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Article

# Mix and Match: How Contractual and Relational Conditions Are Combined in Successful Public–Private Partnerships

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## Abstract

In explaining public–private partnership (PPP) performance, both contractual and relational conditions play a role. Research has shown that these conditions may complement each other in successful PPPs. However, which specific combinations of conditions and how these combinations may influence PPP performance remains unclear. Building on the ideas of neo-institutional economics, principal–agent theory, relational contracting, and governance theories, this article explores the mix and match of contractual aspects and relational characteristics in successful PPP projects. A fuzzy set qualitative comparative analysis (QCA) of 25 PPP projects in the Netherlands and Flanders (Belgium) was used to test how contractual factors, such as the use of sanctions and risk allocation, and relational conditions, such as trust and conflict management, jointly shape the performance of PPPs. The results show three different combinations of conditions that match with high performing PPPs. These configurations often consist of a mix of contractual and relational conditions, which confirms our initial expectation that these factors complement each other, but a combination of only relational conditions is also present.

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## Introduction

Despite the frequent use of public–private partnerships (PPPs) in many countries, there is still no unanimous judgment on the performance of PPPs (Hodge and Greve 2017). Both the question whether PPPs are a success and the question what makes PPPs successful cannot be answered unanimously. Scholars have identified a long list of critical success factors for PPP performance (for an overview, see Osei-Kyei and Chan 2015) from which two main categories can be distinguished. On the one hand, a wide stream of literature emphasizes the importance of contractual conditions: a well-written contract, the possibility to impose sanctions, clear performance indicators, and the allocation of risks (Koppenjan 2005; Pollitt 2002). The main inspiration for these factors stems from neo-institutional economics and principal–agent theory, which

emphasize rational and possibly opportunistic behavior and the need to control this behavior (e.g., Jensen and Meckling 1976; Williamson 1996). On the other hand, the literature on (network) governance and relational contracting has paid much attention to the process of cooperation, especially to the importance of trust, to make these partnerships work (e.g., Huxham and Vangen 2005; Poppo and Zenger 2002; Ring and van der Ven 1992). Relational characteristics such as trust, informal communication, and openness are considered important for PPP performance.

There are various empirical studies on either contractual aspects (Bing et al. 2005a; Da Cruz, Simões, and Marques 2013) or relational partnership characteristics (Smyth and Edkins 2007; Warsen et al. 2018). Other studies propose the idea that PPPs could benefit from a mix of contractual and relational conditions (see, e.g.,

Brown, Potoski, and van Slyke 2016; Parker and Hartley 2003). However, more detailed theoretical notions and empirical studies on how specific combinations of contractual and relational conditions influence partnership's performance are hard to find (for an exception, see Kort, Verweij, and Klijn 2016). This article tries to fill this gap and contributes to the existing literature on PPP performance by providing empirical evidence on how contractual and relational characteristics mix and match with high-performing PPP projects. Our theoretical contribution lies thus in specifying which exact combinations of contractual and relational conditions are present in successful PPPs. This way we aim to refine the existing theories. To explore how and which contractual and relational conditions complement each other in achieving PPP performance, this article focuses on the role of two important contractual conditions, namely the allocation of risks and the application of sanctions in managing contracts (see Savas 2000; van Slyke 2006), and of two relational characteristics: trust (Klijn, Edelenbos, and Steijn 2010; Ring and van der Ven 1992; Sako 1998) and conflict management (Omobowale et al. 2010).

To analyze which mixes of conditions actually match with successful PPP projects, we conducted a fuzzy set qualitative comparative analysis (fsQCA) using data on 25 PPP projects in the Netherlands and Belgium. Assessing the combined impact of conditions is one of the main strengths of QCA.

In this article, we first discuss theoretical starting points underlying PPPs and how contractual and relational conditions might complement each other in successful partnerships. In part 2, we explain the research method and the data used in this study. Part 3 focuses on the main results of the QCA. Conclusions and reflections on the outcomes of the analysis are provided in the final part of our article.

### Explaining PPP Performance

PPPs can be found in many varieties (see Hodge, Greve, and Boardman 2010). In this article, the focus is on PPPs in the narrow sense, that is, as individual projects in which public and private partners jointly work to realize products and services and share the accompanying benefits, costs, and risks (Hodge, Greve, and Boardman 2010). Many of these projects can be considered long-term infrastructure contract partnerships, which often include the design, build, finance, and maintenance of a specific product or service (e.g., a road, hospital, or school). These contracts are often referred to as DBFM(O) contracts (Design, Build, Finance, Maintain, and Operate) (Hodge, Greve, and Boardman 2010).

#### PPP Performance as Multicriteria Phenomenon

Despite using a narrow concept of PPP, assessing the performance of PPPs remains a challenge. The

existence of different views toward PPP performance is not only due to the different conceptions of PPP, but it is also the result of the multiactor character of the partnership. Each partner joins the PPP with their own interests and perspectives on the goals of the project. These goals may differ between partners and can even be conflicting at times. At the same time, partners need each other for the realization of these goals. This mutual interdependency between partners (and relevant actors in the network around PPP projects) requires them to take these various goals into account (Bertelli and Smith 2009; Klijn and Koppenjan 2016). Goals agreed upon in the contract, however, do not necessarily reflect the actual objectives of the involved actors. Moreover, partners will not necessarily use these goals as points of reference for their assessment of the performance of the partnership. In addition, the goals set at the beginning of a PPP project may change over time. Especially, in long-term contract-based PPPs where years of tender and construction are followed by an even longer maintenance and operational phase the likelihood of changing goals is high (Bertelli and Smith 2009; Parker and Hartley 2003).

Rather than considering a single "objective" goal as the ultimate yardstick for assessing PPP performance, the different goals that various actors pursue in the project should be taken into account (Klijn and Koppenjan 2016). This can be done by including the notion of "satisfaction" as one of the criteria to assess PPP performance (e.g., Verweij 2015). Establishing to what extent and why partners consider the partnership to be successful allows for the inclusion of multiple, contradictory, and dynamic goals.

#### Contractual and Relational Success Factors for PPP Performance

To assess PPP performance, scholars have tried to explain success and failure of PPP projects by determining critical success factors (e.g., Jefferies 2006; Bing et al. 2005b). Several of these success factors are derived from relevant theories such as transaction cost theory, principal-agent theory, and literature on complex contracting and (network) governance.

The importance of well-written contracts and more specifically the role of performance indicators, sanctions, and risk allocation in PPPs is strongly inspired by transaction cost theory and principal-agent theory. In these theories, opportunistic behavior plays an important role; hence, the rational behavior of actors will lead them to use any situation to their own advantage. Especially when the exchange between parties, or more specifically between principals (clients) and agents (contractors), is characterized by incomplete information and information asymmetries, parties may use these asymmetries strategically (Jensen and

Meckling 1976; Williamson 1979). To deal with this opportunistic behavior, contracts are used to structure the exchange between principals and agents, so they can both benefit from its win-win potential (Brown, Potoski, and van Slyke 2016, 295). These contracts consist of both products' rules, specifying the features and functions of the product, and exchange rules, specifying what is needed to execute the exchange (Brown, Potoski, and van Slyke 2016), such as agreements on performance, risk allocation, payments, and sanctions.

Two conditions that are included in the contract with the aim of preventing opportunistic behavior are agreements on the allocation of risks and the possibility to employ sanctions (see Akintoye, Beck, and Hardcastle 2008; Hodge and Greve 2007; Ng and Loosemore 2007). The literature on PPP emphasizes that the strength of a DBFMO contract lies in the requirement for private consortia to invest in the project, as a result of which risks are transferred from the public to the private partner (Bing et al. 2005a; De Palma, Leruth, and Prunier 2012). This adjustment in property rights creates strong incentives for the private partner to perform. Inspired by transaction cost theory and the principal-agent theory, the PPP literature considers sanctions to be a crucial ingredient of the contract governing the partnership. The possibility of applying sanctions provides the principal with steering options to make sure that the agent performs and abides by the contract. Without sanctions, principals would not have the means to mitigate opportunistic behavior by contractors and the latter might not perform up to standard (Hodge and Greve 2007; Savas 2000). Thus, the possibility of employing sanctions, to keep contractors in line in projects where the contractor does not have all the necessary information, is crucial for good performance. Both risk allocation and sanctions fit in as mechanisms to prevent opportunistic behavior and keep contractors in line.

However, the exchange between partners in these projects is usually rather complex. This makes it impossible to write down all product and exchange rules because neither client nor contractor can foresee and regulate all contingencies that may affect the realization of the project upfront (Bertelli and Smith 2009; Brown, Potoski, and van Slyke 2016). This results in incomplete contracting. Combined with uncertainty and specific investments in the project, this may lead to a complex contracting challenge (Brown, Potoski, and van Slyke 2016). To fill the gap left by incomplete contracts, relationships are pivotal in ensuring good performance. The role of "soft" or "relational" conditions is highlighted in literature about collaborative governance, network governance, and relational contracting. The latter theory builds on neo-economic institutionalism but acknowledges the incomplete nature

of contracts. Rather than making the contract more extensive and detailed, relational contracting gives room to social relationships. Partnerships are embedded in social relationships. In these social relationships, mutual trust and norms of flexibility, solidarity, and sharing information are pivotal in ensuring good performance (Deakin and Wilkinson 1998; Granovetter 1985; Poppo and Zenger 2002; Zeng, Roehrich, and Lewis 2008). They allow partners to respond to exogenous shocks and enable partners to improve the formal arrangements in the contract (Bertelli and Smith 2009). Literature on governance is often inspired by sociological institutionalism, acknowledging that actors do not exclusively behave according to the principles of economic rationality and following the logic of *consequences* by basing behavior on cost-benefit calculations (Huxham and Vangen 2005; Pierre and Peters 2000). Instead, actors are also seen as intrinsically motivated, sensitive to expectations about role performance, social pressures, and norms and values like reciprocity, fairness, and legitimacy. Behavior is based on a logic of *appropriateness*; actors behave according to what they see as appropriate and assess behavior of others likewise (Hall and Taylor 1996; March and Olsen 1984).

Trust stands out as a core concept in all these bodies of literature, including theories about collaborative governance (Ansell and Gash 2008), network governance (Klijn and Koppenjan 2016; Provan, Huang, and Milward 2009), and relational contracting theories (Deakin and Wilkinson 1998; Poppo and Zenger 2002). Trust can be defined as "the expectation of an actor A that another actor B will abstain from opportunistic behaviour when the opportunity for it arises" (Klijn, Edelenbos, and Steijn 2010: 196; see also Rousseau et al. 1998). If parties mutually trust each other, they are convinced their partners will not behave opportunistically. Therefore, they will be prepared to invest their resources in the joint collaboration, share information and make investments in innovative, uncertain activities. Trust is then seen as a facilitating condition for performance in the sense that it mitigates opportunistic behavior, facilitates the flow of information, and stimulates partners to invest in the project (see McEvily and Zaheer 2006; Ring and van der Ven 1992; Sako 1998).

Both the collaborative governance and governance network literature also emphasize the importance of process management activities to manage the relationship between partners. Even despite high levels of trust or well-written contracts, conflicts are likely to emerge because actors have different perceptions and interests (Bertelli and Smith 2009; Klijn and Koppenjan 2016). In contrast to transaction cost theory, which tends to deal with conflict through contracts and sanctions,

the governance literature tries to solve conflicts using conflict management (see also [Ansell and Gash 2008](#); [Huxham and Vangen 2005](#)). Conflict management includes the extent to which public and private partners adequately know how to mitigate and handle conflicts that arise during the project implementation, and prevent the escalation of these conflicts using conflict management strategies: bringing partners together, bridging differences by mediation and arbitration ([Koppenjan 2007](#)). Conflict management implies the design and application of conflict regulation mechanisms beyond formal juridical procedures that are often lengthy, costly, and inaccessible. It also implies identifying potential conflicts in a proactive way and taking measures before negative emotions and the rise of adversarial strategic positions turn disagreements into conflict ([Fisher, Ury, and Patton 1997](#)).

#### Which Combinations Matter?

Based on underlying theories on the exchange between public and private actors, complex contracting, and (network) governance, we identified four core conditions that might be important for successful PPP performance. Research has shown that contractual and relational conditions are not mutually exclusive, but complement each other (see, e.g., [Edelenbos and Eshuis 2012](#); [Poppo and Zenger 2002](#)). Therefore, we now turn to the question of how these conditions may complement each other.

Using the idea that it is the combination of contractual and relational aspects that make PPPs successful, we expect that the presence of either risk allocation or the strict application of sanctions is necessary for outstanding performance, just as the presence of either trust or conflict management is necessary. The question then is how these conditions can be combined, and which combinations are sufficient for good PPP performance.

First, the combination of both contractual conditions, risk allocation and a strict application of sanctions, is not sufficient for good PPP performance because contracts are incomplete and lack the flexibility to deal with unforeseen events ([Bertelli and Smith 2009](#); [Brown, Potoski, and van Slyke 2016](#); [Williamson 1979](#)). A well-balanced risk allocation to formally record each partners' responsibilities forms a strong incentive for both partners to perform, and thus certainly contributes to good results, but it is unlikely that it will be able to cope with all possible uncertainties. So, the agreements on the allocation of foreseeable risks made at the start of the project have to be complemented by a condition that can help deal with unforeseen circumstances during the project. Both trust, which would stimulate the exchange of information on these new emerging issues, and conflict

management, as a constant way to monitor and deal with potential issues, could do so. They can facilitate the process to reach consensus on how to deal with unforeseen events, and align both partners. This would suggest that a combination of risk allocation and trust or a combination of risk allocation and conflict management is sufficient for good PPP performance.

Second, if we look at the governance network and collaborative governance literature, trust could almost be regarded as a necessary condition. This literature highlights the existence of high levels of trust as the way to cope with external shocks, unexpected events, and the complexity of projects ([Ansell and Gash 2008](#); [Klijn, Edelenbos, and Steijn 2010](#)). Although many governance scholars consider trust as pivotal for collaborative processes, a combination of solely relational conditions also seems unlikely as trust needs time to develop and grow. Certainly, in the first phases of a project, high levels of trust are not likely to be present. Formal agreements are then needed to realize the exchange between partners. The expectation, therefore, is that trust alone is not sufficient to achieve good PPP performance. Besides, previous research has shown that a successful partnership in the absence of trust is possible ([Cook, Hardin, and Levi 2005](#)). This means that we expect trust not to be a necessary condition for successful PPPs. It is also unlikely that conflict management on its own will be a sufficient condition because the transaction costs of conflict management are high, especially in the absence of trust or any predefined contractual agreements on the role and responsibilities of the partners in the project.

That is not to say that trust and conflict management are not important in explaining the success of PPPs. If trust is lacking, the need for managing the relations will be very high to cope with uncertainty and unexpected events. This reinforces our expectation that either trust or conflict management is necessary for successful PPPs.

Based on the previously discussed theories, both sanctions and trust are mechanisms to enforce compliance, but they are rooted in very different ideas on how to deal with opportunistic behavior and uncertainty (see for instance [Lane and Bachman 1998](#); [Nooteboom 2000](#)). Whereas the transaction cost theory and the principal-agent theory primarily focus on the use of sanctions, governance theories opt for a more soft approach through the use of process management, emphasizing trust building or conflict management. In this respect, the combination of a strict application of sanctions and trust seems unlikely as the implementation of sanctions has a risk of damaging trust ([Ring and van der Ven 1992](#)). This means we may further specify our expectation that a combination of risk allocation and trust is sufficient for good PPP performance. Based



on the above argument, the combination of risk allocation and trust, combined with the absence of sanctions, is expected to be sufficient for successful PPPs. Because sanctions, trust, and conflict management might be able to replace each other as mechanisms to enforce compliance and deal with opportunistic behavior, our expectation is that neither one of these conditions is a necessary condition for good PPP performance. The question then is if the remaining condition, risk allocation, is a necessary condition for successful PPPs. Is it possible to have well-performing PPP projects without a clear risk allocation? One could argue that this is possible, for example, when the risks do not occur during the project. This would lead us to expect that risk allocation is not a necessary condition for good PPP performance.

### An fsQCA of 25 Projects in the Netherlands and Belgium

To test how contractual and relational characteristics jointly affect PPP performance, 25 PPP projects in the Netherlands and Flanders were studied. In this section, we first elaborate on the empirical setting and the data collection. Next, the focus is on fsQCA, the analytical tool used in this study. Finally, we turn to the operationalization and calibration of the conditions.

#### PPP Projects in the Netherlands and Belgium

The data used to study the combined effect of contractual and relational aspects on PPP performance stems from 25 PPP-projects in the Netherlands and Belgium (Flanders) that were examined in the period between June 2016 and April 2017. All projects can be categorized as long-term infrastructure contractual partnerships and include the design, build, and maintenance of a product or service. Most projects also include a private finance component (only a few projects use public financing), and in about half the projects, the operation of the service is incorporated as well. The projects are a balanced reflection of the existing PPP projects in the Netherlands and Belgium, including both transport infrastructure projects (roads, railways, and sluices) and social infrastructure projects (swimming pools, prisons, and government buildings) ordered by national and local governments. To be included, projects should be close to finishing the construction phase, in which case all important decisions with regard to the construction were made and most risks were mitigated, or in the operational phase for less than 5 years. This allowed respondents to describe the course of the project and the performance thus far. [Table 1](#) provides an overview of the selected projects ranged by country, type of project, and the level at which these projects are realized.

**Table 1.** Characteristics of Selected PPP Projects

Country	Type of PPP	Level
The Netherlands (13)	Transport infrastructure (7)	National (7) Local (0)
	Social infrastructure (6)	National (3) Local (3)
Belgium (12)	Transport infrastructure (6)	National (6) Local (0)
	Social infrastructure (6)	National (2) Local (4)

The data were gathered using different data collection methods. In total, we conducted 71 semistructured interviews with 74 public and private professionals who are or have been closely involved in the particular projects. Prior to the interviews, respondents were asked to fill out a survey about the project. Of the respondents, 72 complied with this request. After the data collection, all interviews were transcribed and coded using Nvivo. Furthermore, we used official progress reports from the Dutch and Flemish government to check on time delivery of the projects.

#### Set-Theoretic Methods: A fsQCA

In this article, a fsQCA, which is a set theoretical method, is used to analyze the data. Set theoretic methods have a few defining characteristics. First of all, the relations between social phenomena are modeled in terms of set relations ([Ragin 2000](#)). Cases—which could be, for example, individuals, projects, or countries—are perceived as members or as nonmembers of a set. The processed data about the different cases reflect the membership of each case in a set. Thus, it establishes qualitative, rather than quantitative, differences between cases, which is a second characteristic of set-theoretic methods. Finally, the results stemming from set-theoretic methods emphasize the existence of causal complexity. Often there are several combinations of conditions that are able to produce the outcome ([Schneider and Wagemann 2012](#)). In a fsQCA, relations are discussed in terms of necessity and sufficiency. When a condition is necessary, the outcome cannot be produced without the presence of that condition. Hence, every time the outcome is present, the necessary condition has to be present as well. Sufficiency means that the presence of a condition always results in the outcome. However, the outcome may occur without the condition being present (see, e.g., [Schneider and Wagemann 2012](#)). The two main parameters of fit used to analyze results of a fsQCA are consistency and coverage. The first refers to the degree in which the empirical evidence supports the relations found. The latter explains how well the available empirical data is explained by the conditions or in

other words how many cases are covered by a single solution term (Schneider and Wagemann 2012).

We choose to use a fsQCA for our analysis for several reasons. First, as stated above, a fsQCA is highly suitable for systematically analyzing combinations of conditions (so-called configurations), which is congruent with the aim of this article (Ragin 2000). Furthermore, a QCA is applicable to use for a medium number of cases (Schneider and Wagemann 2012). Unlike statistical analysis or comparative case studies, a QCA allows for the use of both in-depth case knowledge and identifying commonalities between cases by systematically comparing them (Verweij and Gerrits 2013). Finally, a fsQCA is preferred over a crisp set QCA because, rather than only using dichotomous sets, fsQCA allows for different degrees of membership in sets. They include more nuanced information than crisp sets, distinguishing between differences in cases both in kind and in degree. This results in a higher content validity (Schneider and Wagemann 2012).

#### Calibrating the Conditions

In a fsQCA, conditions and outcomes are considered sets. During the so-called calibration process, each case will receive a score between 0 and 1 displaying its membership in each of the conditions and the outcome. Important in this process is the cross-over point of 0.5. Scores higher than 0.5 indicate that a case is “more in than out” a set, whereas scores below 0.5 mean that a case is “more out than in” that particular set (Schneider and Wagemann 2012). This process results in qualitatively different cases. In this article, we used a fuzzy set scale with four scores ranging from full membership (1) via scores of 0.67 and 0.33 to full non-membership (0).

The calibration process requires in-depth case knowledge gathered by the researchers and theoretical knowledge about the conceptual meaning of the condition and its potential effect on the outcome. The calibration process is an interplay between theoretical reasoning and in-depth case knowledge (see, e.g., Schneider and Wagemann 2012). This results in strong links between theory and data and thus creates high content validity. Scholars from the Netherlands and Belgium shared their expertise about the 25 cases to ensure a careful calibration process. In addition to this case knowledge, robustness tests (see appendix B) helped to control for potential measurement errors (Skaaning 2011). In this article, we study outstanding performance in PPP projects, using risk allocation, the application of sanctions, conflict management, and mutual trust between partners as conditions. In this paragraph, we elaborate on how the four conditions and the outcome are calibrated (see also table 2 and appendix A).

#### Performance

In this article, we have defined successful PPPs as projects with outstanding performance (OP). To measure performance, a combination of classic performance measures (on-time delivery, on budget delivery, and value for money) and a softer operationalization of perceived performance (satisfaction) was used (see table 2). These four indicators are measured using survey statements with a 7-point Likert scale ranging from “completely disagree” to “completely agree.” Each indicator was calibrated separately. Based on the idea that a partnership should include benefits for both partners, we considered projects only to be successful if both public and private partners state that the results of the project are good. Projects scored a full membership score of 1 when both public and private partners agreed with a positive statement regarding performance. Differences in opinion resulted in lower scores (0.67 for minor differences, 0.33 for major differences). If both partners agreed on insufficient performance, the project got a score of 0 for that specific indicator. Projects that were still under construction received a score of 0.51 (just “in”), because—at the time of the data collection—the projects run according to planning and had no budget overruns so far. Moreover, there were no indications of expected delays of budget overruns that would potentially justify a score below the cross-over point of 0.5. Projects under construction that already had severe time and budget overruns were given a score below 0.5.

Afterwards, the calibrated indicators were combined to determine a score for the condition “outstanding performance.” If a project had one or more negative scores on the “objective” measurements of performance (i.e. “on-time delivery,” “on budget delivery,” and “value for money”), then the project received a score below the cross-over point (see appendix A for the results of the calibration process). The item “satisfaction” was used to determine the final score. Very low scores on satisfaction resulted in the lowering of the project score, whereas high satisfaction scores could lead to an increase in the performance scores. If the assessment of the “traditional” performance measures and the satisfaction of the partners showed substantial differences, qualitative interview data were used to study the justification for these scores.

#### Risk Allocation

One of the main principles behind risk allocation (RA) in PPPs is that risks should be allocated to the partner who is best able to carry or mitigate these risks (Bing et al. 2005a). Although many standardized contracts seem to suggest that most risks are to be transferred to the private partner, the unique context in which the project takes place, the perspectives of partners on risks, and the

**Table 2.** Overview of Calibration Method

Condition	Components	Main data source	Principles guiding the calibration
Performance (OP)	<ul style="list-style-type: none"> <li>- On time delivery</li> <li>- On budget delivery</li> <li>- Value for money</li> <li>- Satisfaction with performance</li> </ul>	Survey data	<ul style="list-style-type: none"> <li>- Different goals, so different indicators included.</li> <li>- Project should be a success for both partners. Disagreement in assessing performance results in lower set membership scores.</li> <li>- Qualitative interview data are used to adjust and check the scores.</li> </ul>
Risk allocation (R)	<ul style="list-style-type: none"> <li>- Risk allocated to private partner</li> <li>- Risk allocated to public partner</li> <li>- Size of risk</li> </ul>	Interview data	<ul style="list-style-type: none"> <li>- Risks are formally allocated according to contract.</li> <li>- The underlying assumption is that partners should be able to carry the risks assigned to them.</li> </ul>
Strict application of sanctions (S)	<ul style="list-style-type: none"> <li>- Consistently imposing obligatory sanctions</li> <li>- Consistently imposing optional sanctions</li> <li>- Opportunities to discuss the application of sanctions</li> </ul>	Survey and interview data	<ul style="list-style-type: none"> <li>- Sanctions should be applied consistently, so partners know what to expect.</li> </ul>
Conflict management (CM)	<ul style="list-style-type: none"> <li>- Nature (formal/informal)</li> <li>- Focus (prevention/control)</li> <li>- Timing (proactive/reactive)</li> <li>- Attention for potential sensitive issues</li> </ul>	Interview data	<ul style="list-style-type: none"> <li>- Use of informal mechanisms indicates extra effort to deal with conflicts.</li> <li>- In conflict management, there should also be attention given to preventing conflict.</li> </ul>
Trust (T)	<ul style="list-style-type: none"> <li>- Honoring commitments</li> <li>- Giving partners the benefit of the doubt</li> <li>- Taking into account each other's interests</li> <li>- Intentions of partners</li> <li>- Use of efforts for their own gain</li> </ul>	Survey data	<ul style="list-style-type: none"> <li>- Trust should be mutual. If one of both partners should experience little trust, there is no high level of trust within the project.</li> <li>- Respondents might have been hesitant to give low scores on this sensitive topic.</li> </ul>

capabilities of partners to carry risks may result in different risk allocations for different projects. Therefore, in calibrating the condition risk allocation, we focus on the question whether the risks are divided between the public and the private partner (score > 0.5) or whether the private partner carries all the risks (score < 0.5). The underlying assumption is that risks should be assigned to the partner who is best able to control and carry them, resulting in a distribution of risks between both partners. Projects in which multiple substantial risks were divided between the public and the private partners scored a 1. A score of 0.67 was assigned to a project if only a few yet substantial risks were divided between the partners. A score of 0.33 was given when most risks were assigned to the private partner, while the public partner carried barely any risks or only risks with a rather low-risk profile. Finally, projects were given a set membership score of 0 when all risks were assigned

to the private partner, regardless of whether the private partner was capable of carrying these risks or not.

#### Strict Application of Sanctions

Sanctions (S) are included in the contracts underlying PPP projects. The public partner is obliged to impose some of these sanctions on the private partner, for example, when the infrastructural project is not available. Besides these “obliged sanctions,” the contract includes a number of penalties which can be imposed, but where an alternative is also offered: the private partner is—instead of a sanction—given a recovery time by which the problem should be fixed. Membership scores are based on the use of both types of sanctions, using both qualitative data and quantitative data on the application of sanctions (see [table 2](#)). Moreover, room for discussion between partners about the application of sanctions is taken into account. It might occur that partners within

a project disagree on whether or not sanctions are imposed. They might have different situations in mind when answering the question, lack a complete overview of all imposed and not-imposed sanctions, or they might have a different opinion on when one “deviates” from a rule. In these cases, the interview data on situations in which sanctions are (not) imposed are used to decide the membership score of the project.

#### Conflict Management

In the calibration process of the condition “conflict management,” multiple dimensions of conflict management (CM) were included. First, the nature of the agreements on conflict management was taken into account. Having both formal and informal mechanisms instead of merely formal mechanisms indicates that extra efforts were made to manage potential conflicts. Second, the focus of conflict management mechanisms can be on preventing, controlling, or solving conflicts, or a combination of these. Conflict management should not only consist of measurements to solve conflicts after they arise; it should also include preventive measurements to manage difference of opinion so that these differences do not turn into conflicts. A third dimension is the timing of these agreements. Early implementation of agreements about conflict management points toward the recognition of the relevance of conflict management. It shows that the partners in the project anticipate the possibility that differences of opinion might end up in conflict. When agreements are drafted after an incident occurs, this is a sign of reactive behavior, indicating that partners did not take sufficient precautions early on in the project. Finally, we focus on signals that indicate early attention for potential sensitive issues. Do managers bring up these issues at an early stage to leave enough time to discuss them? The qualitative interview data on the above dimensions is supplemented with quantitative data. By using the Generic membership Evaluation Template (GMET) of [Tóth, Henneberg, and Naudé \(2017\)](#) the data are calibrated (for an example, see [appendix A](#)). This template allows scholars to systematically evaluate cases on a single condition using predominantly qualitative data. A score of 1 was given if all dimensions were evaluated positively. The more dimensions were scored negatively, the lower the calibrated score.

#### Trust

In determining the set membership score for the condition trust (T), we used quantitative survey data of five indicators, each with a 10-point answering scale (see [table 2](#) for an overview, and for an extended explanation in [appendix A](#)). These indicators are used and tested in prior research (see, e.g., [Klijn, Edelenbos, and Steijn 2010](#); [Warsen et al. 2018](#)) and form a fairly stable measurement to test trust. The condition trust was

calibrated by adding up the scores of the five indicators for each respondent, resulting in scores between the minimum of 5 and the maximum of 50. Considering the mutual character of trust, we selected the lowest score on trust per project as the basis for a project’s set membership score in trust. This score was transformed into a membership score between 0 and 1, using the Tosmana thresholdsetter<sup>1</sup> to gain insight into the clusters that exist in our data ([Cronqvist 2017](#)). The thresholds suggested by the threshold setter are 24.75, 30.5, and 36.25. However, as these thresholds separate cases that, based on the empirical data, should be given similar scores, we adjust the scores slightly. The thresholds used in calibrating the condition of trust are therefore 25.01, a cross-over point of 30.5, and 40.01. The cross-over point is higher than the middle score of 25, as earlier research has shown that trust is a sensitive topic and respondents might be hesitant to give extremely low scores on this topic. Moreover, the relationship between public and private partners is an ongoing relationship in all PPP projects. Therefore, even though respondents who participated in this project are guaranteed anonymity, the prospect of an ongoing relationship might play a role in assessing the statements. Finally, because this condition is about high levels of trust, one might debate whether scoring half of the maximum number is considered a “high” score.

#### Results: Which Conditions Matter Most?

The analysis was performed using the QCA and SetMethod packages in R ([Dusa 2017](#); [Medzihorsky et al. 2016](#)). A first step was to perform an analysis of necessity to test whether a single condition was necessary for outstanding performance in PPP projects. Following [Ragin \(2000\)](#), the minimal consistency benchmark for necessity is set at 0.9. As [table 3](#) shows, none of the four conditions (neither in its absence nor in its presence) is a necessary condition for the presence of good PPP outcomes. Based on our theoretical expectations, we also tested whether either risk allocation or sanctions (RA &#x002B; S) or either trust or conflict management (T &#x002B; CM) is necessary. The analysis shows that the latter is true.

Next, we turned to the analysis of sufficiency. A distinction (see [table 4](#)) is made between cases with a set membership score in the outcome above the cross-over point (0.5) and those with a membership score below the cross-over point.

<sup>1</sup> Tosmana is an analytical tool for small-N analysis and is often used for QCA. The thresholdsetter is used to set and adapt thresholds, while viewing the data distribution, and may thus assist in finding the correct thresholds in the calibration process of a QCA (see [Cronqvist 2003](#)).



**Table 3.** Analysis of Necessity for the Outcome “Outstanding Performance”

Condition	Consistency	Coverage	RoN
Trust (T)	0.865	0.761	0.766
Risk allocation (RA)	0.676	0.757	0.840
Conflict management (CM)	0.675	0.658	0.741
Strict application of sanctions (S)	0.619	0.545	0.633
Absence of trust (~T)	0.483	0.542	0.736
Absence of risk allocation (~RA)	0.539	0.474	0.599
Absence of conflict management (~CM)	0.486	0.485	0.665
Absence of strict application of sanctions (~S)	0.622	0.697	0.808
Trust or conflict management (T & CM)	0.920	0.679	0.608

The truth table is then constructed (see [table 5](#)). The truth table displays all logically possible combinations of conditions (configurations) and assigns the empirical cases to one of these configurations. For the truth table, we selected a consistency threshold of 0.8. This is well above the required level of 0.75 ([Schneider and Wagemann 2012](#)) and coincides with a gap in consistency scores visible in the data (see [Vis 2009](#)). Given the limited number of cases, we use a frequency threshold of 1 (based on [Ragin 2008](#)).

Initially, this leaves us with eight configurations for the analysis. However, further study of the table shows that a number of logically contradictory truth table rows exist with a consistency score above the threshold of 0.8 (e.g., rows 12 and 16). The empirical material shows that the configuration presented by that specific truth table row produces both the presence as well as the absence of the outcome. Despite attempts to solve these contradictory truth table rows prior to the analysis (e.g., by adding conditions and recalibrating the conditions and/or the outcome), the contradiction remains. Therefore, we deal with these rows during the process of logical minimization (see [Schneider and Wagemann 2012](#): 120–123). In deciding which rows to include and exclude from the analysis, we plot each truth table row against the outcome to see whether there are deviant cases consistency in kind (true logical contradictions). Two truth table rows, row 12 and

**Table 4.** Set Membership Scores of Cases in the Outcome “Outstanding Performance”

Outcome	Number of cases	Cases
0	13	P1NG, P2BG, P3NTI, P4NG, P5BTI, P6BTI, P9NG, P10BTI, P11NTI, P12BG, P13BG, P16NG, P17BG,
1	12	P7NTI, P8NTI, P14NTI, P15NTI, P18NTI, P19BTI, P20NG, P21BTI, P22BTI, P23NG, P24BG, P25BG

10, only include deviant cases consistency in kind (respectively, P13BG and P9NG). The consistency level would allow us to include the row, but the only empirical case assigned to this configuration is not a member of the outcome. The consistency value is only driven upward by cases that are not members of the truth table row. Therefore, we declare these rows insufficient for the outcome “outstanding performance.” Truth table rows 14 and 16 also include deviant cases consistency in kind (respectively, P10BTI and P11NTI). However, the decision here is less clear-cut because the other cases assigned to the truth table rows are consistent members of both the row and the outcome. Thorough study of the qualitative data on P10BTI and P11NTI shows that these cases perform quite well, and just fall out of the set of outstanding performance because one of the partners went over budget to realize the projects. On all other aspects of the outcome, the projects score fairly well. Therefore, we decide to include the truth table rows 14 and 16 in the minimization process. This means six configurations are included for the analysis, namely row 15, 8, 14, 16, 11, and 13 (see [table 5](#)).

Then, the six remaining configurations were minimized into solution formulas that explain which configurations are sufficient for the outcome. The conservative solution term in [table 6](#) shows three different configurations which may lead to outstanding performance in PPP projects. Each of the configurations explains at least one truth table row, which is not explained by the others.

The consistency scores for each single configuration and for the entire solution term are rather high. In fact, 82.3% of the empirical evidence is in line with the solution term. Moreover, 75.7% of the outcome “outstanding performance” is covered by one or more of the three configurations. The intermediate solution

**Table 5.** Truth Table for the Outcome “Outstanding Performance”

Row	T	RA	CM	S	Outcome	N	Incl.	PRI	Cases
15	1	1	1	0	1	3	0.929	0.859	P7NTI, P14NTI, P18NTI
8	0	1	1	1	1	1	0.909	0.801	P20NG
14	1	1	0	1	1	2	0.898	0.796	P10BTI, P23NG
16	1	1	1	1	1	3	0.865	0.714	P11NTI, P15NTI, P24BG
10	1	0	0	1	0	1	0.855	0.596	P9NG
11	1	0	1	0	1	1	0.847	0.602	P8NTI
12	1	0	1	1	0	1	0.844	0.596	P13BG
13	1	1	0	0	1	1	0.834	0.752	P22BTI
6	0	1	0	1	0	1	0.798	0.596	P6BTI
9	1	0	0	0	0	5	0.713	0.556	P5BTI, P12BG, P19BTI, P21BTI, P25BG
3	0	0	1	0	0	1	0.614	0.166	P1NG
2	0	0	0	1	0	5	0.546	0.179	P2BG, P3NTI, P4NG, P16NG, P17BG
1	0	0	0	0	?	0	—	—	—
4	0	0	1	1	?	0	—	—	—
5	0	1	0	0	?	0	—	—	—
7	0	1	1	0	?	0	—	—	—

**Table 6.** Solution for Outstanding Performance<sup>2</sup>

Configurations →	Path 1	Path 2	Path 3
	T*RA	RA*CM*S	T*CM*~S
Consistency	0.845	0.823	0.901
Raw coverage	0.594	0.377	0.485
Unique coverage	0.109	0.028	0.135
Solution consistency		0.823	
Solution coverage		0.757	

term<sup>3</sup> is identical to the conservative solution term presented above, whereas the most parsimonious solution term only shows minor differences (see also [appendix B](#)).

The first configuration consists of the combination of trust and good risk allocation (T\*RA). It suggests that after a clear risk allocation has been determined mutual trust between partners throughout the project is sufficient to result in outstanding performance. The second configuration (RA\*CM\*S) combined two “hard” conditions (risk allocation and strict application of sanctions) with one “soft” condition (conflict management). If there are fair and clear agreements regarding risk allocation, which are enforced (through strict application of sanctions), and there are agreements on how to proceed in case of disagreement or

conflict, high levels of trust are not essential. Finally, the third configuration (T\*CM\*~S) is all about relational aspects, thus combining “soft” conditions such as trust and conflict management, with the absence of strict application of sanctions. This configuration indicates that relational aspects are very important for the success of PPPs. When partners trust each other and have a well-organized conflict management with early attention given to sensitive issues, the absence of strict application of sanctions is necessary to provide partners with the opportunity to propose a solution based on their good relationship. The flexibility implied by the absence of strict application of sanctions is used to create solutions that enhance PPP project performance. Mutual trust ensures that this flexibility does not lead to opportunistic behavior from either one of the partners.

Closer study of the configurations shows that only projects P19BTI, P21BTI, and P25BG are not explained by this solution formula. These projects display high levels of trust, but are not in the set for any of the other conditions. Although these cases have an outstanding performance, two other PPP projects (P5BTI, P12BG) with the exact same set membership scores in the conditions fail to deliver. Four of the other projects with outstanding performance are uniquely covered cases, meaning that they hold a membership value higher than 0.5 in only one sufficient path ([Schneider and Wagemann 2012](#)). For the first path (T\*RA), these are P22BTI and P23NG. Case P20NG is only covered by path 2 (RA\*CM\*S), and case P8NTI only holds a membership value over 0.5 in path 3 (T\*CM\*~S). As a result, the unique coverage is rather low, especially in path 2. Only 2.8% of the outcome is explained specifically by this path because three of the four cases covered by path 2 also display high levels of mutual trust (T). These cases are therefore also covered by path 1, so the three paths partially overlap. Several cases hold

<sup>2</sup> Note: The symbol “~” before a letter refers to the absence of a condition.

So, in path 2, the S refers to the presence of strict application of sanctions, whereas in path 3, ~S indicates the absence of strict application of sanctions.

<sup>3</sup> The intermediate solution term (T\*RA &#x002B; RA\*CM\*S &#x002B; T\*CM\*~S) includes the expectation that all conditions have a positive effect on the outcome. The most parsimonious solution term (T\*RA &#x002B; RA\*CM &#x002B; T\*CM\*~S) shows minimal differences from both other solution terms.

a membership value higher than 0.5 in multiple paths (e.g., projects P7NTI, P14NTI, and P24BG). These cases are always explained by path 1 (as a combination of paths 2 and 3 is impossible). As a result, path 1 consists of a mix of different projects where there usually is both a decent relationship between partners and well-considered agreements on the execution of the project. The difference between all cases covered by path 1 might be explained by the way projects deal with the use of sanctions. In some projects, it is commonly accepted to impose sanctions strictly as it is in line with earlier made agreements. Applying sanctions consistently thus results in clarity and predictability and therefore is not considered to be negative. These projects are covered not only by path 1, but also by path 2. Projects that are covered by both path 1 and path 3 are inclined to be less strict in the application of sanctions as a token of good will, for example, when an issue does not cause any hindrance to the project partners or other stakeholders. Furthermore, path 3 stands out as it is the only path that does not display a combination of contractual and relational aspects. Instead, it builds on both relational conditions, trust and conflict management. The case that is uniquely covered by this path is very conscious of the importance of good personal relations between partners. Therefore, it pays a lot of attention to the relationship between the partners and organizes activities to build up and maintain good relations and high levels of mutual trust. This is much less the case for the project that is uniquely covered by path 2. The focus is predominantly on the final product. The relationship between client and contractor is not so much a “we’ll work it out together” attitude, but more business-like. Although a good relationship is possible, this is not the main focus of the partners working in the project.

Moreover, as the cases in our study consist of different types of PPP projects in two different countries, we tested the outcomes for the existing clusters in our data to see whether the results vary over the different clusters (see also [appendix B](#)). It is noticeable that there seems to be little difference across countries or project types. The analysis shows no signs of strong differences across country or between project types. There is only a small degree of heterogeneity between country and project type for the path  $RA^*CM^*S$ . Finally, we did a cluster analysis for differences between cases on a local and national level. The analysis shows no sign of differences between these clusters.

## Conclusion and Discussion

The aim of this article was to study how contractual and relational aspects complement and strengthen each other in successful PPP projects. The analysis shows three different mixes of conditions that match

with high-performing projects, indicating that there are multiple ways to achieve successful PPPs. In two of the three pathways, contractual and relational conditions are combined. This applies to path 1, which suggests a mix of trust (T) and risk allocation (RA), and path 2, which combines risk allocation (RA), conflict management (CM), and the strict application of sanctions (S). These configurations are in line with the theoretical expectations in earlier studies (e.g., [Edelenbos and Eshuis 2012](#); [Poppo and Zenger 2002](#)) and show that contractual and relational conditions can indeed function as complements. The third path ( $T^*CM^*S$ ) puts more emphasis on the importance of relational aspects. Our findings confirm our expectations that no single condition alone is necessary or sufficient for outstanding performance. A mix of different conditions is needed. Moreover, there are several combinations that form a good match in successful PPPs. This seems to us an important theoretical contribution to the scientific debate. Various causal pathways are possible, and we need to further deepen our knowledge on these pathways and our understanding of how they work.

Comparing the results to our earlier theoretical expectations, a few things stand out. First, the theory of incomplete contracting holds. Our analysis shows that contractual aspects have to be complemented by relational aspects. So, this study confirms our expectation that  $RA^*S$  is not sufficient for the outcome. Simultaneously, at least one of the relational conditions, (T &#x002B; CM) is necessary for outstanding performance. In path 1, trust complements the allocation of risks, and in path 2, conflict management complements both contractual conditions. We also find the expected combination of  $RA^*T$  in the study. The combinations  $RA^*CM$  is only sufficient combined with the strict application of sanctions. A second issue that stands out is that although contractual aspects need to be complemented with relational aspects, our study also suggests that a mix of both is not strictly necessary. Path 3 attaches far greater importance to relational aspects ( $T^*CM^*S$ ). The flexibility that occurs when partners refrain from strict application of sanctions can—if combined with high levels of trust and good conflict management—result in outstanding performance. This means that our initial expectation that either risk allocation or strict application of sanctions ( $RA^*S$ ) is necessary for outstanding performance is refuted. One of the main theoretical contributions of this article thus relates to the role of relational aspects. Relational aspects do not only complement contractual aspects, but a combination of only relational conditions can be sufficient to achieve successful PPPs. Third, our theoretical expectation that trust and a strict application of sanctions are incompatible does not hold.

The three paths do not rule out the combination of trust and strict application of sanctions, despite our earlier expectations (see also Ring and van der Ven 1992). For example, some cases covered by the combination of path 1 (T\*RA) do apply sanctions strictly (S), whereas other cases covered by path 1 are more lenient (~S). Therefore, the conditions S is removed in the process of minimization. The same applies with trust in path 2. So, there are several successful PPP projects that display high levels of trust and apply sanctions strictly. Perhaps, strict but consistent application of sanctions makes partners predictable, which might lead to more trust. We could also argue that high levels of trust help to accept sanctions, as one would not believe that their partner would impose sanctions just for their own gain. Finally, this article includes important theoretical lessons on the role of trust in PPP performance. Two out of three configurations include trust as a so-called INUS condition,<sup>4</sup> and the path without trust (RA\*CM\*S) has only limited unique coverage. In our study, only one project (P20NG) is explained exclusively by this path. This confirms the important role scholars attach to trust in PPPs (e.g., Ansell and Gash 2008; Klijn, Edelenbos, and Steijn 2010). However, our results also show that trust is not a necessary condition for outstanding performance. There are alternatives; if trust is lacking, other mechanisms have to be inserted to manage uncertainty in the project.

As with any study, this study also has its limitations. In the first place, there are some limitations in assessing outcomes for PPP projects. One limitation concerns the uncertainty and dynamics in these complex PPP projects. As the projects are still ongoing (most in the operationalization phase), their performance as assessed in this study is not their final performance. Things might change over time, which might result in a different set membership in the conditions or the outcome. This QCA only provides a snapshot of the projects and thus provides no guarantee for future performances of these PPP projects. Another limitation concerns the risk of reversed causality. Especially given the reciprocal relationship between trust and performance, reversed causality might be possible in our study. After all, theoretical arguments about the relationship between performance and trust can be made both ways. In the formulation of the questions to the respondents, we tried to limit the risk of reversed causality. For example, our questions about performance refer to performance at this very moment, whereas the questions referring to trust suggest a longer time span. These questions are supposed to be answered with the construction phase in mind

and aim to measure trust over the past period. More importantly, even in case of reversed causality, the conclusions of this study hold. Trust, here analyzed as an important condition for outstanding performance, after all remains important, even if trust is caused by previous performance. Nevertheless, reversed causality remains a risk we are not able to completely exclude in this study. A third limitation is that we have not been able to explain all empirical cases with outstanding performance. Moreover, there are two cases that are deviant consistency in kind. They are more out than in the set of “outstanding performance,” but, nevertheless, display a promising combination of conditions. This probably means that there are other conditions beyond the scope of this article that potentially contribute to the explanation of PPP performance. Due to the restrictions of the QCA method, our analysis of 25 cases can only include a limited number of conditions. Discussing possibilities for future research should include adding different conditions to the test that could potentially contribute to a fuller explanation of PPP performance and further in-depth case study to deepen our knowledge about the configurations that are present in successful PPPs.

Despite its limitations, this study has important theoretical and empirical implications. Theoretically, this study contributes by providing specific combinations of contractual and relational conditions. These combinations provide new insights into the dynamics between contractual and relational governance, and the role of trust herein. These findings also have important implications for practice, namely that no simple clear-cut roads to outstanding performance exist. The dynamics and uncertainty in PPPs might require different configurations of conditions, and these configurations might change during the project’s lifecycle. This implies that decision makers and managers need to be reflective and should understand what is needed given the conditions present. Project managers should therefore have the capabilities and skills to alternate between various types of management, without becoming unpredictable and untrustworthy to their partners. Despite the dynamics and uncertainties in PPP projects, a good relationship and a shared understanding on agreements regarding the realization (and maintenance) of the project might help dealing with the issues partners face in PPPs. Projects that are able to realize one of the different combinations stemming from the “mix and match” in our analysis are taking a step in the right direction toward outstanding performance.

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4 An INUS condition is an insufficient but necessary part of a condition that in itself is unnecessary but sufficient for the occurrence of the outcome (Schneider and Wagemann 2012).



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## Appendix A. The Calibration Procedure

This appendix provides further details about the calibration of the four conditions (risk allocation, the application of sanctions, conflict management, and trust) and the outcome (outstanding performance).

### Outstanding Performance

In this article, we have defined successful PPPs as projects with outstanding performance (OP). In an earlier

attempt, successful PPPs were defined as “good performance,” but many projects scored reasonably well, leading to too little variation between the projects. Therefore, we raised the bar, wondering what distinguishes exceptionally good projects from poor or reasonable performing PPP projects. Outstanding performance was calibrated using four conditions:

- On time delivery
- On budget delivery
- Value for money
- Satisfaction

The first three conditions are calibrated individually for each project. A score of zero means that respondents agree that the criteria have not been met (e.g., no on-time delivery or no on budget delivery). If respondents agree that the criteria have been a scores of one is given. When respondents partially agree with the statement, or if there are minor differences of opinion (e.g., one actor totally agrees that value for money has been delivered, whereas the other only partially agrees), the project will receive a score of 0.67. Large differences of opinion between partners (e.g., the public partner agrees that the project was delivered on budget, but the private partner strongly disagrees with this statement) will result in a score of 0.33.

The initial score for the project is then determined according to the following scheme:

These initial scores are corrected using the indicator satisfaction. Satisfaction is calibrated in the same way as the other three conditions. Satisfaction scores can be used to adept the initial score. If the difference between the assessment of the “traditional” performance measures and the satisfaction of the partners with the project is substantial, qualitative interview data are used to provide information on whether respondents merely try keeping up appearances by giving a high satisfaction score or whether they have other reasons to be satisfied with the project

**Table A1.** Calibration of Individual Indicators for “Outstanding Performance”

Situation	Calibration OP
All three conditions are calibrated with a 1	1
All conditions have a score above the cross-over point, but at least one of them scores 0.67	0.67
One out of three conditions scores below the cross-over point. The other two score above the cross-over point.	0.33
Two or three out of three conditions score below the cross-over point.	0

**Table A2.** Calibration of “Outstanding Performance”

Project	On time delivery	On budget delivery	Value for money	Initial score	Satisfaction	Final score
P1NG	0.51	0.00	0.33	0.00	0.67	0.00
P2BG	0.33	0.33	0.67	0.00	0.67	0.00
P3NTI	1.00	0.33	0.67	0.33	0.33	0.00
P4NG	0.33	0.33	1.00	0.00	0.33	0.00
P5BTI	0.33	1.00	0.33	0.00	0.67	0.00
P6BTI	0.51	1.00	0.33	0.33	0.67	0.33
P7NTI	1.00	0.33	1.00	0.33	1.00	0.67
P8NTI	0.51	0.51	1.00	0.67	0.67	0.67
P9NG	1.00	0.33	0.67	0.33	0.67	0.33
P10BTI	1.00	0.33	1.00	0.33	1.00	0.33
P11NTI	1.00	0.33	1.00	0.33	1.00	0.33
P12BG	0.00	1.00	1.00	0.33	1.00	0.33
P13BG	0.67	0.33	1.00	0.33	1.00	0.33
P14NTI	1.00	0.33	1.00	0.33	0.67	0.67
P15NTI	0.51	1.00	1.00	0.67	0.67	0.67
P16NG	0.33	0.33	1.00	0.00	0.67	0.33
P17BG	0.33	0.33	0.67	0.00	1.00	0.33
P18NTI	1.00	0.67	1.00	0.67	1.00	1.00
P19BTI	1.00	1.00	1.00	1.00	1.00	1.00
P20NG	0.67	1.00	1.00	0.67	1.00	0.67
P21BTI	1.00	0.67	1.00	0.67	1.00	0.67
P22BTI	1.00	1.00	1.00	1.00	1.00	1.00
P23NG	1.00	0.67	1.00	0.67	1.00	0.67
P24BG	1.00	1.00	1.00	1.00	1.00	1.00
P25BG	1.00	1.00	1.00	1.00	1.00	1.00

performance. This finally results in the “final score” for outstanding performance.

#### Risk Allocation

For the calibration of the condition risk allocation, we used a relatively straightforward method, determining the scores on the number and type of tasks that were transferred to the private partner or deliberately remained a responsibility of the private partner. We limited ourselves to the formal risk allocation. However, we also tested a calibration using a combination of aspects on risk allocation, namely the formal risk allocation and the perceptions on the fairness of this allocation. However, this way of calibrating the data leads to very paradoxical scores. In projects where partners pay attention to a proper risk division, the partners are also well aware of the fact that partners are sometimes unable to carry the risks they have been given. In projects where only limited attention was given to risk division, and the private partner carried most of the risks, both partners were less worried about the question whether partners would be able to deal with the consequences of these risks. This resulted in lower scores for the first group on “proper risk allocation” and higher scores for the second group, which does not reflect the basic theoretical assumptions underlying this condition.

#### Strict Application of Sanctions

In the calibration of this condition data stems from the survey data, using the statement: “We sometimes deviate from the sanctions as described in the contract to maintain a good relationship between the partners involved in the project.” Furthermore, qualitative interview data are used to distinguish the reasons for imposing or remitting sanctions to determine the set membership score on the condition “strict application of sanctions.” If there is a strict application of sanctions, sanctions will always be applied if the monitoring process shows that performance does not live up to the required standards. If there is no strict application of sanctions, sanctions are not always applied. Sometimes sanctions are canceled due to circumstances or because the shortcomings are beyond the power of the partner to prevent them. A project with a full membership score of 1 in the set “strict application of sanctions” can be defined as “*a project in which obligatory sanctions are imposed without any exceptions. The optional sanctions are usually imposed, unless there are very compelling reasons not to. There are no or limited options to discuss the sanction.*” A project with a score of 0 would mean that “*optional sanctions are hardly ever imposed, while obligatory sanctions are avoided as much as possible. There would be many examples in the project of sanctions not being imposed, even if there was an opportunity to do so.*”

### Conflict Management

The calibration of the condition conflict management is done using a Generic Membership Evaluation Template suggested by Tóth et al. (2017). This allows us to provide a clear overview of the qualitative data on this condition per project. Differences between actors can be included in the form. Table A3 provides an example of the GMET for the condition conflict management.

Guidelines toward the decision of the set membership score for each project in 4-value fuzzy set:

- 1: Overall intense and various positive dimensions  
The project had both formal and informal agreements on conflict management, the agreements were focused on both prevention and solving conflicts, the agreements were made early in the process, and there was early attention for potential “sensitive” issues.
- 0.67: Mostly positive dimensions with a few negative dimensions  
For example, a project has both formal and informal agreements on conflict management, focused on preventing and solving conflicts, and there was some attention to “sensitive issues.” However, the agreements were only installed after a conflict arose during the construction phase.
- 0.33: Mostly negative dimensions with a few positive dimensions  
For example, a project has both formal and informal agreements on solving conflicts that have been

established early in the process. However, there is no early attention for potentially sensitive issues, and there are no agreements made on how to prevent the rise of conflicts.

- 0: Overall intense and various negative dimensions

### Trust

In determining the set membership score for the condition trust, survey data on five statements (see below) are used. The statements are as follows:

1. To what extent do the partners involved in this project fulfill their agreements?
2. To what extent do the partners involved in this project give each other the benefit of the doubt?
3. To what extent do the partners involved take each other’s interests into account?
4. To what extent can the partners involved in this project assume that the intentions of the other partner are in principle good?
5. To what extent do the partners involved in this project use the efforts of the other partner for their own gain (at the expense of joint goals)?

### Results

The result of the calibration procedure is showed in [table A4](#).

**Table A3.** GMET Used to Calibrate “Conflict Management”

Generic Membership Evaluation Template (GMET)				
Membership in the set of “good conflict management”				
Overall case description from a “conflict management” perspective	<i>Here, we give a description of the case in terms of conflict, differences of opinion, and the way the partners in the project deal with them.</i>			
Dimensions	Context-specific description	Direction/effect on membership	Intensity/relative importance	Illustrative quotes
Nature of agreements on conflict management	<i>Description of the presence of this dimension in the case</i>	<i>Negative, neutral, or positive</i>	<i>High, medium, or low</i>	<i>State quotes from the interviews</i>
Focus of the agreements on conflict management				
Timing of agreements on conflict management				
Early attention for potential “sensitive issues”				
Supportive quantitative data	<i>Here, we include the scores of the respondents in the case based on the statements: “Conflicts between public and private partners are resolved constructively” and “The partners involved in the project succeeded in controlling differences of opinion in an adequate matter.”</i>			
Set membership in 4-value fuzzy set	<i>Here, we insert our score on the 4-value fuzzy set</i>			
Reason for fuzzy-set attribution score	<i>Give a qualitative explanation for scoring the project with the abovementioned membership score.</i>			



**Table A4.** Results of the Calibration Process

Project	Risk allocation (RA)	Strict application of sanctions (S)	Conflict management (CM)	Trust (T)	Outstanding performance (OP)
P1NG	0.00	0.33	0.67	0.00	0.00
P2BG	0.00	0.67	0.00	0.00	0.00
P3NTI	0.33	0.67	0.33	0.00	0.00
P4NG	0.00	0.67	0.33	0.33	0.00
P5BTI	0.33	0.00	0.33	0.67	0.00
P6BTI	0.67	1.00	0.00	0.33	0.33
P7NTI	0.67	0.33	1.00	0.67	0.67
P8NTI	0.33	0.00	1.00	0.67	0.67
P9NG	0.00	1.00	0.00	0.67	0.33
P10BTI	0.67	1.00	0.33	0.67	0.33
P11NTI	0.67	0.67	1.00	1.00	0.33
P12BG	0.33	0.33	0.33	0.67	0.33
P13BG	0.00	0.67	0.67	0.67	0.33
P14NTI	1.00	0.33	1.00	0.67	0.67
P15NTI	1.00	1.00	1.00	1.00	0.67
P16NG	0.33	0.67	0.33	0.33	0.33
P17BG	0.00	0.67	0.33	0.33	0.33
P18NTI	1.00	0.00	1.00	0.67	1.00
P19BTI	0.33	0.33	0.33	0.67	1.00
P20NG	1.00	0.67	1.00	0.33	0.67
P21BTI	0.00	0.33	0.33	0.67	0.67
P22BTI	1.00	0.33	0.33	0.67	1.00
P23NG	0.67	1.00	0.00	0.67	0.67
P24BG	0.67	1.00	0.67	0.67	1.00
P25BG	0.00	0.33	0.33	1.00	1.00

## Appendix B. Additional Analysis

### Most Parsimonious Solution Term and the Intermediate Solution Term

In the analysis, we also produced the most parsimonious solution term. This includes a simplifying assumption on truth table row 7. The most parsimonious solution term is only slightly different from the conservative solution term (see [table B1](#)). Based on the theoretical expectations that all four conditions in their presence contribute to outstanding PPP performance, the intermediate solution term is created. This creation results in exactly the same solution term as the conservative solution term presented earlier (see [table B2](#)).

### Cluster analysis for Different Countries, Project Types, and Government Levels

To check the results for existing clusters in our data, we performed additional analysis to see whether the results vary over the different clusters. For the clustering based on country, both the pooled consistency and the cross-sectional consistency for each individual country in the set are rather high (see also [table B3](#)). Only the consistency for the Dutch cases in the configuration RA\*CM\*S is below the generally accepted threshold of 0.75 (see also [Ragin 2008](#)). Important is also the distance between the consistencies, and the

**Table B1.** Most parsimonious solution term

Configurations →	Path 1	Path 2	Path 3
	T*RA	RA*CM	T*CM*~S
Consistency	0.845	0.770	0.901
Raw coverage	0.594	0.540	0.485
Unique coverage	0.109	0.054	0.135
Solution consistency		0.784	
Solution coverage		0.783	

**Table B2.** Intermediate solution term

Configurations →	Path 1	Path 2	Path 3
	T*RA	RA*CM*S	T*CM*~S
Consistency	0.845	0.823	0.901
Raw coverage	0.594	0.377	0.485
Unique coverage	0.109	0.028	0.135
Solution consistency		0.823	
Solution coverage		0.757	

overall consistency. If this distance is close to zero, this indicates that the consistencies are (almost) identical between the countries ([Garcia-Castro and Arinõ 2016](#)). The results show that most configurations hold for both the Dutch and the Belgian cases. The differences in terms of consistency are limited (see

**Table B3.** Cluster Analysis Between Countries

	T*RA	T*CM*~S	RA*CM*S
Pooled consistency	0.845	0.901	0.823
Consistency for Belgian cases	0.799	0.875	1.000
Consistency for Dutch cases	0.875	0.918	0.727
Distance from between to pooled	0.032	0.017	0.112

table B3). For the first two configurations (T\*RA and T\*CM\*~S), this is close to zero, indicating that there are no differences between countries with regard to these configurations. The adjusted distance of 0.112 for the configuration RA\*CM\*S indicates some of heterogeneity across countries. Because all distances between consistencies are below 0.2, none of the adjusted distances suggest the existence of strong differences across country in the dataset (Garcia-Castro and Arinõ 2016).

For the clustering between types of project (transport vs. social infrastructure), the analysis shows that the consistency scores are rather good, except for the consistency for the transport infrastructure PPPs in the configuration RA\*CM\*S. With 0.726, this is just below the threshold of 0.75. Only the adjusted difference for the configuration RA\*CM\*S shows some heterogeneity, but none of them suggests the existence of strong differences between the two types of cases (see table B4).

Finally, we also tested for differences between the local and the national level. All consistency scores, both the pooled consistency and the between consistencies are above the threshold of 0.75. Moreover, none of the adjusted distances indicates heterogeneity (see table B5). There is no sign of differences between the cases on a local and national level.

#### Robustness Tests

Despite all efforts to provide a solid calibration of the conditions used in this study, the risk of potential measurement errors remains. As most conditions in this study are calibrated using qualitative interview data and in-depth case knowledge, it is hard to artificially determine different thresholds. Moreover, alternative calibration without harming the underlying (theoretical) principles is not always possible. However, to test for potential measurement errors, we performed two robustness tests using different calibrations of the conditions “trust.” The conditions trust is only based qualitative survey data, which allows us to change the threshold more easily. In the first robustness test, the same five indicators for trust are included, but the thresholds are altered. The cross-over point of

**Table B4.** Cluster Analysis Between Project Types

	T*RA	T*CM*~S	RA*CM*S
Pooled consistency	0.845	0.901	0.823
Consistency for social infrastructure PPPs	1.000	0.857	1.000
Consistency for transport infrastructure PPPs	0.789	0.924	0.726
Distance from between to pooled	0.084	0.026	0.112

**Table B5.** Cluster Analysis Between Cases on Local and National Level

	T*RA	T*CM*~S	RA*CM*S
Pooled consistency	0.845	0.901	0.823
Consistency for national level PPPs	1.000	1.000	1.000
Consistency for local level PPPs	0.809	0.883	0.785
Distance from between to pooled	0.075	0.044	0.085

0.5 in the original condition trust (T) was set at 30.5. In the alternative calibration of trust (T2), we altered the cross-over point to 33. The threshold determining the difference between a membership score of 0 and a score of 0.33 changed from 25.25 to 22. The threshold determining the difference between a membership score of 0.67 and 1 remained at 40. Using these thresholds, we performed a new analysis. The analysis of necessity had the same results as the original analysis. The truth table displayed a few differences. Truth table rows 10, 11, and 12 were not regarded as sufficient for the outcome in the analysis using T2 due to inclusion cuts below 0.8. As we excluded rows 10 and 12 in the original analysis due to the presence of deviant cases consistency in kind, not including row 11 remains the only difference. Although the set membership score of the case in row 11 remains the same, the inclusion cut for this row drops below 0.8. This results in a different solution formula (see table B6 below) in which the third path disappeared. This can be explained easily, as the case covered in truth table row 11 was the only uniquely covered case in path 3. Paths 1 and 2 remain exactly the same.

In the second robustness test, we included only four indicators for trust. These four indicators were formulated in a positive way. The only statement that was formulated in a negative way was excluded, as respondents might overlook the negative phrasing of this statement and score it similar as the four positive statements. As the maximum score now changed from 50 to 40, we also altered the thresholds. The cross-over point of 0.5 in the original condition trust (T) was set

**Table B6.** Conservative Solution Term, Using T2 Instead of T

Configurations →	Path 1	Path 2
	T*RA	RA*CM*S
Consistency	0.845	0.823
Raw coverage	0.594	0.377
Unique coverage	0.245	0.028
Solution consistency	0.821	
Solution coverage	0.622	

at 30.5. In this alternative calibration using only four indicators (T3), the cross-over point is 28. The threshold determining the difference between a membership score of 0 and a score of 0.33 changed from 25.25 to 19.9. Finally, the threshold determining the difference between a membership score of 0.67 and 1 changed from 40 to 34. Using T3 as an alternative calibration of trust, the results of the analysis were almost identical to the original analysis. Both the analysis of necessity and the conservative solution term in the analysis of sufficiency are identical to the original analysis (see [table B7](#)). The only difference is that some of the truth table rows had a slightly higher inclusion cut, but as the same rows remained included in the analysis, this is not a substantial change.

**Table B7.** Conservative Solution Term, Using T3 Instead of T

Configurations →	Path 1	Path 2	Path 3
	T*RA	RA*CM*S	T*CM*~S
Consistency	0.845	0.823	0.901
Raw coverage	0.594	0.377	0.485
Unique coverage	0.109	0.028	0.135
Solution consistency		0.800	
Solution coverage		0.757	

Based on the results of the robustness tests as described above, we would argue that the results of our analysis are fairly robust. The changed calibration of the conditions trust had no major effect as the results are close to the original. The use of the altered condition T3 resulted in an identical conservative solution formula. It displayed the same INUS conditions. The results for the analysis using T2 were not as good, but still satisfying as the new solution did not contradict the old one. Moreover, the new solution formula was a subset of the original conservative solution formula. Therefore, both solutions are in a set relation, which indicates that the results are fairly robust (see [Skaaning 2011](#); [Schneider and Wagemann 2012](#)).