

Investigation of Contractual Specification and Implementation of Relational Approaches in Public Private Partnership (PPP) Projects

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ABSTRACT

Public-Private Partnerships (PPPs) have unique characteristics such as a long time horizon and multiple stakeholders involved. This can lead to common transaction hazards – uncertainty, asset specificity, imperfect information and incomplete contracts, which can further promote opportunistic behavior between parties. Although contracts are designed to govern projects and curb opportunism, their efficacy is limited by these transaction hazards. Therefore, the development of strong relationships and cooperative behavior among stakeholders are often emphasized to complement contractual provisions, which can mitigate transaction hazard impacts.

Relational contracting includes a set of principles such as flexibility and effective communication, which promote cooperative behavior and advance mutually beneficial outcomes for stakeholders. A relational contract can include different relational approaches such as informal resolution procedures, partnering practices and incentives to promote relational exchanges in a project. The level of presence of these relational approaches in PPP contracts is an indication of their ability to further inter-organizational relationships. Although previous studies have summarized and further investigated relational approaches in construction projects using conventional delivery methods, similar investigations for PPP projects are limited.

Furthermore, relational contracting theory suggests that the contractual inclusion of approaches does not assure their implementation in the field. Stakeholders tend to form working relationships different than what is intended in the contract. Therefore, examining the implementation of these approaches is an important precursor to exploring their effectiveness and capacity to promote stronger relationships between parties.

Accordingly, this research presents three complementary studies to enhance understanding of relational approaches employed in PPP projects. The first study focused on the identification of relational approaches described in the literature for specification in PPP contracts to enhance

cooperative behavior. A comprehensive literature review process identified relational approaches that were grouped into six categories – communication/nature of negotiations, partnering, conflict resolution methods, monitoring, changes process and risk allocation. The second study examined the extent that the relational approaches identified in the first study were specified in 22 PPP transportation project contracts in the United States. This investigation characterized how relational these contracts are, which is indicative of the capacity of these contracts to promote relational exchanges in a project. For instance, different partnering practices were either included in contracts or not, while the inclusion of conflict resolution methods in contracts was selective. The third study investigated the implementation of relational approaches in practice. Semi-structured interviews of 13 subject matter experts were conducted to obtain perspectives regarding the implementation of different relational approaches. For example, all the interviewees emphasized handling conflicts through informal resolution methods to save the time and effort required in third party methods such as mediation, arbitration and dispute review boards. A framework intended to promote proactive management of stakeholder relationships is proposed based on the findings.

Collectively, these three complementary studies shed light on the current state of contractual inclusion and implementation of relational approaches in PPP projects in the United States. Overall, this research contributes towards the growing literature concerning the complementarity between contractual and relational governance, which is needed for improved project performance. These studies have advanced understanding of relational approaches in PPPs by establishing a baseline for their current contractual specification in PPP projects and identifying factors influencing their implementation in the field. Future research can explore their impact on project performance and counterparty relations.

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GENERAL AUDIENCE ABSTRACT

Different life cycle phases and stakeholders involved are some of the unique characteristics of Public Private Partnership (PPP) projects. This can lead to presence of transaction hazards such as uncertainty, asset specificity, incomplete contracts and imperfect information which makes contracts less effective in governing projects. Therefore, developing strong relationships between the stakeholders is necessary to complement contracts which can lead to improved project performance.

Relational contracting includes a set of principles which aim at developing cooperative behavior between the stakeholders through improved communication and flexibility. A contract that includes such principles is called a relational contract. Although projects with traditional delivery methods such as design bid build and design build have been investigated regarding relational approaches in contracts, a similar review for PPP contracts has not been found. On the other hand, relational contracting theory suggests that the working relationships between the stakeholders can turn out to be completely different than what is intended in the contract. Therefore, it is important to investigate the actual implementation of relational approaches in PPP projects which has not been performed till now.

Based on the arguments above, three complementary studies have been performed in this research to overcome the limitations mentioned and to have a better understanding of relational approaches in PPP projects. The first study aims at identifying a comprehensive list of relational approaches from the literature which can be included in PPP contracts to enhance cooperative behavior. A robust literature review process was followed to identify relational approaches which were further grouped into six categories – communication/nature of negotiations, partnering, conflict resolution methods, monitoring, changes process and risk allocation. The second study further investigates the contracts of PPP transportation projects in the United States regarding the level of relational approaches identified in the first study. Contracts from 22 PPP projects were investigated and

compared. The findings provided insights into the ability of these contracts to promote relational exchanges in a project. For instance, the inclusion of partnering practices was either all-inclusive or not, whereas inclusion of conflict resolution methods was selective. The third study investigated the implementation of relational approaches in practice. Semi-structured interviews of 13 subject matter experts were conducted to gather insights into the implementation of different relational approaches. For example, all the interviewees emphasized the need to resolve conflicts through informal resolution methods to save time and effort required in third party methods such as mediation, arbitration and dispute review boards. A framework with the objective of promoting proactive management of stakeholder relationships was proposed based on the findings.

Collectively, these three studies provide insights into the current state of contractual inclusion and implementation of relational approaches in PPP projects. This research contributes towards the growing literature concerning the complementarity between contractual and relational governance in PPP projects which is needed for improved project performance.

Dedication

To my parents for being supportive and motivating me to achieve greater heights

To my wife for being my best friend

To my sister for being there for me

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At the accomplishment of this much awaited and desired moment of my life, I would like to express my heartfelt gratitude to all those who believed in my potential and encouraged me to see this day.

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Preface

Contributions of co-authors of each manuscript in this dissertation:

Chapter 2: Synthesis of Relational Approaches for Inclusion in Public-Private Partnership Contracts

- Khurana, Mayank: conducted the research and was lead author
- Garvin, M.J.: advised on research design and implementation; reviewed, and copyedited the manuscript
- Mahalingam, Ashwin: advised on research background; reviewed, and copyedited the manuscript

Chapter 3: Investigation of Relational Approaches in Public-Private Partnership (PPP) Transportation Contracts

- Khurana, Mayank: conducted the research and was lead author
- Garvin, M.J.: advised on research design and implementation; reviewed, and copyedited the manuscript

Chapter 4: Relational Approaches in US Public-Private Partnership Projects: Practitioner Observations and Recommendations

- Khurana, Mayank: conducted the research and was lead author
- Garvin, M.J.: advised on research design and implementation; reviewed, and copyedited the manuscript

1. Chapter 1: Introduction

1.1. Public Private Partnerships and Infrastructure Development

Transportation infrastructure is a vital component of economic strength and national security. Public Private partnerships (PPPs) have been implemented in different countries to support transportation infrastructure needs (Papajohn et al. 2011). A PPP includes private sector involvement to finance and develop public infrastructure (Zheng et al. 2008) with the aim of better cost and risk allocation along with improvement in the quality of infrastructure being delivered (Kwak et al. 2009). Even though significant growth has been observed in the implementation of PPP projects globally, there has been continuous discussion over the benefits achieved through this delivery method (Roehrich et al. 2014). Some of the obstacles to implementation of PPP projects mentioned in the literature are long procurement process, lack of experienced professionals, inappropriate risk allocation and high transaction costs (Osei-Kyei and Chan 2015). The mixed outcomes observed are due in part to the presence of transaction hazards in PPP projects. PPP projects have unique characteristics such as a long-life span and inclusion of multiple stakeholders (Nguyen and Garvin 2018). This leads to presence of well-known transaction hazards – uncertainty, asset specificity, information asymmetry and incomplete contracts (Xiong et al. 2019). These transaction hazards give rise to opportunism and high transaction costs in PPP projects. Therefore, a number of researchers have recommended the development of strong relationships to mitigate transaction hazard risks in PPP projects (Ling et al. 2014; Meng 2015; Zou et al. 2014). Development of trust and cooperative behavior between teams have been linked with improved project performance (Smyth and Edkins 2007), value creation (Kivleniece and Quelin 2012) and satisfaction of user interests (Zheng et al. 2018) in PPP projects. Different contractual arrangements such as relational contracting aim at promoting relational exchanges which can lead to better working relationships and improved project performance (Ling et al. 2014).

1.2. Relational Contracting

In theory, conventional contracts are sufficient to govern projects. However, the discrete nature of transactions has limited their efficacy in the presence of uncertainties. Hence, this spawned relational contracts to counter the inherent limitations of classical contracts and to enhance

governance in the presence of these transaction hazards, particularly in long term projects (Jobidon et al. 2019). Relational contracting includes a set of principles that aim at creation of a win-win scenario and mutual benefits for the stakeholders involved (Ling et al. 2006). Some examples of relational contracting principles include flexibility, effective communication and joint problem solving (Ling et al. 2014). Relational contracting encompasses different collaborative contracting arrangements such as partnering, alliancing and integrated project delivery (Rahman and Kumaraswamy 2002a). A relational contract includes these contracting principles and incorporates contractual language that promotes relational exchanges such as mutual planning, shared benefits and penalties, future cooperation, inclusion of other stakeholders and conflict resolution through cooperative measures (Macneil 1978).

1.2.1. Relational Approaches in Contracts

Research related to relational norms in contracts was initiated by Macaulay (1963) and Macneil (1980). The norms proposed were - role integrity, reciprocity, flexibility, contractual solidarity, reliance and expectations, restraint of power, and harmonization of conflict. Different studies such as Van der veen and Korthals Altes (2011) and Stam (2016) have made an effort to substantiate these norms in an urban development contract and a construction project contract and have identified practices or approaches that can be present in contracts to promote relational exchanges. Stam (2016) proposed six categories of relational parameters that can be present in a construction project contract to enhance collaboration between parties. These categories are - 1) context and goals, 2) interaction, 3) organization structure, 4) remuneration, 5) monitoring and control, and 6) flexibility. Some of the examples of parameters are pre-agreed conflict resolution measures, incentive structure and change procedures. These parameters proposed align with the definition of relational approaches adopted here – “Specific methods that enable relational exchanges among key project stakeholders and support relational governance”.

To date, research regarding identification of relational approaches in contracts is related to construction projects with traditional delivery methods. Moreover, the literature is fragmented, and it does not address PPPs specifically. Characterizing relational approaches in PPP contracts is noteworthy since multiple stakeholders are typically involved throughout a project’s lifecycle compared to more conventional delivery methods (Zou et al. 2014). A comprehensive list of relational approaches, when investigated in a PPP contract provides a strong indication of the

contract's ability to promote relational exchanges. These types of exchanges give preference to development of strong relationships between stakeholders, which can lead to better working relationships and improved project performance (Ling et al. 2014). Recent studies such as Harper and Molenaar (2014) and Jobidon et al. (2019) have used the relational norms proposed by Macneil (1980) to compare the relational capability of construction project contracts through recording and comparing the frequency of keywords related to these norms. While this work has produced meaningful insights, it has not comprehensively considered relational approaches for inclusion within contracts, particularly PPP arrangements. *Therefore, an opportunity exists to synthesize relational approaches that are applicable to PPP contracts.*

1.3. Analysis of Contracts for Relational Approaches

The most common format of storing data in construction projects with traditional delivery or PPPs are contract documents, change orders, meeting minutes and requests for information (RFIs) (Caldas et al. 2002). Therefore, contracts play a central role in project governance. One of the transaction hazards associated with PPP contracts is its incompleteness (Hart 1988). Since PPP projects are complex and uncertain, contractual provisions cannot cover all possible future events (Sakal 2005). In such cases, incorporating relational elements or approaches in the contract to develop cooperative behavior between the parties may mitigate uncovered situations or events. This will promote relational exchanges between parties and will complement contractual mechanisms. A number of papers have suggested that relational and contractual governance are complementary (Arranz and de Arroyabe 2011; Poppo and Zenger 2002; Zheng et al. 2008). Benitez-Avila et al. (2018) and Bygballe et al. (2010) emphasized that contractual elements provide the framework for relational elements, and then, relational governance, in turn, neutralizes the limitations of contractual governance. An effective contractual design should encourage the development of relational coordination. Lu et al. (2015) provided evidence that both relational and contractual governance help to improve project performance, supporting the need for complementary between the two.

Some studies have investigated construction project contracts for the presence of relational approaches - Cheung et al. (2006), Harper and Molenaar (2014) and Jobidon et al. (2019). Cheung et al. (2006) developed a relational index and compared contract types in design bid build delivery method for the presence of relational factors such as risk, trust, good faith, flexibility, and the use

of alternative dispute resolution. The other two studies compared different contract types from delivery methods – design bid build (DBB), design build (DB) and integrated project delivery (IPD) using relational norms proposed by Macneil (1980). Similar studies related to PPPs remain undone. Chan et al. (2011) and Antillon et al. (2018) also called for increased investigation of integrating relational practices within contracts. *Therefore, a comprehensive comparison of PPP project contracts projects in the US is needed to ascertain the level of presence of relational approaches.* This will give insights into different contracts’ ability to promote relational exchanges in a project.

1.4. Implementation of Relational Approaches

Relational contracting theory (Macneil 1978) states that the actual relation between the parties can be different from what is intended in the contract. In other words, parties might have a working relationship different than what contractual provisions imply. For example, if the contract prescribes progress meetings to be held monthly, there could be a possibility that, during implementation, the stakeholders are meeting at a frequency more or less than monthly according to their relationship and understanding. Therefore, it is not only important to examine contractual inclusion, but also the implementation of relational approaches in practice to get a complete understanding of their effectiveness in developing strong relationships between the stakeholders.

Studies such as Harper et al. (2016) and Ling et al. (2006, 2014) have investigated the implementation of relational approaches in practice. These studies have either used a questionnaire or interviews to gather information from practitioners regarding their experience with relational approaches in construction projects. Ling et al. (2006, 2014) have investigated construction projects in Singapore, Hong Kong and China. Some of the approaches investigated are mutually agreed conflict resolution mechanisms and clearly defined risk allocation. Harper et al. (2016) defined statement items for each of the norms by Macneil (1978) and gathered practitioners’ opinions on them. For example, for the norm “harmonization of conflict” the statement item was “When unexpected situations developed, organizations tended to work it out together rather than hold each other to the contract terms” (Harper et al. 2016, p.6). Practitioners were asked to express their level of agreement or disagreement with these statement items. A similar study related to PPP projects has not been found in the literature. Engebø et al. (2020) also suggested that most of the literature in the domain of relational contracting has focused on either drivers, barriers or critical

success factors for relational contracting. Not many papers have examined implementation of approaches. *Therefore, a clear opportunity exists to examine the implementation of relational approaches in PPP projects in the US.* The findings will suggest strategies to improve the implementation of relational approaches and their contractual inclusion in PPP projects.

1.5. Research Approach and Dissertation Organization

Based on the issues discussed, a clear opportunity exists to: (1) develop a comprehensive list of relational approaches from the literature (2) further examine the level of identified approaches prescribed in PPP contracts and (3) investigate how such approaches are implemented as PPP projects are formed and executed. Figure 1.1 portrays the three complementary studies performed in this research.



Figure 1.1: Three complementary research studies

The outcomes of this research are:

- **Study 1** - *Chapter 2: Synthesis of Relational Approaches for Inclusion in US Public-Private Partnership Contracts.*
- **Study 2** - *Chapter 3: Investigation of Relational Approaches in US Public-Private Partnership (PPP) Transportation Contracts.*
- **Study 3** - *Chapter 4: Relational Approaches in US Public-Private Partnership Projects: Practitioner Observations and Recommendations.*

The three studies are integrated with one another. The relational approaches identified from the literature in Study 1 were employed in Study 2 to determine whether such approaches were

specified within PPP contracts to characterize how relational the contracts assessed were. Finally, the outcomes of Study 2 informed the questions regarding implementation of relational approaches for subject matter experts in Study 3. For example, one of the themes identified and further reviewed in contracts in study 2 is the frequency of progress meetings between the client and concessionaire which led to the following interview question in study 3 – How frequent were the progress meetings between the client and concessionaire in the design, construction and O&M phases individually?

1.5.1. Study 1: Identification of relational approaches from literature for inclusion in US PPP contracts

The objective of this study is to examine the literature to identify relational approaches for specification in PPP contracts. The major research question that has been answered by study 1 is:

- *RQ1: What relational approaches should be specified in PPP contracts according to the literature?*

The presence of relational approaches in contracts can lead to promotion of governance mechanisms in PPP projects. A literature review was conducted to identify a comprehensive list of relational approaches. Scopus and Web of science databases were used to identify relevant literature based on a predefined list of keywords. A well-defined exclusion criteria was followed to select a final set of 41 papers which were analyzed for relational approaches. The approaches identified were then grouped into different thematic categories. A connection between the presence of relational approaches and the employment of prevailing governance mechanisms such as shadow of future and shared ownership has been further made related to PPP projects in this study.

1.5.2. Study 2: Investigation of relational approaches in US PPP contracts

The objective of this study is to investigate and compare the level of presence of relational approaches identified in study 1 in contracts of PPP transportation projects in the United States. The major research questions that have been answered by study 2 are:

- *RQ1: What is the level of presence of relational approaches in current PPP contracts, which indicates the capacity of a contract to promote relational exchanges?*

Contracts from 22 PPP projects in the United States were investigated in this study. The presence of relational approaches in contracts was scored using a predefined rubric to compare different

contracts. A two staged method was employed to review the contracts. The first stage included a manual content analysis on 5 sample contracts. The second stage included a semi-automated natural language processing (NLP) method, where the NLP method was first used on the five contracts to ensure that the NLP method can replicate the results from the content analysis method and is efficient. After ensuring its accuracy and efficiency, the NLP method was then used to analyze the remaining contracts.

1.5.3. Study 3: Investigation of implementation of relational approaches in US PPP projects

The objectives of this study are to investigate the implementation of relational approaches identified in study 1 and to determine the general state of client-concessionaire relationships. The major research questions that have been answered by study 3 are:

- *RQ1: How are different relational approaches employed during implementation?*
 - *RQ1a: How can the implementation of relational approaches be improved?*
- *RQ2: What factors affect the client concessionaire relationship in PPP project implementation?*

Semi structured interviews of subject matter experts (SMEs) with significant PPP implementation experience were carried out to investigate the implementation of relational approaches. The interviews were carried out after the Institutional Review Board's (IRB) approval under IRB #21-088. The SMEs were selected through purposive sampling technique using a preset selection criterion. There was a nearly equal distribution of interviewees from the client, concessionaire and consultant side which ensured an adequate representation of key stakeholders directly involved in PPP project implementation. The interviews included questions specific to the approaches and general questions regarding the client and concessionaire relationships in PPP project implementation.

2. Chapter 2: Synthesis of Relational Approaches for Inclusion in Public-Private Partnership Contracts

2.1. Abstract

Contractual governance is considered sufficient to govern particular types of exchanges. In the presence of well-known transaction hazards, however, relational governance is increasingly viewed as a necessary complement to limit transaction hazard risks in many circumstances such as public-private partnership (PPP) arrangements. Consequently, PPPs should employ different governance mechanisms such as trilateral governance and shadow of the future to achieve this complementarity. Relational contracting, which aims to govern transactions through mutual relationships within a project's overall contractual framework, offers a specific avenue for this purpose. In particular, relational approaches such as partnering and effective communication can be included in a project contract to improve relational governance. These relational approaches specified in contracts can act as enablers of governance mechanisms in PPP projects. Consequently, a robust review of the normative literature is completed to synthesize relational approaches. A three-step literature review process was followed, and six categories of contractual relational approaches were identified: communication/nature of negotiations, partnering, conflict resolution methods, monitoring, changes process and risk allocation. This research provides insights into effective contractual designs by identifying relational approaches that can trigger governance mechanisms and promote contractual and relational governance complementarity in PPP projects. Future research can include a review of PPP contracts to determine how and whether such approaches are specified to promote counterparty relationships as well as field investigations to confirm their use and effectiveness in practice.

2.2. Introduction

PPP projects have various complexities such as involvement of multiple stakeholders (Zou et al. 2014), and they typically span time-horizons of 30 years or more (Nguyen and Garvin 2019). Consequently, they are exposed to four well-known transaction hazards: uncertainty, asset specificity (Williamson 1979, 1996), information asymmetry (Hölmstrom 1979) and incomplete contracts (Hart 1988; Xiong et al. 2019). This potentially results in opportunistic behavior between the parties involved and causes different governance challenges for PPP projects. While the aim of contractual governance is to create mechanisms that can curb opportunism as well as other

issues between contracting parties, these transaction hazards exacerbate the inherent inflexibility of discrete transactions and reduce the effectiveness of contractual mechanisms, which creates the need to promote relational exchanges particularly in long-term arrangements (Guevara et al. 2020). Accordingly, complementing contractual governance with relational governance has received significant attention, particularly in PPP projects as a means to enhance project governance and performance (Lu et al. 2015; Warsen et al. 2019). Particular governance mechanisms have been suggested for this purpose (Delhi et al. 2012), and they are underpinned by regulative, normative, and cognitive institutional pillars (Scott 2008). The regulative pillar is generally more aligned towards rules and standards, whereas the normative and cognitive pillars are typically more oriented towards socially acceptable behaviors and a sense of shared identity (Henisz et al. 2012). Trilateral governance, procedural justice, shared ownership, and shadow of the future are examples of such mechanisms described in the literature (Delhi et al. 2012; Henisz et al. 2012; Winch 2001). Such governance mechanisms can be implemented in PPP projects through relational contracting, which has evolved over the years due to the inherent limitations of contractual governance. Relational contracting typically follows contracting principles that focus on developing constructive relationships among key stakeholders (Colledge 2005; Ling et al. 2014) and employs approaches such as effective stakeholder communication (Doloi 2009) and informal conflict resolution procedures (Ling et al. 2014a). A contract that includes these principles is often characterized as a relational contract (Yeung et al. 2012). Different relational approaches conforming to relational contracting principles can be present in PPP contracts and can enable relational governance. Studies from different fields such as business (Macaulay 1963), urban development (Van der Veen and Korthals Altes 2011) and construction (Stam 2016) have identified contractual norms or guiding principles, which should be present in a contract to promote strong relationships.

While the literature has emphasized the significance of complementarity between contractual and relational governance as well as the importance of relational contracting principles in long-term arrangements such as PPPs, a comprehensive synthesis of relational approaches for inclusion in PPP contracts is not found in the literature. A relational approach is defined as a specific method that enables relational exchanges among key project stakeholders and supports relational governance. Accordingly, this research identifies a comprehensive set of relational approaches in the literature that are applicable to PPP contracts; these approaches are also associated with

prevailing governance mechanisms to indicate the linkages between such methods and broader governance constructs. Consequently, this study provides insights for contractual designs that seek to further relational governance approaches and practices.

2.3. Background

2.3.1. Governance Challenges in PPP Projects

Contracts are central to PPPs since they establish the terms and conditions for these arrangements and organize interactions between the public and private sectors (Nguyen et al. 2018). Contractual governance follows a transaction cost economics (TCE) rationale (Williamson 1979), where contracts are the main instruments of governance and create a legal framework that can address opportunism and minimize transaction costs (Guevara et al. 2020). However, PPP projects have complex characteristics including intricate stakeholder interactions during different life cycle phases (Zou et al. 2014) and long-time horizons of 30 years or more (Nguyen and Garvin 2019); this makes PPPs vulnerable to different transaction hazards: uncertainty, asset specificity, information asymmetry and contract incompleteness (Xiong et al. 2019). **Uncertainty** is present in PPPs due to their technical, operating, financial, regulatory, political and environmental risks that tend to vary across a project's lifespan (Grimsey and Lewis 2002). **Asset specificity** is the degree to which investments associated with a transaction are specific to the parties involved. This leads to mutual dependency and creates conditions favoring opportunistic behavior in the case of a power imbalance (Reeves 2008). PPP projects involve contracting potentially under conditions of **imperfect information** (Parker and Hartley 2003); moreover, project stakeholders do not always work toward common goals in the presence of uncertainty, asymmetric information and different risk preferences (Sappington 1991). Finally, PPP contracts are **incomplete** since they cannot cover all future events affecting stakeholders throughout a project's life cycle (Hart 1988). Scholars have long recognized, however, that contractual governance did not paint a complete picture since a variety of complex inter-organizational exchanges occurred despite these hazards based on relational norms such as trust and social processes (Adler 2001; Dyer and Singh 1998; Granovetter 1985). Nascent research in this area viewed relational governance as a substitute for contractual governance. Yet, neither is effective in isolation; as noted, a contract can never stipulate every possible contingency, and attempts to address as many as possible will likely generate an inflexible and unenforceable arrangement (Zheng et al. 2008). Similarly, relational

governance gone too far may result in blind trust, which is problematic in competitive settings (Williamson 1996). Consequently, contractual and relational governance were increasingly seen as necessary complements (Poppo and Zenger 2002). This view has been reinforced by subsequent research (e.g., Arranz and de Arroyabe 2011; Lu et al. 2015; Roehrich 2009; Zheng et al. 2008). Hence, the characteristics of PPPs make the inclusion of relational governance as a complement of contractual governance essential (Guevara et al. 2020).

2.3.2. Governance Mechanisms in PPP Projects

Indeed, the literature has identified a number of governance mechanisms that should be “in-built” in projects to improve their governance. Alignment of incentives (Garvin 2009) and trust (Meng 2015) are examples mentioned in the literature. While a number of mechanisms can be theorized, those that are effective are the ones that are perceived as legitimate, or which can be ‘taken for granted’ by the actors involved. Institutional theorists such as Scott (2008) describe three institutional pillars – regulative, normative, and cognitive – that provide a basis for such legitimacy, and by extension in the case of PPPs, the complementarity between contractual and relational governance. Regulative institutions include enforcement of rules and standards, whereas normative and cognitive institutions include conventions of socially acceptable behavior and norms as well as creation of shared mental maps and identities among individuals or teams (Henisz et al. 2012). The combined presence of these regulative, normative, and cognitive supports of governance mechanisms is considered important to enhance cooperation versus opportunism in infrastructure projects and to improve project governance (Delhi et al. 2012, Henisz et al. 2012).

The literature identifies several prevailing governance mechanisms. **Trilateral governance** involves inclusion of impartial third-party rulings into project governance (Winch 2001), such as an arbitrator to settle disputes. This helps to reduce opportunism and mitigate the risks present due to incomplete contracts in complex projects (West 2005). This mechanism reduces the adherence of parties to rigid contract stipulations in the wake of an unexpected event, which is usually costly to one or both parties (Henisz et al. 2012). **Shared ownership** includes alignment of interests of different parties through creation of a long-term economic stake in a project (Henisz et al. 2012). This incentivizes stakeholders’ interests toward a project (Delhi et al. 2012), so stakeholders work to attain shared project goals leading to better project governance (Garvin 2009). **Partnering** is a set of processes and practices that enhance cooperation between the contracting parties (Bygballer

et al. 2010). The core elements of partnering include trust and long-term commitment where the aim is to create a culture that promotes collaborative relationships among the parties (Cheung et al. 2003). Partnering can lead to better value creation, time savings, better quality, improved profit margins and reduced opportunism (Wood and Ellis 2005). Promoting an environment of **shared identity** among the parties, where individual or organizational identities are linked together, develops a sense of belonging (Macaulay 1963; Macneil 1980) and an environment of collaboration where project interests rise above self-interest. Imagery (i.e., logos and color schemes), rituals and symbolic actions can enhance the intrinsic motivation of stakeholders (Henisz et al. 2012). In addition, frequent interaction contributes significantly towards the development of shared identity (Dutton et al. 1994). **Procedural justice** or fairness in social exchanges often leads to growth of trust among project parties (Kadefors 2004). In the absence of pre-existing social structures, procedural justice can create new social structures and a sense of community since processes are perceived as fair or legitimate (Henisz et al. 2012). Stakeholder engagement, clear explanation of expectations (transparency) and good faith negotiations are indicative of fair process in a project (Delhi et al. 2012). **Shadow of the future** also furthers behavior for the good of the project over opportunistic behavior since a project participant's future business or reputation is at stake (Henisz et al. 2012). This mechanism can enhance cooperation between different parties (Delhi et al. 2012) through both economic and social drivers. Economic drivers include the potential for repeat business and future profit opportunities, whereas social drivers may involve continued inclusion in a social network over time (Solheim-Kile and Wald 2019). **Trust** is a quality of interpersonal and inter-organizational relationships (Lau and Rowlinson 2009, Van der veen and Korthals Altes 2011). The two key components of trust are expectations of the other party to perform and confidence in the abilities of the other party (Smyth and Edkins 2007). The presence of trust leads to development of strong relationships between project counterparties (Cheung et al. 2018; Zheng et al. 2018), which can be further linked to an improvement in project performance (Meng 2015). Finally, **flexibility** is a necessary counter to incomplete contracts (Hart 2003). Project parties will require the means to adjust as future events unfold, particularly when such events are unanticipated by a contract (Macaulay 1963; Macneil 1980). In short, these mechanisms provide the regulative, normative and cognitive basis for project governance, and their combined presence will likely address the known limitations of contractual

governance (Henisz et al. 2012). Moreover, they provide the basis for improving the governance of PPPs.

2.3.3. Relational Contracting Principles and Approaches

Relational contracting also surfaced as the shortcomings of traditional contracts became increasingly apparent; the discrete nature of transactions in such contracts limited their efficacy under conditions of specificity and uncertainty. Consequently, neoclassical contracts emerged that incorporated different concepts such as good faith and flexibility as well as non-discrete or connected transactions (Macneil 1978). For instance, flexible mechanisms included third-party performance determination, use of external standards and cost-plus payments. Even though neoclassical contracts focused more on the existence and preservation of relationships than classical contracts, a similar fundamental structure of both (Jobidon et al. 2019) led to relational contracts to counter self-interest and opportunism in long-term projects. Such contracts include relational elements such as contractual language that promotes informal communication, shared benefits, inclusion of other stakeholders, and conflict resolution through cooperative measures (Macneil 1978). Relational contracting principles have received attention in several fields including supply chain management, and other types of partnerships (Edkins and Smyth 2006).

Macaulay (1963) and Macneil (1980) and other authors laid the foundation for research related to norms that are essential for relational contracts. Such norms include role integrity, reciprocity, flexibility, contractual solidarity, reliance and expectations, restraint of power, and harmonization of conflict. More recent studies have provided further insights about relational contracts. Van der veen and Korthals Altes (2011) established five guiding principles that should be present in urban development contracts to enhance relational governance: (1) focus on relations, (2) focus on the interests of the project, (3) specification of functions of the agreement, (4) specification of goals of the agreement, and (5) a plan for flexibility. Stam (2016) proposed a list of parameters or elements for inclusion in a construction project contract to foster “best for project” behavior. Best for project behavior was defined as collaboration in service of the project, acting in good faith, and effectively communicating with team members; these were argued as essential for improved project performance since they enhance flow of information and improve decision making. This behavior can be achieved through specification of relational parameters or factors in contracts. Stam’s work identified six categories of parameters: 1) context and goals, 2) interaction, 3)

organization structure, 4) remuneration, 5) monitoring and control, and 6) flexibility. Pre-agreed conflict resolution measures, incentive structure and change procedures are some examples of parameters that Stam identified.

2.4. Point of Departure

To date, research has examined different mechanisms that may enhance governance in PPP projects by enabling a complementarity between contractual and relational governance. Further, the literature emphasizes relational contracting as a means to achieve this complementarity by implementing relational principles within contracts. Some recent work has proposed a set of relational “parameters” such as pre-agreed conflict resolution measures and incentive structure; such parameters are aligned with the definition of relational approaches adopted here: specific methods that enable relational exchanges among key project stakeholders and support relational governance. Yet, a thorough investigation and identification of such approaches in PPP contracts is missing in the literature. In long-term projects such as PPPs, relational approaches are the foundation of a relational contract and can act as vehicles to establish in-built governance mechanisms. Therefore, this research conducts a comprehensive synthesis of the literature to identify relational approaches for inclusion in PPP contracts. The need for such a synthesis is supported by Chan et al. (2011) and Antillon et al. (2018) who indicate that research on utilization of relational methods and the integration of relational and contractual governance in PPP projects is limited and needs more investigation.

2.5. Research Objectives and Methodology

The objective of this study is to examine the literature to identify relational approaches for specification in PPP contracts; employment of these approaches may promote various governance mechanisms in a PPP project. A structured and robust literature review process was followed to identify the approaches. The relational approaches found were then grouped into thematic categories. The literature targeted in this study was not confined to PPPs. More general studies in construction project management that considered relational approaches in a project contract were also included since the design and construction phase is a crucial stage of a PPP; consequently, relational approaches in this phase are very applicable to PPP projects. A three-step process was followed, as shown in Figure 2.1, to identify a comprehensive list of relational approaches from

the literature. A similar approach was employed in Rowe (2014), Laursen and Svejvig (2016), and Khurana and Garvin (2019) which includes designing and scoping the search followed by carrying out a preliminary search, followed by selecting papers that meet specific criteria and finally, analyzing the selected literature.

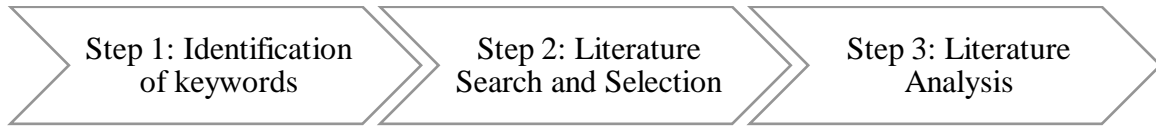


Figure 2.1: Research methodology followed

2.5.1. Step 1: Identification of Keywords

The scope of this study is to identify relational approaches that can be specified in PPP contracts. A list of keywords was identified based on the scope to support a structured search. The keywords include three groups as shown in Table 2.1: (1) keywords representing relationship building, (2) keywords related to methods or approaches, and (3) keywords representing contracts. All three-word combinations of keywords possible using one word from each group were employed to search for relevant literature. An example combination is “Relational” & “Approaches” & “Contract”. This resulted in the identification of an initial pool of relevant papers regarding relational approaches. The keywords used were expected to cover the majority, if not all, of the work regarding relational approaches in PPP contracts.

Table 2.1: List of keywords for literature search

No.	Group	Keywords
1	Keywords representing relationship building	Relational, Relationship, Relationships, Alignment, Align, Collaboration, Communication
2	Keywords related to methods or approaches	Approaches, Methods, Factors, Tools, Governance, Mechanisms, Practices, Model, Framework
3	Keywords representing contracts	Contract, Contractual, Contracting, Agreement, Arrangement, Formal

2.5.2. Step 2: Literature Search and Selection

Figure 2.2 summarizes the process followed to search and select relevant literature. A similar approach was followed by Guevara et al. (2020). First, a preliminary search of relevant papers was carried out in Scopus and Web of Science (WOS) platforms based on the keyword search strategy described in step 1. Scopus and Web of Science are extensive databases related to different scientific fields and are used commonly to perform literature reviews (Guz and Rushchitsky 2009). An initial search using keywords resulted in 512 and 683 papers in Scopus and Web of Science respectively. The papers found were related to PPP and construction projects, and other fields such as business, law and urban development. All the papers identified were combined and duplicate papers were removed. In addition, other papers not relevant to this study such as ones examining mergers and acquisitions or addressing application of contracting theories in other domains (i.e., “Using feminist relational contract theory to build upon consentability: A case study of prenups”) were excluded. This led to a selection of 246 papers for further review. The title and abstract of remaining 246 papers were then examined; editorials and book reviews, papers related to relationships during project procurement, and papers emphasizing the general need for relationship management or relational contracting were then excluded. A PPP contract does not include the procurement phase of a PPP project; therefore, papers addressing procurement phase were removed. This led to a selection of 52 papers for a final full text review. In the final review, papers were removed which, even though included information regarding relational approaches in a project but did not specifically included approaches that could be specified in contracts. The objective of the study is to identify relational approaches that can be specified in contracts, therefore such papers not including a contractual specification of relational approaches were excluded in the final review. This resulted in the final selection of 41 papers for further analysis in step 3.

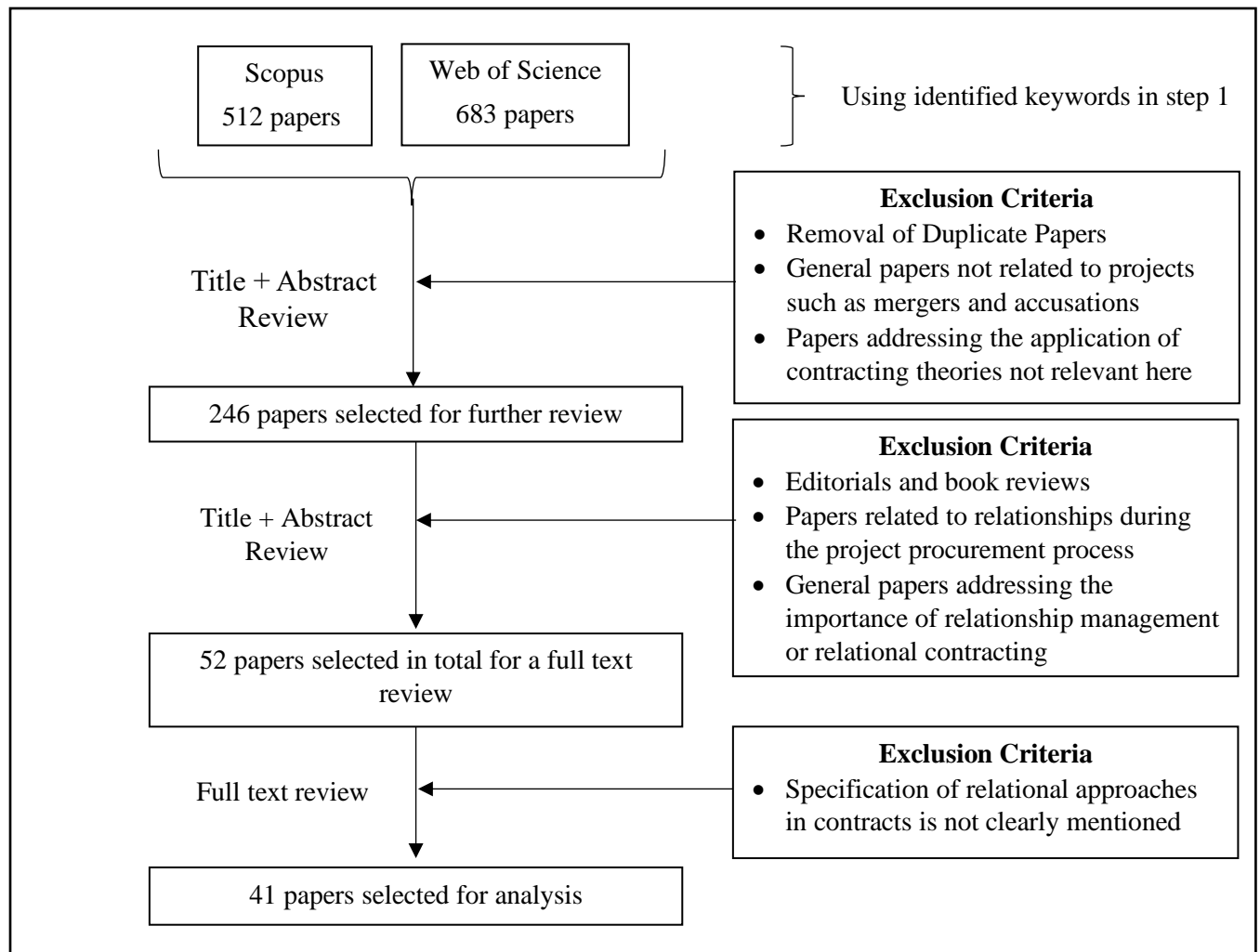


Figure 2.2: Literature search and selection process followed

2.5.3. Step 3: Literature Analysis

This step includes a thorough review of the papers to identify relational approaches that can be specified in PPP contracts, which may enhance relational governance in a project. Two major criteria were followed to review papers and identify approaches: (1) an explicit reference to specification or inclusion of an approach in a contract and (2) an indication of an approach's capacity to enhance relationships or relational governance or to promote governance mechanisms in a project.

Excerpts from Ling et al. (2006) are shown below to demonstrate the process followed in step 3 to identify relational approaches.

- *“Finally, the formulation of contractual incentives will facilitate RC [relational contracting]. The conditions of contract must allow for risk-reward plans, fair risk allocation, and dispute resolution. The fieldwork was undertaken to determine how these may be integrated into contracts to evoke the desired relational approaches”.*
- *“In conclusion, the findings support the core conceptualization of [relational contracting], in that construction contracts must provide motivating incentives, and need to be flexible or armored with appropriate adjustment mechanisms at the postcontract stage, in order to get things done in the face of uncertainty and overcome any complexity. The big difference between clients and consultants and contractors’ views indicate that more contractual incentives need to be integrated into contracts, to persuade contractors to adopt RC approaches”.*

These two excerpts clearly mention contractual incentives, fair risk allocation and dispute resolution as relational approaches for inclusion in a contract, which are likely to enhance relational governance in the presence of uncertainties. Content was reviewed to pinpoint such approaches, and approaches that met the criteria above in three or more unique papers were included in the final list.

The approaches identified were grouped into categories based on the criteria of either having a similar objective, acting as alternatives for each other or collectively being a part of a process. Some of the examples are:

- Approaches - “Regular meetings between the client and SPV”, “Regular communication with other stakeholders” and “Good faith negotiations” were combined to form a category – “Communication/Nature of Negotiations” based on their similar objective of effective communication.
- Approaches – “Informal Resolution Procedures”, “Mediation”, “Arbitration” and “Dispute Review Board” were grouped together to form a category – “Conflict Resolution Methods” since they are potential alternatives in the conflict resolution process.
- Approaches – “Partnering Objectives”, “Partnering Workshop”, “Partnering Charter” and “Partnering Facilitator” were grouped together to form a category - “Partnering” since they each are practices in the partnering process.

This step also includes a descriptive analysis of the 41 selected papers which illustrates the quantitative representation of the number of papers found with respect to the paper type (for example - journal paper) and a distribution of journal papers by publication.

2.6. Results

2.6.1. Descriptive Analysis Results

Distribution of papers with respect to literature type

Figure 2.3 shows the distribution of papers with respect to different literature type. 34 journal papers and 7 conference papers were reviewed in this study. This illustrates that the literature reviewed in this study include academic publications which further confirms their reliability.

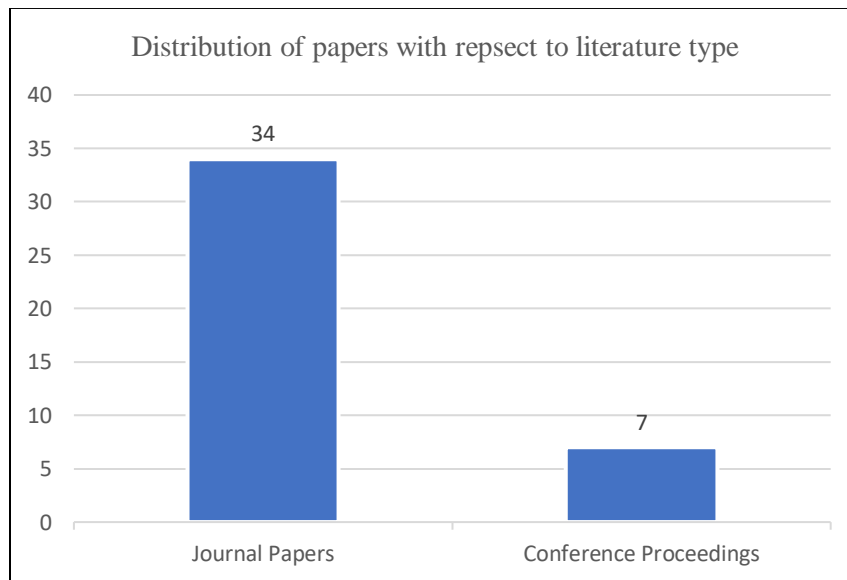


Figure 2.3: Distribution with respect to literature type

Distribution of journal publications with respect to different journals

Identification of different journals where reviewed papers have been published will make sure that publications in top journals have been covered. Journal of Professional Issues in Engineering Education and Practice (6 papers), Journal of Construction Engineering and Management (4 papers), International Journal of Project Management (3 papers), Journal of Management in Engineering (2 papers), Engineering Project Organization Journal (2 papers) and Journal of

Purchasing and Supply Management (2 papers) are the journals with more than one publication reviewed in this research.

2.6.2. Relational Approaches Identified

The literature review process identified multiple relational approaches that were classified into six categories; these approaches expand those identified by Stam (2016) mentioned earlier.

Table 2.2 depicts the six categories: 1) communication/nature of negotiations, 2) partnering, 3) conflict resolution methods, 4) monitoring, 5) changes process and 6) risk allocation, along with the supporting references. Since negotiations are a specific form of communication, therefore nature of negotiations and other communication such as progress meetings have been combined together to form the first category.

Only approaches that were mentioned in three or more sources were included in different categories. All the approaches identified, except partnering workshop which is generally present at the start of a project, can occur in all the life cycle phases of a PPP project.

Table 2.2: Categories and approaches with supporting references

Category	No.	Approaches	Supporting References
Category 1: Communication/ Nature of Negotiations	1.1	Regular meetings between the client and SPV	Cheung et al. 2006; Harper and Molenaar 2014; Jacobson and Choi 2008; Jobidon et al. 2019; Ke et al. 2015; Lima and Cruz 2019; Ling et al. 2014; Paulin et al. 1997; Zou et al. 2014
	1.2	Regular communication with other stakeholders	Dewulf and Kadefors 2012; Jacobson and Choi 2008; Jobidon et al. 2019; Solheim-Kile and Wald 2019
	1.3	Good faith negotiations	Cheung et al. 2006; Demirel et al. 2019; Jobidon et al. 2019; Parker and Hartley 2003; Speidel 1999
Category 2: Partnering	2.1	Partnering objectives	Bygballe et al. 2010; Hosseini et al. 2016; Jacobson and Choi 2008
	2.2	Partnering workshop	Anvuur and Kumaraswamy 2007; Bayliss et al. 2004; Bygballe et al. 2010; Dewulf and Kadefors 2012; Jacobson and Choi 2008
	2.3	Partnering charter	Anvuur and Kumaraswamy 2007; Bygballe et al. 2010; Cheung et al. 2006; Dewulf and Kadefors 2012; Gransberg and Scheepbouwer 2015; Jacobson and Choi 2008
	2.4	Partnering facilitator	Bygballe et al. 2010; Dewulf and Kadefors 2012; Jacobson and Choi 2008
Category 3: Conflict Resolution Methods	3.1	Informal resolution procedures	Cheung et al. 2006, Jobidon et al. 2019; Ling et al. 2006; Osei-Kyei et al. 2019; Speidel 1999; Warsen et al. 2019; Yates and Epstein 2006; Young et al. 2016
	3.2	Dispute review board	Chapman 2009; Yates and Duran 2006; Yates and Epstein 2006
	3.3	Mediation	Cheung et al. 2006; Kerf et al. 1998; Osei-Kyei et al. 2019; Speidel 1999; Yates and Epstein 2006
	3.4	Arbitration	Henisz et al. 2012; Osei-Kyei et al. 2019; Speidel 1999; Yates and Epstein 2006
Category 4: Monitoring	4.1	Performance appraisal mechanisms	Edkins and Smyth 2006; Ismail et al. 2012; Jobidon et al. 2019; Ling et al. 2006; Lord et al. 2011; Nystén-Haarala et al. 2010; Solheim-Kile and Wald 2019; Van Den Hurk and Verhoest 2016; Warsen et al. 2019
	4.2	Incentives	Bayliss et al. 2004; Cheung et al. 2018; Dewulf and Kadefors 2012; El-adaway et al. 2017; Ismail et al. 2012; Jobidon et al. 2019; Ling et al. 2006; Pasquire et al. 2011; Said et al. 2019; Solheim-Kile and Wald 2019; Suprpto et al. 2016
Category 5: Change Process	5.1	Changes to contract	Cheung 2008; Harper and Molenaar 2014; Verweij et al. 2015
	5.2	Changes to project work	Demirel et al. 2019, 2017; El-adaway et al. 2017; Harper and Molenaar 2014
Category 6: Risk Allocation	6.1	Effective risk allocation	Bayliss et al. 2004; Chan et al. 2016; Dewulf and Kadefors 2012; Harper and Molenaar 2014; Ismail et al. 2012; Jobidon et al. 2019; Ling et al. 2006; Warsen et al. 2019

2.7. Discussion

The relational approaches identified can act as enablers of different governance mechanisms in PPP projects. These governance mechanisms, having regulative, normative, and cognitive institutional supports, support establishing complementarity between contractual and relational governance in PPP projects. This section further describes the relational approaches identified in detail and connects them with prevailing governance mechanisms.

2.7.1. Category 1: Communication / Nature of Negotiations

This category includes approaches that emphasize communication or negotiation between key project stakeholders. The first approach is an explicit mention of regular meetings between the key stakeholders in the contract along with their frequency. Regular communication between the stakeholders develops a sense of shared identity (Dutton et al. 1994), trust (Kumaraswamy et al. 2007) and an environment of fair process (Delhi et al. 2012). The second approach is specifying regular communication with other stakeholders, such as the general public or utility owners. Involvement of all parties during different life cycle phases of a PPP project, where mutual goals are established through engagement of key or all stakeholders, leads to the development of trust and a sense of shared influence/identity (Solheim-Kile and Wald 2019). The third approach focuses on explicit description of the nature of negotiations between the client and SPV in the contract. “Good faith” negotiations can lead to effective dialogue in PPPs (Parker and Hartley 2003). Since, negotiation is a particular form of communication, therefore it has been included in this category. According to Cheung et al. (2006), good faith negotiations include full disclosure of material facts, refraining from abuse of bargaining power, acting diligently and interpreting contract language fairly. Good faith negotiations help in building trust among the negotiating parties, which may lead to improvement in project performance. Moreover, the parties tend to interact in good faith when their future business or social reputation is at stake, an impact of the shadow of the future.

2.7.2. Category 2: Partnering

While partnering is more generally a governance mechanism, its implementation through PPP contracts includes a collection of approaches – utilizing partnering objectives, a partnering workshop, a partnering charter and a partnering facilitator. Some researchers have argued that partnering is an informal tool to create an atmosphere of trust and cooperation among the parties

rather than a formal agreement between the parties (Bresnen and Marshall 2000). Even though partnering approaches may be specified in an agreement, they are non-binding (Barlow 1996) and are only exercised after both parties agree to their practice. The partnering workshop is generally the first step in the process, and it occurs at the outset of the project to align the interests of the parties towards the project's goals (Smith and Thomasson 2018). A partnering charter is a non-binding document (Cheung et al. 2006) that include guidelines regarding future partnering meetings, mutual goals and expectations, and other activities to advance the purpose of the partnering process. Since the partnering charter is more concentrated on the partnering process, it has been included in the partnering category rather than the communication/nature of negotiations category. Literature suggests that partnering approaches lead to a greater development of trust (Bygballe et al. 2010) and shared identity (Jacobson and Choi 2008) between firms as compared to non-partnering arrangements.

2.7.3. Category 3: Conflict Resolution Methods

Several studies have specified different reasons for conflicts in construction and PPP projects such as design errors, ambiguous specifications (Acharya et al. 2006), weak communication between client and contractor (Kumaraswamy 1997, Mitkus and Mitkus 2014), lack of clarity regarding roles and responsibilities and excessive contract variations (Osei-Kyei et al. 2019). Osei-Kyei and Chan (2015) argue that PPP projects are more prone to conflicts due to the presence of different transaction hazards when compared to conventional projects. Different conflict resolution approaches can be employed or specified in a PPP project contract to address conflicts. These approaches are informal resolution procedures or negotiation, mediation, arbitration (Kerf et al. 1998; UNDP 2017) and a dispute review board (Chan and Suen 2005). Ideally, negotiation or informal resolution should be the first step in resolving disputes, which enhances trust and flexibility and should lead to time and cost savings (UNDP 2017). The other three approaches – mediation, arbitration and dispute review board – facilitate trilateral governance in PPP projects. Mediation involves a third party (a neutral) to facilitate discussions between client and contractor to resolve disputes (UNDP 2017). Arbitration and a dispute review board are similar in nature since they involve an arbitrator (Marques 2018) or a review board (Chan and Suen 2005) to resolve disputes respectively. The major difference between the two is that arbitration is binding whereas a dispute review board is not.

2.7.4. Category 4: Monitoring

The presence of performance appraisal mechanisms and incentives or bonus payments in PPP contracts are linked to shared ownership and shadow of the future governance mechanisms. A clearly defined performance appraisal method reduces information asymmetry and makes the assessment process of the developer more transparent. Moreover, a performance appraisal method and incentives or bonus payments in PPP projects create an economic stake for the developer, which can coalesce interests, drive the behavior of the developer and further activate the shared ownership mechanism. The nature of the project can also play a major role in influencing developer behavior as far as incentives are concerned. For example, in case of toll concession projects where the developer is taking the revenue risk, there is an inbuilt incentive for the developer to finish the project ahead of schedule to start collecting revenue ahead of time. This incentive has aligned the interests of the parties by creating an economic stake for the developer in the project and therefore, a sense of shared ownership has been created. Employment of performance appraisal methods also help in the implementation of shadow of the future mechanism, both economically and socially since the future reputation or repeat business of the developer or contractor is dependent on their current performance. One such example of performance monitoring in PPP projects is the assignment of noncompliance points. Performance monitoring approaches decrease information asymmetry and align the interests of the contractor to those of the client (Anvuur and Kumaraswamy 2007). However, stricter provisions with respect to performance monitoring can act as a deterrent towards the development of trust between the parties.

2.7.5. Category 5: Changes Process

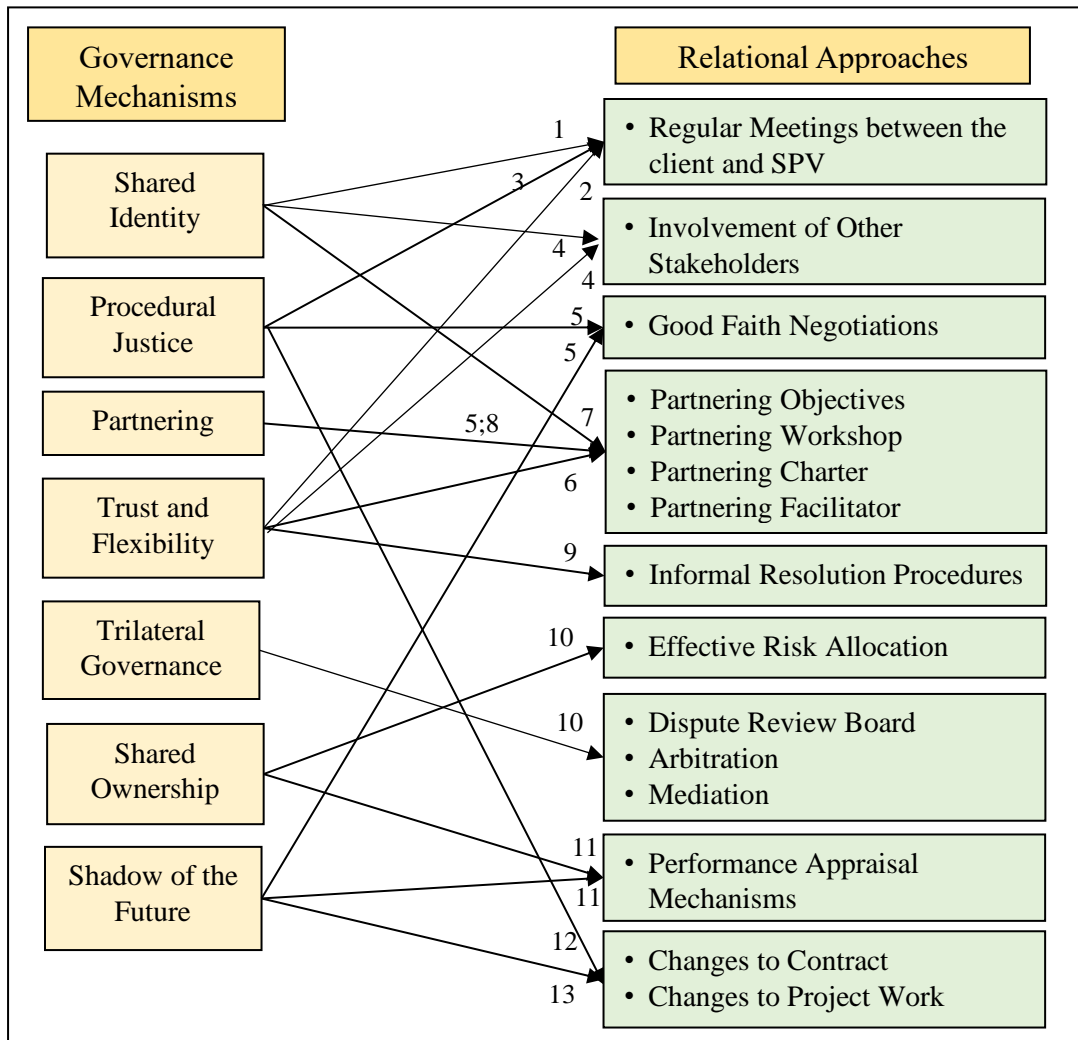
In nearly all projects, procedures are specified to make changes to the project work or contract. These approaches create transparency for changes and reduce information asymmetry (Stam 2016). Changes to the project work such as a change in quantities during construction are generally done through change orders that can be initiated by either client or concessionaire whereas changes to the contract clauses or provisions can be done through mutual negotiations. These approaches enable both economic and social aspects of the shadow of the future governance mechanism. The future reputation of both parties is at stake as far as changes process is concerned since their handling of change orders or changes in contractual provisions can have both economic and social repercussions in the future. A majority of the change orders and contractual changes are negotiated

to determine a final price. The procedure followed to file a change order can be different for a client and a concessionaire which can lead to irregularities in the authority or position in the project. There were instances of such irregularities in the findings in this category which was found consistent for different contracts. However, if this procedure or negotiations are fair for both the parties, this can lead to implementation of procedural justice governance mechanism.

2.7.6. Category 6: Effective Risk Allocation

This category includes only one relational approach – effective risk allocation. A number of papers suggest that a robust and a transparent risk allocation strategy in the contract aids in improving the performance of the project and leads to effective infrastructure delivery (Ismail et al. 2012; Ling et al. 2006; Warsen et al. 2019). Inappropriate risk allocation leads to high transaction costs, increase in number of disputes and can result in reduced participation of private sector in PPP projects (Nguyen et al. 2018). Employment of an effective risk allocation strategy in the contract can lead to the enhancement of the shared ownership governance mechanism. Different risks are generally priced when allotted to the contractor. Therefore, an effective risk allocation strategy supports reasonable pricing, which incentivizes and aligns the interests of the contractor toward the project, thereby triggering shared ownership.

Figure 2.4 displays the linkages found between the relational approaches for inclusion in PPP contracts and corresponding governance mechanisms that can be enabled through these approaches.



1 - Dutton et al. (1994), 2 - Kumaraswamy et al. (2007), 3 - Delhi et al. (2012), 4- Solheim-Kile and Wald (2019), 5 - Cheung et al. (2006), 6 - Bygballe et al. (2010), 7 - Jacobson and Choi (2008), 8 - Smith and Thomasson (2018), 9 – Chan and Suen (2005), 10 – Henisz et al. (2012), 11 - Anvuur and Kumaraswamy (2007), 12 – Cheung (2008), 13 – Demirel et al. (2019)

Figure 2.4: Linkage between relational approaches and governance mechanisms

2.8. Conclusion

The objective of this research was to identify a comprehensive list of approaches that may be specified in contracts and identify how these approaches enable different governance mechanisms which can lead to a complementarity between contractual and relational governance in PPP projects. Prior research by Macneil (1980), van der veen and Korthals Altes (2011) and Stam (2016) provided an initial characterization of such approaches. Additional relevant literature was

identified using a three-step process search and analysis process. Analysis of the selected papers resulted in the identification various relational approaches that were classified into six categories: communication/ nature of negotiations, partnering, conflict resolution methods, monitoring, changes process and risk allocation. The identified approaches were linked with prevailing governance mechanisms such as shared identity and shadow of the future. Hence, the inclusion of such approaches in contracts should enhance the presence of different governance mechanisms in a project. Therefore, these approaches signify the potential of a contract to enable relational governance. Consequently, this research advances the state of knowledge of relational approaches and contracting for PPP projects and indicates pathways toward improving both relational and contractual governance.

3. Chapter 3: Investigation of Relational Approaches in Public-Private Partnership (PPP) Transportation Contracts

3.1. Abstract

Public private partnership (PPP) projects face different transaction hazards such as asset specificity and information asymmetry that pose problems for conventional contractual governance mechanisms. Hence, more emphasis has been placed on complementing contractual mechanisms with relational exchanges to limit the risks posed by these transaction hazards. Relational contracting includes a set of principles that aim at mutual benefits between contracting parties through development of cooperative relationships and mutually accepted social guidelines. Relational approaches that conform with relational contracting principles, such as regular meetings between client and SPV and informal conflict resolution procedures, can be specified in PPP contracts; these aim to develop improved inter-organizational relationships. Consequently, this research investigates these approaches in 22 PPP transportation project contracts in the United States through a two-stage analysis process including manual content analysis and semi-automated natural language processing techniques. Five categories of approaches were investigated—communication / nature of negotiations, partnering, conflict resolution methods, monitoring, and changes process. Examination of these approaches gives an indication of the PPP contracts' ability to promote relational exchanges in PPP projects. Comparative analysis suggests that contracts from Texas, Indiana, Maryland, North Carolina, Colorado and California are relationally stronger overall than contracts from other jurisdictions. The outcomes provide insights into contractual designs that may promote relational practices, which contributes to the increasing focus on contractual and relational governance in PPPs.

3.2. Introduction

Traditionally, contracts are considered sufficient to effectively govern transactions in projects. However, in the presence of different uncertainties and complexities (Zou et al. 2014), as in the case of PPP projects, the effectiveness of contractual mechanisms becomes limited, and their self-sufficiency is questionable. This creates the need to develop relational exchanges in PPP projects to support contractual mechanisms (Guevara et al. 2020). Relational contracting principles have evolved over the years due to these inherent limitations of contractual governance in long term projects. These principles give preference to development of strong relationships between

organizations (Rahman and Kumaraswamy 2008). The foundation of relational contracting is based on the objective of a win-win scenario and achievement of mutual benefits for the parties involved (Ling et al. 2006; Macneil 1978; Yeung et al. 2012). A relational contract can include different relational approaches that promote these principles such as incentives and informal conflict resolution procedures (Cheung et al. 2006).

Contracts play a major role in enhancing the overall performance of a PPP project (Klijn and Koppenjan 2016). PPP contracts are bound to be complex, hence, poorly designed contracts which are open to interpretation can lead to project failures (Iossa et al. 2007). Therefore, effective contractual design is an important element of PPP project governance. Researchers argue that inclusion of informal elements in the contracts during the presence of complexities can build trust between parties and reduce transaction costs (Faems et al. 2008; Van Den Hurk and Verhoest 2016). Recently, Khurana et al. (2021) completed an extensive literature review and identified a comprehensive list of relational approaches which can be present in PPP contracts. These approaches aim at developing cooperative behavior and promoting relational exchanges between stakeholders. Examples of such approaches are regular partnering meetings, informal conflict resolution procedures and incentives. Studies such as Cheung et al. (2006), Harper and Molenaar (2014) and Jobidon et al. (2019) investigated the presence of relational approaches in construction project contracts; however, a corresponding investigation related to PPP contracts is missing in the literature. Different life cycle phases and multiple stakeholders are some of the unique characteristics possessed by PPP projects as compared to construction projects with traditional delivery methods (Nguyen et al. 2018). Moreover, based on their findings, Klijn and Koppenjan (2016) concluded that PPP contract characteristics such as flexibility and the possibility of negotiation, in combination with other factors can have a positive effect on PPP project performance. Presence of such characteristics in contracts can improve cooperative behavior between the parties. Hence, examining the presence of relational approaches in PPP contracts is a necessary first step toward promoting relational exchanges that may lead to improved project governance.

This research takes a necessary next step to examine the level of presence of such relational elements or approaches in PPP contracts. Concessionaire agreements of 22 PPP transportation projects in the United States have been investigated in this study using a two-stage analysis process. This research is a leading indicator of whether these PPP contracts are individually and

collectively designed to facilitate relational mechanisms. Therefore, this research is an advance towards determining effective contractual designs that may promote relational exchanges in PPP projects.

3.3. Background

3.3.1. Relational Contracting Principles and Approaches

Relational contracting is a contracting arrangement based on mutual benefits and win-win scenarios for the contractual parties involved (Macneil 1978). Relational contracts include relational elements which aim at enhancing collaboration between the stakeholders. For example, it includes contractual language that promotes open and effective communication, clarity of division of responsibilities and resolution of conflict through cooperative measures (Ling et al. 2014). Relational contracting underpins different collaborative working arrangements such as partnering, alliancing, joint venturing and other risk sharing mechanisms (Rahman and Kumaraswamy 2002).

Relational contracts have evolved due to the inherent limitations of classical contracts in the presence of complexities and uncertainties. The discrete nature of transactions in classical contracts, which do not include any long-term relational exchanges, limit their efficacy to govern transactions in long term projects such as PPPs. PPP projects have complex characteristics such as long time-spans and multiple stakeholder interactions (Nguyen and Garvin 2019). This exposes PPPs to well-known transaction hazards as summarized by Xiong et al. (2019) – uncertainties (Grimsey and Lewis 2002), asset specificity (Reeves 2008), imperfect information (Parker and Hartley 2003) and incomplete contracts (Hart 1988). Presence of these hazards can give rise to opportunistic behavior and high transaction costs in PPP projects. Therefore, preference has been given to development of strong relationships between the stakeholders in PPP projects to mitigate the risks posed by these hazards (Xiong et al. 2019). Employment of relational contracting principles promotes cooperative behavior and trust between parties and has been associated with improved project governance and performance in PPP projects (Lu et al. 2015). A contract that includes such principles and approaches is called a relational contract.

Macaulay (1963) and Macneil (1980) laid the foundation for research regarding relational perspectives of contractual norms. These norms are - role integrity, reciprocity, flexibility, contractual solidarity, reliance and expectations, restraint of power, and harmonization of conflict.

Recent studies by Van der veen and Korthals Altes (2011) and Stam (2016) have identified guiding principles and relational approaches to enhance relational exchanges in an urban development project contract and a construction project contract respectively. Khurana et al. (2021) identified different relational approaches applicable to PPP contracts as shown in Figure 3.1. Similar approaches were grouped to form six categories – communication/nature of negotiations, partnering, conflict resolution methods, monitoring, changes process and risk allocation.

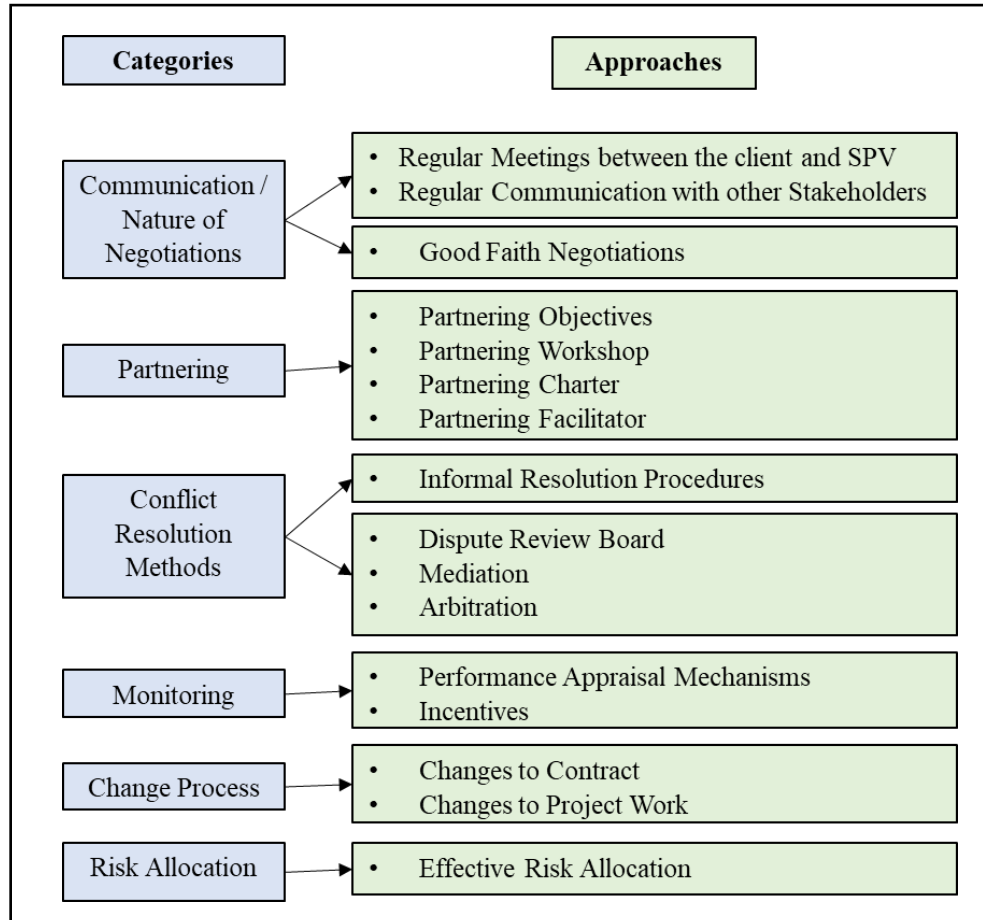


Figure 3.1: Relational approaches related to PPP contracts (adapted from Khurana et al. 2021)

3.3.2. Investigation of Relational Approaches in Project Contracts

Different studies have investigated relational approaches in construction project contracts (Cheung et al. 2006, Harper and Molenaar 2014 and Jobidon et al. 2019). Cheung et al. (2006) developed a relational index using a questionnaire to compare different contract types in design bid build delivery method using eight critical factors - cooperation, organizational culture, risk, trust, good

faith, flexibility, the use of alternative dispute resolution, and contract duration. Harper and Molenaar (2014) investigated the presence of relational contracting norms proposed by Macneil (1980) in construction project contracts to measure the level of integration between teams. Jobidon et al. (2019) also compared relational aspects in the contractual language in Canada for three project delivery methods – design bid build (DBB), design build (DB) and integrated project delivery (IPD) using Macneil’s contractual norms. The studies performed until now have only compared contracts used in DBB, DB and IPD. A similar study for projects employing PPPs is not found in the literature. Moreover, manual content analysis methods have been used; while potentially rigorous, these are more open to subjectivity than automated methods.

Chan et al. (2011) and Antillon et al. (2018) indicate that research on utilization of relational methods and the integration of contractual and relational mechanisms in PPP projects is limited and needs more investigation. More recently, Demirel et al. (2019) examined different contractual and non-contractual strategies exercised in a PPP project to address contract variations and concluded that PPP contracts need to be adaptive and flexible to deal with this issue. Khurana and Garvin (2019) also found that agreements between client and concessionaire have not been explored yet to investigate the presence of relational approaches. Contract documents, change orders, request for information (RFI) and meeting minutes are the most common format of stored data in construction projects (Caldas et al. 2002) or PPP projects (Khurana and Garvin 2019). Therefore, it is necessary to analyze these documents to investigate the extent of inclusion of relational approaches in PPP contracts. Consequently, a clear opportunity exists to examine the level of presence of identified relational approaches in PPP contracts, which is indicative of the capacity of contracts to promote relational exchanges in a PPP project.

3.3.3. Manual and Automated Techniques for Contract Analysis

Previous studies (Cheung et al. 2006; Harper and Molenaar 2014; Nguyen et al. 2018) have investigated construction or PPP project contracts using manual content analysis methods. Content analysis is a manually structured and a replicable technique that examines qualitative data such text to generate common themes using various coding techniques (Krippendorff 1980; Weber 1990). Even though manual content analysis techniques are transparent and provide results with high accuracy, they are generally time consuming and require validation techniques such as inter-rater testing to address subjectivity (Tixier et al. 2016). Consequently, different automated

techniques such as natural language processing (NLP) (Al Qady and Kandil 2010; Zhang and El-Gohary 2015) have been used to examine construction project documents to increase the efficiency and effectiveness of analyzing textual data.

3.3.3.1. Overview of NLP

Natural Language Processing (NLP) is a technique that overlaps artificial intelligence, linguistics and computer science and allows computers to understand and analyze human language (Chowdhury 2003). NLP has its applications in areas such as machine translation, speech recognition and information retrieval (Manning and Schutze 1999). There are two major NLP approaches – a machine learning (ML) approach which uses ML algorithms for extracting information and a rule-based approach which uses manually coded rules (Zhang and El-Gohary 2015). Rule based approaches include greater human effort to develop and code rules but typically provides greater accuracy of information extraction (Lee et al. 2019; Zhang and El-Gohary 2015). NLP is used for two major processes– information retrieval (IR) and information extraction (IE). IR is the process of retrieving useful information from a massive information store (Lee et al. 2019). Some examples of IR systems include web search engines such as Google and Yahoo (Zou et al. 2017). On the other hand, IE is a process of extracting only predefined information from the dataset that conforms to the preset criteria (Lee et al. 2019).

3.3.3.2. NLP Research in Construction Projects

With the advances in NLP application in fields such as computer science, corresponding NLP research in the field of construction has been employed to perform tasks such as document integration and enhancement of inter-organizational systems through different techniques such as document clustering methods and text mining methodologies (Mahfouz 2009). Lee et al. (2019) has summarized the NLP research methods used in the area of construction into two major types: (1) research using NLP as a statistical analysis tool and (2) research using NLP as an application system. Further, NLP as an application system has been classified into three sub-categories: (i) research applying NLP to document classification systems, (ii) research applying NLP to information retrieval systems and (iii) research applying NLP to automatic extraction of text information. The NLP approach used in this research lies in the domain of automatic extraction of information from unstructured/semi structured data (Salama and El-Gohary 2016).

A semi-automated rule-based information extraction method was used in this research, which is more appropriate to investigate PPP project contracts and extract predefined information. This allows for a faster, more objective and an exhaustive extraction of information. To perform efficiently, automated techniques require large samples, usually 75 to 100 (Hopkins and King 2010), that have a sufficient number of data cases (number of contracts in this case) as training points (Tixier et al. 2016). However, in case of small samples, complementing manual analysis with automated techniques can lead to better results and increased efficiency at the same time (De Graaf and van der Vossen 2013). The size of the dataset available in construction projects is generally small, which is not the case in the field of computer science (Zou et al. 2017). Therefore, a semi-automated method has been used in this case. Moreover, the construction or PPP project data is domain specific and requires establishment of context or rules to process it (Tixier et al. 2016; Zou et al. 2017). Consequently, the semi-automated method employed in this study is rule based which includes an automated extraction of relevant information from the contracts and a manual scoring of the contracts afterwards. While this approach involves greater effort for the researchers, it provides high levels of accuracy (Sagae and Lavie 2003).

3.4. Research Objectives and Methodology

The objective of this research is to investigate and compare the level of presence of relational approaches in contracts of PPP transportation projects in the United States. The methodology follows a two-stage process which includes content analysis in the first stage on a sample of five contracts as a pilot effort. In the second stage, a semi-automated natural language processing method is first employed on the five contracts used in stage 1 to ensure that the NLP method can replicate the results obtained through the content analysis method. After ensuring the replicability of the NLP method, it was used to review the remaining contracts. Although the development of NLP method can take considerable time and effort, it likely increases the efficiency of the review process and at the same time can possess an accuracy similar to the manual content analysis method. Natural Language Processing Toolkit (NLTK) in the Python language has been used in the second stage to develop a NLP method using hand-coded rules and different keywords. NLTK is a collection of modules and corpora in Python language that enables researchers to perform research in NLP. NLTK has been in development for more than 17 years and has a wide community of users (Bird et al. 2009; Bommarito II et al. 2018). A semi-automated technique has

been adopted in this research to avoid the limitations posed by a fully manual and a fully automated process. A fully manual process is time consuming and requires inter-rater testing to validate the results, whereas a fully automated model requires a large dataset to perform efficiently. The PPP contract dataset is limited by the number of contemporary PPP projects implemented in the United States and is also domain specific which requires development and regular updating of rules; therefore, a rule based semi-automated approach appeared to be more appropriate.

3.4.1. Data

A total of 30 PPP transportation projects have been identified in the United States over the period of 2004 to 2019 based on Nguyen et al. (2018) and FHWA (2020). Out of these 30 projects, three projects – Chicago Skyway, Indiana Toll Road and Colorado Northwest Parkway were excluded from the analysis because these are asset lease arrangements that do not involve significant design and construction activities. Therefore, an important phase of a PPP project is not covered in these contracts which makes them far less comparable. Moreover, five project contracts were not publicly available, so they were excluded since timely acquisition of these documents was not plausible - Goethals Bridge Replacement, Belle Chasse Bridge and Tunnel Replacement, Gordie Howe International Bridge, I-75 Modernization Project Segment 3, and 395 Express Lanes. This led to a final set of 22 projects for investigation as shown in Table 3.1. Five contracts investigated in stage 1 are marked in the last column of Table 3.1. These five contracts were selected deliberately in stage 1 so that they have differences in jurisdiction, commercial close date, and total project value. The variation in project characteristics will support identifying common relational approaches as well as their level of presence; it will also highlight potential differences.

Table 3.1: List of projects investigated

Project	Jurisdiction	Commercial Close	Value (\$ in millions)	Contracts examined in stage 1
Central 70	Colorado	2017	1271	
Transform 66 - Outside the Beltway	Virginia	2016	3724	x
Purple Line Project	Maryland	2016	2650	
SH 288 Toll Lanes	Texas	2016	425	

Southern Ohio Veterans Memorial Highway (Portsmouth Bypass)	Ohio	2015	819	
Rapid Bridge Replacement	Pennsylvania	2015	1119	
I-77 High Occupancy Toll (HOT)	North Carolina	2014	655	x
I-4 Ultimate Improvements	Florida	2014	2323	x
I-69 Section 5	Indiana	2014	560	
US 36 Managed Lanes—Phase 2	Colorado	2013	175	x
North Tarrant Express (3A and 3B) (NTE 3A-3B)	Texas	2013	1350	
East End Crossing	Indiana	2012	763	
I-95 Express Lanes	Virginia	2011	923	
Presidio Parkway (Phase II)	California	2011	362	
Elizabeth River Tunnels	Virginia	2011	2100	
Eagle Project	Colorado	2010	2043	
I-635 LBJ Managed Lanes	Texas	2009	2600	x
North Tarrant Express (1 and 2A) (NTE 1-2A)	Texas	2009	2000	
Port of Miami Tunnel	Florida	2009	651	
I-595 Express Lanes	Florida	2009	1760	
SH 130: Segments 5 and 6	Texas	2007	1380	
I-495 Capital Beltway Express	Virginia	2007	2068	

The contracts investigated in these 22 projects are signed agreements between the client and the concessionaire, also known as a concessionaire agreement or a developer agreement. These contracts were obtained from publicly available sources and each contract length varies from 800 to 1,000 pages, which includes the main agreement and separate volumes such as technical provisions and different exhibits.

3.4.2. Two Stage Analysis Method

A two-stage analysis method was employed in this study which included a manual content analysis approach on five PPP contracts in stage 1. Stage 2 included a semi-automated NLP method on all 22 contracts using Natural Language Toolkit (NLTK) in Python language. Five categories of

approaches have been investigated in this research – communication/nature of negotiations, partnering, conflict resolution methods, monitoring and changes process.

3.4.2.1. Stage 1: Manual Content Analysis Method

Studies such as Harper and Molenaar (2014), Jobidon et al. (2019), Nguyen et al. (2018) have employed content analysis method to review project contracts. Harper and Molenaar (2014) and Jobidon et al. (2019), first, defined primary nodes (approaches in this case) and then identified a set of child nodes (usually called themes in content analysis method) for each primary node. Second, the frequency of occurrence of child nodes in contracts was recorded to make a comparison. For instance, a primary node identified by Harper and Molenaar (2014) was harmonization of conflict and child nodes used for this norm were – good faith direct discussion, waiver of claims/damages, dispute resolution, mitigation, mediation, arbitration. The frequency of such child nodes was recorded in contracts to measure the level of integration. Nguyen et al. (2018) similarly developed a risk matrix to identify relevant contractual provisions and to assess risk allocation. This study uses a similar content analysis approach where themes are first identified for different approaches and are then scored using a rubric. Therefore, a combination of the inductive and deductive approaches has been used. The content analysis process followed includes six major steps.

Step 1: Information Extraction Guidelines

In the first step, information extraction guidelines were developed for all the approaches; this includes a description of the approaches, instructions regarding their typical location in the contract, a recommended search method, and keywords for finding relevant information. Table 3.2 depicts the information extraction guidelines for the Partnering Workshop approach in the Partnering category.

Table 3.2: Information extraction guidelines for partnering workshop approach

Approach	Description	Location within the contract	Search Method	Related Keywords
Presence of Partnering Workshop	This approach refers to a mention of a partnering workshop at the start of the project in the contract.	<ul style="list-style-type: none"> • There will be a separate partnering section in the contract. • All the information regarding the four approaches will be provided together in the same section where sub sections might or might not be present. 	<ul style="list-style-type: none"> • Partnering should be easily located from TOC, but a keyword search can also be used 	<ul style="list-style-type: none"> • Partnering • Partnering Workshop • Partnering facilitator Partnering objectives.

		<ul style="list-style-type: none"> • Also review other volumes of the contract, such as technical requirements, for a partnering section. 	to ensure a robust search.	
--	--	--	----------------------------	--

Step 2: Information Extraction

Using the information extraction guidelines, a contract was examined for each approach in step 2. The data extracted was kept organized and segregated for different approaches for further analysis.

Step 3: Open Coding

The third step involved an open coding process to code different parts of the text, which lead to identification of themes. This was done by creating small meaning units from the text (Bengtsson 2016). A meaning unit is the smallest unit that contains insights for the investigator; it can be a sentence or a paragraph depending on the relevancy of the information. Each meaning unit extracted from the text was given a code. The code can be either the title or a condensed version of the meaning unit. Codes help in the identification of major themes emerging from the data (Elo and Kyngäs 2008).

Step 4: Identification of Themes

In the fourth step, emerging themes were identified from the codes, which can be used to determine the level of presence of relational approaches in contracts. In other words, themes represent the variables used for this purpose, which also supports comparisons among contracts. For example, in the I-4 project contract, “initial workshop” and “timing of initial workshop” themes were identified from the code “Team building workshop as early as possible after the effective date and before preconstruction conference”.

Table 3.3 illustrates steps 2, 3 and 4 for the partnering workshop approach within the partnering category.

Table 3.3: Coding process followed (steps 2, 3 & 4) for partnering workshop approach

Coding Process	I-66	I-4	I-77	US 36	I-635
Meaning Units/Codes	Not Present	<ul style="list-style-type: none"> • Team building workshop as early as possible after the effective date and before preconstruction conference • Partnering workshops to be held once a year throughout 	<ul style="list-style-type: none"> • Team building workshop within 90 days of the effective date 	<ul style="list-style-type: none"> • The workshop shall be held prior to the commencement of any major work item and preferably before the preconstruction conference 	<ul style="list-style-type: none"> • Team building workshop within 90 days of the effective date

		the duration of construction if parties agree.		• Follow-up workshops may be held periodically throughout the duration of the Contract as agreed by the Contractor and the Engineer at the initial workshop	
Themes	-	<ul style="list-style-type: none"> • Initial workshop • Timing of initial workshop • Later workshops, if needed • Frequency of later workshops 	<ul style="list-style-type: none"> • Initial workshop • Timing of initial workshop 	<ul style="list-style-type: none"> • Initial workshop • Timing of initial workshop • Later workshops, if needed 	<ul style="list-style-type: none"> • Initial workshop • Timing of initial workshop

Steps 5 and 6: Rubric Creation and Scoring

After the identification of themes for all the approaches in each category, a rubric was created in step 5 to score contracts in step 6. An example of the rubric and the scoring done are illustrated in Table 3.4 for the partnering category.

- The rubric includes a collective list of all the themes identified for each approach in the category, as shown in column 2 of Table 3.4.
- A common theme across different contracts is mentioned only once for an approach such as theme - initial workshop.
- Each theme was given pluses based on their presence in each contract. Some themes are binary in nature, so they were given a plus based on their presence or absence such as “initial workshop”; alternatively, some themes are more categorical in nature, so these were given pluses based on their level of presence. For instance, “frequency of later workshops” can be categorized based on typical values in a PPP project contract. For example, typical values for frequency of later workshops are semi-annually, annually, or longer. A contract having semi-annual workshops is given two pluses, a contract having annual workshops is given one plus and a contract with a frequency of workshops more than a year will not be given a plus. This process is shown in Table 3.4.

Table 3.4: Rubric and Scoring example for Partnering category

Approach	Collective List of Themes	Scoring Criteria	I-66	I-4	I-77	US 36	I-635
Partnering Objectives	Four Partnering Objectives	<ul style="list-style-type: none"> ➤ Present – 1 plus ➤ Not Present – No Plus 			+		+
Partnering Workshop	Initial Workshop	<ul style="list-style-type: none"> ➤ Present – 1 plus ➤ Not Present – No Plus 		+	+	+	+
	Timing of Initial Workshop	<ul style="list-style-type: none"> ➤ Within 90 days of effective date – 1 plus 		+	+	+	+

		➤ After 90 days of effective date – No plus					
	Later workshops, if needed	➤ Present – 1 plus ➤ Not Present – No Plus		+		+	
	Frequency of later workshops	➤ Semi Annually – 2 pluses ➤ Annually – 1 plus ➤ More than annually – No plus		+			
Partnering Charter	Presence of partnering charter along with details	➤ Present – 1 plus ➤ Not Present – No Plus			+	+	+
Partnering Facilitator	Presence of partnering facilitator	➤ Present – 1 plus ➤ Not Present – No Plus			+	+	+

After scoring all the themes in each category for all five contracts, an overall relational score was calculated for each contract. This overall relational score for a contract is calculated by dividing the sum of the number of pluses scored by the contract in each category by the sum of maximum number of pluses that a contract can score in each category. For example, the number of pluses scored by a contract in the four categories are 6, 12, 8 and 6, whereas the maximum number of pluses possible respectively in the four categories are 10, 12, 12 and 6; the overall relational score for this contract will be – 80% (32/40).

An alternative approach includes determining the overall relational score by first calculating a percentage score in each category and then taking an average of the percentage scores. Using the example from above, the alternative approach mentioned will have an overall relational score of 81.75% ((60%+100%+67%+100%)/4). This would have resulted in giving an equal weightage to each category. To consider each approach on par with others, providing equal weightage to each category is not followed.

Validity and Reliability of Content Analysis Process

Internal validity of the content analysis process is achieved through inter-rater testing. Two analysts reviewed the five contracts, and the level of agreement between the final scores (pluses) given by two analysts was measured using Cohen’s kappa (Cohen 1960). A similar process was followed in Nguyen et al. (2018).

$$\kappa = \frac{F_o - F_c}{N - F_c}$$

Where:

N – total number of judgments (pluses given in this case) made by each coder

Fo – number of judgments on which the coders agree

Fc – number of judgments for which agreement is expected by chance

According to Landis and Koch (1977), when K approaches or exceeds 0.8, agreement is considered sufficient based on its strength.

The reliability of this method is enhanced by creating a transparent process of getting results from the data (Polit and Beck 2004). The information extraction guidelines and the rubric used in the process are detailed to make the process reliable and an attempt has also been made to explain the analysis process followed in greater detail.

3.4.2.2. Stage 2: Semi-Automated Natural Language Processing Method

The NLP approach developed in this study replicates the content analysis approach explained. The NLP approach was first applied to the five contracts, and the results were compared with those from the manual content analysis method done in Stage 1; the comparison confirms whether the NLP method can replicate the manual approach. The NLP method extracted information regarding different identified themes using a set of predefined keywords. The themes were then scored, and a direct comparison was made with the scores obtained through manual content analysis method. Once confirmed, the NLP approach was then applied to remaining contracts to calculate an overall relational score for each contract. Five major steps were followed in Stage 2 as shown in Figure 3.2.

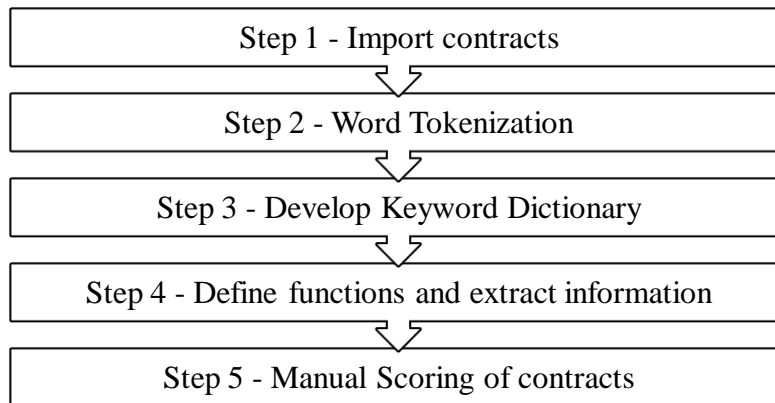


Figure 3.2: Semi-automated NLP methodology followed

Step 1 included importing pdf files of contract documents into Python. The main concessionaire agreement along with technical provisions and other appendices were imported; once complete, this step has extracted raw text from the contract. Tokenization is the process of dividing text into

small units known as tokens. Word tokenization divides raw text into individual words or symbols whereas sentence tokenization divides the text into individual sentences (Bird et al. 2009). **Step 2** included word tokenization of the extracted raw text. The text was divided into individual tokens based on individual words in this case. Figure 3.3 depicts how NLTK was employed to complete the first two steps.

```

Python 3.8.3 Shell*
File Edit Shell Debug Options Window Help
Python 3.8.3 (tags/v3.8.3:6f8c832, May 13 2020, 22:20:19) [MSC v.1925 32 bit (Intel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> import nltk
>>> import PyPDF2
>>> path = input("Enter the path to the contract ")
>>> pdfFileObj = open (path, 'rb')
>>> pdfReader = PyPDF2.PdfFileReader(pdfFileObj)
>>> from nltk.tokenize import word_tokenize
>>> print("Number of pages in the document - ",pdfReader. numPages)
>>> first_page = input("Enter the first page to start reading ")
>>> x=int(first_page)-1
>>> tokens = ['.']
>>> num_pages = pdfReader. numPages
>>> while x<num_pages:
>>>     pageObj = pdfReader.getPage(x)
>>>     tokens = tokens + word_tokenize (pageObj.extractText())
>>>     x = x+1
>>> print("All the text has been extracted")
>>> from nltk.text import Text
>>> textList = Text(tokens)

```

Figure 3.3: Snapshot of Steps 1 and 2 of semi-automated NLP process

Step 3 included the development of a keyword dictionary for the five categories of relational approaches. A keyword dictionary for all the themes related to approaches identified in stage 1 of the methodology, was developed in this step based on the domain knowledge or typical values of these themes in PPP projects. Moreover, the extracted text was scanned for any additional themes; however, no additional themes were identified. An example of keyword dictionary for one of the themes – “Frequency of design meetings” in the approach - “Regular communication between the client and SPV” is shown in Table 3.5. A similar list was prepared for all the themes. The keyword dictionary is an extensive list based on the typical values of the themes in PPP projects, however, it has been updated in case any new keywords are identified.

Table 3.5: Example of keyword dictionary shown for theme – “Frequency of design meetings”

Category	Theme	Keyword Dictionary
----------	-------	--------------------

Regular communication between the client and SPV	Frequency of design meetings	<ul style="list-style-type: none"> • Weekly • Monthly • Quarterly 	<ul style="list-style-type: none"> • Periodic • Regular 	<ul style="list-style-type: none"> • Recurrent • Frequent
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After the development of keyword dictionary, **step 4** defined specific functions or rules for each of the five categories of approaches to search and extract relevant information specific to the themes. The custom functions for each category were defined to enable a comprehensive information extraction from the contracts using the concordance() function in NLTK. The concordance function matches the text under review with the keyword dictionary defined and exports all instances of all keywords for the themes in each approach category. The concordance function extracts a fixed number of tokens before and after a keyword which provides the context of the keywords. The number of tokens that are extracted with respect to a keyword can be changed and was done if the context of a particular keyword was not clear and more text was needed before and after that keyword. The custom functions developed for each approaches category are applicable to all contracts and its appendices. First, an information search was done using the section clause numbers associated with different approaches which can be easily identified from the table of contents. This search technique worked well for approaches such as partnering and conflict resolution methods, which typically have a separate section included in the contracts. This led to an efficient and comprehensive extraction of relevant text for these approaches. Whereas approaches that are present in multiple sections in the contract such as regular communication between the client and SPV, a search of the entire contract and the appendices was done to extract all instances.

Once all the relevant information was extracted for all categories and themes, manual scoring of these themes was done in **step 5** using the rubric developed in stage 1 of the methodology. Any new themes identified through the NLP process were added to the rubric along with the criteria to score these themes. An overall percentage score was calculated for each contract based on the total number of pluses scored in all the categories divided by the total number of pluses possible. Contracts will be further divided into three categories – Relationally “High”, “Medium” and “Low” based on their overall score. Three equal ranges of overall score will be created based on lowest and the highest overall score and will determine the three categories. Contracts with an overall score in the top one-third range will be considered as relationally high. Similarly, contracts

with an overall score in the bottom one-third range will be considered as relationally low and the contracts lying in the middle one-third range will be considered as relationally medium.

Validity of Semi-Automated NLP Method

Internal validity of the semi-automated NLP approach used in this research was achieved through a comparison of the scores calculated through the NLP process with the manual content analysis process. The final scores calculated in both the methods were compared with the initial five contracts to confirm the internal validity of the NLP process followed.

The replicability of this research is enhanced by creating a transparent process of linking the results with the data (Polit and Beck 2004). The information extraction process, rubric, and the analysis process followed have been explained in detail to provide a clear demonstration of the method used. This makes the process replicable (Elo and Kyngäs 2008).

3.5. Results

3.5.1. Stage 1 Scoring Results

The overall results of the content analysis approach used to review five initial contracts in stage 1 of this research have been shown in Table 3.6. Number of pluses scored by the five contracts in each category have been shown along with an overall final score for each contract. The content analysis scores indicate that US-36 and I-77 contracts are the most relational out of the five contracts investigated since these two contracts had a higher presence of relational approaches than the other three contracts.

Table 3.6: Scoring results from stage 1

Categories	Max. No. of Pluses Possible in a Category	Number of Pluses Scored				
		I-66	I-4	I-77	US 36	I-635
Category 1: Communication/ Negotiations	12	8	10	9	9	5
Category 2: Partnering	8	0	4	5	5	5
Category 3: Conflict Resolution Mechanisms	9	6	1	3	7	6

Category 4: Monitoring	5	2	3	3	0	1
Category 5: Change Mechanisms	-	-				
Total Pluses	34	16	18	20	21	17
Overall Score		47%	53%	59%	62%	50%

3.5.1.1. Inter-Rater Testing Results for the Content Analysis Method (Stage 1)

The inter-rater testing involved two research participants. An iterative process was followed to score the contracts using the information extraction guidelines, coding process and the developed rubric. The two analysts worked independently and followed the coding process first to identify different themes present in the five contracts. After identifying the themes, the developed rubric was used by the two analysts independently to score the five contracts. An initial value of Cohen’s kappa, K was observed based on the scoring done by the two analysts, as shown in Table 3.7. While the inter-rater results for four of the five contracts exceeded the recommended threshold of 0.8 (Landis and Koch 1977), a round of discussion among the analysts was done to identify the disparities, enable a shared understanding between the analysts, and consider improvements to the rubric. For example, if a theme was identified by only one of the analysts, then specific sections and text were pointed out from the contracts to facilitate a mutual understanding of that theme and the corresponding score. After a round of discussion, the five contracts were reviewed and scored again and the final K value was observed, as shown in Table 3.7. The final K value for all five contracts was 1, so the analysts ultimately agreed on the scoring across all contracts.

Table 3.7: Inter-rater testing results

Contract	Initial K Value	Final K Value
I-77	0.71	1.0
I-4	0.82	1.0
IH-635	0.95	1.0
I-66	0.88	1.0
US-36	0.95	1.0

3.5.1.2. *Internal Validity and Efficiency Results for the Semi-Automated NLP Method (Stage 2)*

In stage 2, the NLP process described in the methodology section was first employed on the five contracts identified in stage 1. A comparison of the scores obtained through content analysis method and NLP method was done for the initial five contracts to confirm the internal validity of the NLP approach. A 95% match of the scoring done for different themes in all categories using the content analysis and NLP methods was observed. The keyword dictionary was updated based on the 5% non-conformance of the scores to improve the accuracy of the NLP method. This confirms that the NLP approach developed in this study is internally valid and reliable. The NLP method was then used to investigate the remaining contracts. Moreover, there was a considerable increase in the efficiency of the review process through employment of the NLP method. A typical review of a contract using NLP method in stage 2 took 30-45 minutes whereas the manual content analysis method in stage 1 took 6-7 hours per reviewer to review one contract; this excludes the time taken during discussion in the inter-rater testing process which was 1-1.5 hours per contract.

3.5.2. Stage 2 Scoring Results

Each category of relational approaches was scored in the 22 contracts while each contract received an overall score. The results are depicted in Figure 3.4. The results for the “changes process” category were comparable across all contracts, so they are not shown but are included in the discussion. For jurisdictions with multiple project contracts (VA, TX, FL, IN, CO), the contracts are arranged in reverse chronological order. As explained in the research methodology, contracts are further divided into relationally “High”, “Medium” and “Low” categories based on their overall score and the following ranges - High (56% to 68%), Medium (44% to 55%) and Low (32% to 43%). The three ranges were created using the maximum and minimum percentage scores observed (i.e. $(68-32)/3$). These are represented in Figure 3.4 by the thickness of the overall score bar in the last column: thickest being relationally high and thinnest being relationally low. The variation in the thickness of the score bar has only been done in the last column based on the overall score and no such variation has been shown for scores in individual categories.

Jur.	Project	Cat-1: C/N	Cat-2: Partnering	Cat-3: CRM	Cat-4: Monitoring	Overall % Score
VA	I-66	67	0	67	40	47
	I-95	67	0	56	20	41
	ERT	58	0	78	40	47
	I-495	42	0	67	20	35
TX	SH-288	58	75	78	40	65
	NTE 3A-3B	58	75	89	40	68
	I-635	58	75	78	20	62
	NTE 1-2A	58	75	89	20	65
	SH-130	58	75	89	20	65
FL	I-4	83	50	11	60	53
	I-595	75	50	11	60	50
	POM	58	0	22	40	32
IN	I-69	67	75	67	20	62
	EEC	50	75	67	20	56
CO	C-70	83	63	33	40	59
	US-36	75	63	78	0	62
	DE	58	75	56	0	53
MD	PL	67	100	33	60	65
NC	I-77	75	75	44	60	65
PA	RBR	83	13	22	40	44
OH	PB	83	0	22	0	35
CA	PP	58	88	56	40	62
		0 100	0 100	0 100	0 100	0 100

Figure 3.4: Overall Score of 22 contracts and individual score in four categories

Abbreviations: Jur. – Jurisdiction, Cat – Category, ERT – Elizabeth River Tunnels, NTE – North Tarrant Express, POM – Port of Miami, EEC – East End Crossing, DE – Denver Eagle, PL – Purple Line, RBR – Rapid Bridge Replacement, PB – Portsmouth Bypass, PP – Presidio Parkway, C/N – Communication/ Nature of Negotiations, CRM – Conflict Resolution Methods

The score in category 1 - communication/nature of negotiations was the most consistent compared to other categories and in fact, has increased over the years. This suggests that contractual designs have recognized the importance of effective communication or negotiations between stakeholders. For category 2 - partnering, the results were inconsistent across different jurisdictions, where in some cases, not even one partnering element was included. Preference of the jurisdiction appears to be a major factor in the inclusion of partnering in the contract. For category 3 – conflict

resolution methods, contracts from VA, TX and IN scored the highest since they included the maximum number of conflict resolution methods. This gives the maximum number of options to the parties to resolve the disputes. One interesting observation in category 3 is that all the jurisdictions with only one contract scored low, which may correspond with the relative inexperience of particular DOTs in the P3 market. For category 4 – monitoring, the scores either remained the same or have increased over the years in each jurisdiction, which suggests that contractual designs have generally increased their emphasis on performance monitoring provisions; this could enhance client-concessionaire relationships.

Overall, TX, IN, MD, NC, CO and CA have scored higher than other jurisdictions and have followed a similar pattern. These six jurisdictions have a high score in three out of the four categories resulting in a high overall score. The two categories which consistently scored high for all six jurisdictions were communication/nature of negotiations and partnering. TX, IN and CO have executed multiple contracts (ranging from two to five), so these jurisdictions have continued to employ the approaches in these categories over time. On the other hand, other jurisdictions scored high in a maximum of two out of the four categories resulting in a low/medium overall score. These jurisdictions have consistently scored low in the partnering category; hence, the inclusion of partnering played a significant role in the overall score of the contracts.

3.5.2.1. Overall Score and Project Characteristics

Figure 3.5 plots the overall score of 22 contracts with its corresponding project value and year of commercial close. Contracts are represented by dots and labeled with their project name and year of commercial close. Project value in \$ million is depicted on the vertical axis while the overall score is on the horizontal axis; the horizontal axis is further divided into low, medium and high score areas. Contracts within the same jurisdiction are color coded as follows: VA = green, TX = orange, FL = red, IN = blue and CO = purple. FL contract scores increased over time. TX contracts have consistent scores over time as well as the highest scores. Additionally, most high value projects have a medium or high overall score, but some small value projects also plot in the high area. Therefore, it indicates that a high overall score does not necessarily imply a high project value. High project value projects have higher stakes on the line including conflicts of larger magnitude and it can be assumed that preference will be given to development of strong relationships resulting in a relationally high contract. But it appears that other factors such as

DOT's preference and experience with relational approaches play a major role in their contractual inclusion.

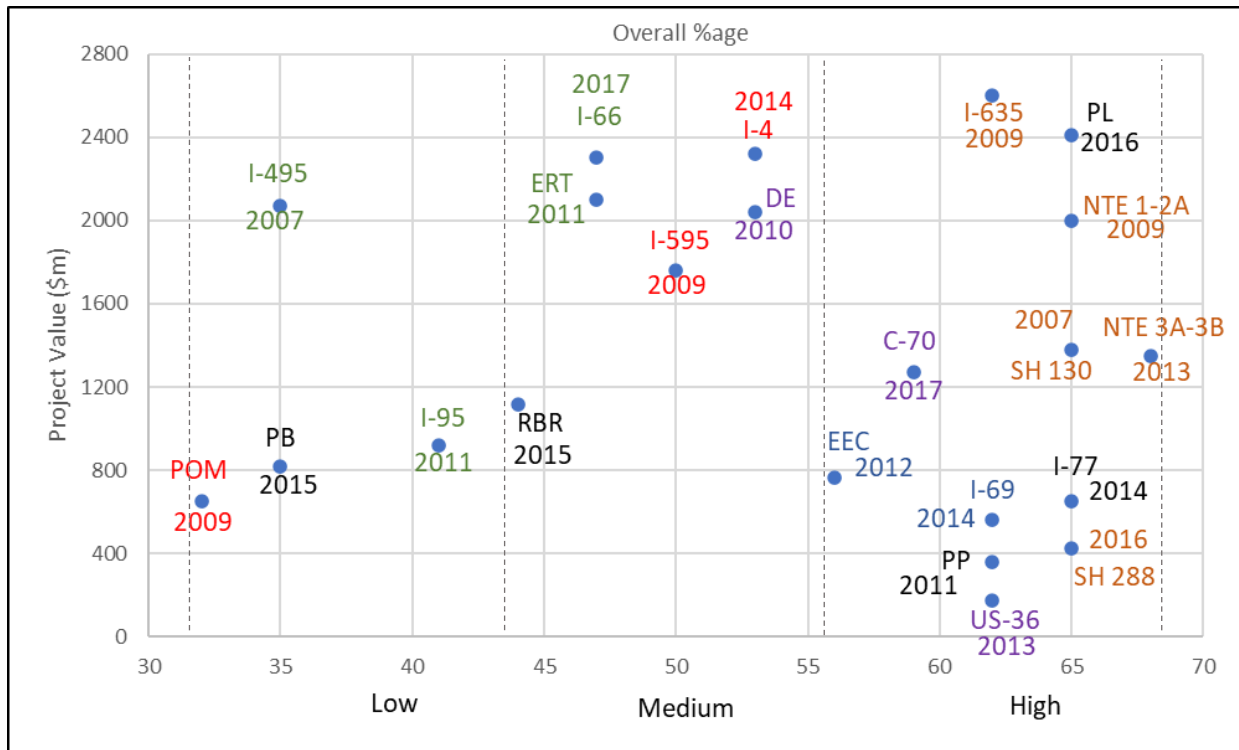


Figure 3.5: Overall percentage score plotted with project characteristics

3.5.2.2. Category 1: Communication/ Nature of Negotiations

The themes identified in category 1 can be divided into three major groups – communication between the client and concessionaire, involvement of other stakeholders and good faith negotiations. The contracts scored comparably across the last two groups. Communication between the client and concessionaire was identified as a major contributor towards the difference in the contracts score in this category. This group includes progress meetings between the client and concessionaire during the design, construction, and operations and maintenance (O&M) phase separately and presence of pre-construction conference. The frequency/presence of these themes has been shown in Table 3.8.

The frequency of meetings in the design, construction and O&M phase has either stayed consistent or increased from the earliest to the most recent contract. A number of jurisdictions have moved from monthly to weekly progress meetings in the design phase resulting in more frequent

communication. The construction phase has a general trend of monthly progress meetings with some jurisdictions having weekly meetings. All the jurisdictions have quarterly meetings in the O&M phase, if they have any, except CO, which has monthly meetings. Therefore, the general increase in the contracts score in this category is attributable to more frequent design meetings. Several jurisdictions have recognized the importance of communication particularly in the design phase where the ability to influence the project is the highest with minimum increment in costs.

Table 3.8: Communication between client and concessionaire in Communications/ Nature of Negotiations

Jurisdiction	Project	Design Meetings	Construction Meetings	O&M Meetings	Pre-Construction Conference
VA	I-66	Weekly	Monthly	-	Present
	I-95	Weekly	Monthly	-	Present
	ERT	Monthly	Monthly	-	Present
	I-495		Monthly	-	
TX	SH-288	Monthly	Monthly	Quarterly	-
	NTE 3A-3B	Monthly	Monthly	Quarterly	-
	I-635	Monthly	Monthly	Quarterly	-
	NTE 1-2A	Monthly	Monthly	Quarterly	-
	SH-130	Monthly	Monthly	Quarterly	-
FL	I-4	Weekly	Weekly	Quarterly	Present
	I-595	Weekly	Monthly	-	Present
	POM	Monthly	Monthly	-	-
IN	I-69	Monthly	Monthly	Quarterly	Present
	EEC	Monthly	Monthly	Quarterly	-
CO	C-70	Weekly	Weekly	Monthly	Present
	US-36	Weekly	Weekly	Monthly	-
	DE	Monthly	-	-	Present
MD	PL	Monthly	Monthly	Quarterly	Present
NC	I-77	Monthly	Weekly	Quarterly	Present
PA	RBR	Weekly	Weekly	Quarterly	Present
OH	PB	Weekly	Weekly	Quarterly	-
CA	PP	-	Monthly	Quarterly	Present

3.5.2.3. Category 2 – Partnering

Five major groups of themes were identified in this category – partnering objectives, initial partnering workshop, later periodic partnering meetings, partnering charter and partnering

facilitator. For illustrative purposes, initial workshop and later periodic meetings are combined and displayed with other partnering themes of objectives, charter, and facilitator in the 4-set Venn diagram in Figure 3.6. Contracts are located in the Venn diagram based on the specification of these themes. Two major groups of contracts are found in Figure 3.6; one group has all of the partnering elements while the second group has none. The contracts within the four category sets of the Venn diagram can have slightly different overall scores since the initial workshop and later meetings categories are a combined set. The Purple Line contract in MD scored the highest in this category. VA projects do not have any partnering element.

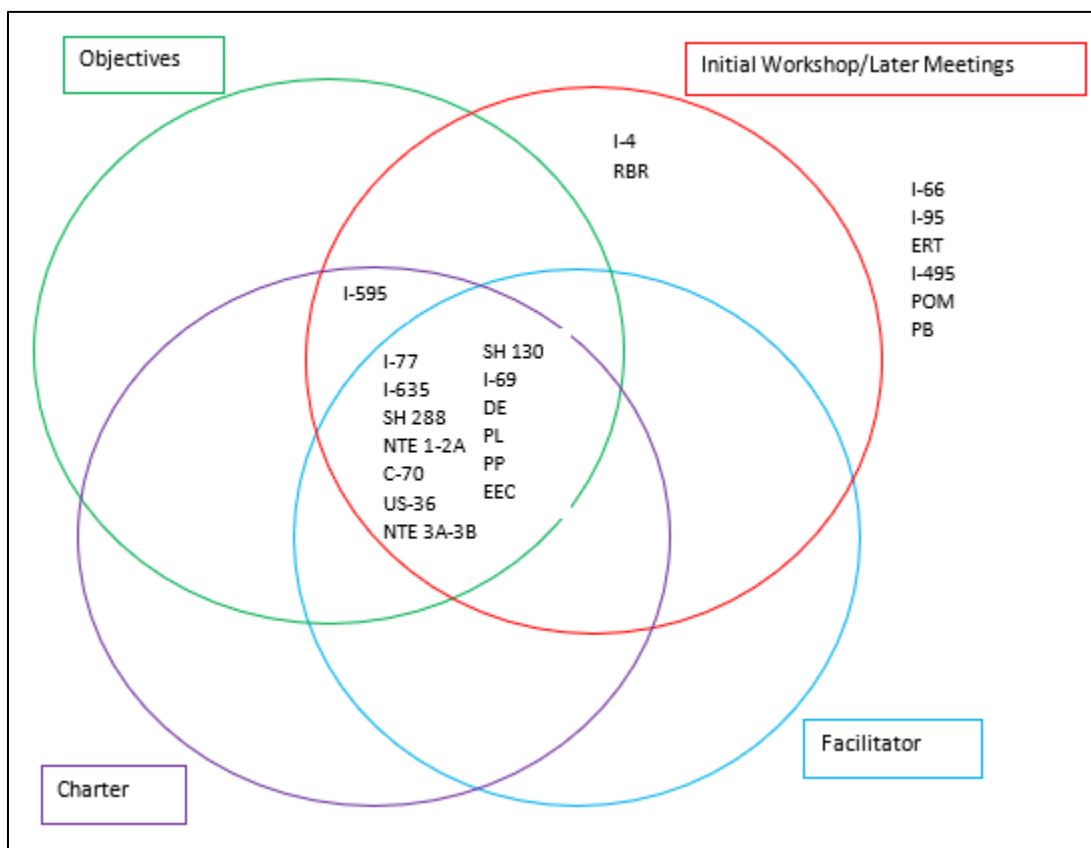


Figure 3.6: Results in category 2 – partnering

3.5.2.4. Category 3 – Conflict Resolution Methods (CRMs)

Four major groups of themes are in this category – informal resolution procedures, mediation, arbitration and dispute review board (DRB). Figure 3.7 depicts the results in a 4-set Venn diagram based on the specification of these themes in contracts. Unlike partnering, contracts in this category are spread across the Venn diagram. All of the TX contracts have all four CRMs except the most

recent SH-288 contract, which excluded arbitration. All of the VA contracts do not include DRB and arbitration except the Elizabeth River Tunnels contract, which included DRB. All jurisdictions included informal resolution procedures except FL where two of its most recent contracts, I-4 and I-595, do not specify informal resolution procedures. A significant number of contracts fall into the overlapping area of informal resolution procedures and DRB only, which indicates that a number of contracts have provided the DRB option if informal resolution procedures do not mitigate conflicts.

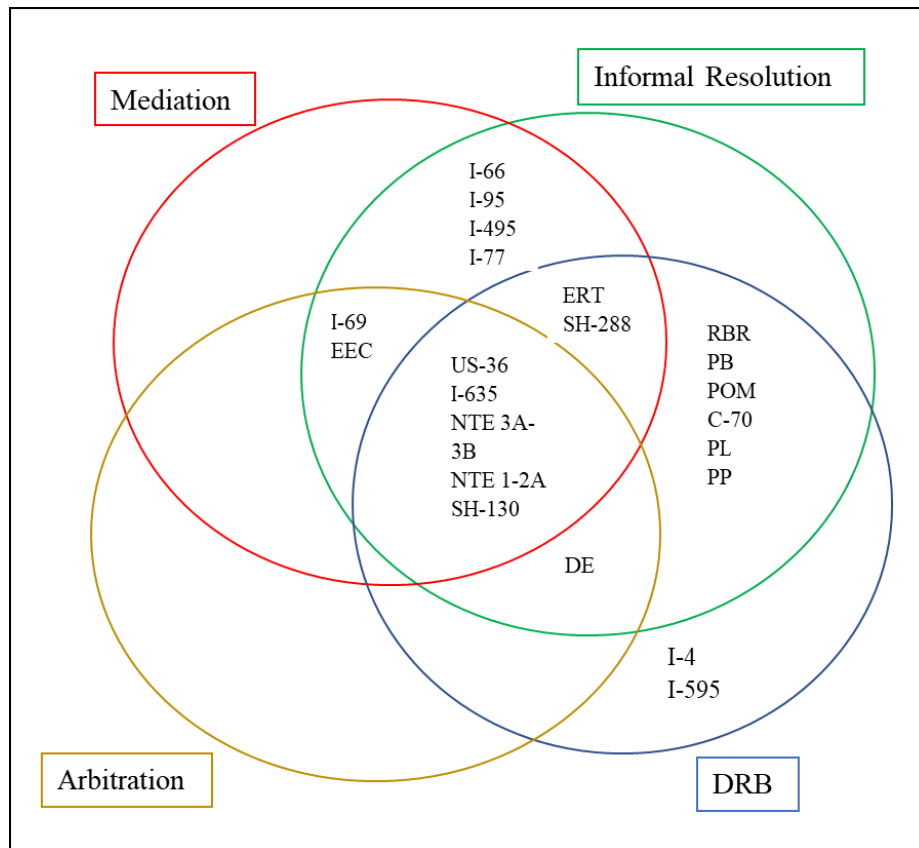


Figure 3.7: Results in category 3 – conflict resolution methods

3.5.2.5. *Category 4 – Monitoring*

Three major themes are included in this category – (1) allowance of time for notification of a noncompliance event, (2) allowance for accumulation of noncompliance points for the developer in a 365-day period before client increases supervision and (3) inclusion of incentives in the contract. The results for this category are shown in Table 3.9.

For the notification allowance, most contracts either require the developer to notify within a 48-hour period or this is not expressly specified; other provisions were specified in all the three FL contracts, NTE 3A-3B contract in TX, and I-66 and ERT contracts in VA. All the jurisdictions with more than one project had a tighter allowance of accumulation of 50 to 150 noncompliance points after which the client increases supervision, whereas the jurisdictions with only project have a more lenient allowance of 150 to 250 points. Incentives were not included in the contracts for most of the jurisdictions except I-595 project in FL, Central 70 project in CO, Purple Line project in MD and I-77 project in NC.

Table 3.9: Contracts Score for category 4 - monitoring

Jurisdiction	Project	Allowance for notification time	Allowance for accumulation of noncompliance points	Presence of Incentives
VA	I-66	3-6 days	50-150 points	-
	I-95	-	50-150 points	-
	ERT	3-6 days	50-150 points	-
	I-495	-	50-150 points	-
TX	SH-288	-	150-250 points	-
	NTE 3A-3B	3-6 days	50-150 points	-
	I-635	-	50-150 points	-
	NTE 1-2A	-	50-150 points	-
	SH-130	-	50-150 points	-
FL	I-4	7-10 days	50-150 points	-
	I-595	7-10 days	-	Present
	POM	7-10 days	-	-
IN	I-69	-	50-150 points	-
	EEC	-	50-150 points	-
CO	C-70	-	50-150 points	Present
	US-36	-	-	-
	DE	-	-	-
MD	PL	-	150-250 points	Present
NC	I-77	-	150-250 points	Present
PA	RBR	-	150-250 points	-
OH	PB	-	-	-
CA	PP	-	150-250 points	-

3.6. Discussion

Five categories of relational approaches – communication/nature of negotiations, partnering, conflict resolution methods, monitoring and changes process were investigated in this research.

The findings regarding the procedure to file a change order for both the client and concessionaire were found consistent across the 22 contracts investigated. Therefore, the changes process category was not included in the analysis. The results varied across the jurisdictions with TX (5 contracts), IN (2 contracts), CO (3 contracts), NC, MD and CA (1 contract each) having a high score, whereas the rest of the jurisdictions lie in the medium or low score range. These six jurisdictions have consistently scored high in both the communication/nature of negotiations and partnering categories. This suggests that contracts with a high overall score have employed approaches that may positively affect communication which in turn may better promote relational exchanges; a similar argument also made by Antillon et al. (2018), Harper et al. (2016) and Meng and Boyd (2017). Further, partnering can help to establish and grow communication channels in PPP projects (Bygballe et al. 2010; Dewulf and Kadefors 2012; Jacobson and Choi 2008). Specifically, a partnering workshop can act as an initial platform to establish these channels (Smith and Thomasson 2018) and regular partnering meetings during different life cycle phases can aid in the development of effective communication between stakeholders (Anvuur and Kumaraswamy 2007).

In particular, TX and VA have the most contracts with five and four respectively and have contrasting final scores. TX contracts scored high and consistently over time whereas VA contracts have been inconsistent with two contracts in the low and two in the medium range. Athias and Saussier (2007) have emphasized that contracts have the tendency to become more flexible and relational in repetitive partnerships between a particular client and concessionaire. This may be enabled by both parties doing repeated business and having good reputation with each other. This is possibly a factor contributing towards a consistent high score of TX contracts where TxDOT (Texas Department of Transportation) has worked with the same concessionaire in four of five projects (FHWA 2020).

The contracts score in category 1 of approaches – communication/nature of negotiations has either stayed consistent or increased over the years for all the jurisdictions. Most of the contracts appeared to have a sound strategy as far as stakeholder interaction is concerned. As depicted in Table 3.8 where projects by jurisdiction are listed in reverse chronological order, the frequency of meetings between client and concessionaire has generally increased over time, whereas the involvement of other stakeholders has remained consistent. More frequent meetings between the client and concessionaire, particularly in the design phase, are major contributors to the increase in category

1 scores for the contracts assessed. This suggests that the contractual designs recognize the importance of effective communication to enhance relational governance and in turn improved project performance – at least in principle. Zou et al. (2014) also suggested that effective communication is one of the top success factors identified by stakeholders to enable relational governance in PPP projects.

The partnering category influenced the final scores of the contracts significantly. Contracts from TX, IN, CO, MD, NC and CA have a high score as compared to other jurisdictions in category 2. These six jurisdictions were identified to have a high score in category 1 as well. The results indicated that there is an all or nothing type of scenario with different partnering elements (objectives, workshop/meetings, charter and facilitator) for most of the contracts, where either all the elements were specified in the contracts or none. Partnering was not present in any of the VA contracts. Virginia Department of Transportation (VDOT) has employed partnering on their more conventional projects. Therefore, field investigation is needed to understand why partnering was not included, such as potential barriers that may have deterred its use. Indeed, Virginia has not included partnering in most of their PPP contracts. Ismail et al. (2012) suggest that a lack of client experience or knowledge is a deterrent towards implementation of relational contracting practices, while Ling et al. (2014) also mention that a deficit of resources, such as personnel resources and budget, needed to implement relational contracting processes can hinder its implementation.

VA, TX and IN contracts have scored the highest in the third category - conflict resolution methods. All the contracts except the two FL contracts have included informal resolution procedures as a conflict resolution method. This indicates that different jurisdictions consider informal resolution procedures as an important first step in resolving disputes and have included them in the contracts to minimize resources spent. Several researchers (Chan and Suen 2005; Osei-Kyei et al. 2019; Yates and Epstein 2006) have argued that negotiation or informal resolution procedures should be employed as the first method to resolve disputes with different advantages such as presence of flexibility and privacy, and speedy resolution with potential savings in resources. The inclusion of different conflict resolution methods has varied with respect to different jurisdictions. TX contracts have included all four methods – informal procedures, mediation, dispute review board and arbitration. On the other hand, FL contracts have only included informal procedures and DRB, whereas contracts from IN and VA (except ERT) have not included DRB. UNDP (2017) has suggested that adoption or inclusion of different conflict

resolution methods in PPPs depends upon the relationship between the two parties and their preference. Osei-Kyei et al. (2019) made a cross-country comparison of adoption of conflict resolution methods in PPPs and found that arbitration in Ghana and negotiations in China are the most preferred methods to resolve disputes. They indicated that arbitration being a rapid, binding, private, and confidential process is more preferred in Ghana, unlike mediation and negotiation where results are non-binding and can result in an escalation of the dispute rather than a resolution. On the other hand, China gives more preference to preserving relationships between the parties and hence utilizes negotiation as the first and major form of conflict resolution. Therefore, cultural and institutional characteristics play a major role in the inclusion of conflict resolution methods in PPP contracts which may explain the variation among US jurisdictions in this study.

Results from category 4 - monitoring demonstrated that incentives are not a common trend as far as the performance appraisal of the developer is concerned. While performance appraisal mechanisms were present, these were generally designed to keep the developer in check. PPP projects can benefit from the application of a compensation model present in other relational contracting approaches such as IPD and alliances where compensation is linked to the project outcomes and not just to the developer's compliance with performance criteria (Sakal 2005). This might lead to the development of "best for project" behavior.

Finally, changes process were consistent among the five contracts and hence there was no scoring done for this category; however, the analysis revealed that the client has greater authority of making the changes to the work or provisions than the concessionaire. The following excerpt from the I-66 contract is illustrative of similar language found in the set of contracts:

The Department (client) may, at any time and from time to time during the Term, authorize and/or require changes in the Work pursuant to a Change Order or in the terms and conditions of the Technical Requirements (including changes in the standards applicable to the Work.

and

Developer (concessionaire) may request department to approve modifications to the Technical Provisions or Technical Documents by submittal of a written Change Request using a form reasonably approved by department.

A change proposal made by the concessionaire can be rejected by the client easily whereas it is not the other way around. This aligns with the findings of Nguyen and Garvin (2019) who concluded that the principal-agent problem still exists in PPP projects, where the concessionaire (agent) is bound by contractual obligations to act in the client's interests (principal). Inclusion of relational approaches in PPP contracts may lead towards a better balance between client and concessionaire rights.

This research does have some limitations. The NLP method developed uses the same five contract cases to train the script i.e., to develop the rules and then to validate the results. The NLP method developed in this study can be further trained in future using other training cases to improve its accuracy. Moreover, the functionality of the tool can be improved in the future regarding comprehensiveness, where the information regarding approaches can be extracted from the whole document even though there is usually a separate section for these approaches in the contract. Another limitation is regarding the scoring done through the rubric developed in this research which excludes the relative importance of different categories of approaches in the scoring process. One way to overcome this in the future is by gathering information from different PPP industry professionals regarding the relative importance of the categories through a survey or a questionnaire. Another avenue to overcome this limitation is to link the level of presence of approaches in contracts to project outcomes such as cost, schedule, and quality. This will provide a better understanding of the relative importance of different approaches.

3.7. Conclusions

Presence of inherent complexity in PPP projects leads to presence of transaction hazards - uncertainties, asset specificity, information asymmetry and incomplete contracts (Xiong et al. 2019). Contractual mechanisms, in the presence of project complexities, should be complemented with employment of relational contracting principles leading to enhancement of relational exchanges and overall project governance (Zheng et al. 2018a). Different relational approaches identified by Khurana et al. (2021) conforming to relational contracting principles have been investigated in contracts of 22 US PPP transportation projects in this research. A two-stage analysis method has been employed involving manual content analysis in the first stage as a pilot effort on five PPP contracts and a semi-automated natural language processing (NLP) technique in the second stage. The NLP method replicates the results from the content analysis approach on five

PPP contracts and is then applied to the remaining 17 contracts to extract relevant information regarding relational approaches. An inter-rater testing was employed in the content analysis method to enhance its validity and a final kappa score of 1 was observed for all the five contracts. The NLP results of the five initial contracts were found to have a 95% match with the content analysis results and hence was internally validated to be used on the remaining contracts.

The results show a comparison of the overall score of the 22 contracts along with the scores in each approaches category. Overall, contracts from TX, IN, NC, MD, CO and CA have scored the highest. These scores represent the capability of the contract to promote relational exchanges in each project. The results indicated that contractual designs have given importance to effective communication between the client and concessionaire over the years. Partnering has contributed significantly to the final score of the contracts and an all-inclusive or exclusive strategy from the DOTs was observed related to different partnering approaches. Alternatively, the conflict resolution methods category illustrated a selective strategy by DOTs where particular methods were included in the contracts. The monitoring category results imply that performance appraisal mechanisms are present to keep the concessionaire in check and incentives are not widely employed in PPPs in the US. The outcomes of this research contribute towards the increasing literature examining contractual and relational governance in PPPs through insights into contractual designs that may promote relational practices. This research provides a better understanding of the level of presence of different relational approaches in PPP contracts. Jurisdictions can examine the approaches employed and adopt them to suit their needs and experience; moreover, they can assess the context and standing of each project when considering which approaches to specify.

Another contribution of the study is the development of a semi-automated method to determine how relational a PPP contract is. This further establishes a basis to investigate the relationship between the extent of presence of relational approaches in a PPP contract and different project outcomes such as cost and schedule. Finally, the characterization of PPP contracts uncovered variance within and across jurisdictions. This provides a benchmark of contemporary practices in the PPP market. Moreover, the variance found suggests that context is important; this generally aligns with the contingency theory (Luthans and Stewart 1977). Future research can uncover the reasons behind the occurrence of this variance.

4. Chapter 4: Relational Approaches in US Public-Private Partnership Projects: Practitioner Observations and Recommendations

4.1. Abstract

Public-Private Partnership (PPP) projects have unique characteristics such as long-life span which leads to presence of complexities and uncertainties. Therefore, a PPP project contract cannot include provisions regarding all future events. Accordingly, it is important to develop strong relationships between the stakeholders to mitigate the risks posed by uncertainties. Relational contracting principles aim at development of cooperative relationships between the stakeholders and mutual benefits for all the parties. Different relational contracting approaches such as informal conflict resolution procedures and regular progress meetings between the client and concessionaire can be present in PPP contracts to enhance relationships. But relational contracting theory states that actual relationships during project implementation can be different from the relationships intended in the contract. Therefore, to understand the working relationship between the stakeholders, the implementation of relational approaches needs to be investigated. The implementation of five categories of relational approaches – communication/nature of negotiations, partnering, conflict resolution methods, monitoring and changes process has been investigated in this research. The methodology adopted includes semi-structured interviews of 13 subject matter experts who have significant PPP project implementation experience. The interview protocol included questions regarding the five categories of approaches and also interviewee's general opinion regarding client concessionaire relationship is sought. Project level and executive level partnering meetings have been found to play a crucial role in not only developing strong communication channels, but they have also been found as a medium to successfully implement other relational approaches. The findings from this study provides insights into the implementation of these approaches which will further help in improving contractual designs. Future research can assess the factors affecting the institutional culture of an organization which has been found to be a major factor towards creation of a collaborative culture in a PPP project.

4.2. Introduction

Different countries around the world have employed public-private partnerships (PPPs) to incorporate private sector involvement in the financing and development of public infrastructure

(Zheng et al. 2008). Some of the benefits that can be achieved through private sector involvement are better cost and risk allocation along with improved quality of the infrastructure (Kwak et al. 2009). Although, PPP projects have seen a tremendous growth internationally, the benefits achieved through these types of projects are still a topic of debate (Roehrich et al. 2014). Recent PPP projects in the United States such as Purple Line in Maryland and I-4 Ultimate in Florida have seen major conflicts, which have led to the replacement of the major contractor in both of these projects. Central-70 project in Colorado has also had its fair share of conflicts between the client and concessionaire, but these were resolved without litigation. There are different complexities involved in PPP projects due to their unique characteristics such as longer life span and involvement of multiple stakeholders (Zou et al. 2014). Due to presence of different complexities and uncertainties, contractual provisions cannot be designed to be all inclusive of future events that can occur during the lifecycle of a PPP project (Sakal 2005). Therefore, emphasis should be given to development of strong relationships between the key stakeholders during PPP project implementation to mitigate the risks present due to these uncertainties.

Relational contracting is a contractual arrangement which aims at creating a collaborative environment in a project (Ling et al. 2006). There is emphasis given to creation of a win-win scenario for both the client and concessionaire. Some examples of the relational contracting principles include flexibility and effective communication (Ling et al. 2014). A contract that includes relational contracting elements is known as a relational contract. Previous studies (Macneil 1980; Stam 2016; Van der veen and Korthals Altes 2011) have investigated different relational approaches that can be present in PPP contracts with the aim to enhance stakeholder relationships such as informal conflict resolution procedures and regular progress meetings between the client and concessionaire. However, relational contracting theory (Macneil 1978) suggests that parties can develop a relationship during implementation which is different than what is intended in the contract. Therefore, examining the implementation of such relational approaches is necessary to align relational contractual designs with prevailing practice.

Different studies related to construction projects have investigated the implementation of different relational approaches in practice. Yet, similar explorations of approaches implemented in PPP projects remain scarce. Therefore, this study aims to uncover which relational approaches are being implemented in PPP projects. This study includes semi-structured interviews of 13 subject matter experts with significant experience in PPP project implementation. The interview questions are

centered around examination of implementation of five categories of relational approaches in PPP projects identified by Khurana et al. (2021) – communication/ nature of negotiations, partnering, conflict resolution methods, monitoring and changes process. Further, participants were queried for more general perspectives of client-concessionaire relationships during PPP project implementation. The findings from this study provide insights into implementation of these approaches which will further contribute towards improved contractual designs.

4.3. Background

4.3.1. Relational Contracting Principles

Public Private Partnership (PPP) projects have inherent complexities and uncertainties involved (Nguyen and Garvin 2019) and it remains difficult to include provisions regarding all possible future events in the contract (Hart 1988). Due to a lot of complications involved in PPP projects, some things are bound to be left out of the contract (Sakal 2005) and these lead to negotiations and in the absence of strong relationships between the key parties, these negotiations can turn into conflicts. Therefore, development of strong relationships becomes crucial to improve PPP project performance (Smyth and Edkins 2007, Zou et al. 2014), aid in value creation (Caldwell et al. 2017; Kivleniece and Quelin 2012), satisfy user interests (Zheng et al. 2018) and enhance life cycle decision making (Antillon et al. 2018). Various studies suggest that enhancement of stakeholder relationships can lead to reduced cost, better quality, on time delivery, client satisfaction and improved safety (Kumaraswamy et al. 2005; Ling et al. 2014; Lu et al. 2015; Meng 2015; Meng and Boyd 2017). Contractual arrangements such as relational contracting aim at relationship development, creation of win win scenarios and enhancement of project performance (Ling et al. 2014).

Relational Contracting includes principles that aim at creating mutual benefits by enabling cooperative relationships between stakeholders (Ling et al. 2006). The term relational contracting can be found in fields such as supply chain management, and different partnership types such as alliancing (Edkins and Smyth 2006). Relational contracting includes development of trust and long-term social exchange between contractual parties in a project. Some examples of relational contracting practices include the presence of flexibility, effective communication through project information sharing, joint problem solving and compromising on unclear issues (Ling et al. 2014). Relational contracts have characteristics such as contractual language supported by informal

communication, mutual planning, shared benefits and penalties, future cooperation, inclusion of other stakeholders and conflict resolution through cooperative measures (Macneil 1978).

Contracts play a major role in enabling effective project governance (Klijn and Koppenjan 2016). A number of studies have identified different relational elements or relational contracting approaches that can be present in PPP contracts (Macneil 1980; Stam 2016; Van der Veen and Korthals Altes 2011). Some of the relational contracting approaches identified are regular progress meetings between the stakeholders, informal conflict resolution methods, communication with other stakeholders and presence of incentives. Khurana et al. (2021) conducted a systematic literature review and identified six categories of relational approaches applicable to PPP projects – communication/nature of negotiations, partnering, conflict resolution methods, monitoring, changes process and risk allocation.

4.3.2. Relational Contracting Theory

Relational contracting theory (Macneil 1978) suggests that, although contracts might specify relational approaches, it is important to investigate their implementation to understand the actual relationship between the stakeholders. Different researchers have investigated construction or PPP project contracts regarding the level of presence of relational approaches which will indicate the ability of contracts to enable relational governance in a project (Cheung et al. 2006; Harper and Molenaar 2014; Jobidon et al. 2019). However, the contents of a contract document might not necessarily indicate how relationships form or function among stakeholders (Macneil 1978). The relationship between the client and contractor is likely to deviate from contractual provisions (Stam 2016; Van der Veen and Korthals Altes 2011). Although, the specification of a relational approach in the contract warrants its implementation, it does not assure its implementation in the field. Therefore, to fully understand the working relationship between different stakeholders, it is important to investigate the actual implementation of relational approaches. There could be a possibility that a relational approach mentioned in the contract is either not followed or adapted differently based on the current working relationship between the stakeholders. For example, a contract may specify regular partnering meetings between the stakeholders, but these may not occur since stakeholders might have preconceived notions about partnering. Based on these arguments, this research aims to investigate the implementation of different relational approaches in practice.

4.3.3. Implementation of Relational Approaches

Different studies related to construction projects have investigated the implementation of relational approaches in practice (Bresnen and Marshall 2000a; Harper et al. 2016; Ling et al. 2014; Ling et al. 2006; Ning and Ling 2015; Stam 2016). Ling et al. (2006) examined implementation of contractual incentives, such as mutually agreed conflict resolution mechanisms and clearly defined risk allocation, in Singapore's construction industry through a survey of representatives from client, contractor and consultant's side. The results from the research indicate that clients and consultants are more in favor of implementation of relational approaches than the contractors and therefore, contractual inclusion of these approaches has been recommended to persuade contractors to employ these in practice. Ling et al. (2014) compared the implementation of relational practices in public projects in Hong Kong and China and also correlated the performance of these projects with the implementation of practices. The findings suggest that although there are considerable number of relational practices being adopted significantly in both Hong Kong and China, however there are some practices which are being adopted to different extents in these two countries. This has been related to the countries' economy with Hong Kong being open market and China being a planned economy. Moreover, the study found that a majority of relational practices are significantly correlated with improved project performance outcomes.

4.3.3.1. Drivers and Barriers to Implementation of Relational Approaches

Numerous studies have investigated different features of relational contracting such as drivers and obstacles to implementing relational contracting practices (Ismail et al. 2012; Ling et al. 2014a), critical success factors for relational contracting (Gunathilake and Jayasena 2008; Meng 2012; Zou et al. 2014) and mechanisms such as trust, flexibility, fair process and shared ownership (Delhi et al. 2012; Henisz et al. 2012; Khurana et al. 2021). Ling et al. (2014) includes a similar classification of relational contracting research done to date. Some of the drivers of relational contracting practices mentioned by Ling et al. (2014a) are better cost, time and quality outcomes, increased client satisfaction and market competitiveness, and the barriers mentioned are lack of experience with relational contracting, cost and time resources required to implement such practices and misalignment among project participants. Some of the barriers to relational contracting mentioned by Ismail et al. (2012) are lack of client knowledge, lack of trust and ineffective communication between contractual parties and unfair risk reward plan. Different success factors or facilitators for

implementation of relational contracting practices include support from senior management, client's knowledge about project processes, alignment of project goals and objectives between the parties, mutually agreed dispute resolution mechanisms, continuous periodic evaluation, effective communication channels, flexible contracts to address uncertainties and clearly defined risk allocation or sharing arrangements (Gunathilake and Jayasena 2008; Kumaraswamy et al. 2005; Meng 2012; Zou et al. 2014). Another set of literature has investigated the role played by relational contracting principles and approaches in implementation of governance mechanisms such as trilateral governance, shared ownership, shadow of the future, procedural justice and trust and flexibility in construction or PPP projects (Delhi et al. 2012; Henisz et al. 2012; Khurana et al. 2021). Presence of relational contracting approaches can enable these governance mechanisms in projects. This can lead to a complementarity between contractual and relational governance in a project further improving overall project governance which has been related to improved project performance in the literature (Lu et al. 2015; Warsen et al. 2019).

4.3.4. Point of Departure

The studies uncovered have been related to implementation of relational approaches in construction projects. A similar study regarding implementation of relational approaches in PPP projects is missing from the literature. Arguably, PPP projects has different characteristics, such as different life cycle phases and stakeholders involved than projects with traditional delivery methods such as Design Bid Build and Design Build which can lead to a distinct implementation of relational approaches. Moreover, unique factors affecting the implementation of relational approaches in PPP projects can be identified. Engebø et al. (2020) carried out a literature search to determine the current state of research for different collaborative contracting arrangements including relational contracting in different project delivery methods including PPPs. The study concluded that the most common study purpose found related to relational contracting is “pros and cons” which focuses on elements such as benefits, drivers, barriers and success factors; papers found related to implementation and experiences of relational contracting were scarce. Consequently, this opens an opportunity to examine the implementation of relational contracting approaches in PPP projects in the US. This research examines the implementation of five categories of relational approaches summarized by Khurana et al. (2021) – communication/ nature of negotiations, partnering, conflict resolution methods, monitoring and changes process in PPP projects in the transportation sector in the United States. This will provide insights into how these

relational approaches enhance relationships between the stakeholders. Moreover, the findings will include strategies to enable their effective contractual inclusion as well as improvement regarding their practicability in the field.

4.4. Research Questions and Methodology

In order to investigate the implementation of relational approaches identified from the literature in PPP projects, the following research questions were posed:

- *Question 1a: How are different relational approaches being implemented in PPP projects?*
- *Question 1b: How can the implementation of these approaches be improved in PPP projects?*
- *Question 2: What factors affect the implementation of relational approaches in PPP projects?*

Table 4.1 includes the relational approaches investigated in this study.

Table 4.1: Relational approaches investigated in this research

Category	Approaches	Description
Communication / Nature of Negotiations	• Regular meetings between client and SPV	Includes regular progress meetings between the client and concessionaire during the design, construction, and O&M phase
	• Involvement of other stakeholders	Includes communication with other stakeholders such as general public and utility owners
	• Good faith negotiations	Includes a mention of negotiations to be done in good faith in the contract
Partnering	• Partnering Objectives	Includes partnering objectives mentioned in the contract
	• Partnering Workshop	Includes partnering workshop at the start of the project
	• Partnering Charter	Includes a partnering charter which contains mutual goals and expectations
	• Partnering Facilitator	Includes a partnering facilitator to guide the partnering process
Conflict Resolution Methods	• Informal Resolution Procedures	Includes informal resolution procedures to resolve conflicts such as negotiations between CEOs or steering committee
	• Mediation	Includes mediation as a conflict resolution method

	<ul style="list-style-type: none"> • Dispute Review Board 	Includes dispute review board as a conflict resolution method
	<ul style="list-style-type: none"> • Arbitration 	Includes arbitration as a conflict resolution method
Monitoring	<ul style="list-style-type: none"> • Performance Appraisal Mechanisms 	Includes procedures used to measure concessionaire performance in the project
	<ul style="list-style-type: none"> • Incentives 	Includes any type of incentives or bonus payments for the concessionaire in the project
Changes process	<ul style="list-style-type: none"> • Changes to contract 	Includes the process followed to make changes to the contract
	<ul style="list-style-type: none"> • Changes to project work 	Includes the process followed to make changes to the project work such as scope changes

The investigation of implementation of relational approaches was done through semi-structured interviews of subject matter experts who have significant experience in the implementation of PPP projects in the transportation sector in the United States. Semi-structured interviews was preferred as the mode of data collection over other modes such as surveys or questionnaires since it allows for a deeper exploration of specific areas as compared to other techniques (Zhang and Wildemuth 2009). An interview protocol was developed which included questions specific to the approaches and general questions regarding the client and concessionaire relationships in PPP project implementation; the questions generally remained consistent across all interviews. The questions specific to approaches examined the implementation of relational approaches and how it can be improved. Some examples of questions specific to approaches are – “How effective is a partnering workshop in your opinion? When should it occur? Who should be the participants?” and “How effective are informal resolution procedures in resolving disputes? Should they be employed first in conflict resolution? Who should be involved from both parties?”. The general questions were intended to get an overall perspective of an individual regarding the client and concessionaire relationship in PPP project implementation over time. These questions were crafted to identify factors that affect stakeholder relationships and implementation of relational approaches in PPP projects. For example, ineffective risk allocation is a factor that can affect implementation of relational approaches. Some examples of general questions asked were – “How do you think the client and concessionaire relationship has changed over the years during PPP project implementation and what factors have caused this change?” and “What are some of the major reasons for conflicts between the client and concessionaire during PPP project implementation?”.

The interviews were conducted after Institutional Review Board’s (IRB) approval under IRB #21-088.

4.4.1. Selection of Interviewees

Research participants were selected using a purposive sampling technique. Purposive sampling, also known as judgment sampling, includes deliberate selection of research participants based on their knowledge and experience (Etikan et al. 2016). An intentional selection of research participants in purposive sampling, which is different from other random sampling techniques, enables a more effective examination of particular areas or phenomena (Serra et al. 2018). Purposive sampling is more effective when used in qualitative research (Patton 1990). Research participants who conform to the preset selection criteria in Table 4.2 were potential interview candidates. An approximate equal distribution of research participants was sought from the public sector (client), private sector (concessionaire) and consultants.

Table 4.2: Preset criteria for the selection of research participants

Preference	Criteria
Required	Minimum 3 years of implementation experience in a PPP project in the US working for either a client or a concessionaire
Required	For a participant from the consultant side, minimum 3 years of consultant experience in the US along with minimum 3 years of implementation experience in a PPP project in the US with either a client or a concessionaire.
Preferred	Implementation experience in multiple PPP projects in the US.
Preferred	PPP project implementation experience in the US representing multiple stakeholders i.e., client, concessionaire, and consultant in different projects.

A minimum of 3 years of PPP project implementation experience working for a client or a concessionaire in the US was required. Whereas, a participant working for a consultant needed a minimum 3 years of consultant experience along with a minimum 3 years of PPP project implementation experience in the US. Some of the preferred criteria were – implementation experience in multiple PPP projects in the US or implementation experience with different stakeholders in different projects. Some of the criteria were made preferred to obtain a significant number of participants.

Based on the selection criteria mentioned, 13 participants were interviewed. Table 4.3 shows the current stakeholder type, total PPP implementation experience in years for each participant, average implementation experience and positions currently or last held for each stakeholder type.

Table 4.3: Distribution of Selected Participants

Current Stakeholder Type	No.	Total PPP Imp. Experience (years)	Avg. Imp. Exp. (years)	Positions currently or last held
Concessionaire	1	13	17.5	Chief Operating Officer, Senior Vice President, Chief Financial Officer, Chief Executive Officer
	2	23		
	3	31		
	4	3		
Consultant	1	20	18.5	Vice President National Practice Consultant, Vice President National Program Delivery, Managing Director, Senior Program Management Consultant, Vice President Transportation
	2	16		
	3	30		
	4	16		
	5	10		
Client	1	7	9	Chief Engineer, Program Manager, Section Branch Manager, Director
	2	10		
	3	9		
	4	10		
	Total - 13	Avg. – 15.2 years		

A nearly equal distribution of participants (4, 5, 4) was achieved with respect to stakeholder type. This provides a balanced perspective across the stakeholder types. Moreover, approximately 77% (10/13) of the participants have more than 10 years of implementation experience; consequently, their knowledge and familiarity with PPP implementation was high.

The interviews were then transcribed, and the data was organized and analyzed using a qualitative analysis software – *QSR NVivo* (Bazeley and Jackson 2013). The interview text was coded in NVivo software; the coding had two major thematic areas: specific approaches used in PPP projects and general information about client concessionaire relationships in PPP project implementation. For coding related to specific approaches, all five categories of approaches had a major code to which all the information was added related to that particular category. Further, child codes were created related to different approaches in these major category codes. For

example, “Partnering” would be a major category code and “Partnering Workshop” and “Partnering Charter” would be the child codes. Further child codes were created if needed such as “Partnering Workshop” would have a child code “Timing of Partnering Workshop”. For coding related to general information regarding client concessionaire relationship, different themes were identified and were coded. These themes are essentially variables that can affect client concessionaire relationship or can be a reason for conflict. A theme that has been mentioned by more than one participant was coded. Some examples of such themes include – “Ineffective risk allocation”, “Scope changes during construction phase” and “Inexperience of client with PPPs”.

4.5. Results

The results cover the interviewee perspectives of the relational approaches identified in Table 1 as well as their perspectives of client and concessionaire relationships in PPP project implementation.

4.5.1. Implementation of Relational Approaches

4.5.1.1. *Communication/ Nature of Negotiations*

Subsequent sections reflect the perspectives of interviewees about regular meetings between client and concessionaire, involvement of other stakeholders and good faith negotiations.

Regular Meetings between the Client and Concessionaire

All the participants except one concessionaire interviewee recommended that contracts should include a frequency of meetings between the client and concessionaire during the design, construction and O&M phases of a project, which is usually mutually decided before contract signing. The frequency specified in the contracts can vary from project to project and is dependent on stakeholders’ preferences, experience with such meetings and importance given to communication. The contractual frequency should be treated as a bare minimum for progress meetings between the client and concessionaire but more importantly, the contracts should include flexibility where the parties can meet more frequently if needed. When asked about the desired frequency of progress meetings, one consultant interviewee’s comment exemplified the general perspective of the interviewees:

I think it's followed initially (contractual frequency). And then the team figures out what pace fits and is necessary. And that can vary over time. So I think it is useful to have that structure in the contract. And it's important for the team to have the flexibility to adjust it

as appropriate as long as it's still effective. You know, not meeting because you're having too many disagreements, that's not an appropriate outcome.

The owner may also use the contractual meeting requirement as a mandate in case the concessionaire is being nonresponsive, since missing the progress meetings during the time of a conflict is not beneficial for the project. Two of four concessionaire interviewees mentioned that these meetings are generally productive unless they become a forum to discuss pending conflicts. One of these concessionaire interviewees stated:

You need to meet from time to time and talk things through. And I think those forums are needed in general. My feeling is that they work. Now, if the intention is to discuss potential disputes in those forums, then no. The intention should be to sit together and see where we are and see the progress that we have. Define an action plan.

Hence, these two concessionaires indicated that the agenda of these progress meetings should be to measure the current progress and discuss future goals; another venue is needed to address conflicts.

Involvement of Other Stakeholders

The general public, government officials and utility owners are a few examples of other stakeholders. All the participants emphasized the need to regularly communicate with other stakeholders to avoid possible conflicts and delays. When asked about the importance of communication with other stakeholders, one consultant participant's comment represented the general perspective of all participants:

It is extremely important to maintain those relationships, whether it's utilities or homeowner's associations or elected officials along the corridor. I would make sure that you have a full team understanding what the issues are with each of those stakeholders, understanding the construction schedule, the potential impacts, and communicating with those individuals. So those other stakeholders don't go away after you sign a contract. They're still there and they still want to be heard and they still want to hear from you. So, I think there needs to be a full plan in place to make sure of that.

The division of responsibilities regarding communication with other stakeholders varies from project to project depending upon different stakeholders' experience. Some projects will include

clients taking on this responsibility and some projects will have clients passing on this responsibility to the concessionaire.

All the participants emphasized that the parties usually have a robust plan and do a good job of communicating with the public. There should be a clear distinction of roles and responsibilities between the client and concessionaire in the contract as well as during implementation. The two parties also need to ensure that the information provided to the public is consistent. Therefore, continuous communication is required between the client and concessionaire in this regard.

More than 50% (7 out of 13) of participants representing all stakeholder types emphasized the significance of utility risks in a PPP project. A delay in utility work can impact a project's schedule significantly. The distribution of participants that have emphasized utility risks is uniform across stakeholder type, experience range and multiple stakeholder experience. A comment of a client interviewee was illustrative of this perspective:

If you're not involving them (utility owners) very early on, your schedule's going to slip. You have to get approvals. You want to have them at the table at the beginning and ask them - can you be there when we are opening up this trench or can you make sure that the design on this water pipe across the highway meets your standards, can you review it on a weekly basis?.

In addition, several interviewees (4 of 13) emphasized regular communication with elected government officials. The communication with elected officials can sustain their support of the project or provide an opportunity for these officials to voice concerns.

Good Faith Negotiations

A general consensus among the interviewees was that “good faith” is an ambiguous term and if included in the contract in a number of places, it does not necessarily influence stakeholders' behavior significantly during implementation. The intent of the term is usually known to the stakeholders, but it is difficult to substantiate good faith and therefore cannot be used to evaluate someone's behavior. Moreover, legal repercussions based on noncompliance with this term is nonexistent since it is open to interpretation. When asked about their thoughts on inclusion of good faith negotiations in the contract, one consultant participant mentioned:

Everybody has their own interests, their own understanding and interpretation of the contract. They read the words on the page. They take a position. That position might be biased by the fact that they're either going to make or lose significant amounts of money depending on the way a particular conflict is resolved. But to say that somebody's using bad faith in that misinterpretation of the contract is generally a little bit too far. I haven't seen personally something being done in bad faith and bad faith would mean a deliberate misinterpretation of the intent and the words of the contract in a way that disadvantages not just the owner or the contractor but disadvantages the project as a whole.

One concessionaire participant mentioned that they use the term “reasonable efforts” to promote cooperative behavior between the stakeholders which would be a better language than good faith.

4.5.1.2. Partnering

This section covers the following approaches - partnering objectives, workshop, charter and facilitator. There can be different levels of a partnering program in a PPP project but usually there are two major levels – management level and project level. A management level partnering platform is very useful according to the interviewees, where current and potential issues can be discussed and resolved quickly since the stakeholders have the authority to make decisions. One consultant participant referred to partnering as a proactive way of establishing communication channels to develop collaborative relationships between the stakeholders and avoid conflicts before they happen.

Based on the participants’ responses, clients have a different opinion than the concessionaires and consultants regarding the implementation and effectiveness of a partnering program. All the interviewees except two client participants, strongly supported the inclusion of partnering in PPP contracts as well its effectiveness during project implementation. According to four concessionaire and four consultant participants (88% of concessionaires and consultants interviewed), the most important factor of an effective partnering program is the commitment and willingness of the stakeholders to sustain the program. Moreover, according to four concessionaire, four consultant and one client participant, the implementation of a partnering process heavily depends on the personalities of the client and the concessionaire, especially the client who might prefer to rely on

the contract solely during conflicts rather than investing in developing relationships through partnering.

When asked about the implementation of partnering, one of the consultant participant's comment was representative of the general perspective of interviewees:

I do (believe in partnering) when both parties are really focused in on partnering. I mean, usually at the beginning, everybody says, hey, that's great, let's do some partnering until the first time an issue comes up. And then they go directly to the contract. I mean, they go to the black and white which I don't mind - adhering to the contract. But if you're doing partnering, there's gotta be some give-and-take in the bargain. And again, I believe partnering is as good as the two parties that get together to work on it. So I do believe in partnering. I believe that it needs to be done on the projects. It just needs to be a mutually acceptable activity that goes beyond I lost \$500 thousand because this material or this thing wasn't done.

One consultant participant was involved with some of the first Private Finance Initiative (PFI) projects in the United Kingdom (UK) and has extensive experience with the partnering program in UK as well as the United States. According to the participant, partnering programs are not well understood in the US as a formal process and its inclusion is a minor part of contracts. Some of the reasons why partnering is not followed in the US is an over reliance on the formal dispute resolution process and lack of awareness regarding the benefits of using a formal partnering program. The participant commented:

I think public owners tend to think, oh, this is just another cost and another overhead. And they probably think to themselves, well, we're going to be meeting the contractor every month at meetings anyway, progress meetings and claims meetings and dispute meetings. Why do we need yet another forum to talk about stuff? So, maybe there's a degree of skepticism that is born out of not having tried it and not necessarily appreciating what the benefits could be for dispute avoidance in the first place.

This perspective was also shared by a concessionaire participant. On the other hand, one client participant was very skeptical of partnering:

We call it (partnering) project first. I think project first is a crack. I think contractors use it to get what they want out of us. I've seen it always works in the contractor's favor and never works in the owner's favor. Project first and partnering is good in theory. In the beginning, it creates an atmosphere of collaboration and camaraderie. But when shovels hit dirt and you start having problems, it all goes out of the window. I'm not a huge believer in project first.

Partnering Workshop, Charter and Objectives

A partnering program, if employed on a project, generally includes a workshop which is held at the start of the project and is really important to set a strong foundation for a partnering program. Nearly 30% (4 out of 13) of the participants representing all types, mentioned that it is important to include executives as well project members from the owner, concessionaire, design-build contractor and subcontractors, if possible, in this workshop. Three of four of these participants in this case have worked for more than one stakeholder, which might explain their preference for including all key stakeholders in the partnering workshop. The workshop helps in getting all the key members familiar with each other, discuss project expectations, identify future challenges, and develop and sign a partnering charter. The charter includes mutually decided goals and expectations from both the parties. Some examples would be being respectful of each other's opinion, carry out work and treat disputes in a professional manner. The partnering objectives are usually included in the contract as well. A key point mentioned by nearly all participants (10 out of 13) is that these common goals and expectations are usually ignored as the project goes further into implementation. Therefore, it is essential to have regular partnering meetings and remind the parties of these common goals, one way is through visual displays such as posters present in the meeting rooms. Moreover, strong executive support is crucial for successful implementation of a partnering program. One such mention from a concessionaire participant is:

It has to be regular [executive partnering meetings]. You have to have buy in from the executive level and then the staff has to see that. The staff has to see that the top guys are bought in. They're telling you all to get along and solve problems.

Regular partnering meetings at the executive level are needed to discuss current major issues and potential issues in the future. The conflicts which have not been resolved at the project level can be resolved quickly at these executive level partnering meetings.

Partnering Facilitator

There can be a facilitator involved in the partnering process who can have different responsibilities. A facilitator can be involved early in the process, can be present during the workshop and help facilitate the process. Whereas a facilitator can also be involved in partnering meetings later to conduct a periodic assessment of implementation of partnering and also help in resolution of conflicts in some cases. A key point mentioned by two consultant and one client participants is that inclusion of a partnering facilitator is only effective if the facilitator has significant knowledge of the PPP industry and is also informed of the project details, current status and issues.

4.5.1.3. Conflict Resolution Methods

The conflict resolution methods include these approaches – informal resolution procedures, mediation, arbitration and dispute review board. All the interviewees have promoted the contractual inclusion and implementation of a clear escalation ladder to facilitate the conflict resolution process.

Informal Conflict Resolution Procedures

All the participants strongly supported the use of informal resolution procedures in resolving disputes. Most of the disputes should be resolved through the informal procedures to maintain trust and collaboration between the parties. The importance and preference given to use of informal procedures varies from project to project and depends upon the working culture of the parties involved and their experience with these types of procedures. Some parties want to resolve the disputes through negotiations and some want to go through formal resolution process. Moreover, there should be a clear escalation process as far as informal resolution procedures are concerned. For example, if the conflict is not resolved at the project level within 2 weeks, it should be escalated to the CEO level. When asked about the importance of informal conflict resolution procedures, one client participant mentioned:

Another problem that can arise is that the lower-level staff don't agree with each other. Sometimes you find the contractor trying to go around that hierarchy and get to someone higher in the owner's team, try to get them to overrule their lower-level staff, or vice versa. And as soon as that starts happening, the parties start losing [trust in] one another. And that can happen much more easily when there's not a clear escalation matrix in place.

Some projects can also have a steering committee consisting of project managers and CEOs who have the ability to quickly resolve a dispute such as one between an inspector and a superintendent. These high-level executives generally have the authority to make the decisions from the monetary perspective and understand the economic repercussions of delays in PPP projects, therefore they have the ability to resolve disputes quickly if warranted. One consultant participant mentioned:

Sometimes, to me, the project level gets too personal, and they just need to step outside. That's what that steering committee is for is to step outside those personal day-to-day activities and just say this is the way we're going to do it. This way we are going to solve.

If these steering committee meetings or CEO meetings are carried out regularly, they take the form of executive level partnering meetings.

Mediation, Arbitration and Dispute Review Board (Third party Methods)

Mediation, arbitration and dispute review boards are conflict resolution methods that may be included in the contract and also implemented in the field. These methods involve a third party into the resolution process. Mediation and dispute review board are generally non-binding but can depend upon the state laws and parties' preference. For example, one client participant had binding mediation include in a P3 contract even though state laws do not mandate it to be binding. Similarly, arbitration is generally binding but can be non-binding in some states. The contractual inclusion and implementation of these methods depends upon the state laws and parties' successful or unsuccessful experience with these methods. Moreover, the parties' reputation is a major factor affecting the inclusion of these methods in the contract since these methods employ a third party into the project. Again, if more than one method is at the disposal of the parties in the project, a clear escalation process is required to avoid misunderstandings and loss of trust between the stakeholders. All the participants recommended to resolve the conflicts through informal procedures rather than employing third party methods which are expensive and time consuming. One consultant participant's comment is reflective of a general perspective of the participants:

There's a cost involved. And what tends to happen is that those third parties that you bring in under dispute resolution need to become familiar with reams of documents, massive amounts of correspondence, and that could be a month of somebody's time just getting up

to speed with the document, the project, the issues and the circumstances before they are really capable of making a proper judgment. And that can be quite an expensive process.

50% (2 out of 4) of the client participants mentioned that a mediation process is as good as the mediator involved. Therefore, a prior unsuccessful experience of a client with mediation due to an ineffective mediator might deter them from using mediation in future projects. Similarly, the effectiveness of the dispute review board is dependent on its board members. A consultant participant also argued that these non-binding methods usually end up suggesting a middle value to the amount claimed by both parties. In case the informal procedures do not work out, apart from the disadvantages mentioned for these third-party methods, these should be included in the contract and implemented to make litigation as the last resort of conflict resolution. The same consultant participant also mentioned:

The dispute resolution board may not have worked out for you. You may not agree with the mediation, but you always have court as the last remedy. And that's what it should be. It should be the last remedy.

Timing is also important with respect to these methods. There should a time limitation associated with each method which should also be included in the contract. This will ensure that the conflict does not linger for a long time which can lead to losses and delays in the project.

4.5.1.4. Monitoring

This category includes two relational approaches – performance appraisal mechanisms and incentives.

Performance Appraisal Mechanisms

The method used to monitor the performance of the concessionaire in a PPP project is through noncompliance points. This procedure is generally used during the operations and maintenance phase and sometimes during the construction phase. A description of the noncompliance events along with the corresponding cure periods and different conditions for monetary deductions is usually included in the technical requirements document of the contract. A consultant participant mentioned that they should be called as liquidated damages and not penalties since the amount of deduction is proportionate to the damage caused. Two concessionaire and two consultant participants (44% of total concessionaires and consultants interviewed) mentioned that these points

should be essentially used as a corrective measure to ensure that such events do not happen in the future rather than finding ways to penalize the concessionaire, which has happened in certain projects. Nearly 61% (8 out of 13) of the participants representing all types mentioned that the key is to define noncompliance events clearly in the contract and provide reasonable cure periods to the concessionaire so that monetary deductions can be avoided. One client and one consultant participant (the latter with client experience as well) mentioned that the cure periods for the concessionaire should be based on the public agency's ability to do the same work. So hypothetically, if it would take the owner's team 2 days to fix a pothole, then they would keep that as a cure period for the concessionaire which ensures that these periods are realistic. Also, safety is another important factor to be considered while setting up cure periods. Events that correspond to a safety situation on the road can have stricter cure periods as compared to events which are not creating any safety risks. The same consultant participant mentioned:

You have to be reasonable in a lot of the ways. There's a certain number of days as a cure period associated with it. If it has to do with something that is a nuisance or a safety issue, then you need to be very strict about it. If it's a pothole that isn't really doing anything, but it needs to be solved in seven days then let it have seven days. But if there's an end treatment to a guard rail that's sticking out, they should be out there the next day creating a safe situation. So, when we put our cure periods together, we try to think of how quickly we would do it if we had to do it as an owner.

Along with setting up clear description of events and realistic respond periods (cure periods) in the contracts, effective communication between the client and concessionaire is significant for implementation of this mechanism. One concessionaire participant mentioned that they were accumulating a large number of points at the start of a project even though they thought they were performing well. Later, these issues were resolved through proper communication where recurring events were identified. Further, modifications were made to the contract regarding the requirements and cure periods for these events. Therefore, effective communication along with presence of flexibility regarding contractual changes is essential for successful implementation of noncompliance points. The participant stated:

We ended up writing an amendment to the project agreement that increased the threshold for the points as well as the closure deductions and actually removed a default clause with

regards to the closure deductions. Ironically, at the same time, we also revamped [the relevant schedule] and how that was implemented by the client's quality group to where it became more collaborative, and communication improved. We also got to the point where there were almost no points being assessed anymore because everything started to come together and communication worked, people kind of got used to what was required and expected and stepped up their game.

Incentives

All the participants, including client, concessionaires and consultants agreed that incentives are not a common element of a PPP project essentially because of the nature of their projects. Since PPP projects, both availability payment based and revenue risk based, include private financing and therefore, there is an inbuilt incentive for the concessionaire to finish the project early and get availability payments early or start collecting revenue early to pay back the financing. When asked about the presence of incentives in P3 projects and their importance, one client participant's comment represented a general perspective of the participants:

So, we did not have it (incentives) in our P3s. Primarily, because their (concessionaire) ultimate motive is to get the facility opening and collect revenue. And there's no incentive that we could generate or offer that would supersede or be more important to them than getting that facility open. So no, we didn't have incentives like that.

Even though a general question was asked regarding incentives in PPP projects, the participants focused on their presence in the design and construction phase. Interestingly, no participants mentioned incentives in the operations and maintenance (O&M) phase. The O&M phase is the longest phase in a PPP project's contract, and incentives can play a major role in motivating the behavior of stakeholders during this phase (Suprpto et al. 2016). Incorporating incentives in the O&M phase in PPP projects remains an unexplored area in the literature. Lima and Cruz (2019) mention that incentives and penalties need to be incorporated in a performance measurement system in a PPP project during the O&M phase but did not include any particular approach to achieve this.

4.5.1.5. *Changes Process*

This category includes approaches that relate to the changes in the project work and changes to the contractual provisions. With respect to change orders, there are usually relief events and compensation events mentioned in the contract for the concessionaire. There were mixed responses with respect to the change orders during the implementation. Participants from the concessionaire side mentioned that most of the change orders filed by them do not get approved from the client. Moreover, these practitioners mentioned that it is easier for the client to do change orders which are usually related to scope changes. One concessionaire participant mentioned:

So, we had 95 change orders on this project, and we haven't hit a 100 yet. I would say the majority of those are client initiated, changes to the design, how they wanted something to look. Well, it's much easier for the client to initiate a change order. Unfortunately, most of the change orders that we have initiated were deemed not valid by the client and ended up going into claims. And that's where our settlements come in. There's only a handful and I mean, four or five change orders that we've initiated with dollars associated with them that have gone through the process. But it's usually mutually agreed on.

On the other hand, client interviewees mentioned that some concessionaires have the propensity to submit a number of change orders. Moreover, one consultant participant who has previously worked for a client, mentioned that concessionaires do not do a good job of explaining whether the event occurred is a relief event or compensation event. Although, one point where all the practitioners agreed is that there needs to be a better risk allocation strategy between the client and concessionaire before signing the contract. An effective risk allocation strategy with respect to different events which may or may not be under developer's control, can lead to reduced number of change orders and a balance can be sought. One consultant participant mentioned:

I will go back to the balance that is sought beforehand. Even if it's something not directly in the contractor's control, we want them to be prepared for it. We want them to try and manage it first. So, some sort of risk share is often better than just offer a full relief and full compensation event.

4.5.2. Client Concessionaire Relationships during PPP Project Implementation

The interviewees also provided their perspective of the evolution of client concessionaire relationships in PPP projects as well as factors that affect this relationship. These set of questions were asked to have a better understanding of factors that affect implementation of relational approaches and development of strong relationships between the stakeholders. Nearly 77% (10 out of 13) of the participants mentioned that changes in risk profile have occurred over the years in PPP projects.

Two prominent set of opinions were found about client concessionaire relationships where one set of interviewees – two client and two concessionaire participants – described significant change over time whereas the other set of interviewees – one client and two consultants – indicated the relationship was more contingent on each project. The first set of interviewees, who are concessionaires and clients and have only worked for one stakeholder type, mentioned that the client concessionaire relationship has changed significantly over the years with the inception of more complex projects, involvement of consultants, contracts becoming more complex, and preference being given to contractual language. The second set of interviewees which includes two consultants and one client mentioned that the client concessionaire relationship has not become adversarial necessarily over the years and depends upon the personalities of the parties involved. There was another group of interviewees which included three consultants, only commented on the change in risk profile over the years. The remaining two concessionaire and one client participants did not comment on the change in client concessionaire relationship. They mentioned that they do not have enough experience to comment in this regard.

4.5.2.1. Evolving Relationships

This set of practitioners - two clients and two concessionaires (30% - 4 out of 13) – explained that a significant change in the client concessionaire relationships have occurred over time and have become more complex. They mentioned that relationships between the two parties were more linear in some of the earlier PPP projects since both were new to this delivery model and moreover, clients mostly worked with contractors with whom they had existing relationships. With the advent of more complex projects and new competitors in the market with more willingness to take on different risks lead to a change in the relationship paradigm. This led to the emergence of different consultants since owners now needed help with the technical, legal and financial aspects of the

project. The parties then started giving more preference to the contractual language rather than using the existing relationship to resolve issues and conflicts. Moreover, the contractual language has become more complex and is open to misinterpretation.

Now, for a public client who is new to the PPP industry and the delivery method along with a lack of experienced staff usually tends to rely on consultants to manage negotiations. Ineffective risk allocation over the years has been regarded as one of the major factors that has led to a change in the relationship dynamics. A number of U.S. based contractors have decided to stop pursuing PPP projects in future due to unfair risk allocation. So, according to the first set of practitioners, client inexperience, unfair risk profiles, complex contractual language and reliance on consultants has led to complex relationships over time.

One concessionaire practitioner mentioned:

When P3s first evolved, the relationships were fairly open. It was a single-point concessionaire. A lot of those were based on existing relationship you had with agencies and so forth. What came after that was the advent of particular law firms who started to get involved with DOTs on the complexity of these contracts and the sharing of risk, trying to push more and more risk to the concessionaire who in turn will push it down the design builder. And probably some of the risks that got pushed down should have stayed with an owner. And it's led to a lot more complex contract.

Another concessionaire practitioner mentioned:

I would say, initially, the relations were more binary relations. There was not as much competition as it is today. Budgets were not as tight as they are now. With time, both parties have learned a lot. And I would say 3-4 years ago, we came to a point where everybody was very much aware of the risks. They were aware of what the problems were and how to manage the contract to protect your own interest. And this is my opinion, both parties, became very contractual. And started to use the contract in the relation which can be good but also can be problematic. The market, the industry and the client realized that the [risk] model needs some kind of evolution to a point where the risk allocation makes more sense and that's not easy.

4.5.2.2. *Contingent relationships*

The second set of practitioners - one client and two consultants (23% - 3 out of 13) mentioned that, over the years, the relationships between the client and concessionaire have not become necessarily adversarial. The relationships vary from project to project and depend upon the parties involved whether they give preference to building a collaborative culture or not. Over the years, the PPP market has matured and both clients and concessionaires have become more aware of the contractual language and its interpretation and have also learned from previous projects. One point where the two set of practitioners agree is the change in the risk profile over the years where more and more risks are being transferred to the concessionaire which in turn gets transferred to the design build contractor.

One consultant practitioner mentioned:

I think client concessionaire relationships are governed largely by the individuals and by the contract. Whether those have really changed much due to just the passing of time, I'm not sure. I do think that there's a greater awareness now of the way those contracts should be interpreted to how they should be managed. I do think there's a greater awareness on both the concessionaire's part and the owner's part, of being able to draw on lessons learned and understand what's been done previously so they don't necessarily fall into the same problems and traps that were there in some of the earlier projects. But I'm not sure that I could put to a particular change in the relationship between the owner and the concessionaire over time. I think it's very, very much dependent on project, contract and people.

Another consultant practitioner mentioned:

There's a lot of concern in the market about the balance in the risk transfer terms within a contract. And so that possibly could change. I don't think it's [client concessionaire relationship] necessarily become more adversarial. I think each developer and each owner has its own personality. And sometimes they can be adversarial, sometimes they can be collaborative. And I think it depends on the culture that both parties setup. And despite the recent challenges that some really large projects have had, I'm not sure that has changed the interaction between owners and developers in any significant way. You know, you have

a contract which forms the basis of the agreement and the parties either want to honor the contract or choose not to. So, I don't think that dynamic has changed in particular.

4.6. Discussion

The interview findings from this study indicate the overarching need for a proactive management of relationships which is essential for effective implementation of relational approaches and improved project governance. This can lead to potential savings in time and money leading to improved project performance. For instance, a majority of interviewees indicated that involvement of third-party stakeholders is essential to avoid miscommunication and delays. Further, several participants also emphasized the importance of regular project level and executive level partnering to effectively manage relationships and resolve conflicts quickly. This is consistent with the arguments made by Dobrowolski et al. (2015) and Smyth and Edkins (2007) regarding the need to proactively manage relationships including changes in organizational culture to promote relational practices within the firm and at the client contractor interface. A proactive relationship management approach aims at a continuous assessment of the current level of relationships and identifies the strengths and weaknesses of the relationships present, which in turn leads to effective implementation (Meng 2012). Moreover, the establishment and development of communication and trust, as emphasized by a number of interviewees, is crucial for such proactive management of strong relationships. According to several participants, these communication channels can be established through a partnering workshop and can be further developed through regular progress meetings and partnering meetings. Development of effective communication channels between PPP parties is regarded as a major factor for proactive management of relationships by Jefferies et al. (2006) and Zou et al. (2014). PPP projects have a longer life span including multiple life cycle phases compared to projects using traditional delivery methods such as design-bid-build (Nguyen et al. 2018). This makes it more essential to sustain strong relationships between the stakeholders in PPP projects and develop robust communication channels.

The interviewees stressed the importance of regular progress meetings for project operations as well as sustaining partnering practices. Further, executive level partnering meetings were viewed as essential to maintaining and enhancing counterparty relations. The key point mentioned by several interviewees regarding progress meetings is that the contracts should be flexible as far as the frequency of the meetings is concerned, and they should not be used as a forum to resolve

conflicts. Anvuur and Kumaraswamy (2007) made a similar assertion that regular project level and executive level partnering meetings not only develop strong communication but can also act as a medium of effective implementation of other relational approaches. Moreover, top management support is crucial for effective implementation of the partnering process and to keep the project level members committed to the process (Bayliss et al. 2004).

A majority of the interviewees also emphasized the need to start the project on the right foot to build a strong foundation for relationships. In this regard, a partnering workshop can provide the platform for establishing a collaborative relationship culture. Smith and Thomasson (2018) argued that such workshops foster development of mutual goals and expectations, which leads to alignment of interests. They also become a forum to address potential major issues in the project and to formulate future communication channels. Additionally, a partnering charter can document mutual goals and expectations, which can be used in the future as a reminder for the parties to the commitment made earlier (Cheung et al. 2006).

A number of interviewees indicated that project level partnering can be used as the first step to resolve conflicts through negotiations. Moreover, the conflicts should be escalated to executive level partnering meetings as soon as possible if project level resolution fails. Most, if not all, conflicts should be resolved through informal procedures, which keep trust intact and saves time and money for counterparties (UNDP 2017). For the non-compliance points procedure in the monitoring category, interviewees suggested that executive level partnering meetings can be used to identify areas where the concessionaire is incurring noncompliance points regularly and a common ground can be attained through effective communication; this aligns with the findings of Anvuur and Kumaraswamy (2007). Further, the importance of flexibility with contractual provisions was indicated by several interviewees to allow for change in the requirements for such recurring noncompliance events in the contract. Regarding changes, interviewees mentioned that the project level and executive level partnering meetings can be used as a two-step platform to discuss pending change orders which can prevent them from becoming claims.

Overall, the research findings provide the basis for a framework which can be used for proactive management of relationships in PPP projects as depicted in Figure 4.1. The framework demonstrates that partnering workshop can act as the first step in a proactive management of stakeholder relationships by forming the communication channels and setting up the goals and

expectations for the project. Moreover, regular progress meeting and regular project level and executive level partnering meetings can further develop these communication channels and effectively manage relationships throughout the project lifecycle. Once these strong communication channels have been established, they can further lead to effective implementation of other relational approaches - non-compliance points, conflict resolution through informal procedures and changes process.

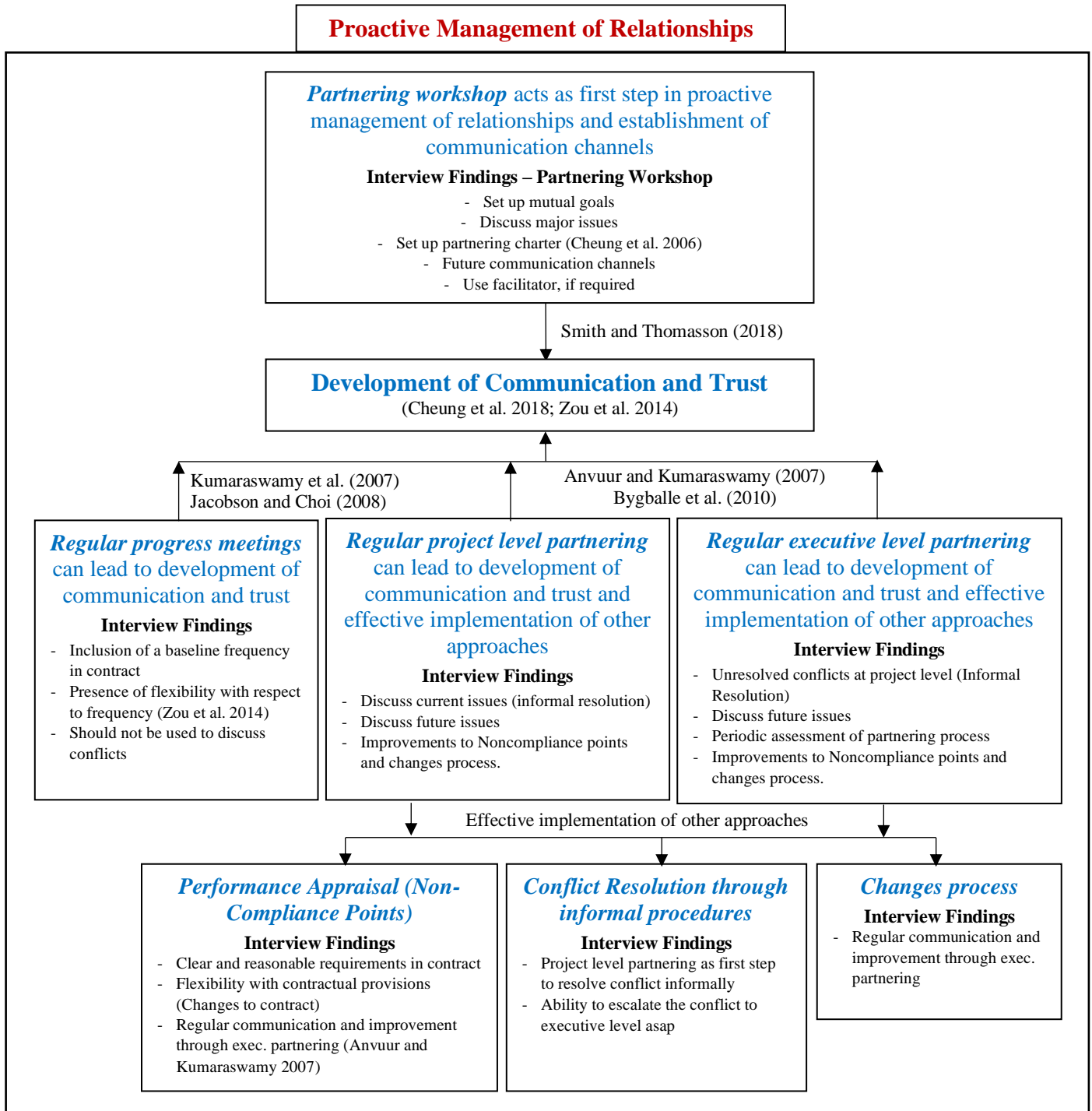


Figure 4.1: Recommended framework for proactive management of relationships

The study possesses some limitations. This research interviewed subject matter experts (SMEs) and general questions regarding the implementation and effectiveness of relational approaches were asked. If a similar approach is used in the future, first, more representatives from client,

concessionaire and consultant side can be included in the study to reinforce the findings which will ultimately increase the reliability of the study. Moreover, other factors that affect implementation of relational approaches can be identified in future. Second, the average implementation experience of SMEs from the client side is 9 years and therefore, more experienced practitioners specifically from the client side can be included in the study to get a better opinion of public sector representatives. This will enhance the reliability of responses from client representatives who have more experience with the implementation of relational approaches in PPP projects.

4.7. Conclusions

This research aimed at investigation of implementation of relational approaches in PPP projects. Semi-structured interviews with 13 subject matter experts were carried out which included questions regarding the implementation of approaches as well as their general opinion regarding client concessionaire relationship in PPP projects. The findings suggest that regular progress meetings, regular project level and executive level partnering meetings are important to develop strong communication channels and trust between the stakeholders. Also, regular partnering meetings at both levels can act as a platform to find areas of improvement in the implementation of other approaches such as non-compliance points, conflict resolution through informal procedures and changes process. This structure can enable a proactive management of relationships in PPP projects rather than a reactive one. This research provides insights into effectiveness of relational approaches during PPP project implementation which can further contribute towards improved contractual designs. Future research in this area can dig deeper into the factors that affect the institutional environment and preference of an organization towards building a collaborative environment in a project. Also, there exists a gap between the investigation of optimization of risk allocation in a PPP project in literature and the risk profiles followed during implementation, which needs further investigation.

5. Chapter 5: Summary, Contributions and Future Research

5.1. Summary of Findings

This research included three major studies. These three studies are designed to be in a linear pattern where findings from study 1 contributes towards development of study 2 and study 3. Moreover, findings from study 2 have been utilized to frame study 3.

Study 1 aimed at identification of a comprehensive list of relational approaches from the literature. Although, several studies identified relational approaches applicable to construction projects with traditional delivery methods, a study related to the synthesis of relational approaches in PPP projects was needed. A robust literature review process was followed in this study which resulted in the identification of various approaches further grouped into six categories – communication / nature of negotiations, partnering, conflict resolution mechanisms, monitoring, changes process and risk allocation. The connections between the identified relational approaches and the prevailing governance mechanisms were also discussed. These relational approaches, when present in PPP contracts, have the ability to promote relational exchanges between stakeholders.

Study 2 investigated contracts from PPP transportation projects in the United States using the list of relational approaches identified in Study 1. Contracts from 22 PPP transportation projects spanning across 10 jurisdictions were examined in this study regarding the level of presence of relational approaches. For the *category - communication / nature of negotiations*, the scores were observed to be the most consistent as compared to other categories; an increase in the scores was observed over the years for jurisdictions with more than one project. An improved communication between the client and concessionaire has been a major factor for this increase, particularly during the design phase. Therefore, it implies that clients and developers already understand the importance of effective communication and the contractual designs regarding this category have improved. For the *category – partnering*, it has been more of an all or nothing scenario where clients and concessionaires have either included all the elements of a partnering process in the contract or none. Contracts from TX, CO, IN, MD, NC and CA have a high score in this category, whereas VA projects do not include partnering. This behavior has been related to a client's preference and experience with a partnering process in past projects. For *category – conflict resolution methods*, it has been more of a pick and choose scenario where clients and concessionaires have picked specific methods to be included in the contracts and that has varied

across jurisdictions. All the five TX contracts have all methods included except the recent SH-288 project contract which does not include arbitration. All the contracts, except I-4 and I-595 in FL, have included informal resolution procedures which indicates that clients and concessionaires understand the importance of resolving disputes through informal means which can lead to cost and time savings. A number of contracts have included either informal resolution + mediation or informal resolution + dispute review board, which indicates that parties want to resolve conflicts first through informal resolution and then with a third-party method of their choice. Again, the selection of third-party method depends upon the client's and concessionaire's preference and successful experience with utilization of these methods in past projects. For *category – monitoring*, noncompliance events and presence of incentives were examined in contracts. The findings indicate that noncompliance points method is usually present to keep the developer in check and the requirements usually depend upon the client's way of working. Incentives were only found in 4 contracts; therefore, it is not a common trend in the PPP industry. The scores for *category – changes process* was not shown since the contractual provisions were similar across the contracts. But it was found that the client generally had more authority than the concessionaire to incorporate change orders. The results show a comparison of the ability of the contracts to promote cooperative relationship between the stakeholders.

Study 3 examined the implementation of relational approaches in practice. Semi-structured interviews of 13 subject matter experts (SMEs) were conducted for this purpose. An interview protocol was developed which included questions specific to implementation of relational approaches along with general questions related to the state of client concessionaire relationships in PPP projects. For *category – communication/nature of negotiations*, all the participants except one concessionaire interviewee mentioned that for progress meetings between client and concessionaire, there should be a minimum frequency present in the contracts along with a flexibility to meet at a different frequency based on current needs. Also, two out of the four concessionaire interviewees mentioned that these progress meetings should not be used as a forum to discuss conflicts. Regarding involvement of other stakeholders, all the participants mentioned that there should be a clear division of responsibilities with respect to communication with stakeholders such as public, utility owners and government officials. Participants mentioned that parties usually have a robust plan and do a good job of communicating with these stakeholders. Regarding good faith negotiations, all the participants mentioned that good faith is an ambiguous

term and is open to interpretation and therefore does not hold any merit in any legal procedures. For category- *partnering*, client participants were found to have a different opinion than the consultant and concessionaire participants regarding its implementation. All participants except two client participants supported the inclusion of partnering. Moreover, one of the major findings is that partnering is a highly effective process in enhancing relationships only if both parties are committed towards using it. 9 out of 13 (70%) participants representing all stakeholder types mentioned that the employment of the partnering process is highly dependent upon the client's and concessionaire's preference and experience; this is in alignment with study 2 findings where an all or nothing policy was followed for contractual inclusion of partnering based on preference. Partnering workshop is usually the first step in the partnering process and is important to set a strong foundation of the partnering process. During partnering workshop, a partnering charter is developed which includes mutual goals and expectations of both parties. This document is important to develop and should be continuously reminded to the parties. The services of a partnering facilitator can be sought in the partnering process but only if the facilitator has a significant knowledge of the PPP industry and has a current information of project issues. The partnering meetings can occur at two levels – project level and executive level. The executive level partnering is important to resolve any pending issues at project level and to see any major upcoming issues. For category – *conflict resolution methods*, all the participants have emphasized the importance of informal resolution procedures in resolving the disputes. Moreover, there should be an ability to escalate the unresolved issue to the executive level or sometimes a steering committee as soon as possible if it is not being resolved at project level. There should be a clear escalation process mentioned in the contract and followed in the field. Regarding third party methods – mediation, arbitration and dispute review board, their implementation in projects depends upon the state laws and the parties' preference and experience with these methods which aligns with study 2 findings. For *category – monitoring*, two consultant and two concessionaire participants mentioned that noncompliance events is sometimes used as a means to penalize the concessionaire which was also found in study 2; in fact they should be more used as a corrective measure to identify avenues of improvement in performance. 8 out of 13 (61%) participants mentioned that for an effective implementation of this approach, there should be a clear description of the requirements associated with these events in contracts along with the presence of some flexibility with changes to these requirements based on discussions with concessionaire. Incentives

is not a common trend in PPP projects as mentioned by all the participants since the toll revenue or availability payment models in PPP projects have inherent incentives based on early finish of work. For category – *changes process*, there were mixed responses where concessionaire representatives mentioned that most of their change orders do not get approved and it is easier for clients to incorporate change orders, and client representatives mentioned that developers sometimes file a significant number of change orders without a full clarity regarding its extent. For the general questions asked regarding the state of client concessionaire relationships in PPP projects, one set of practitioners (4 out of 13) believe that these relationships have changed over time with the advent of more complex projects and more competitors in the market. They believe that risk profiles have been more in favor of the client which has also played a change in relationships over time. The other set of practitioners (3 out of 13) believe that the client concessionaire relationships haven't changed significantly over the years. It varies from project to project and depends heavily on the character and the way of working of both the parties. There was a third set of practitioners (3 out of 13) who only commented on the change in risk profiles over the years.

5.2. Contributions and Implications for Practice

This dissertation has several contributions and implications for practice. Overall, this research contributes towards the increasing literature examining the complementarity between contractual and relational governance. This research also provided insights into improved contractual designs that may promote relational exchanges in PPP projects. Each manuscript has its own contributions:

Study 1 synthesizes the relational approaches that can be present in PPP contracts and can aid in promoting relational exchanges. This study integrates a rich but fragmented body of literature related to relational approaches applicable to contracts. Although prior studies have investigated relational approaches related to construction projects with traditional delivery methods (Stam 2016; Van der veen and Korthals Altes 2011), this research is one of the first related to relational approaches in PPP projects. A number of governance mechanisms such as shadow of future and trilateral governance have been recognized in the literature (Delhi et al. 2012, Henisz et al. 2012), which help in the enhancement of project governance in PPP projects. This study provides a better understanding of these prevailing governance mechanisms in PPP projects and how they can be established in PPP projects through relational approaches. The importance of presence of

governance mechanisms has been widely emphasized in the literature, but this study provides an evidence of their materialization in PPP projects. Essentially, this study can act as a starting point for future research in this domain. For example, this comprehensive list of relational approaches can be expanded and used to investigate international contracts with appropriate modifications or addition of new approaches particular to the country being investigated. Therefore, this study can act as a base study for future studies related to relational approaches.

Study 2 investigates and compares the level of presence of relational approaches in contracts of PPP transportation projects in the United States. Contracts play a central role in the governance of projects, more importantly in PPP projects where it underpins the long-term relationship between the parties during different life cycle phases. Since PPP projects have different uncertainties involved, everything cannot be covered in the contract. Therefore, this study contributes towards the growing literature concerning the important need for development of strong relationships in PPP projects to overcome different risks involved (Arranz and de Arroyabe 2011; Benitez-Avila et al. 2018; Cao and Lumineau 2015; Poppo and Zenger 2002; Zheng et al. 2008). The important argument of complementarity required between contractual and relational governance in PPP projects has been strengthened through this research. This study provides valuable insights into the current state of contracts in US PPP projects in promoting relational exchanges in the project. Through this investigation of relational approaches in the contracts, we have identified jurisdictions which have stronger contracts relationally. Similarly, jurisdictions with contracts that need improvement relationally have been identified along with areas of improvement. This will provide different jurisdictions insights into better contractual designs to promote relational exchanges in projects. Another important contribution of this study has been the development of a content analysis and a semi-automated natural language processing method to review contracts regarding the presence of relational approaches. This has been a significant addition to the body of literature that have employed different automated techniques to carry out document investigation in this field (Tixier et al. 2016; Zhang and El-Gohary 2015; Zou et al. 2017). These tools can be used in the future by different researchers and practitioners to, first, review other documents in a project such as request for proposals, meeting minutes, email conversations to support investigations into implementation of relational approaches. Second, these tools can be used to review other international contracts to assess their ability to promote relational governance in the project.

Study 3 investigates the implementation of relational approaches in practice. This study provides a better understanding of the current state of implementation of approaches in PPP projects. Moreover, this provides information regarding the factors affecting the implementation of approaches and potential areas of improvement in their implementation. This can further contribute towards improved contractual designs in future where changes to the contractual inclusion of approaches can be made based on the learnings from this study. A strong correlation between the presence of relational contracting principles and approaches in PPP projects has been made with improved project performance in the literature (Smyth and Edkins 2007; Zou et al. 2014). Therefore, insights from this study regarding improvement in implementation of relational approaches will contribute towards improving the performance of PPP projects in the United States. A clear and detailed framework regarding implementation of relational approaches proposed in this study will help in avoiding conflicts and in a proactive management of relationships in PPP projects. This will help in time and cost savings, and improved quality of the infrastructure delivered.

5.3. Future Work

This research has opened up several future avenues of research work. I have proposed three future research directions – (1) linking contractual specification and implementation of relational approaches with project performance, (2) deeper investigation into understanding the working culture of an organization and (3) investigation of the disconnect between risk allocation profiles mentioned in the literature with profiles implemented in projects.

5.3.1. Linking Contractual Specification and Implementation of Relational Approaches with PPP Project Performance

This research investigates the contractual specification and implementation of relational approaches in PPP projects. In future, these relational approaches can be linked with project performance parameters such as cost, schedule, quality and client satisfaction. Although, literature has emphasized the importance of relational approaches in enhancing project performance (Cheung et al. 2018; Edkins and Smyth 2006; Zou et al. 2014), but a correlation between different relational approaches and project performance is still unexplored for PPP projects. One potential approach to perform this is through qualitative comparative analysis (QCA). QCA enables examining the relationship between input conditions (relational approaches) with outcomes of

interest (project performance such as cost, time, quality, and client satisfaction) across a range of cases. The results will include patterns or combinations of different relational approaches that either support or inhibit the outcomes of interest. The results from such an investigation are expected to provide evidence of the impact of relational approaches on project outcomes while also identifying specific approaches that advance overall project governance in PPP projects.

5.3.2. Working Culture of an Organization

The preferences and the working culture of an organization, both client and concessionaire, has emerged as a prominent theme in contractual inclusion and implementation of different relational approaches in a PPP project such as different partnering elements and third-party methods of conflict resolution. A number of participants in study 3 mentioned that the working environment of a project depends significantly upon the character and the background of the client and the concessionaire. Therefore, it is important to understand different intra-organizational and other cultural factors that affect the working culture of an organization and how much preference an organization gives to development of relationships in a project. Although different intra-organizational factors such as top management support, staff's commitment, experience with relational approaches, and trust and communication within the organization have been identified (Ling et al. 2014; Meng and Boyd 2017; Zou et al. 2014), these factors are general and needs deeper investigation.

5.3.3. Risk Allocation in PPP Projects

A majority of the participants in study 3 have agreed that risk allocation has changed significantly over the years in PPP projects with all the risks not being allocated to the party best suited to manage that risk. This has led to different contractors willingly exiting the PPP industry. Therefore, risk allocation remains a critical element of the evolving PPP industry. Public clients such as TxDOT have already started to giving preference to modify risk profiles to create more balance, as mentioned by one of the participants. Although, there are a number of studies (Chung and Hensher 2015; Ke et al. 2010; Nguyen et al. 2018) which have mentioned different risks that can be present in PPP projects in detail along with the party best suited to manage it, there is still a disconnect with how risks are being allocated during implementation which needs investigation in future.

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