

COMMUNICATION RISK AND TRUST IN CONSTRUCTION PROJECTS: A FRAMEWORK FOR INTERDISCIPLINARY RESEARCH

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Communication risk is one of the most important types of risk that occur in construction projects, and trust is one of the most effective ways to minimise it. Interest in communication risk and trust spans economics, sociology and psychology. These social sciences are most relevant for the understanding of different dimensions of trust investigated in the framework of the principal-agent theory. In construction projects, this applies to inter-firm, intra-firm and interpersonal relationships between the project parties. The project owner, contractor, and their respective project managers are among the key parties involved in every construction project. This conceptual paper is based both on empirical research that has evolved in four stages, and on extensive literature review that has developed through three stages. Using the principal-agent theory, this paper offers a framework for interdisciplinary research into communication risk and trust spanning economics, sociology, and psychology. This framework rests on firm theoretical foundations concerning inter-firm, intra-firm, and interpersonal relationships characteristic of construction projects, all of which depend on trust between project parties.

Keywords: principal-agent theory, trust, risk, communication.

INTRODUCTION

Interest in trust spans a number of social sciences relevant to the field of management. This applies especially to economics, sociology, and psychology. According to Rousseau *et al.* (1998:393), economists tend to find trust as either calculative or institutional; sociologists commonly view trust in socially embedded properties of relationships between people; and psychologists tend to view trust in terms of attributes of those who trust or are trusted, as well as focus upon these personal attributes of individuals. As will be shown in this paper, all of these perspectives are relevant to the understanding of different dimensions of trust as it pertains to project management in construction (Ceric, 2012c). The principal-agent theory framework includes inter-firm, intra-firm, and interpersonal relationships, and it thus brings together the three social sciences above in a coherent and comprehensive manner.

Most theorists agree that trust is intimately associated with risk, and that trust and risk can be thought of as "*mirror images*" of each other (Das and Teng, 1998:503). Also, trust requires communication, for cooperative relationships tend to suffer without proper communication (Das and Teng, 1998:504). Communication can be thought of

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as a route to trust and collaborative working (Dainty *et al.*, 2006:230). Related to this, trust has a time dimension, for it can change as a cooperative relationship develops or declines (Gill and Butler, 1996; Schoorman *et al.*, 2007:346). The fourth edition of the Project Management Body of Knowledge recognises that trust plays a part in the successful management of projects (Brewer and Strahorn, 2012). A wide variety of perspectives on trust recognise that risk is required for trust to influence choice and behaviour (Doney *et al.*, 1998). Williamson (1993) thus argues that trust is a calculated risk assessment in an economic exchange. However, Bresnen and Marshall (2000:590-591) argue that financial incentives may reinforce "*calculative trust*", but that they are limited in their ability to generate "*more intense*" forms of trust at the group or individual level. At these levels, trust is an ethical construct whose qualities identified in the literature include integrity, honesty, truthfulness, reliability, dependability, openness, and respect for the other's autonomy and fairness (Wood *et al.*, 2002:5). Indeed, the view of trust as a foundation for social order spans many disciplines (Lewicki *et al.*, 1998:438). Although the principal-agent theory offers a useful framework for organisational research, researchers of organisational behaviour are thus well advised to look beyond economics (Eisenhardt, 1989:72). As argued by Chiles and McMackin (1996:85), this applies especially to trust, the many qualities of which point to other social sciences, including sociology and psychology.

Focussing on professionals as agents, Sharma (1997) introduces the notion of knowledge asymmetry that favours them to principals in many business interactions. Among commonplace business interactions involving professionals as agents, Sharma (1997:762) lists those of attorney-client, builder-owner, and doctor-patient, in that order. In such situations, Sharma (1997:764) argues that professionals are better trusted than controlled by principals on account of the underlying asymmetry in expertise. In intra-firm relationships, factors such as altruism, peer pressure, and specialised bureaucratic controls are especially pertinent (Sharma, 1997:793).

This paper opens with a brief presentation of the principal-agent theory concerning construction projects. It continues by succinctly presenting the previous empirical research applying this theory, which has evolved in four distinct stages (Ceric, 2012a,b,c,d). This is followed by a discussion of the literature review concerning trust, as well as two previous literature reviews leading up to the present paper (Ceric, 2013, 2014c). Next, the main part of the paper discusses trust at all three levels characteristic of the relationships between project parties in construction projects: inter-firm, intra-firm, and interpersonal. The paper concludes by providing a framework for interdisciplinary research in this promising field.

THE PRINCIPAL-AGENT THEORY

The principal-agent theory offers a useful representation of many types of relationships between economic parties, including construction projects. For their work on the theory, George Akerlof, Michael Spence, and Joseph Stiglitz shared a Nobel prize in economics in 2001. It provides one of the best known applications of information asymmetry in economics, which is the situation in which one of the two parties is better informed than the other, in which they do not share the same interests, and in which both parties are motivated by self interest (e.g., Eisenhardt, 1989; Sharma, 1997; Jensen, 2000). Among other fields, the theory has so far been applied to project management, where the focus has initially been on the relationship between the project owner and the project manager engaged for a particular project (e.g., Turner and Müller, 2004; Müller and Turner, 2005). However, it has also been

extended to other agents, such as contractors, sub-contractors, designers, and consultants.

Specifically, three types of information asymmetry apply for acting parties: hidden characteristics, hidden information, and hidden intention (Jäger, 2008). These generate the following risks: adverse selection, moral hazard, and hold-up. Adverse selection occurs when the principal does not have the exact information about the agent before the contract between them is signed. Moral hazard occurs after the contract is signed and the agent does not perform in accordance with it without knowledge of the principal. Hold-up occurs after the contract is signed and the principal makes large investments because of the trusty relationship with the agent, but these investments come into jeopardy because the agent acts uncooperatively. The ways to minimise risks that arise from information asymmetry are known as agency costs. These include screening and monitoring costs. Screening refers to the principal's effort to gather information about the agent's qualifications before the contract between them is signed. It helps reduce the adverse selection risk. Similarly, monitoring refers to the principal's effort to ascertain whether or not the agent is behaving in accordance with the contract after it is signed. It helps reduce moral hazard and hold-up risks.

Now, trust reduces agency costs both before and after the contract is signed between the principal and the agent. Alternatively, mistrust comes at a cost (Zeghloul and Hartman, 2003). Screening is typically conducted on the inter-firm level, but it is also relevant on the intra-firm level. However, monitoring typically happens on the intra-firm and interpersonal levels. The reduction of agency costs thus requires different kinds of trust between project parties.

As will be argued in the next section, monitoring is most important in the construction phase of a project. This is where trust is crucial in the relationship between project parties. However, the key relationship in question involves the principal's and the contractor's project managers, and their communication during the construction phase is central to the fostering of their trust. The empirical research on which the present paper is largely based has therefore focused on the two project managers.

EMPIRICAL BACKGROUND

The empirical research that provides the background for this paper has evolved in four stages, which will be briefly outlined below. The principal-agent theory has formed the core of the endeavour throughout. In this theoretical framework, the principal delegates a particular task to the agent. In simplest construction projects, the project owner is the principal and the contractor is the agent. This relationship is extended by adding project managers as agents of both the project owner and contractor, as is shown in Figure 1 (Ceric, 2012a,b). For a more complex project organisation involving the designer and designer's project manager, see Ceric (2012d, 2014b). As agents, the project managers are in a non-contractual relationship, while the other project parties are in contractual relationships.

The first stage of empirical research was based on an exploratory survey of project managers, in which it was found that the project owner's and contractor's project managers played the key role in the construction phase of a project (Ceric, 2012a). The Delphi method was employed in the second stage. A panel of experts in project management confirmed the previous finding (Ceric, 2012b). The third stage involved another exploratory survey of project managers to establish the relative importance of communication-risk minimisation strategies in construction projects, which were

established by Schieg (2008). They are bureaucratic control (contracts), information systems, incentives (bonuses), corporate culture, reputation, and trust. Trust was found to be the most important risk-minimisation strategy, which was reflected in the following comments by two respondents to the survey: "trust takes time to develop between the parties, and it is very fragile, but once developed it outshines all the other strategies in terms of project control and risk minimisation," argued one, while another pointed out that "the most important document is the contract, but the trust between the parties is as important as the contract" (Ceric, 2012c). The fourth stage concerned the impact of knowledge and experience on project managers' conception of risk (Ceric, 2014a). Again, trust came foremost as a risk-minimisation strategy. This finding is insensitive to all the three dimensions of project managers' knowledge and experience considered in the survey - years of experience, largest project worked on, and number of countries worked in. This research led to a further conceptual investigation of trust in the context of the principal-agent theory. It was found that trust is the only viable way forward because non-contractual relationships between project parties tend to dominate contractual relationships as projects grow in size and complexity (Ceric, 2014b). Without trust between project parties, large projects would be in jeopardy.

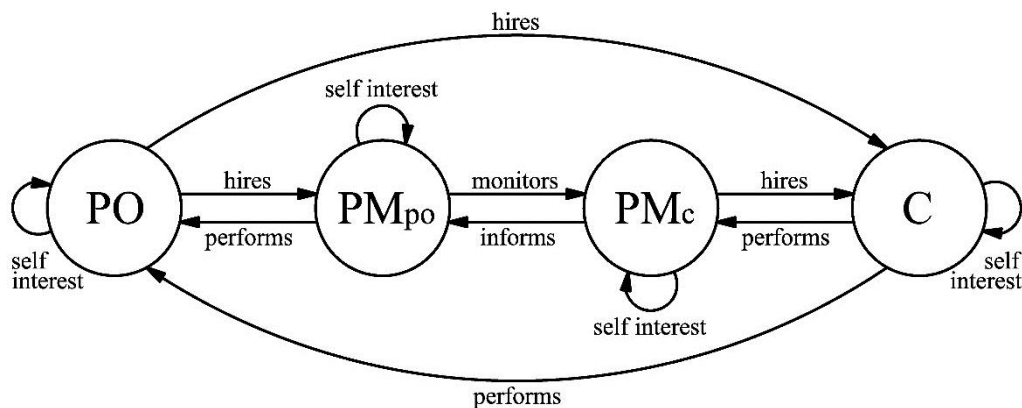


Figure 1: Principal-agent theory framework for construction projects (PO: Project owner, C: Contractor, PM_{po}: Project owner's project manager, PM_c: Contractor's project manager)

The principal-agent theory framework in Figure 1 displays three different types of relationship. That between the project owner and the contractor can be either an inter-firm or intra-firm relationship, but it is typically of an inter-firm type. The relationship between the project owner and project owner's project manager can be either an intra-firm or inter-firm relationship, but it is typically of an intra-firm type. The same holds for the relationship between the contractor and the contractor's project manager. Finally, the relationship between the project owner's and contractor's project managers can be either an interpersonal or an inter-firm relationship, but it is typically of an interpersonal type. Inter-firm and interpersonal relationships involved in construction projects are typically one-off, whereas intra-firm relationships are typically long-term. All three dimensions of trust introduced are consequently involved in the principal-agent theory framework. Therefore, they fall into domains of economics, sociology, and psychology, the three social sciences relevant to project management in construction.

Interestingly, the above analysis is supported by the empirical research summarised here. When asked about trust, project managers surveyed reported all three types of relationship discussed here: inter-firm, intra-firm, and interpersonal (Ceric, 2012c,

2014a). However, trust relevant for the relationship between the project owner's and contractor's project managers was always of the interpersonal type. As has been pointed out in the previous section, this relationship is central during the construction phase of a project.

The key distinguishing characteristic of all relationships investigated here is whether they are one-off or repeating. Most construction projects are one-off, however. In other words, construction projects tend to be undertaken by a combination of firms and individuals most of whom will not have worked together before and are not likely to work together again (Dainty *et al.*, 2007:7). Relationships between project owners and contractors are typically one-off, and so are relationships between project owner's and contractor's project managers. Only relationships between project owners and their project managers, as well as those between contractors and their project managers, are typically repeating. In this case, they are guided by employment contracts.

LITERATURE REVIEW

In addition to the empirical background discussed above, this paper is based on an extensive review of the literature concerning trust. The review, which has developed in three stages, covers both construction management literature and literature concerning management in general. Also, this review is based on two previous reviews of the construction management literature - the first concerning the principal agent theory (Ceric, 2013), and the second concerning the New Institutional Economics, which brings together the principal-agent and transaction cost theories (Ceric, 2014c). The first review concluded that the main interest of researchers in construction management associated with the principal-agent theory is a combination of contracts and risk management to limit the principal's exposure. The second review found that the key concepts from New Institutional Economics used by construction management researchers point at the self-interest of all parties engaged in the exchange of goods and services related to construction. The concept of trust appeared only in the first review, but its place was marginal.

The present literature review is not limited to the principal agent or transaction cost theories, however. Spanning both management in general and construction management, its aim was to capture the seminal papers concerned with trust, as exemplified by their titles and keywords used. A wide variety of theoretical frameworks are therefore represented in the papers identified.

To date, much research has been dedicated to the study of inter-firm trust in construction, most of which concerns partnerships and alliances (e.g., Gulati, 1995; Gill and Butler, 1996; Wood and McDermott, 2001; Wood *et al.*, 2002; Jeffries and Reed, 2000; Kadefors, 2004, 2005; Lui and Ngo, 2004; Wong and Cheung, 2004, 2005; McDermott *et al.*, 2005; Wong *et al.*, 2005; Cheung, 2007; Eriksson and Laan, 2007; Wong *et al.*, 2008; Lau and Rowlinson, 2005, 2009; Pinto *et al.*, 2009; Maurer, 2010; and Eriksson and Kadefors, 2012). However, intra-firm trust is represented rather rarely in the construction management literature. One such example is provided by Wong and Skitmore (2000). This also holds for interpersonal trust, where Emmitt and Gorse (2003) and Lau and Rowlinson (2009) offer rare examples in the literature. According to Emmitt and Gorse (2003:53), interpersonal trust, communication and commitment are vital components in building a responsive and collaborative culture in construction.

Partnerships and alliances typically involve long-term relationships between firms, and trust reduces agency costs involved. However, this literature review demonstrates that there has been relatively little research dedicated to the study of intra-firm and interpersonal trust in construction. As Williams (2001:377) argues, interpersonal trust is an important social resource that can facilitate cooperation and enable coordinated social interaction. Importantly, trust is often initiated by managers, who engage in trustworthy behaviour pre-emptively in order to enhance the performance of their subordinates (Whitener *et al.*, 1998:523). This is where the principal-agent theory framework is likely to be of greatest value to future research in construction. As this framework aptly shows, it will performe be interdisciplinary.

DIMENSIONS OF TRUST: A FRAMEWORK FOR RESEARCH

As has been argued above, the principal-agent theory provides a useful framework for the interplay of economics, sociology, and psychology in the research of the relationships between the project owner, contractor, and their respective project managers. This is shown in Figure 2, which offers a useful remapping of the relationships shown in Figure 1 so as to accommodate the three sets of relationships between project parties.

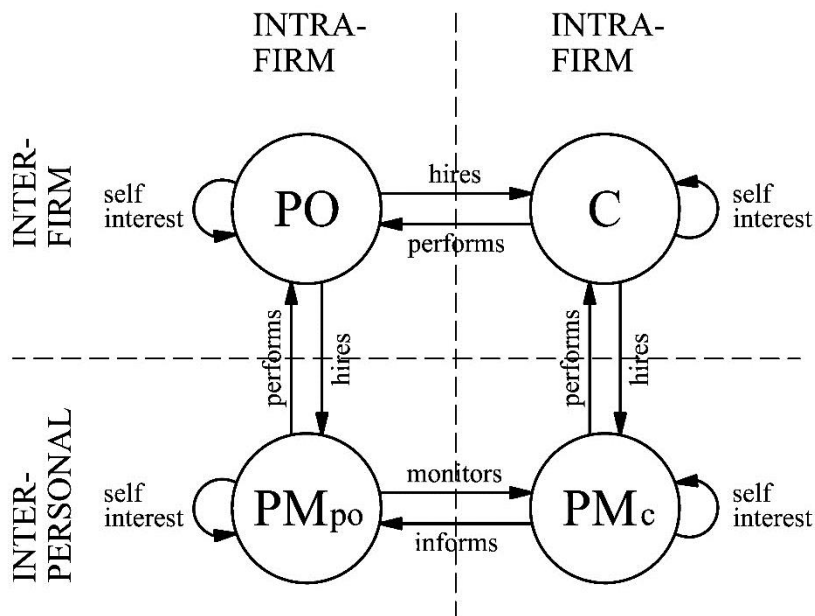


Figure 2: Remapping of the principal-agent theory framework for construction projects showing key relationships between project parties (PO: Project owner, C: Contractor, PM_{po}: Project owner's project manager, PM_c: Contractor's project manager)

In typical construction projects, the inter-firm relationship applies to the project owner and contractor; the intra-firm relationship pertains to both project owner and contractor and their project managers; and the interpersonal relationship applies to the two project managers. Communication risk differs widely across these relationships. Although this would be an oversimplification, it could be said that inter-firm relationships are studied mainly by economics, intra-firm relationships by sociology, and interpersonal relationships by psychology. Still, all three social sciences have a good deal to offer to the study of all three types of relationship in the context of trust between project parties.

It is interesting to consider briefly the dynamics of relationships depicted in Figure 2. What follows is meant only as an illustration rather than an exhaustive depiction of all

possible changes in these relationships. Before a project is initiated, the relationships are of the intra-firm variety. When it is initiated, the relationships are first of the inter-firm kind, and then they turn interpersonal. The process moves backward when the project comes to an end. That is, interpersonal relationships return to inter-firm relationships at project completion. Looking a bit more closely into project dynamics, the process starts with the project owner. The project owner's project manager is selected next. With the help of the project manager, the project owner then selects the contractor. This accomplished, the contractor's project manager is then selected by the contractor, and then the two project managers establish their relationship. Once again, the process moves in reverse at the end of a project. Concerning the construction phase, the relationships between project parties are first of intra-firm kind, then they turn to inter-firm variety, and ultimately they become interpersonal. Communication risks involved follow the same dynamics, and the time dimension of trust can be appreciated in the context of changes in relationships outlined here. Each type of trust can increase, decrease, or vary in more complex ways from the initiation to completion of a construction project. This brief illustration shows that the principal-agent theory framework is useful for bringing together different types of trust involved in construction projects, as well as their changes over time.

Most important, the principal-agent theory framework provides a useful understanding of how all these relationships are intertwined in construction projects. As Figure 2 shows, the relationships between the parties to a construction project can be studied by researchers from all three social sciences at once, thus providing a better understanding of their interplay. This is of special interest in the field of management, which perforce integrates a number of social sciences, including economics, sociology, and psychology. At present, researchers in all three social sciences are well acquainted with the principal-agent theory framework. As Eisenhardt (1989:72) argues, this framework provides a *"unique, realistic, and empirically testable perspective"* on problems of cooperative effort, but excessive reliance on economics with its restrictive assumptions is not warranted in empirical research. This is where interdisciplinary research with broader assumptions is required.

CONCLUSIONS

As has been shown in the literature review above, much of the research in trust in the construction management field is concerned with inter-firm relationships typical of partnerships and alliances. By and large, intra-firm and interpersonal trust are neglected in the literature. Research in trust concerning the relationship between all parties in construction projects needs to develop in three different but inter-related directions outlined by the principal-agent theory framework. These directions, as well as dimensions of trust, depend on the type of relationship between project parties involved. Trust involved in inter-firm relationships falls mainly into the domain of economics, but both sociology and psychology can contribute to the study; trust involved in intra-firm relationships relies chiefly on sociology, but economics and psychology are also relevant to its study; and trust involved in interpersonal relationships falls mainly in the domain of psychology, but both sociology and economics can contribute to the study, as well.

This framework provides a firm theoretical foundation for further interdisciplinary research in inter-firm, intra-firm, and interpersonal trust in construction projects. Grounded in empirical research that has evolved in four stages, which was briefly presented in a separate section above, this is the main contribution of this paper. The

principal-agent theory framework assures that researchers from different social sciences can cooperate on the basis of a common understanding of the same theoretical foundations. The interaction between the three dimensions of trust can be better understood by interdisciplinary research using the shared theoretical framework.

Therefore, the study of trust concerning the relationship between parties in construction projects requires an interdisciplinary effort in which all the disciplines involved - namely, economics, sociology, and psychology - stand to gain from a deeper appreciation of each other's means and ends. This is best appreciated in the research in trust coming from the field of management, which integrates the three disciplines so as to help improve the management practice in many areas of application. It is to be hoped that the framework presented in this paper will foster closer collaboration between social scientists, and that it will thus be of value in research project governance in this promising field.

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