Understanding Construction Project Governance: 
An Inter-organizational Perspective

Kaixun Sha*

School of Management Engineering, Shandong Jianzhu University
96 Lishan Road, Jinan, Shandong, China

Abstract: In essence, construction projects belong to the category of inter-firm projects that can be viewed as 
firm-like organizations in the market, differing from intra-firm projects that can be regarded as market-like processes 
within the hierarchy. The aim of this paper is to create a better understanding of construction project governance 
by expanding the focus from project-parent relationships within the hierarchy to contractor-contractee relationships 
in a self-organizing “heterarchy”. The characteristics that distinguish the project from the market and the firm are 
identified. Two basic types of projects - type I and type II projects - are classified. The essence of governance is 
examined, making a clearer distinction between governance and management. Construction project governance is 
then conceptualized as an effort to make legally independent participants with divergent long-term interests and 
strategic goals work together towards shared goals. Three governance categories (vertical, horizontal and project 
manager related governance) are classified and examined from a game theory perspective, providing insight into 
inter-relationships between diverse participants of construction projects. A key question that is addressed is how to 
create a favorable institutional environment in which people are willing to do the right things.

Keywords: Project governance, organization, institution, heterarchic coordination, building sector

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1 INTRODUCTION

Projects are playing an increasingly important role in 
social and economic development, not only delivering 
products, services or infrastructure but also being used 
strategically to transform organizational practices and 
processes (Bjørkeng et al. 2009). The increasing 
“projectification” of society indicates that the business 
environment has become a more project-based economy 
However, scholars and practitioners have long been 
suffering from project failures. A recent report (PM 
Solutions 2011) states that 37% of projects fail. For 
other authors the number is even higher, e.g., McManus 
and Wood-Harper (2014) report that in the information 
technology (IT) sector only one in eight projects can be 
considered truly successful. In the building sector project 
failures are often accompanied by serious accidents, side 
fatality, catastrophic collapses of buildings, facilities, and 
bridges, as well as political and/or business scandals 
(Bologna and Del Nord 2000; Loosemore 2000; Pietroforte 
and Miller 2002; Sha 2004).

In the face of frequent project failures, Cobb (1995) 
outlined his paradox asking: “We know why projects fail; 
we know how to prevent their failure - so why do they still fail?” This is indeed a dilemma of project research. To 
great extent, project failure is more a failure of project 
theory than a failure of the project itself. A growing 
number of scholars and practitioners are recognizing 
that the future of project management is dependent on 
its theory and that it is time to develop a wider and 
more powerful theoretical foundation to substitute the 
obsolete one (Koskela and Howell 2002). As a result, 
research perspectives have been expanded from “project 
management” as a toolbox approach to the “management 
of projects” as a strategic approach (Morris 1997), and 
from pure technical rationality, or projects as “rational 
objects”, to socio-technical rationality, or projects as 
“rational actors” (Ahern et al. 2014). Statistics indicate 
that the number of journal papers on project governance 
increased sharply in 2005 and has remained at a high level 
since then (Biesenthal and Wilden 2014), indicating that 
governance has become a significant topic in the realm of 
projects.

Project governance is too multifaceted and complex to 
be analyzed through any single theoretical lens (Ahola 
et al. 2014). The research on project governance

*Corresponding author. Email: skx@sdjzu.edu.cn
has drawn substantially from economics, organization theory, political science, sociology and psychology, and particularly, from corporate governance theories. Literature analyses indicate that principal-agency theory, stakeholder theory and transaction cost economics are three basic theories that not only underpin general governance theories but also are adapted to the project governance context to a greater extent than other theories (Biesenthal and Wilden 2014; Ahola et al. 2014).

From different points of view, project governance is defined in various ways; as a central tool for controlling the risk exposure of individual projects (Turner and Keegan 2001), as a set of principles, structures, and processes for undertaking the management of projects (Crawford and Cooke-Davies 2009), as a set of relationships between the project’s management, its sponsor (or executive board), its owner and other stakeholders (Turner 2009), as an overarching business function to provide a framework for organizational processes, decision-making models and project management tools, which support the successful delivery of projects, programs and portfolios in project-based organizations (PMI 2013), and as an essential strategy to assist project teams understand, and respond to various stakeholder groups as an enabler of collaboration and reflection (Biesenthal and Wilden 2014) amongst others. It is worthy to note that in spite of diverse definitions, two basic views of project governance can be identified: project governance as external to any specific project or as internal to a specific project (Ahola et al. 2014). The former focuses on intra-organizational relationships, while the latter concentrates on inter-organizational relationships.

Research has been conducted at multiple levels through different approaches. In the vertical dimension, project governance is classified as project governance (the governance of individual projects) and governance of projects (the collective governance of a program or portfolio of projects). The former is mainly concerned with ensuring that “projects are undertaken in the right way to deliver the right products, and to ensure the products will deliver the desired benefits” (Turner et al. 2010). The latter takes a broader view than the individual project (Williams et al. 2010), and comprises the values system, responsibilities, processes, and policies that allow projects to achieve organizational objectives (Müller 2009). In addition, the project management office (PMO) is taken as the middle level that links parent organization (corporate governance) to the governance of a particular project (Biesenthal and Wilden 2014) and governmentality is taken as the overall governance culture in the organization (Müller et al. 2014).

In the horizontal dimension, various research orientations are often presented in the form of dyads, e.g., hard aspects vs. soft aspects (Walker et al. 2008); control vs. involvement (Toivonen and Toivonen 2014); ex-ante regulative and cognitive governance mechanisms vs. ex-post normative and cognitive governance processes (Henisz et al. 2012); internal process vs. external process, and flexibility vs. control (these two dyads together form a competing values framework) (Aubry et al. 2014); stakeholder orientation vs. shareholder orientation, and behavior control vs. outcome control (these two dyads act as the two axes of the model of organizational enablers for governance of projects) (Müller and Lecoeuvre 2014). Furthermore, the knowledge-based approach focuses on distributed coordination mechanism (Ahern et al. 2014). The systems engineering based approach emphasizes the transformation from “project governance” to “system governance” (Locatelli et al. 2014).

In spite of significant advances, the project governance research is still a fledgling field that has the potential to make a major scholarly and practical contribution (Pitsis et al. 2014). Literature analyses illustrate that there are considerable differences in both themes and concepts between non-project management and project management journals. The former specifically deals with the concept of governance, whereas the latter is more concerned with the aspect of project management (Biesenthal and Wilden 2014), retaining many elements of localism (Pitsis et al. 2014). Currently dominant standards and guides relating to multi-project management and project governance (Office of Government Commerce 2007; APM 2011; PMI 2013; DIN 2013) are underpinned by a theoretical framework that regards project governance as a subset of corporate governance, or enterprise/strategic project management (Too and Weaver 2014). Under such a framework, “governance” is only a concept within “management” (Biesenthal and Wilden 2014), with quite many sources claiming that the project governance discourse has been built on representing the project management discourse itself (Ahola et al. 2014). This theoretical framework may be effective for addressing intra-organizational relationships within a project-based organization. However, as the ensuing analysis will demonstrate, it is not well suited for dealing with inter-organizational relationships between legally independent firms participating in a specific project, as is the case with construction projects alone. In order to avoid the confusion around project governance research, it is essential to make a clearer distinction between project governance and project management. To do so will require not only specifying how projects are distinct from other forms of organizing conceptually and philosophically (Morris 2013), but also telling the two types of projects, intra-firm and inter-firm projects, apart from each other clearly.

Borrowing from Koskela and Howell (2002), this paper argues that the underlying theoretical foundation of project governance can be divided into a theory of project and a theory of governance, and that a better understanding of construction project governance could be made by distinguishing the project from the firm and the market, distinguishing inter-firm from intra-firm projects, and distinguishing governance from management. Accordingly, the rest of this paper is structured as follows: The next section scrutinizes the nature of the project by identifying the characteristics that distinguish the project from the firm and the market,
and classifies the two basic types of projects - inter-firm (type I) and intra-firm (type II) projects. Later it analyzes the idiosyncrasy of construction projects. In the third section, the essence of governance is examined, making a clearer distinction between management and governance, and the multi-level nature of governance is analyzed through a lens of complexity and flexibility. In the fourth section, the concept of construction project governance is reviewed, and three governance categories, vertical, horizontal and project manager related governance, are examined from a game theory perspective. The conclusions section provides a summary of the research findings and identifies directions for further research.

2 THE NATURE OF THE PROJECT

According to Williamson (1991), there are three generic forms of economic organizations - market, hierarchy and hybrid. Characterized by long-term incomplete contracts, projects and construction projects, in particular, belong to the hybrid category (Turner and Keegan 2001; Sha 2011). In the matter of the relationships with their parent organizations, construction projects belong to the category of the inter-firm project (Archibald 1992; Turner and Keegan 2001). In order to grasp the nature of construction projects, it is necessary to first understand the basic properties of the project, and then differentiate inter-firm projects from intra-firm projects.

2.1 Distinguishing the project from the market and the firm

A good question to begin a discussion of the nature of the project is: “Why does it exist?” In this regard, classical authors’ opinions about the raison d’être of a firm can provide conceptual insight. Knight (1921)’s opinions can be summarized as follows: (1) Risk and uncertainty are two different concepts - the former is measurable (either through calculation a priori or from statistics of past experience) whereas the latter cannot be measured. (2) It is “true” uncertainty, rather than risk, that forms the basis of a valid theory of profit. (3) Consolidation and specialization are the two fundamental methods of dealing with uncertainty - the former is based upon reduction by grouping; while the latter upon selection of individuals to “bear” it.

According to Williamson (1991), there are three dimensions of transactions which raise transaction costs and combine to create market failure. They are asset specificity, uncertainty, and transaction frequency, the last one paying far less attention to the empirical literature than the first two (Geyskens et al. 2006). Williamson (1991)’s opinions about vertical integration can be summarized as follows: (1) Asset specificity brings about a fundamental transformation, where originally independent parties in the market are transformed into interdependent stakeholders. (2) Those who have invested capital in asset specificity will be menaced by the hold-up of others, which weakens the power of asset-specificity investors in ex-post haggling and, ultimately, increases the transaction cost. (3) Governance cost is a function of asset specificity, thus a higher degree of asset specificity requires a higher level of vertical integration.

As illustrated in Figure 1, Knight infers that uncertainty creates demand for consolidation and specialization, which in turn brings about the firm as well as the role of entrepreneur. Williamson, however, suggests that asset specificity causes the hold-up problem, which in turn entails vertical integration, including the firm and the project. By combining these two similar positions together, one can identify uncertainty as a raison d’être of both the firm and the project, or as a characteristic to distinguish them from the market.

What should be done next is to tell the project apart from the firm. The emergence of the project can be attributed to the failure of the normal mode of routine production in firms plus transaction in the market. Under normal circumstances, firms carry out their business under the guidance of the market’s invisible hand; while customers buy ready-made goods or services from the market - both firms and customers gain what they want, with the market acting as an “omnipotent” intermediary. However, when a customer cannot find desirable goods or services in the market, he or she has to hire someone to provide bespoke products or services, bringing about a new mode of production - customization. From the viewpoint of the organization, the way in which a client hires a firm or a group of firms to provide bespoke products or services is neither the market nor the firm (hierarchy), but a hybrid of them. This is just the way construction projects are. Sometimes, in order to meet the challenges arising from a volatile business environment, firms may initiate projects to develop new products or technologies for potential clients, as is the case for software development projects. In both cases,
most processes are neither routine nor repetitive. This is in contrast to the firm where the routine production is relatively stable and repetitive. Hence, one-off or non-repetitive features can be identified as a distinctive characteristic of the project from the firm.

The non-repetitive feature of the project is closely related to its transiency. Generally speaking, the market is endless. The production process in firms is continuous, stable and repetitive, and thus is routine in nature, whereas in a project the production process is limited in time, and thus is transient in nature. It is for this reason that transiency is coincidentally accepted by various schools as a distinctive characteristic of the project; “temporary endeavor or process” (PMI 2013), “temporary production system” (Koskela and Ballard 2006) and “temporary multi-organization” (Turner and Müller 2003; Turner 2006; Winch 2006). Note that so-called transiency here is with respect to the parent organization of the project, and thus is a relative concept.

In summary, it is the clients’ unique and novel requirements as well as volatile business environments that make the normal mode of “market plus firm” no longer appropriate, entailing a new form of economic organization - the project. What distinguishes the project from the market and the firm lies in the fact that the project simultaneously possesses the characteristics of uncertainty, transiency and non-repetitiveness.

2.2 Differentiating inter-firm from intra-firm projects

Projects can be divided into two categories according to the relationships with their parent organizations (Archibald 1992; Turner and Keegan 2001). Type I projects are undertaken in the market, and are inter-organizational in nature; whereas type II projects are undertaken within the hierarchy, and belong to intra-firm organizations. In the first case, clients play the role of parent organization of projects. They place their project work in the market and hire firms as “legal person employees” to carry out the work (Turner 2004). Correspondingly, firms that undertake projects as their main or even exclusive business, supplying bespoke products or services to clients should be classified as type I firms. Construction companies and construction projects are typical type I firms and type I projects respectively. In the second case, it is the firm that has projects supporting its mainline business, which is routine in nature, to keep pace with rapid market changes. So the parent organizations of projects are firms rather than external clients. Correspondingly, firms that retain project work within the hierarchy should be classified as type II firms, where projects are undertaken in the support function to create new markets, products or technologies (Turner and Keegan 2001). IT companies and IT projects are typical type II firms and type II projects respectively.

Different types of organizations and different tasks require different methods to steer. In the domain of “pure” project management where the focus is cost, time and quality, the canonical Project Management approach is suitable for both type I and type II projects. However, in the domain of project governance, it seems that different approaches are needed for each type. Currently, dominant standards and guides (Office of Government Commerce 2007; APM 2011; PMI 2013; DIN 2013) which put the focus on project-parent relationships within the hierarchy are suitable for type II projects. Imagine a software development company within which several projects are carried out simultaneously. It is easier for the company (the parent) to align the goals of various projects with its short- and long-term goals, and thus ensure that projects serve as vehicles that execute its strategies (Ahola et al. 2014). However, if market transactions and inter-organizational relationships are involved, limitations of this approach become evident, which calls for a new governance approach. Take a construction project for instance. The project coalition requires several legally independent firms to temporarily pool together their resources, capabilities, and knowledge to deliver bespoke products. Since the client and all involved parties have divergent long-term interests and strategic goals, the project’s goal must be determined on the basis of negotiations between and concessions from relative parties. In this case, what can be done is to align involved parties to work together towards shared goals that are short-term in nature (Winch 2010; Ahola et al. 2014).

In summary, when research perspective is expanded from “pure” project management to project governance, it is essential to make an explicit distinction between type I and type II projects. The opinion that takes the parent organization’s interests as the benchmark is suitable for type II projects. Whereas type I projects need a new strategy that takes the interests of both the client and all involved parties into account simultaneously, which is bound to be a much more complex issue than in type II projects.

2.3 Analyzing the idiosyncrasy of construction projects

A construction project can be viewed as a nexus of formal and informal contracts. Relationships between various participants in construction projects are typical contractor-contractee relationships, differing from project-parent relationships in type II projects which are more like employee-employer relationships within a firm. Because of the high cost of specifying a long list of the particular rights, contracts on construction projects are necessarily incomplete, leaving big room for residual rights of control (Grossman and Hart 1986) and residual claims (Fama and Jensen 1983). Construcation projects distinguish themselves by a high degree of uncertainty that can hardly be found at the aggregate level of the product market environment (Winch 1989). Some of the sources of uncertainty facing the industry include: (1) task uncertainty due to the small units of production, (2) natural uncertainty due to the unpredictability about weather and geological conditions, and so on, (3) organizational uncertainty due
to the temporary character of the project team, and (4) contracting uncertainty due to errors in estimating and competitive tendering (Winch 1989). Such a high level of uncertainty creates the strong demand for specialization. The broader and well-developed chartered professional certification system in the building sector can be regarded as an institutional arrangement designed for addressing uncertainty. Specialized knowledge, especially tacit knowledge, is at the core of the chartered professional certification system and belongs to the category of human asset specificity. According to Williamson, as mentioned above, it is reasonable for the construction project to adopt a hierarchy structure because of its high degree of asset specificity. In practice, however, construction projects adopt a hybrid structure, which exceeds Williamson’s expectations. To explain the paradox, uncertainty, specialized knowledge to deal with uncertainty and information cost are included into the analysis framework by relaxing some assumptions made by Williamson (Sha 2011). The analysis indicates that under some conditions, the approach of selecting the governance structure of construction projects might deviate from the path anticipated by canonical theories. If uncertainty exceeds a certain degree, its influence on the production cost may be greater than that of the hold-up problem on the transaction cost. The pressure of uncertainty on the production cost may restrain the client’s enthusiasm for a hold-up in ex-post haggling, which will reduce construction firms’ tendency towards vertical integration. In consequence, the trade-off between production and transaction cost may bring about a hybrid, rather than a hierarchy structure (Sha 2011).

In summary, as a typical type I project, the construction project can be regarded as a consequence of the trade-off between production cost and transaction cost under the circumstance where great uncertainty creates strong demand for specialization, and could be concisely defined as a temporary multi-organization to undertake a one-off customization-based endeavor.

3 THE ESSENCE OF GOVERNANCE

As the complex art of steering multiple agencies, institutions and systems, the governance paradigm is about a new mindset and methods (Jessop 1997). The rise of governance stems from difficulties of hierarchical coordination by organizations or the state (Miller and Lessard 2000), which, in turn, is a consequence of increasingly complex business environments characterized by rapidly changing patterns of reciprocal interdependence (Jessop 1998) and increasingly frequent interactions across all types of pre-established boundaries (Scharpf 1994). In spite of diverse and contrary usages, governance is, in essence, “concerned with creating the conditions for ordered rule and collective action” (Stoker 1998).

According to new institutional economics, social, political, legal and economic institutions may be divided into four categories or levels: (1) social or cultural foundations, or embeddedness, (2) basic institutional environment, (3) institutions of governance, and (4) short-term resource allocation (Williamson 2000). At the third level where the purpose is to get the governance structures right, the main task is to define structures and processes, and “craft order, thereby to mitigate conflict and realize mutual gains” (Williamson 2000), while requiring assurance that management is operating effectively and properly within the defined structures (Biesenthal and Wilden 2014; Too and Weaver 2014). As compared to day-to-day management, governance is a relatively stable institution with a change time-frame of one to ten years (Williamson 2000).

Besides the above-mentioned differences in terms of purpose, function and change time-frame, the fundamental distinction between management and governance lies in their values orientation and way of thinking, which can be depicted by the following dyads: authority vs. consensus (Ahern et al. 2014), control-oriented vs. involvement-oriented approach (Toivonen and Toivonen 2014), collective top-down vs. mutual bottom-up characterization (Ahern et al. 2014), hierarchical vs. heterarchic coordination (Jessop 1997), and higher “power distance” vs. lower “power distance” culture (Hofstede 1980). The term “power distance” refers to the extent to which the less powerful members in organizations accept and expect power to be distributed unequally. Individuals in a society that exhibit a high degree of power distance accept hierarchies in which everyone has a place without the need for justification. Societies with low power distance seek to have equal distribution of power. These dyads are helpful to understand the connection and distinction between the two paradigms.

In the context of management, people are classified into two categories: those who manage others and those who are managed by others. The hierarchical coordination of management is based on the values of “managers know best” which can be traced back to Taylor (1911). Taylor’s view of workers may be considered prejudiced or insulting. He called less intelligent workers “stupid”, and compared them to draft animals; q6Now one of the very first requirements for a man who is fit to handle pig iron as a regular occupation is that he shall be so stupid and so phlegmatic that he more nearly resembles in his mental make-up the ox than any other type’ (Taylor 1911). Consequently, in the context of management, more attention is paid to planning, organizing, commanding, coordinating and controlling (Donnelly Jr et al. 1987). The control-based feature of management is vividly presented in the plan-do-check-act (PDCA) cycle in which the continuous improvement process is just like negative feedback loops in control theory.

In the context of governance, however, more attention is paid to autonomy, decentralization, flatness of structure, mutual trust, and self-organization achieved by “underspecification” of structure (Müller et al. 2014). All involved parties, whether individually, in groups, or in organizations, could be regarded as stakeholders in a self-organizing “heterarchy”, or a network of elements in
which each element shares the same “horizontal” position of power and authority. Using the lens of complex problem solving, governance approach can be viewed as a distributed coordination mechanism that is underpinned by a “common will” of mutual interest and operates through what Polanyi (1966) calls “mutual control”. A “common will” as a consensus among all involved parties is achieved through bottom-up dialogues and negotiations. In a “mutual control” structure, agents exercise control over each other, based on the twin principles of self-discipline through mutual authority and self-coordination through mutual adjustment (Polanyi 1969; Ahern et al. 2014).

Governance as an art of complexity is enabled through different forms of flexibility at different levels. Generally speaking, the higher the level, the greater the complexity, and the greater the degree of flexibility that would be required. It is argued that lower levels require flexibility in the choice of methods and processes, while higher levels of governance require flexibility in people’s mindset and attitude towards work. In the realm of projects, governance is executed by: (1) flexibility in the idiosyncrasy of governance approaches and authority at the project level, (2) flexible organization structures and mindsets of people at the organizational level, and (3) management’s flexibility in deployment of governmentality in project settings (Müller et al. 2014).

Discriminating alignment is a fundamental principle to deal with complexity at different levels. Transaction cost economics asserts that the supply of a good or service and its governance must be examined simultaneously. The central exercise is to align transactions which differ in their attributes with governance structures (market, hierarchy and hybrid, which differ in costs and competencies) in a discriminating way so that an economizing match is achieved (Williamson 2000). This implies that there is no omnipotent approach to governing economic organizations and activities; instead, they must be steered in a contingent manner.

In summary, management and governance are just like two sides of the same coin. Both of them serve the same purpose of pursuing organizational effectiveness and efficiency, but they do this in different ways. Management is mainly concerned with the execution of daily work and operational control through hierarchical coordination at tactical level; whereas governance is mainly about strategic objectives (Biesenthal and Wilden 2014), which aspires to the collective interests of people and the consent which leads them to voluntarily obey contextual frameworks that shape, but not necessarily determine, the actions of individuals (Clegg et al. 2002; Müller et al. 2014), demanding more flexible mindsets and methods.

4 RETHINKING CONSTRUCTION PROJECT GOVERNANCE

Above analyses indicate that the firm and the project are two different types of economic organizations, that projects can be classified into type I and type II, and that management and governance are two different approaches to steering diverse organizations. As illustrated in Figure 2, there are four basic tasks for a construction corporation: enterprise management, corporate governance, project management and project governance. Generally speaking, the project is more complex than the firm since the former is a hybrid of the latter and the market; type I projects are more complex than type II projects since the former belongs to inter-firm organization, while the latter is intra-organizational in nature; and governance is more complex than management since the former represents a higher-level structure (Biesenthal and Wilden 2014). Therefore, it can be expected that construction project governance (as type I project governance) is the most challenging one among the four tasks.

4.1 A conceptualization of construction project governance

Project governance is typically defined as “the alignment of project objectives with the strategy of the larger organization by the project sponsor and project team” (PMI 2013). This definition implies an assumption that project governance is an activity that is externally, and unidirectionally, imposed by the project-based organization on the focal project (Ahola et al. 2014). In the context of construction projects, however, the client and involved firms interact with each other in a bidirectional way (Ahola et al. 2014). Furthermore, the strategic goals and long-term interests of legally independent participants are not necessarily consistent and can even be conflicting. Therefore, construction
projects governance requires an alternative approach that pays more attention to balancing the interests and claims of different participants.

Under the assumption of bounded rationality, self-interest, and opportunistic behavior, construction project governance can be conceptualized as an effort to make legally independent participants with divergent long-term interests and strategic goals work together towards a shared goal, achieving positive results for all parties. This implies a favorable institutional environment that gives people, whether individually, in groups, or in organizations, the motivation to do the right things in the right way. In essence, it is a framework to shape and influence the attitude of participants, rather than directly determining every action of organizational actors. The job of regulating participants’ behavior can be divided into three categories (Sha and Wu 2016):

- To increase incentives by means of more reasonable allocation of responsibilities, rights, and interests, which would make participants unwilling to behave opportunistically.
- To increase the difficulty of wrongdoing by means of stricter supervision and restrictions, as well as a check and balance mechanism that enables transparency, accountability and defined roles (Müller 2009), which would make participants unable to behave opportunistically.
- To increase the risk and cost of wrongdoing by means of more severe sanctions, legal, economic, social (mainly through peer groups) and psychological (through cognitive dissonance) (Henisz et al. 2012), which would make participants dare not behave opportunistically.

Some relevant mechanisms involve compensation (engineering change, claim, and counterclaim), mutual aid (engineering insurance) and security (engineering guarantee, mortgage, lien and deposit). Theoretically speaking, these three lines of defense can effectively prevent opportunistic behaviors from occurring in construction projects. However, any institutional arrangement cannot be designed and executed without a cost. So the real effects of governance structures and mechanisms are dependent on the balance of their costs and benefits. Nevertheless, they do indicate practical approaches to governing construction projects.

4.2 Three governance categories

In the framework defined by Winch (2001), the governance structure of construction projects is divided into vertical governance and horizontal governance. The former focuses on the relationship between the client and the project, or as Winch noted, the transactions between the client and its first-tier suppliers; whereas the latter pays most attention to the supply chain, or a series of contracts developed behind the first-tier suppliers (Winch 2010). In addition, there is another kind of relationship to be steered - the relationship between construction firms and project managers, which could be classified as the category of “project manager related governance”.

4.2.1 Vertical governance: formal vs. informal contract perspective

The vertical governance of a construction project can be examined in two dimensions, as Turner (2004) suggested: project procurement route (PPR) and payment terms. The PPR determines the roles and scope of supply - traditional (design-bid-build, DBB), integrative (design-build, DB) or construction management (CM), public-private partnership (PPP) and so on. In addition, payment terms determine the allocation of risk and the incentive intensity, including fixed price, cost plus, re-measurement, target cost contracts and so on. In most cases, one kind of PPR may involve several principal-agent relationships. Each relationship should be regulated by a certain contract. Combining different types of PPR and payment terms yields various contractual arrangements (Sha 2011).

Principal-agency theory has been widely applied in general governance theories and is useful for examining the relationship between the client and the project. Consider a construction project composed of two parties: a risk neutral client and a risk averse agent. The payment that the agent gains from the client is

\[ w = \alpha + \beta Y, \]

where \( \alpha \) is constant payment, \( \beta \) is incentive coefficient \((0 \leq \beta \leq 1)\), and \( Y \) is the observable output of the project. The client’s problem is to select \( \alpha \) and \( \beta \) so as to maximize its expected payoff under the condition that both participation constraint and incentive compatibility constraint of the agent are satisfied.

The key to modeling lies in selecting the outcome function \( Y(\bullet) \) in accordance with the research purpose and the features of the problem to be solved. For example, the outcome may be simply represented as \( Y = e + x \) where variable \( e \) is the agent’s effort, and random variable \( x \) is a measure of risk. When analyzing a standard pain-gain sharing arrangement in construction contracts, the outcome is represented as the difference between fixed target cost \( \bar{C} \) and outturn cost \( C : Y = \bar{C} - C \), where \( \bar{C} \), in turn, is a function of agent’s effort (Chang 2013). With the aim of examining the influence of uncertainty and specialized knowledge on selecting the governance structure, the outcome is represented as a non-linear function \( Y = K^\tau G^{1-\tau} + x \), where \( K \) and \( G \) are the amount of specialized knowledge and general producer goods respectively, \( \tau(0 < \tau < 1) \) is the index of information gap to reflect the degree of “true” uncertainty (Sha 2011).

In practice, there are relational project delivery arrangements, including project partnering, project alliancing and integrated project delivery (Lahdenperä 2012). In the domain of transaction cost economics (TCE), the research on relational contracting incorporates the role of reputational capital in repeated games. Stewardship theory provides an alternative description of human behavior compared to agency theory (Biesenthal and Wilden 2014). An interdisciplinary governance framework that is supported by “three institutional pillars” (regulative, normative and cognitive)
provides a powerful way to unify the disparate and fragmented insights from TCE, sociology and psychology into a more unified theory that can allow us to better understand and manage relational project governance (Scott 2008; Henisz et al. 2012).

4.2.2 Horizontal governance: a coalitional game perspective

Generally speaking, cooperation can generate more benefits as compared to single-handed practices, getting the result of “1+1>2”. Cooperation practices, in turn, require two preconditions. One is that the excess benefits from cooperation (making the cake bigger); the other is that the fairness in distributing the cooperation gains (cutting the cake in a way acceptable to all parties). These issues are exactly what the cooperative game theory focuses on.

As a sub-area of the cooperative game theory, coalitional game theory is mainly concerned with the stability of the grand coalition, or the coalition of all players. The fundamental assumption here is that the grand coalition will form. In order to guarantee the stability of the grand coalition, it is essential to allocate the payoff among the players in a fair way. Several solution concepts have been developed based on different notions of fairness, including core, Shapley value, and nucleolus (Saad et al. 2009).

Based on the notion of “gains from trade”, the core simultaneously satisfies (1) individual rationality (no player receives less than what he could get on his own), (2) group rationality (the payoff vector exactly splits the total value) and (3) coalitional rationality (there is no coalition that can improve upon it), so no group of players has an incentive to leave the grand coalition to form another coalition. The Shapley value assigns a unique payoff allocation among the players, while satisfying four axioms. It is, in essence, a weighted average marginal contribution of the player to the grand coalition, representing the notion of “more pay for more work”. The nucleolus provides a unique payoff allocation that minimizes the dissatisfaction of some players. It is well compatible with Rawls’ difference principle of justice as fairness, which states that inequalities are to be to the greatest benefit of the least-advantaged members of society (Rawls 2001). Obviously, when applying coalitional game theory, the local population’s perception of fairness must be taken into consideration.

4.3 Project manager related governance: a common agency perspective

The roles of construction project managers can vary depending on the procurement route chosen by the client. In the case of executive project management or PM mode, they act on behalf of the client. On the other hand, design-and-building companies usually designate their own persons as project managers (Walker 2007; Fewings 2005). In practice, they are often treated as the same occupation as construction managers (DOL 2015). What is to be discussed here is the relationship between construction firms and their project managers.

Construction project managers are responsible for all phases of the construction management process, interacting with a variety of stakeholders, and handling any issues that arise during construction in a contingent manner. That is why they have more autonomy as compared to workshop managers in the manufacturing industry and project managers in the IT sector. Having more autonomy can ensure efficiency and productivity, while, in the presence of conflicting interests and asymmetric information, it can bring about the problems of adverse selection and moral hazard.

When designing mechanisms for designating and stimulating project managers, construction firms must take the client’s influence into account because a project manager making decisions may be responsible both to the construction firm and to the client. The relationships between the three parties can be described as “one servant of two masters”, which is well compatible with the scenario of common agency game where the action chosen by a particular individual (the agent) affects not just one, but several other parties (the principals) whose preferences for the various possible actions typically conflict (Bernheim and Whinston 1986). The common agency literature has developed an analytical framework to tackle a variety of important problems (Carmona and Fajardo 2006; Attar et al. 2007). So it is technologically feasible to examine project manager related governance from a common agency perspective.

In the above sub-sections, three governance categories have been discussed mainly from a game theory perspective. Without a doubt, the game models may be unrealistically simple in many aspects, and inevitably have limitations. However, as Bowles (2004) argued, “models do not explain all the details, but they tell us where to look”. Regardless of their simplicity, these models are capable of providing some clues for studying construction project governance.

5 CONCLUSION

Projects have become a major form of economic organization, to the point of being on par with markets and firms. Type I projects can be viewed as firm-like organizations in the market, and type II projects can be regarded as a market-like processes within the firm. The canonical project management approach was mainly derived from type II projects, however, construction projects fall within the type I category. Thus, a better understanding of its governance will depend on expanding the focus from project-parent relationships within the hierarchy to contractor-contractee relationships in a self-organizing “heterarchy”.

Being at a higher level than management, governance is enabled through different forms of flexibility. This implies less control and more autonomy. In the realm of construction projects, governance structure and governance mechanism can be summarized as the sum of heterarchic coordination-based institutions to lay a foundation for the check and balance between
diverse participants of the project. The basic framework can be illustrated in two dimensions: governance category (vertical, horizontal and project manager related governance) and approach to regulating participants’ behavior (making people unwilling and unable to behave opportunistically). The ideal state should be one where all parties act together under a common will that is achieved via compromise between them, with each party finding the right niche for itself. However, it is just theoretically realizable due to uncertainty facing construction projects, bounded rationality of diverse participants, and flexibility inherent in the governance paradigm. Therefore, it can be concluded that there is no best approach, but rather a most suitable one to governing a given construction project.

In the multi-level structure of institutions, construction project governance serves as a connecting link between the construction business system and project management. But, while the construction business system greatly influences governance and hence the process and performance of construction projects, it cannot operate independently or without the support of management. Further studies should be conducted in a broader framework to grasp the interactions between the construction business system, project governance, and project management.

REFERENCES


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