Walking the line: Navigating the space between calculus-based and relational trust in construction supply chains

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Abstract

Literature suggests that trust can take a number of forms, two notable ones being calculus-based and relational trust. Researchers have also argued that it is important to understand how these forms can be blended in different situations. However, there is limited empirical work that has explored how this blending can be managed in construction settings, where calculus-based forms of trust have often been overemphasized. In these situations, parties often depend excessively on contracts, incentives, and deterrents in ways that are counterproductive, perhaps even leading to distrust. Existing models of trust provide limited guidelines on how to achieve an optimal mix. We use qualitative case studies and actor-network approaches to explore these forms of trust, along with the movements between them, in two settings. Based on our findings, we argue that trust can initially emerge not just as calculus-based but also as dominantly relational and that trajectories of trust reflect complex, non-linear paths between the two pure forms. These findings allow us to enrich existing models that suggest that trust begins as entirely calculus-based and eventually changes to relational forms. We also point to potential areas for future work in terms of exploring the antecedents and outcomes of trust in various forms.

Keywords: trust, calculus-based, relational, capital, construction supply chains

1. Introduction

Trust has been defined as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another" (Rousseau et al 1998, p. 395). In collaborative contexts, trust has been described as "the glue and lubricant" that that holds relationships together (Bryson et al 2006, p. 47). Trust as a construct has received considerable attention in the field of construction, an arena where relationships have been described as conflict-laden, lacking in trust (Chan et al 2004), and adversarial (Phua and Rowlinson 2003). Studies suggest that trust in construction settings has multiple benefits: it helps supply chain partners fulfil their commitments in terms of service or product delivery, allocate appropriate resources to the required tasks, and facilitate team work among the project development team (Chow et al. 2012). High levels of trust among partners also result in a clear focus on the long-term benefits of their relationship (Davis 2008). An appropriate organisational culture that values trust is also a prerequisite to maintaining a sustainable supply chain partnership (Cheung and Rowlinson 2011). In the same vein, a lack of trust would result in unsuccessful collaboration (Akintoye and Main 2007). Trusting relationships therefore play a critical role in developing long-term relationships among partners. Interestingly, trust can have surprising complexities: studies have shown for example, that trust can lead to inefficiencies and waste as reported by Khan et al. (2011).

Researchers from within and outside the domain of construction have sought to understand trust theoretically and empirically by developing models that unpack trust in different forms. A number of these have analysed trust by proposing typologies ranging from calculative, economic, highly rational notions of trust, to affect-driven, relational forms that are seen to emerge from long-term interactions. In management literature, for example, Rousseau et al. (1998) proposed that trust as a micro, meso, or even macro-level construct, can come in three different forms. Calculus-based trust, they claim, emerges when one party concludes, based on the assessment of credible information (reputation, academic credentials), that a trustee (the actor being trusted) "intends to perform an action that is beneficial" (p. 399). The actor therefore becomes willing to engage with the trustee. The process is described as a highly rational approach, and is utility-driven in the sense that it focuses on benefits that can come from deciding to trust. However, this type of trust is limited in the sense that actors engage only in a small pool of select exchanges, and the actor seeks to maintain its own well-being maintaining some protection through the presence of deterrents. In contrast to calculus-based trust, relational trust emerges when one party engages with a trustee in repeated interactions over time, forming a relationship which in itself becomes the basis for trust. The relationship usually involves emotion and a higher level of faith as compared to calculus-based trust. The result of this type of trust is a broad range of exchanges typically transcending arms-length transactions (Rousseau et al. 1998). Apart from calculus-based and relational trust, Rousseau et al. (1998) also discuss a third type of trust, institution-based trust, which explores the role of entrenched norms, rules and practices in shaping conditions for trust. Other researchers have proposed similar typologies. Lyons and Mehta (1997) likewise argue that trust can be economic in nature, resulting in what they call "self-interested trust" (SIT); in contrast, trust can be social in nature, resulting in what they call "socially-oriented trust" (SOT). There are considerable overlaps between SIT and calculus-based trust, just as there are considerable overlaps between SOT and relational trust. SIT is based on an actor's calculating a future returns or benefit as the outcome of trusting in another party. SOT, on the other hand, assumes that social factors (for example an affective component) drive an actor to behave in trustworthy ways to others.

Similar categorizations of trust have emerged in the field of construction. Khan et al. (2011), for example, distinguish between cognitive- and affect-based trust. Cognitive-based trust is based on the professional competence of the service or product provider. In contrast, affect-based trust is the emotional attachment that gets developed among partners over a period of time. Zhagloul and Hartman (2003) likewise propose different types of trust, two of which are trust based on competence (based on the question "can you do the job?") and trust based on intuition ("does this relationship feel right?").

The persistence of typologies (economic/ rational/ calculative versus affective/ relational/ social) across these four models is worth noting. Also common across at least two models is the idea that different types of trust can be present in a single situation. Rousseau et al. (1998), for example, argue that different situations can be characterized by all three forms of trust, combining into a trust bandwidth. They propose a model that shows the changing composition of this bandwidth over time:

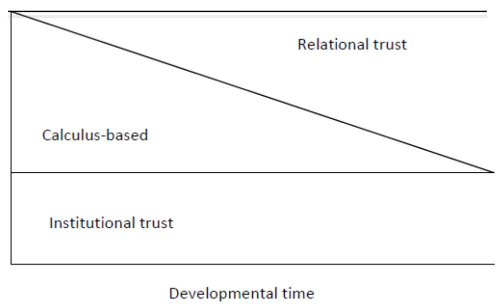

Figure 1: A model of trust (Rousseau et al. 1998, p. 401)

A key feature of this model is the proposal that the calculative component of trust begins as dominant relative to relational trust, but is gradually replaced by relational trust over time.

Lyons and Mehta (1997, p. 254) likewise argue that multiple forms of trust can be present in a situation, and that "[different forms of trust] may be used to reinforce each other, though they are likely to be present in different blends of relative importance". However, they argue that the specific blend of trust that is present in a given context is an empirical question often riddled with complexity:

> *We do not claim that one is universally true and the other is not, nor that there is room for only one type of trust in each relationship…It is possible that one type dominates in one group of firms and the other in another. It is also quite possible*

that the same individuals act with SOT with respect to one trading partner, but only SIT with respect to another. Certainly, we must expect both to evolve differently over time.

Our purpose for this paper, then, is to explore the two types of trust (economic/ rational/ calculative versus affective/ relational/ social calculus-based trust) in the context of two qualitative case studies. For the sake of brevity, we refer to these two types as calculus-based versus relational trust, although our findings for this specific paper would also support SIT/SOT and cognitive/ affective categorizations. The empirical examination of this blending process is particularly important, given that researchers have argued that "[i]n today's complex business relationships, like construction projects, the most effective approaches to developing 'business trust' are based in between these two extremes of egoism and altruism" (Rahman and Kumaraswamy 2002, p. 47). Still, negotiating this "space in between" has proven to be far from straightforward. Lyons and Mehta (1998, p. 254) warn against making simplistic conclusions, for example those that argue that "both [types of trust] are equally important". Equally dangerous is the tendency to ignore one type of trust completely. In the field of construction, for example, calculus-based forms of trust have often been overemphasized, with parties depending excessively on contracts, incentives, and deterrents in ways that are counterproductive, perhaps even leading to distrust (Kadefors 2004). There is therefore a need to explore, particularly in construction-related situations, how different forms of trust can best be combined in specific situations, and how the nature of these blended forms of trust can be allowed to emerge, rather than forcing them into a predetermined path. In our empirical study, we seek to discern and unpack how this blending takes place in nuanced ways. Our findings allow us to propose, among other things, a number of ways that the model of Rousseau et al. (1998) can be enriched.

2. Methods

This study is part of a three-year project exploring collaboration in housing supply chains using novel offsite manufacturing approaches in Australia. The study's emphasis on collaboration makes an examination of trust necessary, as there is a close link between the two (Bryson et al., 2006). For this paper, we focus on the issue of trust in the context of two qualitative case studies. Organization A is a large national developer that operates in a large Australian capital city. It focuses on the design and construction of medium-storey timber-framed apartments. Over the last decade, the organization has made it a priority to move away from purely site-based construction approaches and to explore alternative construction methods. In 2013, it began a five-storey apartment building project that involved the design and use of an innovative cassette floor that could be manufactured offsite and later craned into place. Upon completion of the project, it was assessed that the use of the cassette floor led to a cost savings of 25% per apartment. While use of the cassette was successful in retrospect, the development of the prototype of the cassette was a stage that was fraught with considerable uncertainty and resistance. There was therefore a period when Organization A found itself having to build relationships with suppliers and contractors in ways that fostered trust and encouraged these partners to launch into this new undertaking with them.

Organization B is a regional provider of housing solutions with two main locations, one being a small town in South Australia. The company specializes in both site-built houses as well as transportable homes that are manufactured on company premises then trucked to specific locations. Organization B has evolved over time, having its beginnings with a small firm founded by a single entrepreneur, and then expanding over time to include multiple businesses, four owners, and multiple managers. Apart from building homes, the firm also maintains properties and provides kitchen solutions. Organization B has, until recently, been operating with partners who have long-standing personal relationships with the owners, relationships that have persisted even in the absence of formal contracts. In 2014, Organization B took on a new general manager, and one of her goals is to professionalize and formalize structures and processes in the organization.

Our purpose is to examine trust in the context of the two construction-related organizations that are embedded in larger supply chain networks. Data was gathered primarily through interviews of managers and external partners of both organizations. Fourteen interviews have so far been conducted across both organizations. Interviews lasted one hour, were fully transcribed, and then analysed thematically using NVivo.

In analysing the data, we employed actor-network theory (ANT) as a methodological approach. ANT overarches a range of theoretical and methodological approaches based on the premise that much of social reality can be understood as the outcome of actors (human and non-human) interacting in heterogeneous networks (Law 1992). From an ANT perspective, complex phenomena such as organizations, technologies, IT systems, and communities are all networks made up of people, objects, documents and other entities exercising some form of agency, shaping their relationships with other actors, and in doing so creating network effects. Much of the "work" of creating network is often, though not completely, carried out by a key actor (referred to as a prime mover). The prime mover seeks to enrol other actors into a network, and to subsequently stabilize this network, in order for the network to address a certain problem (Callon 1999).

We used ANT to identify key players in both organizations, to examine how they established interactions with other actors, and to explore what forms of trust emerged between human actors. Many of the quotes can be understood to be coming from "prime movers" with considerable influence on the direction of an organization. These prime movers' views (whether on strategic issues or on things like trust) are important, but are not to be taken as the views of the overall organization. Acknowledging this also highlights that in these case studies, it is not the organizations as monolithic entities that "trust"; it is specific people who trust in certain ways. Trust in this case is therefore examined primarily on a micro level (as linked to an individual's notion of trust), although it should be noted that when referring to "trusting a partner", the term "partner" is loosely employed, at times referring to a partner organization, other times to a representative of that organization. It should also be noted that trust can be multifaceted to the extent that people "possess" it different forms and mobilize it in different ways. Analysing organizations as composed of different actors with different interests and views is consistent with the assumptions of actor-network theory.

3. Findings

We discuss our findings as follows. First, we describe what we discerned to be the roles of calculus- and relational trust at the relationship formation stage, that is, at the stage when managers from Organizations A and B were selecting and recruiting partners. Second, we examine the trajectories of these two types of trust over time, suggesting that the so-called switch between calculus and relational trust requires more complex conceptualizations than the suggestion that relational trust eventually replaces calculus-based. These two sets of findings become the basis for discussing future areas of research, specifically in terms of exploring antecedents and outcomes of various forms to trust. Due to space limitations, we do not discuss institutional-based trust here.

3.1 Forms of trust: the role of the relational component

The model of Rousseau et al. (1998) suggests that trust begins mainly as calculus-based. This may seem intuitive, given than trust based on economic thinking has tended to dominate business settings (Lyons and Mehta 1997). Our data from Organization A also supports this, as key managers describe partner selection for their innovative project as a systematic, well-researched process. For example, a manager who played a lead role in the 2013 project we described recalled,

> *I mean we still tendered out all the other basic trades but we knew who our core subcontractors and suppliers needed to be. And in doing so we had to* ***research*** *on that company and make sure they were capable of doing what we needed as well. So we went out to the* ***largest*** *frame and truss manufacturers who had the best detailers in their, I guess, pool of employees. We went to a flooring company* ***who had the ability*** *and cashed up to be able to do all the independent testings that we wanted to be done. And we had the* ***best engineers*** *on board. All those things all clicked, that's all. So* ***we knew who we needed to make it to work.*** *(emphasis ours)*

The reference to "research" suggests that there was a deliberate and systematic search for credible information about potential trustees, and this is consistent with the definition of calculus-based trust. Managers at Organization A thus moved to the decision to trust partners on the basis of trustworthy attributes: being "capable", being the "largest", being the "best".

We do note, however, that the case of Organization B was not as straightforward. Our data-gathering at Organization B was not at a point when new partnerships were being formed; however, it was at a point when a new general manager and sales director had just been appointed, and were reassessing existing relationships with suppliers, as well as how these relationships came about. Their assessments did yield some insights on the basis of these existing relationships, and a number of points were noted. First, there was no mention of screening or researching on potential suppliers at the start of the relationship. References to the history of partner relationships were mostly centred on the role of the owners "because [the owner] obviously built the relationship over the years". When this owner was interviewed, he made reference to what was important in partnerships:

I know a lot of builders will chase the dollar, and we don't seem to and it's a good place to be when you don't chase the dollar because you sort of burn those relationships... So yeah, I do like running the business where I can keep relationships alive with suppliers.

This seemed to indicate that relationships were important in partner selection; in fact, the statement may even be interpreted to mean that monetary targets ("chasing the dollar") were less important. Either way, an argument can be made for saying that relational trust can be significant from the very start of the relationship.

Adding weight to this argument is the fact that many of these long-term partners were not providing the most in terms of economic benefits, but they were still being kept on as partners, often as the sole partner for a specific good or service. A new manager commented,

…one of my bug bears with [owner]… is he won't switch suppliers sometimes. When I know we can get it cheaper …and that's why we love him and people love us because [he says] no, he's a good guy, he's honest, he looks after me, the price, he's around the mark, he's not, you know, so we'll stick with him... So, we've got a core group of suppliers for each products, usually it's only one, other builders are a bit more intelligent…

…you've got to love [owner] for it because he's just about relationships and but, you know, just got to find that happy balance, we're a bit too happy families at the moment, yep, but that's fine.

A third point that seems to emphasize the dominance of relational trust over calculus-based trust is that there had never been any formal agreements in place that could have protected Organization B. The new general manager commented

... there's no agreements in place, there's no pricing grid there's no SLRs [service level reports], there's no any of those things. So I'm trying to bring to that, like get some agreements in place. Because I want to understand timeframes, for me, it's about, time costs quality, and get that, and less of the handshake.

The emphasis on "not chasing the dollar", the need for "less of the handshake", along with the persistence of long-term relationships without formal agreements and despite suboptimal economic benefits, seem to suggest that these relationships did not start out as purely calculus-based. The argument we make here, then, is that, contrary to Rousseau et al.'s (1998) model (see Figure 1), relational trust can have a role at the beginning of a relationship. It is worth exploring in future studies, therefore, how relational forms of trust can exist even without a long history of repeated interactions.

3.2 Trajectories of trust over time

A second point about the model of Rousseau et al. (1998) is related to what we call the trajectory of firms in the journey related to trust development. Rousseau et al. (1998) suggest that over time, firms move away from calculus-based trust, and as they do so, relational trust comes to dominate. The model thus suggests a simple, linear trajectory with calculus-based trust decreasing as relational trust increases.

We can see this, albeit only up to a point, in the case of Organization A. Organization A is largely characterized by a professional work environment, and multiple interviewees discussed how work and processes have been explicated and formalized in programs, minutes of meetings, and contracts. Still, key actors in projects have on occasion chosen to depart from these formal program and contractual commitments, in order to accommodate partners in vulnerable situations:

> *Look, there are contractual boundaries here and we have got a serious job to do, and that element of contracting is still black and white. But for the sake of getting this moving I want to have another element which sits above it, and that is that we're all here to work together and to cooperate.*

The quote seems to suggest that Organization A can shift from calculus-based trust, to relational trust. The shift to relational trust, though, does not proceed indefinitely to the point of completely removing the need for calculus-based trust. Our data shows that, even as managers create space for relational trust with partners, they still curb this trajectory by moving "back" to calculus-based trust. A manager describes how a situation involving an underperforming partner once came up, one involving a "brilliant" man who for some reason had begun underperforming, with the project starting to "come off the tracks." The manager then described how this was dealt with:

> *I wanted to find out why… Now, if ultimately we can't get it back on track we have got a contract sitting behind it. I can't do anything about that. We're both commercially - we're both commercial entities and we've both got outcomes we have to achieve. So that will come into it at some stage.* ***But at this point in time they're not the place I want to be. Right now I want to work out how can we get you back on track, because if I can get you back on track I'm going to win, you're going to win and everyone is going to look good.*** *(emphasis ours)*

This would suggest that, prior to the occurrence of problems with this partner, there was a clear contract embodying clear accountabilities (calculus-based trust, with deterrents). A lapse in partner performance took place, and a decision was made to accommodate this (relational trust, despite the contract). However, in the end, in the end, the expectation was that the contract would still take force (back to calculus-based trust).

This non-linear movement between calculus-based and relational trust can also be seen in Organization B. In this setting, people have operated primarily in a space of relational trust, but they have begun to move this into something more calculus-based and formalized:

> *So yes, I am very conscious of, now, that I'm bringing in price agreements, service level agreements, and all of those things, and I'm very conscious of how I deliver the message to the supplier and to the business….the conversation is, I value the relationships and I appreciate those, but at the same time again my instruction is to make a profit.*

Again, this trajectory is not expected to continue indefinitely, this time with calculus-based trust completely replacing relational trust. Data shows that, despite the move to more calculus-based trust, the manager still brings in the ideal of "valuing the relationship", but it must now be weighed side by side with economic accountabilities. The persistence of the relational component of trust was mentioned again when this same manager clarified, "I don't want to burn the relationship, but I want to find the boundaries in a relationship, too, that we need."

Close scrutiny of the data suggests, then, that these firms are weaving complex, non-linear paths which, at different points in time, mix both calculus- and relational trust. In the case of Organization A, calculus-based trust seems more important at the beginning of the relationship, as well as at times of "final accounting", but relational trust is privileged during times when pre-screened partners go through periods of vulnerability. In the case of Organization B, relational trust seems to have been privileged in the beginning and for much of the organization's life, but the organization is now in a period of transition where key people are seeking to carve out a space for the long-term institutionalization of calculus-based trust. A possible representation of these pathways is shown in Figure 2.

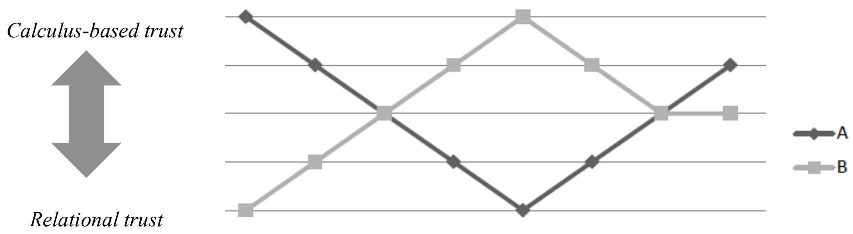

Figure 2. Trust pathways of Organizations A and B (note that the figure is meant to illustrate trajectories, and is not meant to show a precise mathematical function)

4. Discussion

The argument that trust often emerges in blended form foregrounds a number of questions that could lead to enriched understandings of it in organizational contexts. We note two that are important questions here: the question of antecedents of trust, and the question of outcomes of trust. We discuss these as two potential research directions.

The question of antecedents of trust could focus on the specific conditions and resources that give rise to trust, whether calculus-based or relational. In Organization A, trust emerged when managers obtained information about potential partners' competencies and accomplishments, and processed this in a rational way. In Organization B, trust emerged mainly from the nature of a long-running relationship. We believe that these forms of trust did not arise in a vacuum, but were closely linked to different conditions for trust that can be examined systematically. Pierre Bourdieu's (1986) concept of fields and symbolic capital provide an analytical apparatus for examining these conditions. Bourdieu argues that much of the social world can be explained by treating parts of society as fields, such as the fields of art, politics, and education (Swingewood 2000). Each field, for example housing construction, has its own rules, practices, and ideals as to what makes up the good life. Importantly, fields can be understood as networks of positions, some of which are dominant, others dominated. Positions are occupied by actors, and actors consistently seek to ascend to better positions. Fields are thus "a terrain of contestation among occupants of positions differently endowed with the resources necessary for gaining and safeguarding an ascendant position within that terrain" (Emirbayer and Williams 2005, p. 692).

To ascend to a better position in a field, actors seek to accumulate capital in various forms: economic (money), social (relationships), and cultural (which can be embodied, objectified, or institutionalized). Embodied cultural capital is acquired by investing in resources that "form long-lasting dispositions in the mind and body" (Bourdieu 1986, p. 84), a process which takes time and which must be done first-hand. Objectified cultural capital (paintings, monuments, books) takes material form and becomes transmissible. Institutionalized cultural capital generally takes the form of recognized academic qualifications. We are proposing that future work can explore the link between trust and capital two ways. First, researchers can explore the extent to which parties with more capital are considered more trustworthy. Second, researchers can explore the extent to which specific forms of capital are linked to specifically to calculus-based or relational trust.

Preliminary insights on these issues can already be discerned from our case study data. Organization A, for example, chose to trust in firms endowed with embodied cultural capital in the form of capabilities possessed by employees ("You need to judge fairly quickly what their capabilities - capacity and capability is and their expertise"). It also privileged firms with objectified cultural capital, in the sense that these were firms that had a track record of producing good quality artefacts. In contrast, this emphasis on cultural capital was not evident in the case of Organization B. Instead, trust seemed to be based on social capital, and social capital was portrayed to be more important than other forms like economic capital:

> *Like I could get on the phone to any one of my suppliers and if I'm in trouble or I've made a mistake they will get down in the trench with me and help me. Whereas if you burn relationship chasing the dollar you don't get that level of support, you're on your own, because obviously they haven't got that level with you.*

A second important question that can be explored in future research is the question of outcomes, or how different forms of trust actually shape specific behaviour. We are specifically interested in the types of *collaborative* behaviours that emerge from different types of trust. Trust and collaboration are not the same thing, since trust is a psychological state (Rousseau et al. 1998) while collaboration implies some form of interaction, hence it is enacted. This means trust can exist without being enacted in a collaborative relationship; and collaboration can be enforced by other means when trust is absent. Still, they are often linked in the sense that trust can facilitate and deepen coordinative activities (Kadefors, 2004). Our tentative findings suggest that relational trust appears to be accompanied by behaviours of accommodation, but these findings warrant deeper investigation. It is therefore worth exploring if different types of collaborative behaviours and arrangements can be linked to different types of trust.

5. Conclusion

In summary, theoretical work on trust has persistently showed that there are at least two forms of trust. However, attempts to understand the relative importance of one over the other in specific sections have been limited by simplistic conceptualizations. Furthermore, trust in the context of construction projects has not been explored extensively (Bresnen and Marshall 2000). This paper contributes to the small and growing body of work on trust in construction settings. It empirically explores calculus-based and relational trust in the context of two case studies. Our findings call into question the assumption that calculus-based trust tends to give way to relational trust over time. Instead, our analysis suggests that relational trust can have a significant role in the early stages of interaction between parties and that the movement between calculus-based and relational trust is a complex, non-linear path. Future work can explore the antecedents of various forms of trust using the Bourdivian concept of capital as a lens, as well as the behavioural outcomes that emerge.

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Part II: Constructing Commitment and acknowledging human experiences

3. Health and Safety
4. Organisations, Knowledge and Communications
5. Projects, Procurement and Performance
6. Users, Clients and Stakeholder Engagement