The Principal-Agent Theory and the Role of Project Managers in Construction: Guidelines for Future Research

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Abstract

The principal-agent theory has been successfully applied to the research of management of construction projects. It has focused on the relationship between the project owner as principal and the contractor as agent. Also, the relationship between the contractor as principal and subcontractors as agents has been explored. After introducing the literature in this field, this paper will present recent research into the relationship between the project owner's and contractor's project managers along the lines of the principal-agent theory. An exploratory survey was used at the first stage of research. After the exploratory survey, the Delphi method was employed for further exploration of the issues involved. It has been shown that the two managers play key roles in the construction phase even though they are both agents not related by contracts. Risk minimization is their main concern in the construction phase. Having summarized this research, the paper addresses the opportunities for further research in this area, which offers a challenge to the principal-agent theory in the field of construction. Guidelines for future research take the central part of the paper. They focus on communication risks caused by asymmetric information, which are of central importance to the principal-agent theory.

Keywords: principal-agent theory, asymmetric information, communication risk, risk minimization, project management

1. Introduction

Good communication between key participants is most important for the success of every construction project. Communication involves sharing relevant information between project participants. Poor communication has been shown to be one of the most common project risks (Ceric, 2003). It is usually assumed that all participants cooperate and exchange information in order to achieve project's goals. Actually, there is a potential conflict of interests between project participants because they all have their own interests, as well.

The situation in which one of the two parties is better informed than the other is recognized in economics as the *principal-agent problem* (e.g., Jäger, 2008). In construction projects, the project owner and contractor as principal and agent form the key relationship (Turner and Müller, 2004). Delegation of tasks establishes a principal-agent relationship between the project owner and manager, where the principal (project owner) depends on the agent (contractor or project manager) to undertake a task on the principal's behalf (Müller and Turner, 2005). It can be assumed that an agent will try to maximize his or her own benefit even when that may involve a higher damage to the client (Schieg, 2008). According to the principal-agent theory, this problem is characterized by three issues concerning the relationship between the principal and the agent: adverse selection, moral hazard, and hold-up. These three issues will be discussed in the following section.

The literature review shows that the application of the principal-agent theory in construction is extensive. It covers all three issues of risk concerning the relationship between the principal and agent: adverse selection, moral hazard, and hold-up. Analyzing papers that have been published so far, it can be concluded that most authors have researched moral hazard dealing with supply chain management, procurement systems, make-or-buy decisions, and outsourcing (Rosenfeld and Geltner, 1991; Tedelis, 2002; Yiu *et al.*, 2002; Ive and Chang, 2007). Several authors have discussed the adverse selection problem and its impact on building performance and building quality (Holt *et al.*, 1995; Corvellec and Macheridis, 2010). It should be noted that the hold-up problem dealing with subcontracting and procurement systems has attracted least attention so far (Chang and Ive, 2007; Unsal and Taylor, 2010). A more detailed analysis of the key construction literature covering all three issues can be found in Ceric (2010). However, the literature does not cover the relationship between project managers in construction projects, which is central to the research outlined in this paper.

In the pages that follow, the principal-agent theory in construction is introduced first. A short summary of previous research conducted by the author is presented next (Ceric 2010; 2011). The paper closes with guidelines for future research regarding the application of the principal-agent theory to construction projects.

2. Principal-Agent Theory and Information Asymmetries in Construction Projects

The owner of a project is the person or group that provides the financial resources for its delivery, accepts the project milestones, and project completion (Project Management Institute, 2000). In a

standard situation, the project owner hires a contractor to perform all the activities required to complete the project. According to the principal-agent theory, the relationship between the two parties also involves self interest of each party, which is also shown in Figure 1.

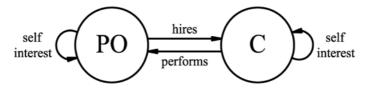


Figure 1: Project Owner - Contractor relationship (PO: Project Owner C: Contractor)

Also, the project owner and the contractor delegate their tasks to their project managers. Therefore, there are four different parties involved in the project even before its execution starts. It should be noted that the contractor's project manager is understood here as the person who is in overall charge of a particular project on contractor's behalf irrespective of the title. Namely, in some business environments this role is played by consultants. It is commonly assumed that all participants in the project will work together in order to achieve the same goal. However, there is a potential conflict of interests between the participants because they all have their self interests, too. Extending Figure 1, the relationships between all the above-mentioned participants taken together are shown in Figure 2. These are the key parties to any construction project.

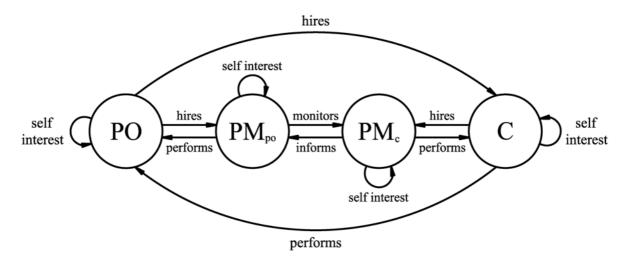


Figure 2: Principal-agent theory framework for construction projects (PO: Project owner, C: Contractor, PM_{po} : Project owner's project manager, PM_c : Contractor's project manager)

As it is shown in Figure 2, the project owner acts as the principal in relation to both the project owner's project manager and contractor as agents, and the contractor acts as the principal in relation to the contractor's project manager. Therefore, there are two principals and three agents involved, where the contractor is both a principal and agent in a project.

The situation in which one of the two cooperation partners is better informed than the other is characterized by *asymmetric information* (Schieg, 2008). After Akerlof (1970), much has been written on this subject. In 2001, George Akerlof, Michael Spence, and Joseph Stiglitz shared a Nobel prize in economics for this important work. Information asymmetries apply whenever the principal and the agent are not in possession of the same information at the same time. In construction projects, we have four key parties that work together, and it is assumed that they will share important information in order to meet main project's targets: time, cost, and quality. However, because of self interest, they will not be willing to share all the information all of the time. Therefore, the following types of information asymmetries apply for acting parties: *hidden characteristics*, *hidden information*, and *hidden intention*. Respectively, these three types of information asymmetries generate following risks: *adverse selection, moral hazard*, and *hold-up*.

Based on the principal-agent theory, relationships between the project owner and contractor, as well as the two project managers employed by them, are systemized according to related asymmetric information and corresponding types of risk. Hidden characteristics are associated with adverse selection; hidden action and/or hidden information are associated with moral hazard; and hidden intentions are associated with hold-up (e.g., Jäger, 2008). Hidden characteristics cause the adverse selection problem before the contract is signed between the parties involved. It means that the project owner does not have all the information about the contractor before the contractor is hired. Similarly, the project owner does not have all the information about the project manager before hiring. The same holds for the contractor and the project manager working on the contractor's behalf. Therefore, in the case of adverse selection we have three different parties involved and three information asymmetries. The adverse selection problem occurs in the early phases of the project

Hidden information or hidden action causes the moral hazard risk. This occurs *after* the contract is signed between involved parties. For instance, the client cannot be sure that firms, once hired, will fully mobilize their capabilities on the client's behalf or on behalf of other clients of theirs (Winch, 2010). In our case, four parties are potentially involved in the moral hazard problem. After the relevant contracts are signed and the project owner has hired the contractor and the project manager, and after the contractor has hired the project manager, they cannot be sure that all information will be shared in an appropriate way because of the self interest of all the parties involved. The moral hazard problem also occurs between two project managers because they have their self interest, as well.

Hidden intentions can cause hold-up problems. The project owner can invest some money at any stage of the project and trust that the contractor will cooperate, but it can happen that the contractor will actually behave opportunistically. After the project owner realizes that the contractor is acting opportunistically, it can be too late for the project owner to withdraw investment. The same holds in the opposite direction. The contractor can also invest some money at any stage of the project and trust that the project owner will cooperate, but it can happen that the project owner will act opportunistically.

There are several ways to minimize risks that arise from adverse selection, moral hazard, and hold-up problems. These are known as *screening* and *monitoring* (Jäger, 2008; Schieg, 2008). As both screening and monitoring represent costs, they are known in the literature as "agency costs." The

purpose of screening is to gather information of use to the principal in an effort to learn more about the agent's qualifications—for example, references, certificates, work probes, and credit worthiness. Similarly, the purpose of monitoring the agents is to ascertain that they are behaving in accordance with the contract. In other words, it helps reduce moral hazard and hold-up risks.

3. Exploratory Survey and the Delphi Method

Due to space limitations, this section provides a short summary of previous research conducted by the author concerning the principal-agent problem (Ceric, 2010; 2011). The research process consisted of two phases. First, the exploratory survey was conducted. The respondents were project managers with an appreciable experience in the filed. The average value of the largest project they managed was US\$1 billion and they had fifteen years of experience on the average, working in a wide range of countries around the globe. Among more than thirty countries, they worked in Egypt, Hong Kong, India, Iraq, Italy, Pakistan, Poland, Russia, Saudi Arabia, Spain, Switzerland, Turkey, the United Kingdom, and the United States. A total of 27 project managers participated in the survey. Following the principal-agent theory, there were five questions. The first three concerned three issues of information asymmetry (adverse selection, moral hazard, and hold-up), which correspond to their three sources (hidden characteristics, hidden information, and hidden intentions), while the last two concerned two types of communication risk minimization (screening and monitoring). The respondents were asked to rate the importance of each issue addressed in five questions in terms of the four relationships between the key project parties, as shown in Figure 2.

The key finding from this exploratory survey was that, *after* the contract is signed between the project owner and contractor, the most important relationship in risk minimization is that between the project owner's and contractor's project managers. They are both agents and there is no contract between them, which is an interesting challenge for the principal-agent theory. Interestingly, a number of project managers suggested that communication protocols should be part of project administration so as to ensure better communication between all the participants.

Following the exploratory survey, there were two additional Delphi rounds. The results of the exploratory survey itself were considered as the first round. The Delphi method was chosen as an appropriate tool because the project managers are geographically spread apart. Also, they were not available for consultation over lengthy periods of time. All of the project managers that were selected from the exploratory survey for the next two Delphi rounds were practitioners with considerable expertise in the project management field, as witnessed by their thirteen years of experience on the average, and the average of the largest project they managed assessed at \$1.4 billion. For the second Delphi round 20 of the 27 respondents were selected. In the final Delphi round, 11 out of 15 respondents took part. The focus was on risk minimization in the construction phase.

The key finding from the Delphi method confirmed and strengthened the main finding from the previous exploratory research. The central relationship in construction projects *after* the contract is signed is that between the project managers. Therefore, they play the most important role in the risk minimization process in the construction phase of a project.

4. Guidelines for future research

Taking into consideration the findings from the previous section, there are three directions for future research proposed here. First, strategies of communication risk minimization could be explored in further detail. Second, future research could look into more complex relationships between project participants. Third, the communication process between project participants could be investigated in much greater detail, so as to arrive at viable communication protocols. These possibilities will be briefly discussed below.

4.1. Selection of strategies for minimizing communication risk caused by information asymmetries

As argued in the previous section, the project mangers play the most important role in risk minimization in the construction phase *after* the contract between the project owner and contractor is signed. One of the possibilities for future research is focusing on the construction phase and selection of the appropriate strategies for minimizing communication risk between project participants caused by information asymmetries.

According to Schieg (2008), there are six strategies for minimizing information asymmetries between project participants:

- 1. bureaucratic control (contracts),
- 2. information systems,
- 3. incentives (bonuses),
- 4. corporate culture,
- 5. reputation, and
- 6. trust.

A survey could be used to establish the rank list of the six strategies mentioned above for risk minimization. Once again, the respondents would be project managers with considerable experience and expertise in the field. They would be asked to rate the importance of each strategy for minimizing information asymmetries mentioned above in terms of the four relationships between the key project parties: project owner-contractor; project owner's project manager-project owner; contractor-contractor's project manager; and contractor's project manager-project owner's project manager. After this step, the multi-attribute utility theory can be used for compiling a rank list of the strategies for risk minimization, calculating the overall utility function for each alternative.

4.2. Exploring more complex relationships between project participants

Future research should also consider more complex relationships between construction project participants, and especially the agents. In particular, this would involve consultants, such as designers—either engineers or architects. The relationships shown in Figure 2 could be widened by

adding the designer to better understand the complexities of the construction process beyond the four key participants investigated heretofore (Figure 3).

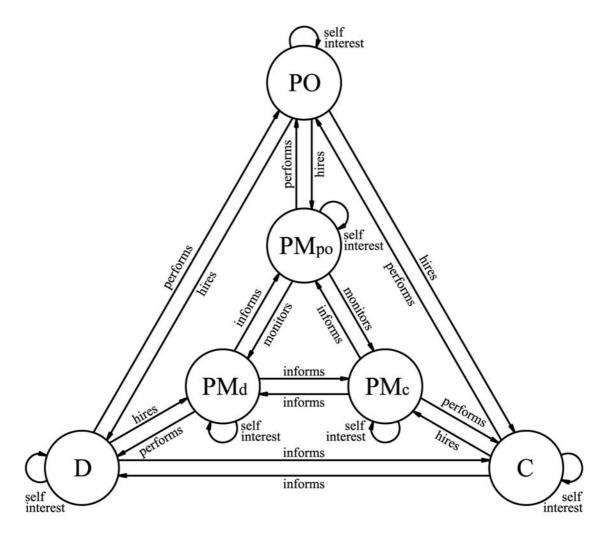


Figure 3: Principal-agent theory framework for construction projects (PO: Project owner, C: Contractor, D: Designer, PM_{po} : Project owner's project manager, PM_d : Designer's project manager, PM_c : Contractor's project manager)

As can be seen by comparing Figures 2 and 3, the number of relationships between the key project participants rapidly increases. When there are only the project owner and contractor, as well as their project managers, there are twelve relationships between them altogether, two of which are between project managers, who are not related by contracts. By comparison, there are twenty-four relationships when the designer and the designer's project manager are added. In addition, eight of these relationships do not involve contracts, which is a full third of all the relationships involved. Adding more project participants, such as sub-contractors, would furthermore complicate the picture quite rapidly.

4.3. Establishing communication protocols in contracts

Many of the communication problems occur in the construction phase, when conflict can become dysfunctional and disruptive (Emmitt and Gorse, 2007). Such conflict is detrimental to both the project owner and contractor as the principal and agent. Exploring the intricacies of the monitoring process would require much more detailed investigation of project managers and their interaction to arrive at the most promising interplay between formal and informal communication during construction. As shown by the exploratory survey presented in the previous section, communication protocols defined in contracts may help improve the monitoring process (Ceric, 2010). In particular, this is what a large number of respondents suggested in their comments to the survey. Such an investigation could be best achieved by means of interviews and/or focus groups.

4. Conclusions

As outlined in the Introduction, the principal-agent theory in construction was first introduced in this paper. Due to space limitations, a short summary of previous research conducted by the author was presented next. Guidelines for future research regarding the application of the principal-agent theory to construction projects complete the paper.

As has been argued in the previous section, there are three directions for future research worth considering at this stage. First, strategies of communication risk minimization could be explored. Second, future research could look into more complex relationships between project participants, including the designer. Third, the communication process between project participants could be investigated in greater detail, so as to explore viable communication protocols between the key project participants.

On the basis of research into the relationship between the project owner's and contractor's project managers conducted to date, it deserves greater emphasis in further research. Especially in the construction phase, this relationship is crucial for the understanding of project management as a field. The three directions outlined in the previous section offer great promise. Only by understanding better the relationships not regulated by contracts can we expect significant advance of the field.

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