients' requirements.

Trust as a resource of domination levers service value by making resource integration more flexible and nurturing shared intentions between main contractors and subcontractors.

9.2.3 Cohesive service coordination and shared identities

The level of commitment increases as main contractors using trust relations as resources start to generate mutual benefits and take responsibility in the pursuit of service and project value. From the perspective of subcontractors and service value, main contractors are more responsive to their needs and pay more attention to their suggestions. Perceived equity and reciprocity increase subcontractors' commitment to the relationship. In reciprocation, they are more willing to mobilise their own resources for the benefits of both parties. From the perspective of main contractors, subcontractors are more cooperative and responsive to their needs.

Trust as a rule of legitimation maintains relational norms in service interactions by forming relational thinking and expectations that guide collectively-accepted behaviour between main contractors and subcontractors. Particularly at the completion stage, actors and organisations were found to refrain from opportunism and seek collaborative ways to deal with disagreements. Supply chain relationships became more stable. Moreover, shared identities can emerge as main contractors and subcontractors form relational expectations of each other and have social orientations.

In this vein, trust as a rule of legitimation levers service value by making service coordination more cohesive and forming shared identities between main contractors and subcontractors.

9.2.4 Service outcomes

The more informative, flexible and cohesive processes engender shared understanding, intentions and identities as service outcomes co-created in supply chain relationships, which enables main contractors and subcontractors to generate more resources (social capital) and secure more financial resources (offset against any transaction cost savings), specifically operant resources such as knowledge and relationships, in future service for project delivery. Service experiences, including the process and outcomes, also lead to improved outputs at different stages of project lifecycle. For instance, shared understanding built in the early involvement optimised value propositions and enabled both parties to secure contracts. Shared intentions at the execution stage ensured viable solutions, adaptive resource allocation and effective delivery of project contents. Shared identities helped structure inter-organisational relationships and secure future projects. Value was co-created and benefited both parties. This is in line with S-DL. The co-creation of value therefore takes place through trust development – investment in social capital that yields a return – to improve project outcomes. The totality of these actions is part of the service experience, which has outcomes in terms of efficiency and effectiveness in execution and also an improved experience for those involved in delivery, hence an enhanced service outcome.

Shared understanding, intentions and identities are co-created at the project level. Under conditions of the shadow of the future and linking systems between the project and organisation levels, service outcomes can be transferred to the organisation level, influence events and structures at higher levels, and enhance the dynamics of the service

ecosystem for co-creating value. However, the emergence of the service ecosystem from the bottom is challenged by weak systems of project business between project and organisation levels, between organisations, and because of heavy reliance on agency to transfer resources across hierarchical levels.

9.3 Summary

This chapter consolidated and compared findings from individual cases. It reveals implications for S-DL, structuration theory and social capital theory as well as construction project and supply chain management. The next chapter will discuss findings in relation to theories and by doing so the theoretical framework will be refined.

Chapter 10 Discussion

This chapter brings together what has emerged from the analysis to draw out the theoretical implications. On this basis it proceeds by developing dialogues between empirical research and theories. The purpose is to build a theory of the value of trust in construction supply chains.

The present research has identified that trust and value co-creation can form a series of virtuous cycles in the service process. This is linked to effective interactions to generate valuable outcomes in service experience and post-completion. As trust develops in supply chain relationships, it can facilitate service communication, resource allocation and integration, and service coordination. Service efficiency and equity are critical to initiating and sustaining the perception of trustworthiness, hence trust as a rule of signification. Joint problem-solving offers opportunities for building shared understanding.

To use trust relation as a facility of resource allocation requires bounded solidarity and reciprocity, which helps form shared intentions. Social orientation might also emerge in this process, under which actors and organisations are concerned not only for their own benefits but also the other party's – that is, value co-creating. Relational norms emerge in actor-to-actor (A2A) interactions at the project level, which enable trust and trustworthiness and constrain opportunism. The norms commence the structuring of the trust development process and this helps the norms to develop too as processes emerge and become structured.

Zooming out, this is a layered process of value co-creation through interactions at the inter-organisational, organisational and project levels that takes into account power and legalities in ways where engagement is facilitated rather than constrained, so that security and confidence are formed. Norms at the project level, under conditions of structures of service ecosystem, can also transfer to the organisation level, hence influencing the structuring between organisations.

10.1 The underlying process and foundation for trust

Based on case findings, learning as the underlying process and security and confidence as the foundation for trust are added to the original theoretical framework.

The development of trust consists of intentional and unintentional learning that combines rationality and intuition (Smyth, Gustafsson and Ganskau, 2010). Generating the interpretation of trustworthiness – that is, trust as a rule of signification – does not necessarily involve rational calculation at a discursive level, an insight that is opposed to central assumptions of rational choice theory (Coleman, 1990) and transaction cost economies (Williamson, 1993) that regard trust as a strategic result of calculating the gains and losses or risks. Experiential and reflexive learning underneath the discursive learning about performance and problems adds a dimension to the development of collaborative relationship and trust (Ring and Van de Ven, 1994; Doz, 1996).

The repetitive learning about the other party's trustworthiness in the context can transform discursive learning to reflexive and experiential learning, whereas uncertainties that increase perceived risks beyond the current tolerance level can bring the learning back to the discursive level (Nooteboom, 2002). The permeable distinction between discursive learning and reflexive and experiential learning is fundamental to the structuring of relationships in actor-to-actor (A2A) interactions. The two-way transformation involves reflexive monitoring of actions and reflexive self-regulation that enable the duality of structure and system reproduction (Giddens, 1984), in this case the duality of trust and continuous supply chain relationships. The transformation occurs "*not [as] a string of discrete actions, involving an aggregate of intentions, but a continuous process... influenced by knowledge which agents have of the mechanisms of system reproduction and employ to control it*" (Giddens, 1984, p.376), meaning that learning about the other party's trustworthiness is the underlying process of daily interactions. It can be in a calculating manner based on the precise, though not necessarily complete, knowledge – learning from the past at the front end, for instance. But this is an exceptional step out of the daily routine that rests on good reasons, "*as a reassuring consideration*" (Luhmann, 1979, p. 36).

Learning induces shared understanding, intentions and identities, hence the collective agency between main contractors and supply chains, as will be discussed soon. This collective agency might further enable the service ecosystem emergence (Taillard *et al.*, 2016), although in construction project businesses weak systems between project and organisation levels and discontinuity of inter-organisational relationships across time make it difficult to move such 'sharedness' across projects and from the project level to higher levels (and vice versa) (Khalfan and Maqsood, 2012), thereby generating new

properties of service ecosystems. Related to the service-dominant logic (S-DL) characterisation of the service ecosystem, processes moving between micro-, meso- and macro-levels occur *“in a sea of change, making all the systems inherently dynamic”* (Lusch and Vargo, 2014, p. 170). The dynamics of service ecosystem and value co-creation activities in construction project businesses are mitigated by the discontinuity across hierarchical level and time, which is caused by the project-by-project management approach prevalent in construction project management.

On the other hand, learning at the project and agency level presupposes a certain level of mutual knowledge, *“the knowledge of how to ‘go on’ in forms of life... the necessary condition of gaining access to valid descriptions of social activity”* (Giddens, 1984, p. 375). This includes the understanding of institutional arrangements (e.g., contract), norms of conduct and other tacit or practical knowledge (Bachmann, 2001; Bachmann and Inkpen, 2011). Mutual knowledge provides the sameness and continuity in interactions.

Controlling can form mutual knowledge and confidence in the other party’s behaviour because of structural influences (Möllering, 2005; Bachmann and Inkpen, 2011). Power is one of the control mechanisms and, from the perspective of structuration theory, is enabled by allocative and authoritative resources. In the context of construction, authoritative resources reside in the hierarchy between the main contractor and subcontractor; hierarchy might be enabled by institutions and institutional arrangements such as contracts. For internal partners, such hierarchy might be caused by the organisation system of the parent organisation. Allocative resources are embedded in the market between independent actors.

Structuring formal mechanisms creates a common form of symbolic communication, collectively accepted norms of conduct and systematic learning that provides a reliable track record for those involved, so both parties have a sense of security (Bechky, 2006; Maurer, 2010; Enberg, 2012; Suprpto *et al.*, 2016). Control in this manner accords to Bachmann's (2001: pp. 358-359) conceptualisation of system power:

...system power which is anonymous and is carried out through the structures of hierarchy and the authority of institutions. This form of power... can hardly be (mis-)used by them [individual actors] for opportunistic strategies. Thus, it can provide generally acknowledged guidelines of behaviour, and for this reason,

system power can foster the efficient production of a high level of trust in trans-organisational relations.

Therefore, using power at the structure level, or system power in Bachmann's words, can provide a condition of, rather than an alternative to, trust. Positive control develops trust and solicits win-win and enhanced win-win outcomes with the promise of further enhancements by building trust and increasing social capital – and investment contributing to the shadow of the future.

This insight contradicts the studies arguing that control through contracts is more likely to be detrimental than conducive to the constitution of trust (Bradach and Eccles, 1989; Lyons and Mehta, 1997). There is a difference between reproducing legal norms and the fierce 'battles of contracts' (Sako, 1992), whereby the former can help structure positive relations. Contracts and monitoring occupy a neutral position; it is what supports them and flows from them that is decisive in building or eroding trust.

Furthermore, system power at higher levels of the service ecosystem can create a positive condition for trust and value co-creation at lower levels (Bachmann, 2001; Das and Teng, 2001; Möllering, 2005). Establishing formal roles and positions, adopting standard procedures and structuring projects at the organisation level regularise expectations, increase predictability, and ensure consistency and shared meanings at the project level. Consistent interactions and shared understanding of technical and relational issues enable the dynamics of trust. Although the relationship development unit might have the key role of finding new businesses and making propositions before and at the front end, the actualisation, satisfaction and future business are the results of the coordinated and collaborative actions of actors in multiple functions across project lifecycle (Enz and Lambert, 2012). Trust as rules and resources established in relational contracting at the organisation level therefore can transfer to the project level and induce better value co-creation. Meanwhile, trust co-created in A2A interactions at the project level in execution can move to the organisation level, influencing events and structures of higher levels in order to lever value for the service ecosystem.

Hence, power may not necessarily substitute trust (cf. Luhmann, 1979). At least if mobilised in certain manners, it can enhance trust as an authoritative resource by creating opportunities for developing the perception of trustworthiness or promoting trust and trustworthiness as norms of conduct, which in turn sustains the powerful position or even

escalates the power of the relationship in wider systems (Sydow, 1998). From the perspective of structuration theory, this recursiveness is caused by the interrelations between elements of structure and action.

Agency across boundaries is important. With frequent changes trust established through system power at the front end might be problematic because predefined common knowledge might be insufficient to represent the differences and dependencies now present at the project level (Carlile, 2004). Ties embed shared meanings and informal socialisation mechanisms that help reconcile discrepancies in meanings, goals and value (Grant, 1996; Carlile, 2004; Lawson *et al.*, 2009; Ballantyne *et al.*, 2011), and maintain the sense of security and confidence in changes (Lawson *et al.*, 2009). However, as mentioned, heavy reliance on boundary agency and weak systems induce discontinuity of trust across levels and boundaries when agency is reallocated, pointing to the need for linking structures and strong systems between project and organisation levels as well as across organisation boundaries.

Power can also be used by one party to control the other party against its wishes by extracting extensive safeguards for its own self-interest and taking advantage of the other party. Controlling in this manner invokes defensive behaviour and discourages trust. However, using power to control supply chain relationships does not necessarily mean distrust. Whereas power is used on the basis of the undesired possibility of a general future, distrust works on the negative assumption of the other party's incompetence and/or opportunism.

Taken together, the relation between trust and control is traditionally opposed (cf. Inkpen and Currall, 2004), except where relational contracts apply (cf. Poppo and Zenger, 2002). However, the intensification of interactions has been shown in this research to be more powerful than the contract *per se* and can lead to trust development where the control is there to structure the systems in support of norms and behaviour.

10.2 Trust as a rule of signification

Whereas system-actor interactions can raise competence trust, to increase intention trust requires shared experiences in A2A interactions. Project efficiency is the first driver for supply chain collaboration. The aim is to use resources in supply chains to address site-specific problems and tasks that either the main contractor or the subcontractor cannot

deal with alone. In construction projects, collaboration for efficiency starts at the organisation level, usually between business development or marketing units. To sustain collaboration in project execution, however, requires perceived equity to make ‘fair dealing’ (Ring and Van de Ven, 1994, p. 93), in which main contractors and subcontractors seek benefits proportional to their investments, with the condition of maintaining social relationships (Tsanos and Zografos, 2016). Assessment on efficiency and equity demonstrates that supply chain relationships consist of economic but also social aspects (Blau, 1964; Venselaar, Gruis and Verhoeven, 2015). Collaborating only for efficiency and equity is largely self-interested. Under self-interested trust, actors and organisations are forward-looking at the transaction-end payoffs (and other business benefits) within the boundaries of transactions that are treated in isolation even in repeat businesses (Smyth and Edkins, 2007). Self-interested trust does not necessarily mean profit from subcontractors in real actions; yet it implies the possibility of doing so when opportunities arise, hence opportunism in interactions.

In contrast, under socially-oriented trust, as will be discussed soon, actors and organisations recognise social relations and focus on the process in the pursuit of value (Lyons and Mehta, 1997). Mutual benefits can be more than direct financial ones, including growth and competitiveness, hence reputation as business benefits, and include social benefits, such as job satisfaction and general well-being, to employees in both the main contractor and subcontractor organisations. The intersection between business and social benefits is the social capital that trust engenders and supports.

Nevertheless, collaborating creates shared experiences where actors are able to learn about the other party and form the interpretation of trustworthiness – that is, generating trust as a rule of signification. For construction supply chain relationships, competence trust is closely related to the supply chain’s capability of allocating and integrating operand and operant resources from different levels of the service ecosystem to deliver a high-quality service, especially in the context of changes. Intention trust is related to the supply chain’s capability of communicating in an open and honest way, ensuring service consistency, understanding and helping main contractors beyond contract specifications and agreements (Mayer, Davis and Schoorman, 1995; Nooteboom, 2002). The latter points to the importance of shifting from firm-controlled customer-orientation towards service-driven and dealing with value co-creating customers (Vargo and Lusch, 2008). On the other hand, the main contractor’s capability of understanding supply chains,

technically and relationally, and maintaining equity in service interactions is important for trust development. Main contractors and subcontractors need to have equivalent knowledge bases in the sense that they are able to understand each other (Nooteboom, 2000) in order to mitigate potential conflicts and suspicion due to cognitive distance and misunderstanding.

Therefore, to generate competence and intention trust and sustain collaboration requires relational and ethical interaction capabilities of both main contractors and supply chains to enhance the connection of social and emotional links and to act in a fair and non-opportunistic way towards each other (Söderlund, Vaagaasar and Andersen, 2008; Karpen, Bove and Lukas, 2012). Both organisation and project levels need to develop these capabilities to co-create “*a commitment to collaborative processes with customers, partners, and employees*” (Lusch, Vargo and O’Brien, 2007, p. 5). At the project level, this needs relational interactions and relationship building with supply chains, structuring routines, joint problem solving, sharing risks, and learning in relationships (Brady and Davies, 2004; Söderlund, Vaagaasar and Andersen, 2008), which require the accumulation of knowledge and resources at the organisation level in support (Newell, Tansley and Huang, 2004). Apart from agency, resources and efficient service flows, the notion of equitable relations is important for sustaining trust and collaboration.

The capability and process of developing trust are aligned with S-DL that is focused on communicative interaction, reciprocal value propositions, resource sharing and value co-creation (Ballantyne and Varey, 2006; Ballantyne *et al.*, 2011). Trust as rule of signification enhances service communication in terms of its intensity, depth and density. Competence and intention trust help create an open environment where actors and organisations share and learn with each other. Shared meanings are co-created and adapted in dialogic communication. Dialogic communication is a key manifestation of trust and relational interaction. It helps problem solving, strengthen ties and transform local understandings and (re)create the common ground beneficial to current and future interactions (Bechky, 2003; Ballantyne and Varey, 2006; Söderlund, Vaagaasar and Andersen, 2008). Actors clarify their own opinions but also invite the other party to explain theirs, so both parties become more aware of each other’s needs and preferences (Senge, 1990).

Shared understanding as a service outcome lays a good foundation for trust development and value co-creation (Etgar, 2008). Main contractors and subcontractors who have

shared understanding of technical and relational issues are able to know about the changing context quickly, mobilise and transform their own resources to jointly produce solutions, and satisfy project requirements but also each other's expectations. In this vein, collaboration and value co-creation become more absorptive of uncertainties and risks (Staber and Sydow, 2002; Berggren, Sydow and Tell, 2017).

10.3 Trust as a resource of domination

Trust as a resource of domination is built upon relational investment that nurtures confidence in using trust relations to allocate resources and deal with changes jointly. Relationship-specific investment signals commitment and thus reduces perceived risks (Nooteboom, Berger and Noorderhaven, 1997; Swärd, 2016), which could be small actions such as surpassing goals or big actions such as prioritising the other party's needs and going the extra mile in undertaking works. To maintain or develop trust requires reciprocity of relational investment. Actors and organisations might initially be driven by the expectation of gaining economic returns, hence economic reciprocity (Swärd, 2016; Tsanos and Zografos, 2016). The economic reciprocation means that what the main contractor and subcontractor receive from each other is contingent on what they give to each other. Returns are specific and, in an economic sense, the logic of managing relationships through economic reciprocity is largely aligned with transaction cost theory (Williamson, 1985). Transaction cost theory emphasises the role of legal and private orders, such as insurance and economic hostages, in maintaining cooperation in contractual relationships (Williamson, 1985). Legal and private orders create a fear of legal sanction or losing economic hostages that drive actors and organisations to continue cooperation. Transaction cost theory also allows for relational contracting, hence trust, but more proactive management from firms (rather than governed by the contract of exchange) goes beyond transaction cost theory and towards the social capital side of relationship management, which can tie actors and organisations together by contributing to positive expectations that form the desire to uphold the relationship for value co-creation (Pervan, Bove and Johnson, 2009).

The notion of bounded solidarity and social reciprocity, which emerge in project-level interactions, links the research to social capital theory and provides a complementary perspective of relationship management to transaction cost theory. Main contractors and subcontractors form bounded solidarity to ensure that the two parties are fairly treated by

the client and gain benefits. To continuously use trust relations needs concern for the other party's value, hence social orientations. Social orientations may be project-based, under which actors and organisations pursue the collective benefits within a project as singular transactions. Alternatively, social orientations may extend beyond the duration of a project and focus on continuous benefits that could be achieved through collaboration with the specific party, which usually occur when actors and organisations perceive future business opportunities. In this vein, paybacks for mutual service may become diffuse and the balance of exchange is achieved over time – that is, social reciprocity. Trust relations bring about social capital to enhance communication quality, reduce transaction costs and increase efficiency (Sako, 1992; Zaheer, McEvily and Perrone, 1998).

Social capital theory as an emergent area of this research has been an emerging area in the domain of S-DL (Laud *et al.*, 2015). Despite differences in the conceptualisations among researchers (cf. Bourdieu, 1986; Coleman, 1988), social capital is believed to reside in the structure of relationships and represent the ability of actors or collective actors as organisations to obtain benefits by virtue of relationships in certain social structures such as inter-organisational relationships or networks of relationships (Portes, 1998).

Social capital theory is aligned with the conceptualisation of operand and operant resources in S-DL, both of which have a broader sense of resources than mainstream economics. Actors can use trust relations to gain access to operant and operand resources. Co-creation is as strong as the relationship, including trust and power, and other resources when dynamically combined in interactions (Fyrberg and Jürriado, 2009; Laud *et al.*, 2015). However, to possess social capital, actors and organisations must be related to others; it is those others who are the actual source of strategic advantage (Lin, 1999, 2002). The acquisition and maintenance of social capital requires investment of resources and the processes of transforming social capital to economic capital, relative to transactional exchange, bring about uncertainties, unspecified obligations and the possible disappointment of reciprocity expectations (Portes, 1998). Despite such uncertainties and risks, actors and organisations who invest and maintain social capital may see it as primarily the accumulation of obligations and expect repayment in the future, either from the recipient *per se* (Coleman, 1994) or the collective consisting of both the investor and recipient, in the form of status and reputation, for instance. Further, actors and organisations exchanging social capital may be motivated by the emergent

identification of each other as a community and the recognition of the limits of their community (Portes, 1998).

In relation to S-DL and structuration theory, social capital theory offers a micro-foundations perspective along side transaction cost theory to explain higher-level constructs – that is, the motivation of maintaining trust and value co-creation. Relationship-specific investment might start as relational contracting at the organisation level, but the research reveals the role of bounded solidarity and social reciprocity emerged in intensive A2A interactions at the project level.

Value co-creation between main contractors and supply chains involves co-production of value propositions and core offerings (Vargo and Lusch, 2006); the latter refers to construction projects in this case. In the process of co-producing, main contractors and subcontractors provide mutual service, lever value for service beneficiaries in use and in doing so, bring benefits for their own organisations (Grönroos, 2008). Co-production is in essence self-interested, although common goals that satisfy both parties' short-term interests may be temporarily initiated.

On the other hand, value co-creating as another type of value co-creation is associated with social orientations. In value co-creating, collaboration goes beyond 'win-win'; actors and organisations consider not only their own but also the other party's value (Lusch and Vargo, 2014). In this service experience, moreover, main contractors and subcontractors gain shared intentions and identities that can improve service communication, resource integration and service coordination, and lever value in future service use. Value co-creating sustains the use of trust relations to allocate resources, hence trust as a resource of domination, which embeds more social capital for future use. The totality of the service experience, thereby, goes beyond co-producing *per se*.

Trust as a resource of domination influences the power relation in interactions. In using trust relations, main contractors delegate authority and tolerate uncertainty. From the perspective of S-DL, this empowering means to regard supply chains as operant resources. They have knowledge, skills, ideas and relationships that can drive effects within a service system, and the capability of empowering supply chains enables the supplier to allocate operand and operant resources in networks of relationships for resource integration and therefore co-create value propositions and solutions with the customer and their networks (Cova and Salle, 2008; Karpen, Bove and Lukas, 2012;

Tsanos and Zografos, 2016). Value is created in networks of relationships (Cheung, Myers and Mentzer, 2010) rather than in any individual firms (Corsaro, 2014; Akaka, Vargo and Schau, 2015), especially when sources of specialist resources are widely dispersed, as the case of the construction industry.

In this vein, trust relations are not only about risk mitigation but also risk sharing (cf. Laeequddin *et al.*, 2012). The effects of using trust relations as facilities of resource allocation accord with McEvily, Perrone and Zaheer (2003: pp.93-94):

...trust influences organizing through two main causal pathways: structuring and mobilizing... From a structuring perspective, trust shapes the relatively stable and enduring interaction patterns in and between organizations... From a mobilizing perspective, trust motivates actors to continue, combine and coordinate resources toward collective endeavours.

In terms of value co-creating, the structuring effects include reducing the use of contractual mechanisms and redundant resources for micromanagement and the mobilising effects include enabling serial equality and suspending judgements in times of uncertain conditions. Each party invests in the relationship and expects balance to be reached in a series of exchanges and commitments to be honoured in the future (Dyer and Chu 2003). The ability to operate on the basis of reciprocity and bounded solidarity enables the adaption of the best structuring process for problem solving. In this vein, trust as a resource of domination makes resource integration more flexible.

Shared intentions are co-created as trust relations are recursively used and social orientations emerge. Under shared intentions, actors and organisations are more willing to open resource access and mobilise resources for better integration (Laud *et al.*, 2015). In other words, shared intentions as a service outcome can lever value in use by making service and value co-creation more adaptive.

10.4 Trust as a rule of legitimation

The effectiveness of value co-creation in the service provision and outcomes encourages the repetition and eventual routinisation of using trust relations to allocate resources; the more trust-based service is repeated, the more trust develops, social capital increases and benefits are secured. In return, trust as an appreciating asset supports the continuity of

value co-creating. As actors and organisations continuously act in a trusting and trustworthy pattern and co-create value in the service process, they share and legitimate norms of conduct in day-to-day interactions – that is, ‘actor-generated norms’ (Vargo and Lusch, 2016). As stated in previous sections, equity, reciprocity and bounded solidarity emerge in the service interactions and may act as normative rules of conduct between main contractors and subcontractors. Following normative rules helps maintain the relationship stability, equitable and reciprocal service process and outcomes, which in return strengthen rules of conduct and routines. In this manner, actor-generated relational norms form relational control that initiates trust as a rule of legitimation and sustains the third cycle of trust and collaboration.

Routinisation of trust-based service does not mean blind trust, which is closer to instinct. Routines are repeatedly proved a success but are also susceptible to change, whereas instincts are hereditarily acquired and are ‘hard-wired’ (Teece and Pisano, 1994; Nooteboom, 2002).

Routine is psychologically relaxing, but in an important sense it is not something anyone can ever be relaxed about. The continuity of the routines of daily life is achieved only through the constant vigilance of the parties involved – although it is almost always accomplished at the level of practical consciousness

(Giddens, 1990, p. 98)

Routines are structured out of the norms and designed processes to become systematic. They include actions and behaviours that both support and generate trust; they show intent and are based in organisational competence. They occur at the practical level and create continuity in interactions as actors “*know tacitly about how to ‘go on’ in the context of social life without being able to give them direct discursive expression*” (Giddens, 1984, p. xxiii). Nevertheless, when uncertainties and risks go beyond tolerance level, routines may be shattered, and a new process is created at the discursive level (Nooteboom, 2002).

Trust as a rule of legitimation creates a “*capacity for the evolution of a ‘shared organisational mind’*” (Morgan, 1997, p.104) that encourages risk sharing and responsibility taking. Actors and organisations complied with these norms and controlled their own behaviour to maintain relationships. Relational norms seen here control the behaviour of those involved by generating a sense of responsibility, instead of

accountability. Accountability ties actions with “*the normative component of the rationalisation of action*” (Giddens 1979, p. 85). Whereas accountability at healthy levels is good, excessive accountability erodes trust and relationships. This is because it tends to discourage learning about the substance of performance or the other party and encourage decision making satisfying the criteria of accountability. Responsibility, on the other hand, is more likely to induce care, empathy and appreciation in interactions. Service coordination therefore becomes more cohesive under the shared mind that promotes collaborative behaviour of both main contractors and supply chains (Granovetter, 2005; Yi and Gong, 2013; Laud and Karpen, 2017).

Trust as a rule of legitimation and relational norms form relational thinking and expectations on each other, which generates shared identities in supply chain relationships. Shared identities lever value in future service use by helping align goals and values, increasing commitment, maintaining stability and cohesion, and shaping expectations on collective behaviour and intentions (Kramer, Brewer and Hanna, 1996). Moreover, as will be discussed in the next section, under the condition of linking systems between hierarchical levels and across boundaries and the shadow of the future, shared understanding, intentions and identities can be moved to the organisation level and lever value at higher levels of service ecosystem in future service.

10.5 Structural conditions of service ecosystem

From the service ecosystem perspective, the recursiveness of trust development and value co-creation involves actors and resources from multiple levels of the service ecosystem. Structures of the service ecosystem can form a conducive condition for learning about trustworthiness, help balance power relations between main contractors and subcontractors, and increase confidence in supply chain collaboration.

At the organisation level, systems linking projects and the organisation and boundary agency facilitate learning at the front end. Comparing trust development between external and internal relationships reveals the positive influence of shared systems at the organisational level. Shared organisation systems, including supporting functions, norms and practices provided common knowledge, standards and procedures and thus could facilitate joint activities and mutual understanding. Organisational policies, as they were continuously communicated between units, influenced individuals’ interpretations such as the meaning of internal relationships and way of utilising internal resources.

However, the positive influence was reduced by injecting elements of market and competition between internal units. Transactional elements discourage learning, relationship building and resource sharing between internal partners. The finding points to the dark side of the hybrid organisational form, as suggested by Teece and Pisano (1994, p. 540):

...we recognize the inherent limits [of the task of management to inject markets into firms] and possible counterproductive results of attempting to fashion firms into clusters of internal markets. In particular, learning and internal technology transfer may well be jeopardized... as we discuss what is distinctive about firms, we stress competences/capabilities which are ways of organizing and getting things done which cannot be accomplished by using the price system to coordinate activity. The key point, however, is that the properties of internal organization... cannot lead to the immediate replication of unique organization skills through simply entering a market and piecing the parts together overnight.

The organisation, including internal units and the parent organisation, as a reasonably permanent structure can be transactional and constrain trust. It reproduces transactional views and practices between internal relationships. The internal relationship also offers other types of social capital substitutes for trust. Internal companies might collaborate with each other on the basis of the belief in their shared identity through having the same parent organisation. Such belief in a shared identity might reduce reflexive learning about the other party's competence, integrity and benevolence. This results in a lack of belief in the other party's intentions as it is difficult to determine if observed trustworthy behaviour is a result of actors' volition or role constraints (McEvily, Perrone and Zaheer, 2003). Lacking belief in the other party risks internal relationships in disagreements, especially when there are few organisational policies or systems available for dealing with internal disputes.

Different from other businesses, the service ecosystem includes the project as an extra meso-level layer. Inter-organisational relationships therefore occur at both the organisation level and project level. Whereas the organisation level is deeply involved at the front end, in execution, it is the interaction at the project level that develops trust and co-creates value. As analysed at different levels and across the data, weak systems between project and organisation levels, heavy reliance on boundary agency and discontinuity of inter-organisational relationships across time make it difficult to move

value co-created in projects to the organisation level and vice versa. Both the continuity (top-down) and emergence (bottom-up) of a service ecosystem are disrupted, resulting in difficulties in realising relational contracting at the project level, inducing inconsistent practices across projects and losing value for the service ecosystem (Bresnen, 2007; Smyth, 2015b).

At the inter-organisational networks level, client involvement helps balance the power relationship between main contractors and subcontractors, inducing the perception of equity, openness and trustworthiness. Long-term relational contracting between clients and main contractors increases the confidence in supply chain collaboration (Brahm and Tarzijan, 2016). From the perspective of main contractors, the experience of relational contracting with clients ensures sustainable resources and increases the capability of structuring collaboration with supply chains at the organisation level. From the perspective of supply chains, long-term collaboration between the client and main contractor can increase perceived reliability of the main contractor and motivate relationship-specific investment at both organisation and project levels (Khalfan and Mcdermott, 2006).

10.6 Conditions of time

The path from prior history to trust and present projects is indirect (Poppo, Zhou and Ryu, 2008). The influence of past experiences is mediated by cognitive learning of how cooperation should take place and behaviour learning of how to make the cooperation work at the organisation level (Doz, 1996; Poppo, Zhou and Ryu, 2008; Hartmann and Caerteling, 2010; Elfenbein and Zenger, 2014; Buvik and Rolfsen, 2015). Relational contracting is based on learning and knowledge at the organisation level, which relies on boundary agency to transfer to the project level and in execution. Relying on agency and lack of relationship management can cause difficulty in realising relational contracting in projects as well as inconsistent practices across projects (Bresnen, 2007; Kadefors and Badenfelt, 2009; Smyth, 2015b).

The shadow of the future influences the present project, relationships and hence trust through the process of future-oriented learning (Brahm and Tarzijan, 2016). Future relationships and business opportunities affect the continuity of shared learning and future-oriented learning at the project level (Poppo, Zhou and Ryu, 2008), hence value co-creating activities.

Chapter 11 Conclusions

11.1 Summary of research development

Trust and its value are explored in the development of supply chain relationships in construction project settings in this thesis. It starts with the question “Why has it been so difficult to induce and sustain collaboration in the construction industry, especially among supply chains?” Complexity in terms of both content and management is certainly one reason. Relational contracting, partnering, best practices and supply chain integration have been promoted, but their effects vary (cf. Cicmil and Marshall, 2005; Brady and Davies, 2014). These mechanisms are mostly promoted through markets and by clients to benefit themselves. Supply chains are reactive, pointing to the second reason for the difficulty of collaborating with them – the institutionalised logic in the construction industry, including goods-dominant logic (G-DL) and project-focused logic (P-FL). G-DL and P-FL enable and are enabled by the recursive use of transactional approaches, such as transferring risks along supply chains, pursuing self-interests at the cost of other parties and managing projects in a project-by-project way instead of managing collective value across projects. Relationships are fundamental to establishing and maintaining collaboration. However, a further review on current construction project and supply chain management approaches indicated a lack of attention to relationships and their management, especially in supply chains. Second-tier subcontractors and suppliers have less understanding of partnering or collaboration with main contractors and clients, what it is, how to operate it and – most importantly – what benefits can be derived.

Complexity, the institutionalised logic and lack of attention to supply chain relationships point to a managed relational approach as a way forward that places supply chain relationships at the centre of analysis and theorising, offers a complementary logic to G-DL and P-FL that goes beyond value-in-exchange, and concerns the process of inducing and sustaining collaboration as well as value for both main contractors and supply chains. Trust is fundamental to relationships. Investigating the process of constituting trust in delivering construction projects and the influences of trust on service provision and outcomes offers a relational perspective of viewing collaboration. Taken together, research questions were formulated:

- 1) Whether and if so how does trust, from the main contractor to second-tier subcontractor, develop during service interactions between the two?

- 2) Whether and if so how does trust, from the main contractor to second-tier subcontractor, dynamically help increase service value during service interactions between the two?

Detailed objectives were:

- 1) Identifying the process of trust development in construction supply chains;
- 2) Providing an institutional logic at least complementary to G-DL and P-FL as a lens of analysing value and value-creating activities in construction;
- 3) Shedding light on the value of trust for those involved, including main contractors and subcontractors, as well as a broader view on value beyond points of transactions towards value-in-use in the course of time (Vargo and Lusch, 2004; Saxon, 2005).

To answer these research questions, the empirical research was process-based and used a case study method. First, a pilot case study was conducted to identify trust-related themes. The findings then helped develop a case study protocol, including a topic guide and interview questions. Three cases were selected based on the case selection criteria. To study the process of trust development and unfolding value of trust, data were collected in three waves in the lifecycle of subcontracted projects, first during the procurement and preconstruction, then execution and lastly completion. Seventy-one semi-structured interviews were conducted with informants from both main contractors and subcontractors. This thesis took a critical realist view and studied the process of trust development and unfolding value by investigating the generative mechanisms and phenomenon of trust. Data were analysed in four steps to construct chronological histories of cases and identify interactions influencing trust, different dimensions of trust phenomenon and the value of trust.

Before the empirical research, theoretical points of departure were determined through the literature review on trust theories and service-dominant logic (S-DL) as a complementary logic to G-DL and P-FL, which helped identify a conceptual framework. The conceptual framework consisted of five building blocks, which were 1) trust phenomenon, 2) interactions, 3) structures of service ecosystem, 4) time dimension of past and future and 5) value as perceived by both main contractors and subcontractors. These building blocks served as theoretical expectations of this research and guided the empirical research.

The literature review led to the need to consider interaction processes, structures and the interplay between structures and interaction processes in trust research under S-DL, which requires more open, dynamic, and reflexive management and organisation theories (Bygballe, Swärd and Vaagaasar, 2016; Sydow, 2017). Structuration theory (Giddens, 1984) emerged at the early stage of data analysis and was employed as a theoretical lens of analysis. Through the lens of structuration theory, trust can be regarded as a structural property of relationships. Generating trust is to raise the perception of trustworthiness (interpretative rule), use trust relations as resources to allocate resources (facility of resources), and legitimate relational norms that constrain opportunism and encourage trusting and trustworthy behaviour (normative rule). In turn, trust influences actors' interpretative schemes, facilities of resource allocation and norms of conduct, hence project processes and practices (Sydow, 1998). The recursive and dynamic relations between trust and interaction processes and practices provide an analytic approach to understanding the dynamics of supply chain relationships.

It is notable that the author did not use structuration theory in a deductive way and remained open to the meanings of concepts in order to give rise to the refinement of concepts according to empirical findings. Research questions were subsequently addressed, as detailed below.

11.2 Question 1: The process of trust development

The first set of propositions explores the question: whether and if so how does trust, from main contractor to second-tier subcontractor, develop during service interactions between the two? To answer this question, both the generative mechanisms and the dynamic phenomenon of trust were explored.

In terms of the generative mechanisms of trust development, this thesis proposes:

Proposition 1a: the development of trust is an engineered but also emergent process; it can be an intended or unintended consequence of learning in interactions.

Proposition 1b: relating, controlling and routinising initiate and maintain a sense of security and confidence as the foundation of trust development.

Proposition 1c: value co-creation initiates and sustains efficiency, equity, reciprocity, bounded solidarity and relational control, which recursively reinforce or develop trust.

Proposition 1d: the shadow of the past forms an initial condition for learning and generating a sense of responsibility that supports the exploitation of the past for the present and future service interactions.

Proposition 1e: the shadow of the future can lead to future-orientated learning, relational investment and social reciprocity, which facilitate trust, relationships and other operant resources obtained in the present to be transformed and reused in the future.

Proposition 1f: structures of the service ecosystem create conditions for trust development by balancing the power relation between main contractor and subcontractor, forming a conducive condition for learning and offering confidence in supply chain collaboration.

This thesis identified five types of trust-generating interactions – learning, relating, controlling, collaborating and routinising. *Learning* is the underlying process that promotes trust development. The perception of trustworthiness can be a consequence of *intentional learning* – that is, to assess partners’ capabilities in order to make trust-related decisions. The potential trustee’s cognitive and behavioural learning from the past demonstrates responsibility and commitment and thereby can stimulate the perception of trustworthiness. On the other hand, learning about the other party’s trustworthiness might be *unintentional*, meaning that trust emerges as a consequence of experiential and reflexive learning in monitoring the project performance or joint activities. However, the heavy reliance on agency to transfer organisation-level learning at the front end to the project level and execution, and weak systems between the organisation and project levels hinder the consistency of trust development across hierarchical levels and time.

To generate trust requires a sense of security and confidence to reduce perceived risks, swiftly establish roles, responsibilities and practices, and maintain stability when uncertainties occurred in delivering projects. At the organisation level, prior ties are the main source of security and confidence. Ties embed socialisation tactics and shared meanings. Structural *control*, in the form of negotiating contracts, for instance, helps strengthen perceived security and confidence at the organisation level but also transfer the perception to the project level. At the project level, a healthy level of structural control – such as establishing roles and positions, structuring procedures of systematic operations, having a reliable track record and maintaining consistency throughout the project lifecycle – creates common knowledge and codes of behaviour, regularises

expectations and increases predictability in operations. *Relating* helps build ties between actors and organisations in projects. These ties create familiarity and help sustain dialogic communication in changes and uncertainties to transform the common ground and recreate shared meanings. Relational investment nurtures the confidence in using trust relations to allocate resources and deal with changes jointly, which can be small actions such as surpassing goals or big actions such as prioritising the other party's needs and going the extra mile. Further, having equivalent knowledge bases, in the sense that actors are able to understand each other's specialised knowledge, reduces a trustor's suspicion due to cognitive distance and thus the sense of insecurity.

On the other hand, using power to control others' behaviour against their intentions and extract safeguards for one's own self-interest hinders trust. Controlling in this way formed a 'win or lose' perception that drives project partners to emphasise self-interest and ignore the benefits from trust-based relationships. Moreover, it led to a powerlessness perception of unfairness, insecurity and the behavioural manifestation of resistance.

Routinising effective and efficient service processes further strengthens perceived reliability and predictability in daily interactions and operations. The process of routinising helps trust and collaboration form virtuous cycles where trust serves as the medium and outcome of collaborating. On the basis of security and confidence, *value co-creation* creates shared experiences in which trust can develop. Project *efficiency* is the first driver for collaboration between main contractors and subcontractors. The aim is to use the other party's resources to co-produce value propositions and core offerings and achieve one's own goals. To sustain co-production requires perceived equity, in which both parties seek benefits proportional to their investments, with the condition of maintaining relationships. Co-producing creates shared experiences where actors are able to learn about the other party's competence and intentions, hence generating trust as a rule of signification.

A sense of *reciprocity* emerges as actors and organisations continuously exchange service in trusting and trustworthy ways. Actors and organisations might initially be driven by the expectation of gaining economic returns, hence economic reciprocity. Main contractors and subcontractors form *bounded solidarity* to ensure that the two parties are fairly treated by the client and gain benefits. To continuously use trust relations needs consideration of the other party's value, hence social orientations and value co-creating. In the shadow of the future, groups of actors are motivated to exchange service with

unspecified returns in the current project but expect the balance of exchange to be achieved in future – that is, social reciprocity. Reciprocity and bounded solidarity tie organisations together and lead them to shared identities and the desire to uphold the collaboration and use trust relations to allocate and integrate resources.

Relational norms that emerge in interactions can form *relational control* and sustain the collaboration by restraining opportunism and encouraging trust and trustworthiness. Relational norms control the behaviour of those involved by generating a sense of responsibility, which induces care, empathy and appreciation in interactions. In this vein, trust is not only about risk mitigation but also risk sharing.

Zooming out, structures of the service ecosystem create conditions for trust development by forming a conducive condition for learning about trustworthiness, helping balance power relations between main contractors and subcontractors, and increasing confidence in supply chain collaboration. At the organisation level, systems linking projects and the organisation and boundary agency facilitate learning at the front end. Shared organisation systems also positively influence trust development. Shared organisational systems, norms and practices provide common knowledge, standards and procedures and thus could facilitate joint activities and build shared understanding. For internal supply chain partners, policies from parent organisations, as they are continuously communicated between units, influence individuals' interpretations such as the meaning of internal relationships and way of utilising internal resources. However, the positive influence is reduced by injecting elements of market and competition between internal units. The organisation, including internal units and the parent organisation, as a reasonably permanent structure can be transactional and constrain trust. It reproduces transactional views and practices between internal relationships.

Internal relations can also hinder trust development by offering social capital that replaces trust. The internal relationship and arrangements can bring about resources with little experiential and reflexive learning about internal partners' actions. Internal partners might collaborate with each other on the basis of the belief in their shared identity through having the same parent organisation. This results in a lack of belief in the other party's intentions as it is difficult to determine if observed trustworthy behaviour is a result of actors' volition or role constraints.

Different from other businesses, the service ecosystem includes the project as an extra meso-level layer. Inter-organisational relationships therefore occur at both the organisation level and project level. Weak systems between project and organisation levels, heavy reliance on boundary agency and discontinuity of inter-organisational relationships across time render difficulty for continuous trust development across hierarchical levels and time.

At the inter-organisational networks level, client involvement helps balance the power relation between main contractors and subcontractors, inducing the perception of equity, openness and trustworthiness. Long-term relational contracting between clients and main contractors increases the confidence in supply chain collaboration. From the perspective of main contractors, the experience of relational contracting with clients ensures sustainable resources and increases the capability of structuring collaboration with supply chains at the organisation level. From the perspective of supply chains, long-term collaboration between the client and main contractor can increase the perceived reliability of the main contractor and motivate relationship-specific investment at both organisation and project levels.

The path from prior history to trust and present projects is indirect. Rather, history enables learning, responsible behaviour and relationship-specific investment in exploiting the past experiences for the present and future service provision. The shadow of the future leads to future-orientated learning, relational investment and social reciprocity since relationships and knowledge obtained in the present can be transformed and reused in the future. Without well-structured inter-organisational relationships or future business, actors and organisations tend to focus on short-term profits that could be actualised or co-created through delivering the present project.

In terms of the dynamic phenomenon of trust, this research proposes:

Proposition 1g: the extent of trust development is determined by the perception of trustworthiness in terms of competence and intentions and the orientation of trust.

Proposition 1h: competence trust develops from considering certain aspects of capability that might negatively influence project delivery, to perceived capability of completing contract specifications to the minimum requirements and managing planned change, and to perceived capability of managing emergent changes not specified *ex ante*.

Proposition 1i: intention trust develops from perceived openness in communication to perceived honesty and integrity, and to benevolence.

Proposition 1j: the orientation of trusting behaviour develops from being self-interested to socially-orientated.

Proposition 1k: the perception of competence and intentions and orientation of trusting behaviour enact patterns of behaviour demonstrating the extent of trust.

This thesis examined the phenomenon of trust from multiple dimensions, the perception of trustworthiness (competence trust and intention trust), the orientation of trust (self-interested trust and socially-orientated trust) and trusting behaviour.

A low degree of competence trust means that the main contractor perceives specific aspects of the subcontractor's capability that might negatively influence the project delivery. A higher degree is that the subcontractor is perceived as capable of completing contract specifications to the minimum requirements and managing planned changes. The highest degree, furthermore, is that the subcontractor is perceived as being able to manage emergent changes. Competence trust leads to main contractors' openness and receptiveness in communication and responsiveness to subcontractors' needs and requirements.

From the dimension of perceived intentions, the threshold is that the main contractor perceives the subcontractor as open and seeks transparency in communication. Intention trust can grow if subcontractors are perceived as having honesty and integrity, and, to a higher degree, benevolence and willingness to help when needed. Intention trust encourages main contractors to share meaningful information and reduces the concern that the subcontractor might use the information to disadvantage them. The perception of trustworthiness may further be attributed to the delegation of authority and tolerance of uncertainty in the subcontractor's actions.

From the dimension of orientations of trusting behaviour, trust develops from being self-interested to socially-oriented. Under self-interested trust, main contractors use subcontractors for their own benefit with little concern about subcontractors' value, implying the possibility of opportunism. On the other hand, under socially-oriented trust, main contractors recognise the social and relational influences on value and consider mutual benefits. Furthermore, the perception of mutual benefits might be project-based

or beyond the project and include future business. Socially-oriented trust encourages actors and organisations to take responsibility and increases social capital in supply chain relationships that helps raise value for the current or future service exchange.

11.3 Question 2: The value of trust

The last set of propositions is related to the third research question: whether and if so how does trust, from main contractor to second-tier subcontractor, dynamically help increase service value during service interactions between the two? Based on the research, this thesis proposes:

Proposition 2a: trust helps increase service value by improving service experiences for actors and organisations involved during service delivery; better service enables actors to reach higher performance levels.

Proposition 2b: trust makes service communication more informative, resource integration more flexible and service coordination more cohesive.

Proposition 2c: better service creates shared understanding, intentions and identities that lever value for future service.

Trust as a rule of signification first increases the intensity of service communication as actors become more open to each other. From the perspective of main contractors, they are more willing to share information and ask for advice from the subcontractor. From the perspective of subcontractors, main contractors' openness is perceived as one of the first signals of trust, which gives them confidence in advising and sharing project information. As perceived trustworthiness increases, actors exchange information beyond the current project, so the content of communication becomes thicker. Trust also helps form new relationships between previously unacquainted actors, groups and organisations, which increases the efficiency and effectiveness of communication in the project networks. By doing so, the phenomenon of trust forms a learning and sharing atmosphere in a network of relationships that makes actors and organisations more *informative*. Trust as a resource of domination mitigates the use of contractual mechanisms in resource allocation and generates the conditions for suspending judgements under uncertainties and expecting serial equity that reduces the need for instantaneous and equal compensation for relational investment. In this vein, resource

integration becomes more *flexible*. The virtuous cycles of trust and collaboration form relational norms and a sense of sharedness that induce relational thinking and expectations. Coordination based on collectively-accepted rules makes the service experience more *cohesive*.

The totality of these actions is part of the service experience, which has outcomes in terms of efficiency and effectiveness in execution and also an improved experience for those involved in delivery, hence an enhanced service outcome. Having more informative, flexible and cohesive processes engenders shared understanding, intentions and identities as service outcomes are co-created in supply chain relationships, which enables main contractors and subcontractors to secure more resources, specifically operant resources such as knowledge and relationships, in future service for project delivery. Service experiences, including the process and outcomes, also lead to improved outputs at different stages of project lifecycle.

Shared understanding, intentions and identities are co-created at the project level. Under conditions of the shadow of the future and linking systems between the project and organisation levels, service outcomes can be transferred to the organisation level, influence events and structures at higher levels, and enhance the dynamics of the service ecosystem for co-creating value. However, the emergence of the service ecosystem from the bottom is challenged by weak systems of project business between project and organisation levels and between organisations, and heavy reliance on agency to transfer resources across hierarchical levels.

11.4 Contribution

11.4.1 Trust theories

This research presents a dynamic picture of trust, from the lens of structuration theory and service-dominant logic (S-DL). It demonstrates interactions and structures affecting trust development, trust phenomenon and the value of trust beyond the traditional economic sense in one study. By focusing on the duality of trust in the process of service interactions, the thesis dynamically illustrates the recursive relationship of trust and value. This dynamic view of trust is, to the author's knowledge, one of the first among trust theories in various disciplines.

Structuration theory offers an explanation for how and why trust is created and recreated or transformed by interactions between collectives of actors, and, in turn, how and why trust influences the service experiences and outcomes. S-DL furnishes a broader definition of resources and value than mainstream economics of which trust has often been considered a part. Resource integration is not only about goods and services but also relationships and knowledge, which can increase social capital and hence lever value for the present as well as the future. The emergent findings relate trust to social capital theory, which adds to the logic behind complying with relational norms such as reciprocity and bounded solidarity, having a social orientation and continuing engaging in value co-creating activities with other parties. In this vein, the model for trust development and the value of trust proposed in this research go beyond mechanisms for building perceived trustworthiness (e.g., Mayer, Davis and Schoorman, 1995; Hartman, 2000; Wong *et al.*, 2008; Lau and Rowlinson, 2009), the calculative or cognitive view on trust (e.g., Williamson, 1993; Lewicki and Bunker, 1996; Rousseau *et al.*, 1998; Kadefors, 2004; Laeequddin *et al.*, 2012) and investigating linear effects of trust (e.g., Doloi, 2009; Chalker and Loosemore, 2016). It depicts trust development in multiple dimensions, including the perception of trustworthiness, but also the orientation of trust and the behavioural enactment of trust, the unfolding value of trust over time and the structural conditions of trust. Trust is found to be an intended but also unintended consequence of service interactions under multiple-level structural conditions that influenced learning environment and power relations between collectives of actors. The value of trust is beyond facilitating goods and services for project efficiency and reducing perceived risks; trust can generate a sense of responsibility and commitment in relationships and enrich social capital for value creation.

Methodologically, the process-based study enables the findings going beyond static snapshots of trust. The zooming-in and -out observation and multilevel analysis facilitate a critical realistic approach to understanding a particular phenomenon over time in order to form a more comprehensive view of a given reality. By deconstructing reality and interpretations, this research analysed the phenomenon at different levels of scale and direction. Where one level has been chosen for the focus of observation, other levels can be used as the context. For instance, the thesis sheds light on the effect of power on trust at the macro-level (that of market power and hierarchical power from contract or legal systems), meso-level (that of structuring inter-organisational relationships and projects) and micro-level (that of manipulating prices in negotiation). In this vein, this research

sheds light on the interplay of trust and power. Structuration theory and social capital theory regard both trust and power as resources that can be used to consolidate the dominance of a social group through enabling resource integration. The use of power in a way that structures interactions to form a collective line of actions and achieve collective value is beneficial to trust and value. Nevertheless, imposing power upon other actors or collective actors might destroy trust and other operant resources, hence value. Trust, in contrast, can bridge different social groups, encourage co-creating of value and increase social capital for those involved to achieve higher-order value for the present and future.

11.4.2 Construction project and supply chain management

This thesis advances the relational approach to managing construction projects by going beyond transaction cost economics. It combines empirical findings with theoretical underpinnings and demonstrates collaborative relationships among supply chains as a strategic advantage that levers value for project businesses and organisations. The increase in the perception of trustworthiness and social orientation can improve resource integration in terms of allocating goods and services but also building shared understanding and gaining knowledge, hence a more adaptive and absorptive way of organising projects and higher performance level. The contribution is not only theoretical and conceptual in regard to trust; it responds directly to a call for empirical examination in the construction and project management domains (Smyth *et al.*, 2016).

It also enriches the understanding of relational integration in construction supply chain management by demonstrating detailed knowledge about the dynamics of relationships in the project lifecycle and the creating of value for both main contractors and supply chains. Extant research has highlighted the significance of aligning goals in collaborative procedures and tools to generate value for the end user (Kumaraswamy, Anvuur and Smyth, 2010). This thesis extends this line of thought and points out the necessity of understanding the dynamics of value co-creation in the project lifecycle and motivations to participate in and continue collaboration and value co-creation. The contribution of integrative activities to value creation and project performance is explicated. The research highlights the role of relational norms such as equity, bounded solidarity and reciprocity in forming and sustaining the phenomenon of trust and value co-creation in construction supply chain relationships, indicating a move towards the social capital side of the relationship management approach.

However, under current construction project and supply chain management practices, relational norms are mostly emergent and rely on personalities, interpersonal relationships and interactions between key actors. This points to the need for more systemic approaches to initiating and spreading relational behaviour and practices within and between organisational boundaries in order to realise consistent service across projects.

11.4.3 Service-dominant logic

This thesis contributes to service-dominant logic (S-DL) in several important ways. First, it introduces trust and other relational elements such as relational norms into the S-DL literature at a detailed level of empirical and theoretical investigation. The eighth foundational premise (FP8), “*a service-centred view is inherently beneficiary oriented and relational*” (Vargo and Lusch, 2016, p. 4) is therefore underpinned and strengthened. Taking relationships as the centre of theorising and analysis extends the understanding of value co-creation by explicating how service manifests itself within and among relationships that actors and collective actors are part of. Structuration theory offers a lens by which to analyse how trust influences collectives of actors’ interpretations (rule of signification), mechanisms for resource integration (resource of domination) and normative practices (rule of legitimation). Service interactions and value co-creation are enhanced as trust and relationships become intensified. The relational perspective offers a zoom-in opportunity for researching and demonstrating the significant role of relationship in service exchange and value co-creation.

Second, the thesis depicts an interactive and multilevel picture of value co-creation. By weaving together structuration theory, social capital theory and S-DL, the thesis illustrates not only how the structures of multiple levels of service systems constrain and enable service interactions and value co-creation at the project level but also the motivation behind continuing value co-creating practices between actors and collective actors. It also shows how interactions between actors and collective actors can affect the phenomena and outcomes at the project and organisation levels. This in combination advances emerging social construction dialogue in the S-DL literature, which currently focuses on practices in interactions or the influence of relational structures on resource integration and value co-creating behaviour (e.g., Edvardsson, Tronvoll and Gruber, 2011; Edvardsson, Skálén and Tronvoll, 2015; Laud *et al.*, 2015; Laud and Karpen, 2017).

Focusing upon service interactions over time enables the research to identify what activities are conducted when and how value is co-created or emergent in an interactive way. The relational, zooming-in, interactive and multilevel nature of this research enriches the understanding of value co-creation.

11.5 Implications for practices

Although the research findings make clear that trust is often an unintended consequence of shared experiences, this does not mean trust cannot be generated by management intervention. On the contrary, trust can be intentionally and reflexively nurtured. To do so:

- (1) Clients and main contractors should extend long-term relational contracting to include tier-two contractors and structure open-end relationships so as to co-create a shared vision of future, increase supply chain engagement and achieve consistent value co-creating performance across programmes of projects.
- (2) Main contractors and second-tier subcontractors should co-create relationship governance to set the tone of collaboration and initiate responsibilities, confidence and security, procedures and tools of interactions to sustain confidence and security, code of behaviour to clarify roles and duties, behavioural programmes to nurture interpersonal relationships and relational norms, and communication systems to ensure regular communication, shared understanding between different professional groups and functional units and multilevel relationships between two parties.
- (3) Main contractors and subcontractors should invest in internal knowledge and relationship management systems to link organisation and project levels and enable two-way transferring of rules and resources across hierarchical levels and projects. On the direction of top-down, these systems should ensure the consistent exercise of procedures, tools and programmes; on the direction of bottom-up, these systems should enable the improvement of the service ecosystem by embedding knowledge and relationships from the project level to the organisation level.
- (4) Managers, especially boundary agencies, should be able to reflexively learn in service experiences, relating structures of the service ecosystems to interactions by means of practices.

11.6 Limitations and implications for further research

This thesis has some notable limitations which point out a number of paths for future research. First of all, the focus of this research is main contractor-subcontractor relationships in construction projects. Additional research can be carried out to go beyond this dyadic relationship as well as the construction industry context to promote analytical generalisation of the concepts presented here. Second, the findings of the interplay of trust and power need further attention. A comparable study can use the methodology and method to investigate the value of power and trust, and to compare findings of different cases. Third, although the thesis recognised the significant influence of time on trust and managed to conduct process-based case studies throughout the lifecycle of subcontracted projects, the duration of the research programme limited the amount of time available for fieldwork. 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. A longer study duration will also enable research on different levels of service ecosystems in different phases of the project lifecycle as well as between different projects. By doing so, these studies will be able to explore a wider range of structural conditions that are not considered in detail here, such as the institutional and cultural contexts. Fourth, the findings concerning trust and operant resources give rise to research questions about the link between trust and dynamic capabilities at the organisation level. Specifically, detailed research should be conducted to explore whether and how resources obtained or renewed within projects are integrated within the focal organisation and thus improve dynamic capabilities of the organisation.

Trust can improve service experiences and enable actors and collective actors to integrate resources better. It can bridge different social groups, encourage co-creating of value and increase social capital for those involved to achieve higher-order value for the present and future. If we want to build trust, we need to think less about accountability through close monitoring and imposing power to control others against their wishes, and more about good governance and responsibility; less about transparency and more about limiting opportunism and encouraging trustworthiness. To achieve the latter, we shall have to start interacting in ways that form a sense of security and familiarity, equity, reciprocity and bounded solidarity.

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Appendix: Case study protocol

A. Introduction

This research aims to investigate the value of trust in construction supply chains, in particular main contractor (MC) and second-tier subcontractor (SC) relationships. The primary research questions are:

- (1) Whether and if so how does trust, from MC to SC, develop during service interactions between MC and SC?
- (2) Whether and if so how does trust, from MC to SC, dynamically help increase service value during service interactions between MC and SC?

B. Data collection procedures⁶

	Alpha	Beta	Gamma
Context	Surfacing for a highway improvement project	Piling for an office building project	Piling for a multiple-use building project
Location	Address:	Address:	Address:
Main contractor	Road Ltd. Main contacts: Project manager/Site agent Mobile:	Office Plc. Main contacts: Project director Mobile:	Build Gamma Main contacts: Project manager Mobile:
Subcontractor	Surface Ltd. Main contacts: General manager Mobile:	Found Gamma Main contacts: Project director/Project manager Mobile:	Found Gamma Main contacts: Project director/Project manager Mobile:
Procurement stage			
Data collection methods	<input checked="" type="checkbox"/> Interviews <input checked="" type="checkbox"/> Archival records <input checked="" type="checkbox"/> Observation (Non-participant)	<input checked="" type="checkbox"/> Interviews <input checked="" type="checkbox"/> Archival records <input checked="" type="checkbox"/> Observation (Non-participant)	<input checked="" type="checkbox"/> Interviews <input checked="" type="checkbox"/> Archival records <input checked="" type="checkbox"/> Observation (Non-participant)
Interviewee roles	Main contractor <input checked="" type="checkbox"/> Project manager <input checked="" type="checkbox"/> Supply chain manager <input checked="" type="checkbox"/> Site agent <input checked="" type="checkbox"/> Quantity surveyor Subcontractor <input checked="" type="checkbox"/> General manager <input checked="" type="checkbox"/> Commercial manager <input checked="" type="checkbox"/> Supervisor	Main contractor <input checked="" type="checkbox"/> Supply chain manager Subcontractor <input checked="" type="checkbox"/> Bid manager <input checked="" type="checkbox"/> Project manager	Main contractor <input checked="" type="checkbox"/> Project director <input checked="" type="checkbox"/> Project planner Subcontractor <input checked="" type="checkbox"/> Bid manager <input checked="" type="checkbox"/> Project director <input checked="" type="checkbox"/> Operations director <input checked="" type="checkbox"/> Project manager
Execution stage			
Data collection methods	<input checked="" type="checkbox"/> Interviews <input checked="" type="checkbox"/> Archival records <input checked="" type="checkbox"/> Observation (Non-participant)	<input checked="" type="checkbox"/> Interviews <input checked="" type="checkbox"/> Archival records <input checked="" type="checkbox"/> Observation (Non-participant)	<input checked="" type="checkbox"/> Interviews <input checked="" type="checkbox"/> Archival records <input checked="" type="checkbox"/> Observation (Non-participant)
Interviewee roles	Main contractor <input type="checkbox"/> Project manager <input type="checkbox"/> Supply chain manager <input checked="" type="checkbox"/> Site agent <input checked="" type="checkbox"/> Quantity surveyor <input checked="" type="checkbox"/> Subagent Subcontractor <input checked="" type="checkbox"/> General manager <input checked="" type="checkbox"/> Commercial manager <input checked="" type="checkbox"/> Supervisor	Main contractor <input type="checkbox"/> Supply chain manager <input checked="" type="checkbox"/> Project director <input checked="" type="checkbox"/> Project manager <input checked="" type="checkbox"/> Quantity surveyor Subcontractor <input checked="" type="checkbox"/> Project director <input checked="" type="checkbox"/> Project manager <input checked="" type="checkbox"/> Quantity surveyor <input checked="" type="checkbox"/> Project engineer <input checked="" type="checkbox"/> Supervisor	Main contractor <input type="checkbox"/> Project director <input type="checkbox"/> Project planner <input checked="" type="checkbox"/> Project manager <input checked="" type="checkbox"/> Commercial manager <input checked="" type="checkbox"/> Construction manager <input checked="" type="checkbox"/> Project engineer Subcontractor <input type="checkbox"/> Bid manager <input type="checkbox"/> Project director <input type="checkbox"/> Operations director <input checked="" type="checkbox"/> Project manager <input checked="" type="checkbox"/> Quantity surveyor <input checked="" type="checkbox"/> Project engineer

⁶ Some contents are anonymous for confidentiality.

Completion stage			
Data collection methods	<input checked="" type="checkbox"/> Interviews	<input checked="" type="checkbox"/> Interviews	<input checked="" type="checkbox"/> Interviews
	<input checked="" type="checkbox"/> Archival records	<input checked="" type="checkbox"/> Archival records	<input checked="" type="checkbox"/> Archival records
	<input checked="" type="checkbox"/> Observation (Non-participant)	<input checked="" type="checkbox"/> Observation (Non-participant)	<input checked="" type="checkbox"/> Observation (Non-participant)
Interviewee roles	Main contractor	Main contractor	Main contractor
	<input type="checkbox"/> Project manager	<input type="checkbox"/> Supply chain manager	<input type="checkbox"/> Project director
	<input type="checkbox"/> Supply chain manager	<input checked="" type="checkbox"/> Project director	<input type="checkbox"/> Project planner
	<input checked="" type="checkbox"/> Site agent	<input type="checkbox"/> Project manager	<input checked="" type="checkbox"/> Project manager
	<input checked="" type="checkbox"/> Quantity surveyor	<input checked="" type="checkbox"/> Quantity surveyor	<input checked="" type="checkbox"/> Commercial manager
	<input checked="" type="checkbox"/> Subagent		<input type="checkbox"/> Construction manager
			<input type="checkbox"/> Project engineer
	Subcontractor	Subcontractor	Subcontractor
	<input checked="" type="checkbox"/> General manager	<input checked="" type="checkbox"/> Project director	<input checked="" type="checkbox"/> Bid manager
	<input checked="" type="checkbox"/> Commercial manager	<input checked="" type="checkbox"/> Project manager	<input checked="" type="checkbox"/> Project director
	<input type="checkbox"/> Supervisor	<input checked="" type="checkbox"/> Quantity surveyor	<input checked="" type="checkbox"/> Operations director
		<input checked="" type="checkbox"/> Project engineer	<input checked="" type="checkbox"/> Project manager
	<input checked="" type="checkbox"/> Supervisor	<input checked="" type="checkbox"/> Quantity surveyor	
		<input checked="" type="checkbox"/> Project engineer	

C. Outline of case study report

1. Project overview

2. Service ecosystems

Project participants, Procurement systems, Organisational systems

3. The shadow of the past and future

Past experiences, future expectations, initial trust

4. Procurement and preconstruction

Chronology of events, Interactions, Trust phenomenon, Trust value

5. Execution

Chronology of events, Interactions, Trust phenomenon, Trust value

6. Completion

Chronology of events, Interactions, Trust phenomenon, Trust value

D. Interview topic guide

1. General information about informants

- 1.1. Position, key role and experiences in the company and project
- 1.2. Working experiences

2. General information about projects

- 2.1. Projects characteristics
- 2.2. Project progress

3. The shadow of the past

- 3.1. Established relationships between individuals and relationship quality
 - At the project level
 - At the firm level
- 3.2. Past experiences between two companies
 - Average number of projects delivered together every year
 - The perception of past experiences: direct or indirect? If indirect, where the perception comes from?
- 3.3. Relationship quality at the front of the front end

4. Structures

- 4.1. Project organisation procedures/routines
- 4.2. External or internal, organisation structures, organisational relationship and knowledge management systems
- 4.3. Procurement systems, contract types

5. Interactions

- 5.1. Risk management practices
- 5.2. Change management practices
- 5.3. Relationship management practices
- 5.4. Knowledge management practices

6. Perception and behaviour

- 6.1. The perception of risks, reliance
- 6.2. Expectations on the other party
- 6.3. Behaviour showing reliance

7. Service experiences

- 7.1. Service communication and coordination
- 7.2. Resource allocation and integration

8. Service outcomes

- 8.1. Perceived benefits from the other party
- 8.2. Benefits delivered to the other party
- 8.3. Relationship quality
- 8.4. Learning from the other party

E. Interview questions

Main contractor set

- How many years have you worked for this company and how many years have you held the current job position?
- What are your key responsibilities in the company?
- Could you please give me a brief introduction about [project name]?
- How is your company's relationship with the client of this project?
- How did your company qualify subcontractors?
- Could you please introduce me the project with [subcontractor name]?
- How was your company's experience with [subcontractor name] before this project?
- Why did your company select [subcontractor name]?
- Does your company put any demanding terms on [subcontractor name] that are applied on your company in the contracts with your clients?
- What risks does your company perceive in this subcontracting project?
- Is [subcontractor name] helpful in risk reduction? Why?
- How are resources allocated in this subcontracting project?
- Do your two companies make plan together?
- Are there any changes in value propositions at this stage? If so, how?
- What is your company's approach to manage relationships with [subcontractor name]?
- How is your company's relationship with [subcontractor name]?
- How about [subcontractor name]'s attitude in this project?
- What is your company's approach to manage knowledge and skills in this project?
- Does your company rely on [subcontractor name]?
- Are there any behaviour showing your reliance on [subcontractor name]?
- What benefits has your company perceived?
- What benefits has your company brought to this project?
- What does your company expect from this project?

Subcontract set

- How many years have you worked for this company and how many years have you held the current job position?
- What are your key responsibilities in the company?
- Could you please give me a brief introduction about this project?
- How was your company's experience with [main contractor name] before this project?
- Why is your company interested in this project?
- Why do you think your company was selected?
- Does [main contractor name] put any demanding terms on your company that are applied on [main contractor name] in the main contract?
- What risks does your company perceive in this project and level of risks?
- Is [main contractor name] helpful in risk reduction? Why?
- How are resources allocated in this subcontracting project?
- Do your two companies make plan together?
- Are there any changes at this stage? If so, how?
- What is your company's approach to manage relationships with [main contractor name]?
- How is your company's relationship with [main contractor name]?
- How about [main contractor name]'s attitude towards your company in this project?
- What is your company's approach to manage knowledge and skills in this project?
- Does [main contractor name] rely on your company?
- Are there any [main contractor name]'s behaviours showing their reliance on your company?
- What benefits has your company perceived?
- What benefits has your company brought to this project?
- What does your company expect from this project?

F. Participant information sheet

The Value of Trust in Construction Supply Chains

INTRODUCTION

This research aims to understand whether and how trust, from [*main contractor name*] to [*subcontractor name*], develops and dynamically helps enhance service value and benefit both parties. It focuses on the inter-organisational relationship between two companies.

Potential findings of this research include:

- Interactions between two companies in the project delivery
- The process of trust and relationship development and its influence on performance
- Value created or lost in the project delivery

Potential benefits for your company include:

- Optimising service process and outputs
- Managing value creation and preventing value loss in service
- Enhancing capabilities of relationship management and supply chain management
- Networking opportunities with academia

METHODOLOGY AND REQUIREMENTS

We would like to conduct three-wave interviews in one of the projects *between* [*main contractor name*] and [*subcontractor name*]. Interviews are going to be conducted at the procurement/preconstruction stage, then execution stage and finally completion stage. Ideally, the project execution lasts 5 to 7 months.

For each wave, we would like to interview 6 employees, 3 from [*main contractor name*] and 3 from [*subcontractor name*]. Ideally, we would like to interview the same interviewees or roles, during the data collection process.

Each interview will last 1 hour.

The response will be held with strict confidence, and interviewees will be referred by job position and organisations kept anonymous for data analysis purpose.