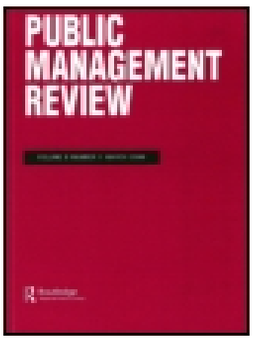

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What makes public-private partnerships work? Survey research into the outcomes and the quality of cooperation in PPPs

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ABSTRACT

Public–private partnerships (PPPs) are often regarded as the solution for time and budget overruns in large infrastructural projects, but not all are successful. This raises the question of what really makes PPPs work. Focusing on the role of relational aspects, this article examines the degree to which trust and managerial activities correlate to the perceived performance and cooperation process in PPP projects. A multilevel analysis of survey data from 144 respondents involved in Dutch PPP projects shows that both trust and management correlate significantly to the perceived performance of these projects. Moreover, trust is associated with a good cooperation process.

KEYWORDS Public–private partnerships; PPP; trust; management; collaborative governance

Introduction: trust and management as conditions for successful PPP

The last two decades have seen a growing trend towards the use of public–private partnerships (PPPs) to provide service delivery and realize large infrastructural projects. The suggestion that PPPs can realize more innovative projects more efficiently than traditional procurement forms is at the heart of this trend (Ghobadian et al. 2004; Hodge, Greve, and Boardman 2010). Especially in the transport infrastructure sector – where projects are often confronted with time delays and cost overruns (e.g. Flybjerg 2007; Cantarelli 2011) – PPPs are used frequently. Just like the increased use of PPPs in daily practice, the academic interest in this phenomenon has grown.

Much research has been carried out on PPPs, but no generally accepted understanding of the concept exists (Hodge and Greve 2007). Nonetheless, some aspects, including durable cooperation between public and private entities, shared risks, and joint production of either services or products, are shared in most definitions (see Savas 2000; Klijn and Teisman 2003; Hodge and Greve 2005). Although a variety of definitions of the term public–private partnership have been suggested, this article uses the definition proposed by Klijn and Teisman (2003, 137), who defined a PPP as a 'cooperation between public and private actors with a durable character in which

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actors develop mutual products and/or services and in which risks, costs and profits are shared'. The variety of definitions possibly results from the many forms that PPP may take. From loosely coupled collaborations to strict contract-based partnerships, PPPs come in different shapes and sizes. Within this diversity, we focus on one of the most discussed forms: the DBFM(O) project. This type of partnership is characterized by long-term contracts integrating the different aspects of construction projects: the design, building, financing, maintaining, and – occasionally – the operation of the project (Van Ham and Koppenjan 2002).

Research into PPPs has shown their potential but has also revealed mixed views on whether their supposed benefits work out in daily practice (e.g. Hodge and Greve 2005; Hodge and Greve 2007). A much-debated question is what really makes these contract-based partnerships work. In much of the literature, the relative importance of the contractual form and the incentives within the contract are deemed relevant (e.g. Savas 2000; NAO 2002; Steijn, Klijn, and Edelenbos 2011). On the other hand, there is a growing body of literature that recognizes the importance of the relationship between contractual partners. These scholars highlight the importance of trust and managerial effort in establishing successful PPP projects (e.g. Huxham and Vangen 2005; Kort, Verweij, and Klijn 2016). In another article, we analysed the impact of contractual characteristics on DBFMO (Design, Built, Finance, Maintenance and Operating) partnerships (see Klijn and Koppenjan 2016b) and concluded that they were not significantly related to the (perceived) outcomes of partnerships. Using the same data – a survey among PPP professionals in the Netherlands – this article explores the other hypothesis: that the relationship between the partners is pivotal in successful PPPs.

Thus, this study sets out to assess the significance of relational aspects, more specifically the role of trust and managerial effort, for PPP performance. Therefore, the central question in this article is as follows: *What is the influence of trust among contracting parties in public–private partnership projects and the managerial effort in the project on the (perceived) performance of PPPs*?

This article first gives a brief overview of the theoretical arguments for the influence of trust and management on PPP performance. It then goes on to discuss the research design and methodology of our study. The fourth section is concerned with the results of the analysis. Finally, we present the conclusions and reflections on the research.

Why trust and management matter in PPP

This section first elaborates on the idea of performance in relation to PPP. It then deals with the question of why trust and managerial effort are potentially important for PPP performance. It concludes with some hypotheses that are tested against the survey data.

PPP: better performance and more cooperation

PPPs entail assumptions about better value for money and superior performance compared to more traditionally tendered projects (see Savas 2000; Hodge and Greve

2005). Nevertheless, the question remains as to how to define good performance. PPP performance can be conceptualized in roughly two ways.

On the one hand, a narrow definition of performance includes the achievement of particular targets and the efficiency in achieving those targets, such as on-time and on-budget delivery and increased efficiency, thanks to life cycle optimizations. In contract-based PPPs, these targets can be found in the contract. The issue with this narrow definition is that it provides information on only a small part of the project. Scholars argue that project performance can also be conceptualized more broadly 'beyond the contract.' Focusing on the wider support for the project and the durability of the solution for the future adds an extra dimension to the concept of performance. As various scholars argue, several distinctive criteria are needed to assess PPP performance (e.g. Van Ham and Koppenjan 2002; Skelcher and Sullivan 2008). We follow that line of thought by combining five dimensions in measuring PPP performance. These dimensions have often been mentioned by scholars in earlier research (e.g. Skelcher and Sullivan 2008; Steijn, Klijn, and Edelenbos 2011) and include effectiveness of the solution offered, support, integral character of the solution, robustness (durable solution for the future), and cost effectiveness (efficiency).

It is striking that both the narrow definition and the broader definition focus only on the outcome of the project by measuring performance. The crucial argument in the 'grey literature' (including audit commission pieces, consultancy reports, and policy documents) is that long-term contracts and private involvement lead to better cooperation and relations between (public and private) partners; this is also relevant for good PPP performance (see NAO 2002; Algemene Rekenkamer 2013). To take into account good cooperation as part of PPP performance, this study includes a number of indicators that focus on the cooperation between public and private actors (based on, for example, Huxham and Vangen 2005; Skelcher and Sullivan 2008). These include the resolution of conflicts between partnerships, the presence of deadlocks, and the gradual course of cooperation between partners during the entire process.

So, performance is not merely about on-time and on-budget delivery. It is a combination of good outcomes and good cooperation that will result in successful PPPs.

Trust in PPPs

One of the most important scholars of neo-institutional theory, an important theoretical underpinning of PPP, Williamson argues that trust is a more or less redundant concept in economic transactions based on contracts (Williamson 1996). However, a wide and prominent part of the literature on contractual relations and alliances contradicts this statement, emphasizing the importance of trust in partnerships. This section provides more insight into the trust concept, explaining the concept and its relevance for PPPs.

As an intensively studied concept, trust is defined in many ways. In spite of the variety of definitions of trust, generally there is agreement on the idea that to trust a person is to expect that the other will refrain from opportunistic behaviour, even if the opportunity arises (Deakin and Michie 1997; Deakin and Wilkinson 1998). The trusting actor assumes that the other will take his/her interests into account, although he/she can never be certain about it (Rousseau et al. 1998; Nooteboom 2002). This

can be perceived as taking a risk, because the partner becomes vulnerable to opportunistic behaviour. This risk is taken in the belief that the other party can be trusted. When actors communicate openly about their intentions, honour existing commitments, or collaborate without misusing each other's vulnerabilities, trust will develop. Trust needs to be actively developed and maintained through interaction. Without interaction, trust will easily diminish (Giddens 1984; Nooteboom 2002).

Most authors agree that trust is inextricably related to risk. Without risk, the notion of trust is simply unnecessary (Rousseau et al. 1998; Lane and Bachman 1998; Nooteboom 2002). In contractual relations, partnerships, or other cooperative relations involving private and public actors, the actors are confronted with various risks. One of the risks is that an actor will abuse his power in the project or abandon the cooperation, forcing the other actor to bear the costs. The strategic complexities in PPP make it difficult for actors to foresee all the possible contingencies, reason them out, or calculate them accurately (Deakin and Wilkinson 1998; Koppenjan and Klijn 2004). If there is trust in the partnership, the actors no longer need to calculate all possible negative outcomes, because they expect the other party to take their interests into consideration. Trust is crucial for partnerships to function properly. Without trust, it is unlikely that actors will engage in risk-taking behaviour because it can be 'punished' by opportunistic behaviour. Therefore, it is more difficult to reach satisfactory outcomes (Bromily and Harris 2006; Klijn, Edelenbos, and Steijn 2010; Nooteboom 2002; Rousseau et al. 1998). So, our first theoretical conclusion is that trust is an indispensable concept when studying PPPs.

A vast amount of literature on the role of trust in alliances (e.g. Sako 1998; Bachman and Zaheer 2006) and collaborative governance (Huxham and Vangen 2005; Ansell and Gash 2008) presents several arguments for the importance of trust in partnerships. First, trust facilitates cooperation. Because trust creates greater predictability, it reduces the risks inherent in transactions and cooperative relations (Nooteboom 2002; Sako 1998). Trust also reduces the necessity for highly detailed contracts. Thick contracts are costly and often inadequate in complex cooperation processes (Miles and Snow 1986; Grabher 1993; Parker and Vaidya 2001). Therefore, very strict and detailed contracts are counterproductive for the development of creative ideas. When trust is present, partnerships can function with less detailed contracts, leaving more room for creativity (see Parker and Vaidya 2001). The third argument for the importance of trust is that trust solidifies cooperation. Trust increases the probability that actors will invest resources like knowledge, time, and energy in the partnership, even when the return on investment is uncertain. From an economic perspective, this would constrain actors from investing, but the presence of trust creates stability in the relationship. This compensates for the uncertainty in partnerships and creates a strong basis for long-term cooperation (Sako 1998; Parker and Vaidya 2001; Ring and Van Der Ven 1992). Fourth, trust enhances performance. As stated, trust stimulates the exchange of information and knowledge that is essential for facilitating the learning process and achieving new solutions (Nooteboom 2002). In the literature, there is broad consensus on the idea that a learning process in which actors exchange information and learn from one another is critical to develop new solutions (Schön and Rein 1994; Hajer and Wagenaar 2003). So, trust can be seen as an efficient way to lower transaction costs in collaborations (Parker and Hartley 2003). Trust therefore plays a major role in relational

contracting, where formal contractual agreements are combined with more informal social mechanisms. At its best, relational contracting is based on high levels of trust, cooperation, informality, and shared problem-solving. Despite the fact that many PPPs (including DBFMO projects) are based mainly on transactional contract-based relationships, aspects of relational contracting and trust-based relationships may occur in these partnerships (Reeves 2008).

The role of network management

Many scholars distinguish between project management (managing given contents and goals, and controlling time and budget) and inter-organization management, where both the relations between partners and those with the network around the project are managed (see Steijn, Klijn, and Edelenbos 2011). The latter form of management, often referred to as network management, is essential for organizing complex governance processes, such as PPP projects (McGuire and Agranoff 2011; Klijn and Koppenjan 2016a). Because of the complex nature of PPPs, network management activities or strategies are critical for achieving good outcomes (see O'Toole 1988; Steijn, Klijn, and Edelenbos 2011; McGuire and Agranoff 2011). This implies the use of internal management activities to manage the interactions between partners in the partnership, but also to manage the environment of the project. This argument builds on earlier research on strategic alliances that also emphasizes the importance of managing relational characteristics in order to achieve good results in partnerships (e.g. Niederkofler 1991; Borys and Jemison 1989).

If we see PPPs not only as an organizational construction but also as a network, the literature on network management is especially interesting because it also focuses on managing the network in which the project is embedded. In the literature on network management, frequently mentioned management and leadership strategies include initiating and facilitating interaction processes between actors (Friend, Power, and Yewlett 1974), for instance, by activating (or deactivating) actors and resources. Moreover, management strategies encompass the creation and change of network arrangements for better coordination (Scharpf 1978; Rogers and Whetten 1982) as well as the realization of new content and win–win situations (Mandell 2001), for example, by exploring new ideas, working with scenarios, organizing joint research, and joint fact-finding (Klijn and Koppenjan 2016a). Finally, management strategies also include guiding interactions (Gage and Mandell 1990; Kickert, Klijn, and Koppenjan 1997). The literature on collaborative governance and collaborative advantages mentions similar activities. Huxham and Vangen (2005) mention activities like mobilizing member organizations, dealing with power relations, empowering actors that can deliver collaborative aims, and trust building. Ansell and Gash (2008) mention strategies like committing to the process, creating shared understanding, and aiming for participatory inclusiveness.

Research shows that two types of network management strategies seem to have the most impact: exploring and connecting (Klijn, Edelenbos, and Steijn 2010; see, for comparable findings, Agranoff and McGuire 2003). Exploring strategies are aimed at creating and looking at new solutions, collecting (joint) information, organizing research, and combining conflicting points of view. Connecting strategies are aimed at activating actors and resources, linking actors together,

nurturing inter-organizational relations, and dealing with conflicts. We focus on these two strategies in this article.

Hypotheses about trust and management

The previous arguments lead us to the theoretical conclusion that trust, as an intention and a perception of actors, is positively correlated with performance in PPPs. Trust enables actors to share more information and innovate, and this results in better outcomes. Trust will also enhance the cooperation process, seen as cooperative activities. Actors will invest more in cooperation when the level of trust is higher, resulting in better cooperation between public and private actors. This results in the first two hypotheses:

H1: PPP projects with a higher level of trust between the public and the private partners will be characterized by a higher (perceived) performance.

H2: PPP projects with a higher level of trust between the public and the private partners will be characterized by better cooperation between the partners.

Network management strategies are expected to relate positively to both good performance and good cooperation. Intensive network management – by connecting actors and exploring content – will enhance the possibilities of actors finding satisfactory solutions and implementing them (better performance). Network management will foster cooperation, because coordination activities are being performed and attempts are being made to increase the mutual development of goals and the collection of information. We acknowledge that network management and trust could potentially influence each other over time. To deal with this issue, respondents were asked to rank the level of trust at the time of the survey. Respondents were asked to classify various network management activities in the project that had (usually) been performed in the past period. So, in our measurement, network management precedes trust. There are also theoretical arguments to perceive the relation in this way. Network management consists of deliberate, active interventions in the process to facilitate and stimulate the project interactions and outcomes, and to improve the relation between partners (see Klijn and Koppenjan 2016a; Huxham and Vangen 2005; McGuire and Agranoff 2011). So, from a theoretical point of view, this seems to be the most logical correlation. Thus, our next two hypotheses are as follows:

H3: The more network management strategies are employed in PPP projects, the better the projects will perform.

H4: The more network management strategies are employed in PPP projects, the better the cooperation between (public and private) partners will be.

Methodology

Survey and variables

The data used in this article stem from a survey (March 2014–June 2014) among Dutch practitioners involved in PPPs. In order to identify these practitioners, a list was compiled of all officially known PPP projects in the Netherlands by studying publicly available PPP databases in the Netherlands. These included databases of both ministries and ministerial support bureaus. So, the survey represents approximately the whole population of officially known Dutch PPP projects up to 2014. By including almost the entire population in our study, we avoid many of the issues with regard to representation as described in the total survey error framework (see, for example, Groves and Lyberg 2010 or Lee, Benoit-Bryan, and Johnson 2012). Coverage or sampling errors, which arise in the process of selecting a sample from a target population, are therefore most likely not present in our study. Subsequently, respondents who were directly involved in these projects were selected to participate in the study. These potential respondents worked mainly for the public commissioning authority or the private contractor, for example, as project manager, contract manager, or technical manager. However, respondents who were involved in an advisory role – working for consultancy or law firms – were also selected. All respondents were closely involved in (a specific phase of) one of the PPP projects.

In total, 343 respondents involved in 93 PPP projects received a request to fill in the survey. With a response rate of 46.6%, 144 respondents filled in the survey. These respondents worked for 68 different Dutch PPP projects, of which the majority were DBM or DBFM(O) projects. Consequently, the survey covered 73% of the then existing PPP projects in the Netherlands. Because of this response rate, the risk of nonresponse error might be less of an issue in this study (Lee, Benoit-Bryan, and Johnson 2012). With 144 respondents answering questions about 68 projects, there were multiple respondents per project. In the section on 'Data analysis,' we discuss the implications of the multilevel structure of the data for the data analysis. As stated, the respondents were mainly employed in public organizations (45.8%) or private contracting parties (27.1%). The other respondents worked either for consultancy firms (13.2%) or for non-profit organizations (11.8%) such as housing associations or resident associations. In small-scale local projects in particular, these stakeholders are involved in the project. The respondents had considerable experience working in complex projects, asserting that, on average, they had 14 years of experience with such projects. Some of the respondents were involved in multiple PPP projects, and so, each respondent was asked to select just one of their projects and answer all questions with that specific project in mind.

Measurement

Perceived project performance

The measurement of project performance poses some challenges. First of all, projects generally consist of various actors; this means that multiple goals are present within a single project. Because of the various actors' different interests, it is difficult to select one overarching goal in which all actors feel represented. Furthermore, projects usually have a lengthy time span. Consequently, actors' goals are likely to change over time consequent to a readjustment of preferences as a result of learning or goal displacement (Klijn

Table 1. Measurement of perceived project performance (Cronbach's alpha = 0.71).

Dimension	Term	Item
1. Integral nature of solution	INT	Different environmental functions have been connected sufficiently
2. Effectiveness of solution	EFF	Solutions that have been developed really deal with the problems at hand
3. Effectiveness in the future	FUT	Developed solutions are durable for the future
4. Support for solution	SUP	The project solutions are sufficiently supported by the involved organizations
5. Relation costs and benefits	RCB	In general, the benefits exceed the costs

and Koppenjan 2016a). Additionally, it is not possible to assess objective outcomes with surveys that measure respondents' perceptions. Therefore, perceived project performance is taken as a proxy for outcomes. In this approach, we follow the work of Klijn, Edelenbos, and Steijn (2010). Their measurement scales build on different dimensions of project performance, listed in Table 1. The mean score for perceived project performance, as rated by project respondents, is 4.00 (SD = 0.51) on a 5-point Likert scale, indicating a high satisfaction with the performance of their project.

Cooperation between public and private actors

As stated earlier in this article, the assumption behind PPPs implies that PPPs result not only in more efficient outcomes, but also in better cooperation between the partners. Therefore, the performance of PPPs should be measured not only in terms of outcomes, but also in terms of process. Therefore, this study includes process criteria in order to measure the cooperation between public and private actors in PPPs. As performance based on output is substantially different from good cooperation in the PPP process, the different indicators used to construct both variables cannot be combined. Although the correlation table (see Appendix A) points towards a medium correlation between the variables, an exploratory factor analysis, presented in the section on 'Network management', clearly shows that performance based on output and performance based on cooperation are different concepts and that both are also perceived differently by the respondents. Therefore, we include both concepts as two different variables in the analysis. The respondents' perceptions on output-based performance are referred to in this study as perceived project performance, and their perceptions of the process are labelled as cooperation. Regarding the process criteria, both the presence of deadlocks and the way conflicts are settled during the process are used as indicators for the quality of the cooperation between actors. Table 2 provides an overview of the dimensions used to measure cooperation, which has a mean score of 3.40 (SD = 0.76) on a 5-point Likert scale.

Table 2. Measurement of cooperation between public and private actors (Cronbach's alpha = 0.70).

Dimension	Term	Item
1. Managing internal conflicts	MIC	The actors involved in the network have succeeded in managing internal conflicts and disagreements in an adequate manner
2. Presence of deadlocks	PDE	I did not experience any cumbersome deadlocks during the process
3. Course of cooperation	CCO	The actors have improved the cooperation process over the past years

Trust

To measure trust between the contract partners within the project, a 10-point scale was used in which respondents rated the amount of trust varying from (1) 'There is no trust between public and private partners' to (10) 'There is a lot of trust between public and private partners.' The mean score of this variable is 6.67 (SD = 1.93) on a 10-point Likert scale.

Network management

This study also focuses on the relation between network management and the cooperation within, and the performance of, PPPs. In order to do so, a number of items (see Table 3) on network management focusing on coordination activities within the project are included. Management activities that focus on external stakeholders are not taken into account. The mean score for management is 3.87 (SD = 0.57) on a 5-point Likert scale.

For the three variables consisting of more than one item (performance, management, and cooperation), an exploratory factor analysis was used to check whether the concepts are valid and reliable and whether the in-between correlations are higher than the correlations between the variables. The factor analysis (Table 4) shows that the items

Table 3. Measurement of management (Cronbach's alpha = 0.70).

Dimension	Term	Item
1. Defining principles	DPR	When information is being collected, the focus is on developing and establishing common principles and information needs for both public and private actors in the project
2. Involving partners	IPA	(Private) Contractors are consulted and involved in project management decisions
3. Communication	COM	Much time is spent on the communication between various actors
4. Aligning interests	AIN	During deadlocks and problems, the management focuses mainly on aligning conflicting interests

Table 4. Exploratory factor analysis (principal components approach with Varimax rotation[a]).

Construct	Term	Perceived performance	Management	Cooperation	Cronbach's alpha
Management	DPR	.030	.605	.078	0.70
	IPA	.199	.747	.043	
	COM	.021	.792	.034	
	AIN	.181	.621	.452	
Cooperation	MIC	.296	.132	.699	0.70
	PDE	.114	−.042	.790	
	CCO	.211	.231	.679	
Perceived performance	SUP	.587	.001	.198	0.71
	INT	.692	.098	.146	
	EFF	.742	−.059	.339	
	FUT	.713	.213	.284	
	RCB	.576	.333	−.118	

[a]Principal components analysis assumes that the sample used is the population, which is the case in this survey as we included all known PPP projects up to 2014. As it is not the aim of this factor analysis to generalize the findings beyond the data in this survey, the use of principal components analysis seems fit for this study. As the different variables are unrelated rather than dimensions of the same concept, Varimax rotation is preferred over oblique rotation.

form good constructs and that the variables do not overlap. As theory offers clear directions towards the underlying relations between the items, we also employed a confirmatory factor analysis (CFA) – which is generally more strict – to check for the validity of the constructs. The CFA showed that most items loaded on their construct with a score >0.6, but all of the items displayed scores above 0.4, which is sufficient.

Control variables

In the analysis, three control variables that may be associated with performance and cooperation in PPP projects are included (see Table 5). These control variables were selected on two different analytical levels. On the one hand, we controlled for a variable at project level, namely, project phase. This was measured by asking respondents which phases of the project had already been completed, so that we could correct our results for project phase. To include this variable, we added a dummy variable called 'projects phase.' All projects that had completed the realization phase, and were thus in the maintenance and/or operational phase, were scored with a '1'. All projects that were still in the construction phase, or even in the tendering phase, received a '0'. We also tested other dummy variables; for example, we included projects in the construction phase in the list of projects scoring a '1'.. Only projects in the tendering phase then received a '0'. However, this did not lead to any significant changes in the results of the analysis.

On the other hand, control variables at individual respondent level were taken into account, including respondents' organizational background (public organization, private organization, and other). This variable allowed us to control for the fact that respondents worked for either the public commissioning authority or the private contractor. Again a dummy variable was used. In the dummy variable, called 'public,' all respondents working for the project sector scored a '1' and all respondents who worked in the private sector, for consultancy firms or other organizations, a '0'. Finally, the technical complexity of the project was included. Although this might seem a variable at project level, we included this variable on the individual level, because this variable includes each respondent's individual perception of the technical complexity of the project. The respondents' perception of technical complexity varied depending on individual factors, such as their technical knowledge and their previous experience with technically complex projects. So, the technical complexity of a project may be scored differently by the respondents involved in the project. With regard to scoring the technical complexity of the project, respondents were presented a 10-point scale on whether the project was characterized by high or low technical complexity. The expectation was that, in more complex projects, respondents would find it more difficult to cooperate well and achieve strong performances.

Table 5. Control variables.

Variables	Term	Item
1. Project phase	PPH	What activities in the project are already completed?
2. Technical complexity	TCO	The project is characterized by a high [low] technical complexity
3. Organizational background	ORG	In what type of organization do you work?

Data analysis

The data have a nested structure because multiple respondents filled out the survey per project. The individuals in the survey worked for projects, which themselves had characteristics that may influence the study. Consequently, we have a two-level model with measurements on person level (n = 144) and project level (n = 68), making it likely for the answers of the respondents involved in the same project to be somewhat similar. This conflicts with the idea that surveys should result in completely independent observations. To account for the fact that there were multiple respondents for each of the projects, we performed a multilevel analysis instead of a regular regression analysis. As hierarchical linear modelling (HLM) is much better suited to dealing with multilevel analysis, HLM was used to test our hypothesis. In order to find a statistical justification for running HLM, the null models were provided (see Appendix B for the tests). As the chi-square tests for both dependent variables were significant, there was variance in the outcome variable by the level-2 groupings (project level). The results of both the test using performance as a variable (x^2 (49) = 119.73, $p < .001$) and the test using cooperation as a variable (x^2 (49) = 107.36, $p < .001$) supported the use of HLM. Examination of the between-project and within-project variance components of the variables also justified the multilevel approach in HLM. The scores of individuals within projects were significantly more similar than the scores of individuals between the different projects. For perceived project performance, the within-project variance was 40%.[1] This result suggests that 40% of the variance in perceived project performance is attributable to group membership. Sixty per cent of the variance was at individual level. For cooperation, the intercept resulted only in a slightly lower within-project variance of 36%.[2] These levels of within-project variance justify the multilevel approach. To test our hypotheses, the full maximum likelihood procedure in HLM was used.

Common method bias

In the survey used in this article, respondents answered questions regarding both the dependent and the independent variables. There is therefore a risk of inflated relationships between the variables, as a result of the measurement method causing variance. This means that there could potentially be a measurement error, one of the errors described in the total survey error framework (see, for example, Lee, Benoit-Bryan, and Johnson 2012). In this section, we address some measures in order to deal with the potential presence of common method bias.

As most of the variables in this study are based on individuals' perceptions, our variables are by their very nature perceptual (George and Pandey 2017). Although this does not imply that common method bias is not an issue, it means that using a survey, even though it is a single data source, may still be an appropriate method (Podsakoff, MacKenzie, and Podsakoff 2012). A few characteristics of our survey limited the possibility of common method bias and other survey-related errors. First, by approaching almost the entire population, there is no chance of sampling errors in this study. Moreover, some procedural remedies were used to minimize potential common source bias (Podsakoff, MacKenzie, and Podsakoff 2012; Lee, Benoit-Bryan, and Johnson 2012; George and Pandey 2017). These include the use of different scales (both 10-point and 5-point Likert scales) and making sure that not all variables are presented on the same page of the questionnaire. With regard to common method

variance, the correlation table (Appendix A) shows a medium and significant effect between the main variables; this indicates that there is no strong inflation of the existence of common method variations to create strong common source bias. Finally, to test whether common method bias was a problem, we conducted a Lindell and Whitney's test, the results (see Appendix C) of which show that common method bias is not an issue in this paper.

Results

In this section, the results of the analysis are presented. In order to study the role of trust and network management, two multilevel analyses were conducted. The first analysis used perceived project performance as the dependent variable. The second one focused on good cooperation as the dependent variable.

The relationship between trust, management, and perceived project performance

First, the role of trust and management with regard to perceived PPP project performance was studied. The results, presented in Table 6, show that both trust and management are correlated with the perceived performance of PPP projects. The coefficient score indicates that, when respondents score the independent variable one point higher, this also has a positive effect on perceived performance of the project – the dependent variable. This is true for both trust ($p < 0.05$) and management ($p < 0.01$), but management in particular is strongly related to perceived PPP performance. Moreover, the technical complexity ($p < 0.001$) of the project is also positively associated with perceived performance at the .001 level. When PPP projects are assessed as more complex by respondents, the higher their perceived performance for this project is. This might be related to the possible connections between various elements of the project. Technically more complex projects usually are projects where more different environmental aspects are combined. This is what makes the project more (technically) complex, but it also provides more possibilities for win–win situations and solving more than one (spatial) problem at once. Thus, these projects have more potential for good performance.

Table 6. Multilevel analysis of perceived performance of PPP projects.

Independent variable	Coefficient	Standard error	*p*-Value
Intercept	2.283	0.231	<0.001
Organizational level			
Project phase	0.073	0.102	0.478
Individual level			
Technical complexity	0.060	0.017	0.001***
Trust	0.070	0.030	0.024*
Management	0.208	0.074	0.007**
Organizational background	−0.083	0.084	0.330

***$p < .001$; **$p < .01$; *$p < .05$.
N on project level is 68; *N* on individual level is 144.

The relationship between trust, management, and cooperation in PPP projects

PPPs are considered successful not only because of the way stakeholders perceive their project's performance, but also because of the way public and private actors cooperate during the process. Therefore, this section focuses on the role of trust and management in the cooperation between public and private actors in PPP projects. The analysis shows a slightly different result than the previous analysis focusing on PPP performance. In the first analysis, both trust and management were positively associated with the perceived performance of PPP projects. With regard to the cooperation of public and private actors within PPP projects, only trust is significantly correlated ($p < .001$) to the perceived cooperation in the projects (see Table 7). So, to ensure a smooth process and good cooperation between actors in PPPs, a high level of trust between actors seems to be very important.

The analysis also indicates that no control variable (respondents' organizational background, technical complexity of the project, and project phase) is significantly related to the cooperation between public and private actors in the project.

More strikingly, the analysis shows that – in contrast to trust – management is not associated with good cooperation. As the variable management includes management strategies aimed at cooperation between partners, such as involving partners in project management decisions, communication between actors, and aligning conflicting interests, the result is surprising. In order to clarify the relation between management and cooperation, the role of trust herein should be studied more closely. As trust is strongly related with the cooperation of actors in PPP projects, management may be indirectly associated with cooperation, because the various management activities may influence the amount of trust between partners. As stated in the section on 'Network management,' building trust is one of the many existing management activities. Therefore, a Pearson's correlation test of the relation between management and trust was conducted; Table 8 shows the results. There is a moderate (0.438) yet significant ($p < .001$) correlation between management and trust. This suggests that management could indeed be indirectly correlated with the cooperation between actors in PPPs by increasing trust between those actors.

Finally, a multilevel analysis (see Table 9) was run to assess the relationship between good cooperation and perceived performance in PPP projects. The analysis shows that good cooperation in PPP projects is associated with perceived performance of these

Table 7. Multilevel analysis of cooperation in PPP projects.

Independent variable	Coefficient	Standard error	*p*-Value
Intercept	2.210	0.566	<0.001
Organizational level			
Project phase	0.195	0.144	0.182
Individual level			
Technical complexity	−0.011	0.036	0.773
Trust	0.124	0.036	0.001***
Management	0.120	0.144	0.407
Organizational background	−0.207	0.143	0.154

***$p < .001$.
N on project level is 68; *N* on individual level is 144.

Table 8. Correlation between management and trust.

Variables		Management	Trust
Management	Pearson's correlation	1	.438***
	Sig. (2-tailed)		.000
	N	121	121
Trust	Pearson's correlation	.438***	1
	Sig. (2-tailed)	.000	
	N	121	121

***$p < .001$.

Table 9. Multilevel analysis of cooperation, trust, and network management on perceived PPP project performance.

Independent variable	Coefficient	Standard error	*p*-Value
Intercept	1.938	0.274	<0.001
Organizational level			
Project phase	0.029	0.102	0.780
Individual level			
Technical complexity	0.063	0.016	<0.001***
Trust	0.048	0.029	0.101
Cooperation	0.176	0.061	0.006**
Management	0.171	0.065	0.012*

***$p < .001$; **$p < .01$; *$p < .05$.
N on project level is 68; *N* on individual level is 144.

projects ($p < .01$). This means that the higher individuals score cooperation with partners, the better their perception of the performance of the PPP project. Both the technical complexity of the project and management are positively associated with perceived performance, although the level of significance of network management differs slightly compared to the original analysis (.05 rather than .01). Note that trust is no longer significantly correlated with perceived performance now that cooperation is added to the analysis.

Conclusions and reflections

From our analysis, we conclude that trust and management are important for both the perceived PPP performance and the cooperation between actors in those projects. Trust is associated with both perceived performance and cooperation. Network management is associated only with perceived performance. However, as the correlation test shows that management is correlated with trust, it may therefore be indirectly related with the cooperation between actors in PPPs via trust. Furthermore, the analysis shows that cooperation is positively associated with performance.

These results show the relevance of relational characteristics, to which limited attention was given at the start of the PPP debate. Initially, attention focused strongly on performance indicators, contract characteristics, and performance monitoring as important conditions for the success of PPPs. The results of this study, however, show that relational characteristics are at least as important and may even be more important, because recent research casts doubt on the influence of, for instance,

contract characteristics (see Klijn and Koppenjan 2016b). Given the complexity of PPP projects and their often strong relation with their environment, and thus other affected stakeholders, this is not surprising however. PPP projects are of long duration, and many unexpected things can happen. This means that constant nurturing of the partnership, the ability to cope with unexpected events that are not specified in the contract, and managing relations are crucial for the project's success. On the basis of this study, this suggestion seems to hold for PPPs.

Of course, this research has its limitations. The study is based on a survey and thus on respondents' perceptions of PPP performance and the influencing factors. This also means that we have data on a very large number of projects, which is an asset, but we do not have in-depth detailed information about these cases. Also, we now know that management matters, but not the type of management strategies that are effective, and under what circumstances. Furthermore, as both the dependent variables (perceived project performance and cooperation) and the independent variables (trust and management) are measured using the same survey, common method bias might occur. We tested for this with a marker variable, and that showed that common method bias probably is not a very big problem. Another issue is that we had only one item available for measuring trust, whereas many authors argue that trust has several dimensions (see Sako 1998; Klijn, Edelenbos, and Steijn 2010). Finally, we should address the fact that the cross-sectional nature of our data implicates that causality and endogeneity cannot be ruled out. Although this should not stop researchers from doing this type of research, it means that the results of our study should be viewed in terms of correlations between variables, rather than precise effects. Therefore, we suggest the use of longitudinal data or survey experiments to deal with these issues in further research into this topic.

Despite these limitations, this article generates some very interesting results that contribute to the discussion about the conditions under which PPPs are effective and produce good outcomes. It nuances the early PPP literature and sets the stage for further research on the relational aspects of partnerships. Further research should perhaps focus on the precise interplay between (network) management and trust and also on their combined influence. It may very well be that, for instance, one of these conditions is very crucial for the other to have effect. Multiple case studies and qualitative comparative analysis could provide more precise answers to this question. This type of research may gain more in-depth knowledge about the quality of the relationships in PPPs and the management strategies that may contribute to this.

Notes

1. Level 1 intercept variance divided by the total variance: .09961/(.09961 + .24603) = .404869.
2. Level 1 intercept variance divided by the total variance: .21086/(.21086 + .37682) = .35880.

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Appendix A. Means, standard deviations, and correlations (*N* = 94)

	M	SD	1	2	3	4	5	6	7
1. Perceived performance	3.98	0.49	1						
2. Cooperation	3.39	0.75	0.46***	1					
3. Management	3.89	0.58	0.37***	0.30**	1				
4. Trust	6.71	1.95	0.41***	0.43***	0.40***	1			
5. Technical complexity	7.31	2.13	0.30**	0.02	0.04	0.08	1		
6. Project phase (1 = building finished)	0.36	0.48	0.27**	0.23*	0.13	0.20	0.02	1	
7. Organizational background (1 = public partner)	0.48	0.50	−0.16	−0.15	−0.03	0.05	−0.18	−0.10	1

***$p < .001$; **$p < .01$; *$p < .05$.

Appendix B. The intercept only

The intercept only with the outcome variable 'perceived project performance' (PER1)
Summary of the model specified
Level-1 Model
$PER1_{ij} = \beta_{0j} + r_{ij}$
Level-2 Model
$\beta_{0j} = \gamma_{00} + u_{0j}$
Mixed Model
$PER1_{ij} = \gamma_{00} + u_{0j} + r_{ij}$
Final Results
$\sigma^2 = 0.14642$
Standard error of $\sigma^2 = 0.02613$
τ
INTRCPT1, β_0 0.09961
Standard error of τ
INTRCPT1, β_0 0.03724

The value of the log-likelihood function at iteration 8 = −7.179775E+001

Table B1. Intercept only 'perceived project performance.'

Random level-1 coefficient	Reliability estimate
INTRCPT1, β_0	0.552

Table B2. Final estimation of fixed effects.

Fixed effect	Coefficient	Standard error	*t*-Ratio	Approx. *d.f.*	*p*-Value
For INTRCPT1, β_0					
INTRCPT2, γ_{00}	3.997710	0.060063	66.558	49	<0.001

Table B3. Final estimation of fixed effects (with robust standard errors).

Fixed effect	Coefficient	Standard error	*t*-Ratio	Approx. *d.f.*	*p*-Value
For INTRCPT1, β_0					
INTRCPT2, γ_{00}	3.997710	0.060057	66.566	49	<0.001

Table B4. Final estimation of variance components.

Random effect	Standard deviation	Variance component	*d.f.*	χ^2	*p*-Value
INTRCPT1, u_0	0.31561	0.09961	49	119.73308	<0.001
Level-1, *r*	0.38264	0.14642			

The intercept only with the outcome variable 'cooperation' (SAM1)
Summary of the model specified
Level-1 Model
$SAM1_{ij} = \beta_{0j} + r_{ij}$
Level-2 Model
$\beta_{0j} = \gamma_{00} + u_{0j}$
Mixed Model
$SAM1_{ij} = \gamma_{00} + u_{0j} + r_{ij}$
Final Results
$\sigma^2 = 0.37682$
Standard error of $\sigma^2 = 0.06858$
τ
INTRCPT1, β_0 0.21086
Standard error of τ
INTRCPT1, β_0 0.08733

Table B5. Intercept only 'cooperation.'

Random level-1 coefficient	Reliability estimate
INTRCPT1, β_0	0.503

The value of the log-likelihood function at iteration 17 = −1.172110E + 002.

Table B6. Final estimation of fixed effects.

Fixed effect	Coefficient	Standard Error	*t*-Ratio	Approx. *d.f.*	*p*-Value
For INTRCPT1, β_0					
INTRCPT2, γ_{00}	3.373292	0.091571	36.838	49	<0.001

Table B7. Final estimation of fixed effects (with robust standard errors).

Fixed effect	Coefficient	Standard error	*t*-Ratio	Approx. *d.f.*	*p*-Value
For INTRCPT1, β_0					
INTRCPT2, γ_{00}	3.373292	0.091564	36.841	49	<0.001

Table B8. Final estimation of variance components.

Random effect	Standard deviation	Variance component	*d.f.*	χ^2	*p*-Value
INTRCPT1, u_0	0.45919	0.21086	49	107.36216	<0.001
level-1, r	0.61386	0.37682			

Table C1. Correlation and R^2 between variables and marker.

Variables in the model	Pearson's coefficient	R^2
Cooperation	0.128	0.016
Perceived performance	0.158	0.025
Management	0.034	0.001
Trust	0.056	0.003
Organizational background	−0.111	0.012
Project phase	−0.127	0.016
Technical complexity	0.073	0.005

Appendix C

The Lindell and Whitney test uses a theoretically unrelated construct as a marker variable to adjust the correlations between the principal constructs. Any high correlation among these items would be an indicator of common method bias. We used a survey variable that is not used in this study to answer our research question as a marker (to what extent are societal groups involved?). Table C1 shows the correlation coefficients and the R^2 between variables in the model and the marker. The highest value corresponds to the perceived performance variable. The R^2 of this correlation coefficient shows the maximum percentage of variance shared between factors. If common sources bias were a concern, we would obtain high levels of dependency between factors and the marker. In our study however, a low level of common source effect is shared between constructs ($R^2 = 0.025$).