



Managing risks in public-private partnership formation projects

Bianca B.M. Keers ^{a,*}, Paul C. van Fenema ^b

^a Royal Netherlands Navy, Naval Maintenance and Sustainment Agency, P.O. Box 20701, 2500, ES, The Hague, The Netherlands

^b Netherlands Defence Academy, Faculty of Military Sciences, P.O. Box 90004, 3509, AA, Utrecht, The Netherlands

Received 5 August 2017; received in revised form 3 May 2018; accepted 3 May 2018
Available online xxxx

Abstract

While sourcing by means of Public-Private Partnerships has been lauded over recent years, increasingly risks appear to jeopardise public organisations' unique societal tasks. Integrated Risk Management has not yet been applied to public organisations getting involved in PPP in the sense of understanding risk management capabilities. This article explores risk awareness and risk management practices underpinning maintenance partnership formation by means of a dual case study of two PPP projects and a short industry survey. The results suggest that organisations face several "intolerable risks" linked to project governance and project management responsibilities: insufficient representation of qualified employees, absence of a shared performance system, assignment of responsibilities and decision-making authority, impractical or inappropriate partnership agreement, and timing of the partnership initiative. Cross-case analysis revealed the role of different levels of risk awareness and senior management involvement. Drawing on these findings, a framework for risk management for PPP formation projects is developed.

© 2018 Elsevier Ltd. APM and IPMA.

Keywords: Public-private partnership; Partnership formation; Alliance management; Project management; Risk management; Governance mechanisms; Capabilities

1. Introduction

Since the last economic recession public organisations, especially in infrastructure and security sectors, face a number of strategic challenges regarding the maintenance of their unique and complex technical system (Bobbink and Hartmann, 2014; Hartley, 2008; Humphries and Wilding, 2004; Koppenjan, 2005; Levering et al., 2013; Tatham, 2013). Public asset owners have been under pressure to reduce the downtime and life-cycle costs of their systems in an attempt to improve business cost efficiency and

dependability (Brax and Jonsson, 2008; Samaddar et al., 2006). Their operational technical systems have become increasingly unique and complex, making it infeasible to develop and sustain all relevant maintenance knowledge at in-house service-departments (Pateli, 2009). Moreover, due to the ageing of the technical workforce, irrespective of their nature, service maintenance providers are forced to group technological expertise to enhance their utilisation and the development of new knowledge (Cambra-Fierro et al., 2011).

To improve public services in quality and effectiveness and to make operations more efficient, Public-Private Partnerships (PPP) have emerged as a strategic instrument in the Dutch maritime industry; they are pursued by public and commercial service providers teaming up and pooling complementary knowledge, skills, and resources over a longer period of time. This way, they seek to co-perform and secure the service maintenance on both the public and commercial systems (Chang et al., 2008; Kleemann

☆ Funding: This work was supported by the TKI Dinalog, Dutch Institute for Advanced Logistics and the Dutch Ministry of Defence [Maselma Project, 2012–2016].

* Corresponding author.

E-mail addresses: BBM.KEERS@mindef.nl, (B.B.M. Keers), PC.V.FENEMA@mindef.nl. (P.C. van Fenema).

and Essig, 2013). When controlled effectively, such Public-Private Service Maintenance Partnerships (PPSMPs) can increase the utilisation of resources, lower cost, and enhance innovation (Samaddar et al., 2006; Schemm and Legner, 2008). Exercising the required control across private and public actors, however, proves to be a daunting task. Researchers studying inter-organisational value creation and performance management have repeatedly reported these control challenges (Crié and Micheaux, 2006; Otto et al., 2011), referring to organisations' ongoing struggle to manage diverse partnership risks (Majchrzak et al., 2015; Pitsis et al., 2004) and the myriad of governance inadequacies (Bamford et al., 2003). Sampson and Williamson - as cited in (Vlaar et al., 2006) - found that partners' (in)ability to control partnership performance appears to depend on (in)adequate informal or formal control mechanisms (Sampson, 2004; Williamson, 1985). These findings echo related work on partnership governance (Feller et al., 2013; Keers and van Fenema, 2015; Mukherjee et al., 2013; Smith et al., 1995; Tjemkes et al., 2012). Different control approaches have been advocated emanating from a variety of perspectives, economics, organisation science, or sociology (Dunford and Jones, 2000; Wilkinson et al., 2013), contributing to the much-debated question of whether formal and informal control mechanisms substitute or complement each other (Ansari et al., 2014). Research mainly explored the selection and effects of various mechanisms, instead of deepening insight into organisations' capability to sufficiently manage PPP project risks in practice (Elmuti and Kathawala, 2001). Insufficient risk management may manifest in either organisations dropping out of partnership formation, being overwhelmed by the amount of risk factors requiring coverage, or quasi-smoothly proceeding formation by neglecting to cover them all; which may undermine cooperation at a later stage (Uiterwijk et al., 2013). Understanding organisations' capability to sufficiently manage PPP project risks, may help bridge the knowledge gap between partnership expectations and the way these are fulfilled. On top of that, integrated risk management is of growing importance to strategic managers (Bromiley et al., 2015). This is in particularly the case at public organisations, due to management challenges arising from decentralisation of activities in accordance with the subsidiarity principle (Kickert et al., 1999). *Academic research falls short of analysing public organisations' capability to manage PPP project risks, as a factor influencing collaborative performance. Our objective is to contribute to this gap.* Conceptually, we draw on and combine research on PPPs and project and performance management. Empirically, we apply IRM using a phenomenological method for conducting a qualitative sequential mixed methods approach.

Integrated Risk Management (IRM) is an interactive process of strategy formulation, identifying and assessing risks, differentiating risk factors, and formulating and implementing appropriate measures (Kinney and Wiruth, 1976). IRM is considered of key importance to monitor the overall – integrated – result (Lam, 2014).

The study context stems from a government-funded research programme aimed at developing partnerships within the Dutch maritime sector, as a strategy to increase efficient and predictive service maintenance. The programme includes two public and nine private organisations. These include fleet owners, Original

Equipment Manufacturers (OEMs), and maintenance and service logistics providers representing a cross-section of the professional Dutch maritime maintenance industry. The sector's ambition is driven by the observation that maintenance constitutes a significant part of a ship's exploitation costs; systems downtime leads to a substantial loss of revenues or other value for asset owners (Peeters et al., 2012). In the past, top management tended to ignore maintenance by just considering it as a part of manufacturing overheads (Pintelon et al., 2006). From today's perspective, they are viewing maintenance and overhaul from a broader angle, adopting innovative strategies for designing, modifying and maintaining assets. As further explained in the methodology section, our unit of analysis for empirical research is multi-layered to capture the complexity of PPP: we focus on a sub-project within the government-funded research programme mentioned (project 1), the community associated with this programme, and project 2 involving a public organisation getting involved in PPP with its key supplier. The public organisation and its key supplier both participate in the government-funded research programme but they have also developed a partnership outside of this programme.

The remainder of the paper is structured as follows. The next section reviews the literature on PPPs and the role of integrated risk management in this respect, and the theoretical gap this paper is addressing. We then describe the empirical research, followed by the results and a discussion of the findings from research and practice.

2. Conceptual background

2.1. Public-private partnerships

Public-Private Partnerships (PPPs) became fashionable some forty years ago, and have been discussed in many studies since (Bovaird, 2004). Growing appreciation of the importance of market mechanisms underscored the success of privatisation in various countries and underlie the increased interest in the PPP phenomenon (Osei-Kyei and Chan, 2015). PPPs have become a rather popular institutional arrangement, as they are perceived to be a remedy for a lack of dynamism in traditional public service delivery (Jamali, 2004). PPPs introduce working arrangements based on a mutual long-term commitment between a public sector organisation and an organisation outside the public sector (Bovaird, 2004). For example, private companies may partner with public organisations to develop and execute cyber security operations; or they design, build, finance, maintain and/or operate infrastructures and facilities for public customers (Brinkerhoff and Brinkerhoff, 2011). The private sector can supposedly provide services in a more efficient manner than the public sector (Joha and Janssen, 2010).

While PPPs were originally treated as a derivative of the privatisation movement, there is a growing consensus today that PPPs implies more than the introduction of market mechanisms or the privatisation of public services. Rather, they imply a form of collaboration aimed at pursuing common goals, while leveraging joint resources and capitalising on the respective competences and

strengths of the public and private partners (Nijkamp et al., 2002; Pongsiri, 2002).

Furthermore, the term PPP has been commonly used to describe a spectrum of possible relationships between public and private actors for the provision or management of public goods and services (Grimsey and Lewis, 2002). As such, various incentives underlie the implementation of PPP projects, and the spectrum of PPPs includes a wide diversity of arrangements ranging from fully public sector to fully private sector. The form of the partnership depends among other things on the legal status, assignment of responsibilities, and allocation of governance roles (Jamali, 2004). Incentives include the sharing of risks, mutual learning opportunities, and provision of economies of scale or scope (Bovaird, 2004).

Studies have explored industry-level factors linked with the creation of PPP projects, in addition to exploring which organisations tend to seek participation (Osei-Kyei and Chan, 2015). Different perspectives suggest that factors explaining interest in PPP participation include: strategic interdependence, established social ties, and structural connections within the network (Gulati et al., 2000; Oliver, 1990). Industry factors and organisational conditions may also explain tie formation between public and private organisations. For example, research on science and technology has identified that in biotechnology a factor linked with the development of PPP projects includes the knowledge gap between private life science companies and public research institutions (Nwaka and Ridley, 2003). Such partnerships are set up to leverage complementarities and potential synergies between public and private knowledge assets (Rausser et al., 2000). In the area of technology development and maintenance, researchers have stressed that integrated technology has made it increasingly difficult for private system manufacturers and public maintenance providers to develop all relevant knowledge for optimal functioning themselves (Kerkhof et al., 2016; Pateli, 2009). While facing a decrease of technically skilled personnel due to ageing of the existing workforce and a decline of technical students, organisations in the developed world increasingly decide to form cross-sector partnerships (Taplin, 2007). Health scientists have identified societal incentives for public and private health organisations to collaborate (Nelson et al., 1999). In the aerospace and Defence industries, public management scholars emphasize an increase of motives for public and private organisations to co-develop, co-maintain, co-operate, or co-exploit a product or a service in time of recession (Dussauge and Garrette, 1993; Van Ham and Koppenjan, 2001).

2.2. *Project management in public-private partnerships*

Research efforts have been taken to study the critical success factors for managing PPP projects (Hwang et al., 2013; Osei-Kyei and Chan, 2015; Zou et al., 2014). These projects seek to align multiple stakeholders with only partially overlapping interests and different logics. An overwhelming amount of literature points out the numerous risks involved (Bobbink and Hartmann, 2014; Hartley, 2008; Humphries and Wilding, 2004; Koppenjan, 2005; Levering et al., 2013; Tatham, 2013). PPPs face specific risks

such as conflicting public-private objectives (e.g. environmental sustainability versus high profits), conflicting “good” governance norms (e.g. operational transparency versus commercial confidentiality), blurring of accountability, clash of cultures (Bovaird, 2004), and information asymmetry (Provan, 1984; Williamson, 1981).

Researchers have advanced our understanding of the various partnership risks. According to Das & Teng they can be categorized in relational and performance risks (Das and Teng, 2001). Relational risks refer to the possibility that the partner does not comply with the spirit of the cooperation. This involves opportunistic behaviour causing low commitment with regard to creating common value, and trust issues concerning the preservation of intellectual property or misuse of knowledge by partners. As a consequence partners limit their exchange of knowledge in an attempt to avoid unintended leakage of valuable advantages (Möller and Rajala, 2007). Performance risks, on the other hand, refer to the possibility that intended strategic goals might not be achieved, even though cooperation between the partners is satisfactory. These risks may obstruct the successful functioning of the partnership (Koppenjan, 2005; Luo et al., 2008). They concern capability and control issues, such as a lack of control, inadequate decision-making capability, and demand instability (Dekker, 2004). Relational risks have been related to cooperation risks and performance risks to coordination risks (Gulati et al., 2012). Cooperation risks involve misaligned incentives of self-interested partners, leading to diminished commitment or even opportunistic behaviour (Bellamy and Raab, 2005; Dyer and Hatch, 2006). Coordination risks involve problems regarding the structure design, communication and management skills, leading to miss-coordination and problematic division of labour and tasks.

Approaches to risk management in particular delve into one of the risks associated with or specific control mechanisms for managing partnerships (Das and Teng, 2001; Elmuti and Kathawala, 2001; Ireland et al., 2002; Koppenjan, 2005), or discuss the complementary or subsidiarity between informal (such as trust) and formal (such as procedures, structures, and KPIs) control mechanisms for value creation and distribution (Gurcayiliyar-Yenidogan, 2014). However, the management of risks in actual practice is hardly explored and well understood (Elmuti and Kathawala, 2001). In addition, researchers stress the importance of a refocus onto the processes used for performance management (Ireland et al., 2002) for which integrated risk management (IRM) is of crucial importance to both public and private sector organisations (Akintoye et al., 2008). IRM encompasses a philosophy in which departments, organisational units or projects are fully responsible and authorised in their own field, objectives, and work processes, and in which the central administration with their support units is responsible for controlling the total – integrated – result. Next to this, IRM is a method (ISO 31000) that helps to identify and brings together the risks and risk factors in more than one area that affect the prospect of meeting the scheme of objective (Kinney and Wiruth, 1976; Lam, 2014). While the importance of risk management for PPP projects is well accepted, insight in the risk management practice remains ambiguous in current project management and organisation

science literature. As a result, this paper aims at understanding how an organisation can increase its capability to successfully set up PPP projects, by giving insight into the direct and underlying factors affecting collaborative performance.

The paper includes IRM as an approach for studying an organisation's capability to manage PPP risks in an integrated fashion. It identifies and prioritises common risks and factors, addresses the appropriateness of controls put in place, and informs discussions and decisions in relation to the overall strategy affecting partnership performance.

3. Research methodology and design

3.1. Design

We were interested in a public organisation's capability to manage PPP project risks, as a factor influencing PPP performance. Relying on IRM, we adopted a phenomenological approach. We designed qualitative sequential mixed methods research to combine insights across units of analysis. Qualitative studies suit in case in-depth knowledge on a particular organisational phenomenon has to be gained (Yin, 2009). While our study is multi-layered, we focus on a public organisation getting involved in PPP. It operates within the maritime industry and performs maintenance in-house. The organisation was selected on the basis of its willingness to participate and accessibility to do research on this matter. Its intent to partner with the industry is part of its mission to offer technical high-quality innovative service maintenance to ensure the highest possible material readiness. Since in the next 10–15 years 45% of its (technical) employees leave the organisation in connection with age dismissal, they seek knowledge and expertise by, among other things, forming PPSMPs to supplement the upcoming shortage. In addition, new technological developments in the field of system maintenance, such as smart sensors, remote diagnostics, Virtual and Augmented Reality, 3D Engineering and robotics, require that the organisation's employees with respect to their knowledge and skills are well affiliated to these new developments. Moreover, business economic reasons also encourage the formation of PPSMPs.

The scope of the study was limited from mid-2014 until the end of 2016. During this period the organisation worked on two PPSMP projects (with commercial service suppliers). The first project, part of a government-funded research programme, under scope concerned a possible partnership between this fleet owner, a ship-builder and a logistic service provider for outsourcing the upkeep of new tugboats (further referred to as project 1). The project's ambition was to decrease the capital costs of the tugboats by means of grouping organisations' service maintenance and logistics, and by commercial exploitation of the tugboats during periods in which they are not in use by the public owner. In the period of the study the project was and remained in the first planned stage of design, since developing towards implementation stagnated. The second project, involving a service partnership between the same public fleet owner and its radar system manufacturer (further referred to as project 2), was more successful as it developed towards signing a letter of partnership intent kick-starting

implementation. Project 2 was aimed at pooling maintenance resources, to be used for public and commercial services. Objectives in this context included enhancing and sustaining organisations' maintenance knowledge as well as reducing their capital costs. We also used our access to the community of the government-funded research programme to collect data.

For reasons of confidentiality, the name and a more detailed description of the organisation are not included.

3.2. Research process and data collection

Data was collected from multiple sources across the following sequential phases, see Fig. 1. The figure shows three empirical research phases with associated unit of analysis. We inserted a conceptual development phase between phase 2 and 3 to process results of phase 2 and prepare for phase 3.

During the *first phase*, with the help of a consultant a workshop was organised for the 6 senior management representatives of the organisations participating in project 1, to identify risks in project 1. Within the workshop a partnership strategy map (Kaplan and Norton, 2004) was developed to decide upon shared stakeholder objectives, and subsequently identify potential risks concerning business processes and capabilities jeopardising their successful achievement. The workshop lasted one day. The outcomes were communicated back by the participants for confirmation by their organisation. Fig. 2 depicts this map and – as will be elaborated later – the associated risks.

Subsequently, during *phase 2*, a small-scale survey was developed and on-line distributed among 44 industry representatives in the maritime B2B industry participating in the larger research programme in which the two PPP projects were embedded. These professionals, usually one or two per organisation, represent key customer and supplier/OEM organisations in the maritime B2B industry. The survey included all the identified potential risks a PPP project may face. Then, the participants were asked to assess both the probability of each risk occurring, and the impact on the project if the risk occurs, and assign it a de-developed rate. A total of 33 responses were received, resulting in a response rate of 75%.

We then framed areas of responsibility following phase 2 and in preparation for phase 3. Three forms are distinguished: Project Governance, Process Management and Project Management.

During the *third empirical phase*, twelve in-depth interviews were conducted with key managers of the public organisation. In-depth interviews, as a qualitative interview technique, enable gathering of detailed information to enhance in-depth understanding. The data collection strategy relied on purposeful sampling (Patton, 2002), starting with the staff representatives of the organisation under scope and subsequently including other of its managers, being recommended by interviewees for having a role in the two PPSMP projects. This ensured their ability to offer a representative assessment. Also, the inclusion of a variety of different management functions and management levels was considered to obtain a comprehensive view. The interviews focused on exploring interviewees' risk awareness, identifying the various risk factors, and discussing the appropriateness of controls put in place. Interview questions were

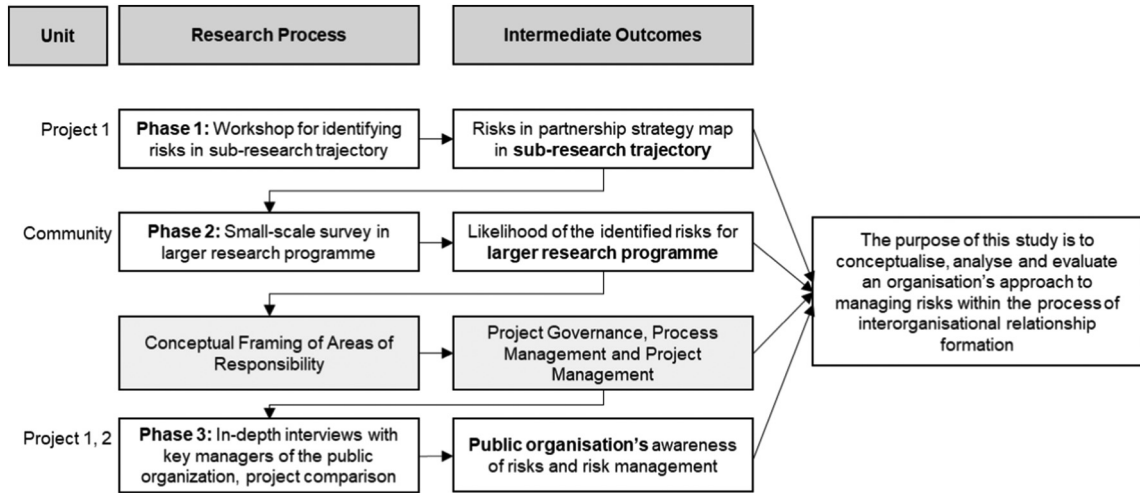


Fig. 1. Research process in relation to research objective.

semi-structured to enable the respondents to talk openly and express their opinion. Interviews were conducted by two researchers, in privacy, at the interviewees' office. The interviews

lasted, excluding a short break period, from 2 to 2.5 h. We considered twelve interviews to be sufficient, since after the last one no new findings emerged.

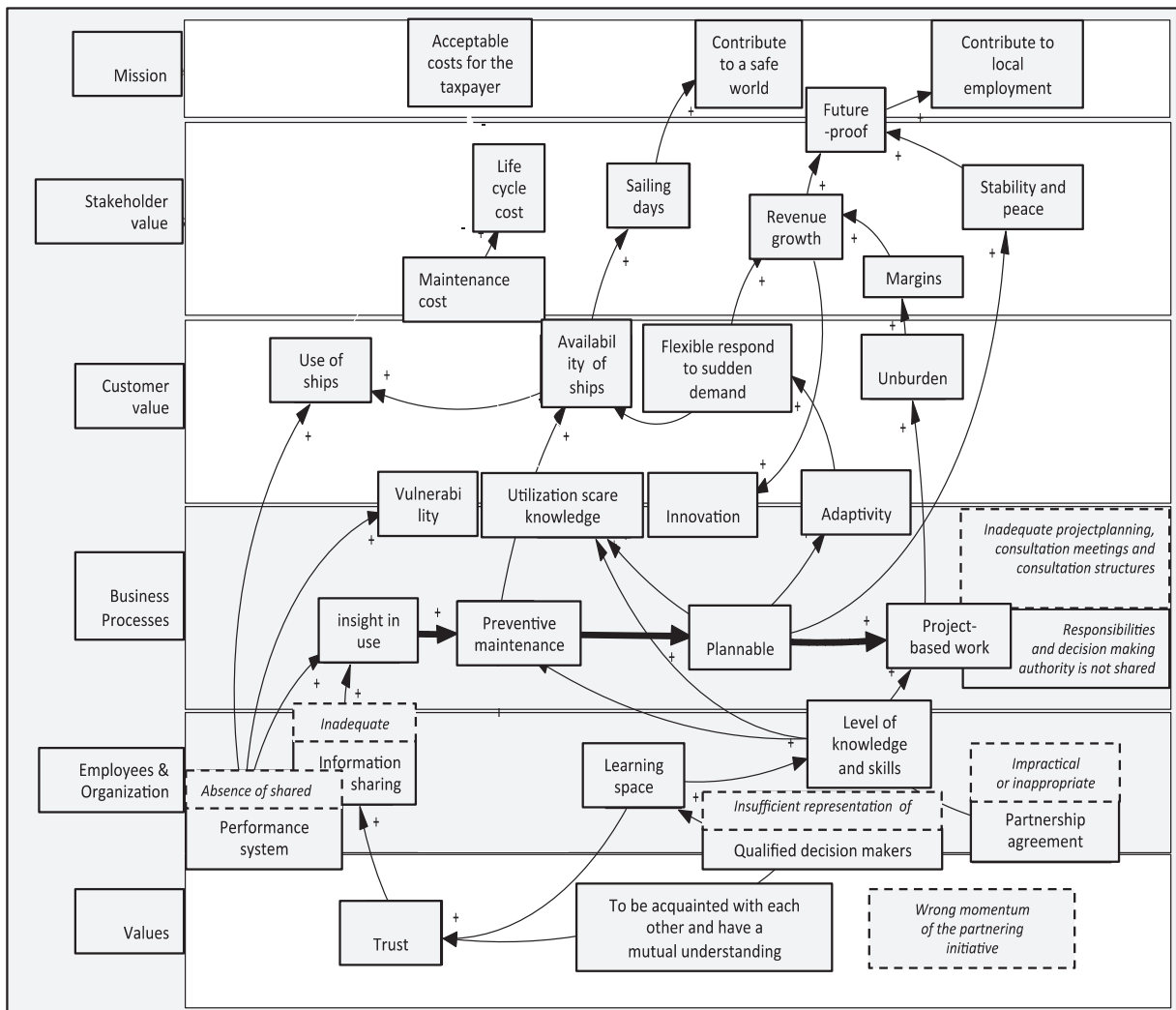


Fig. 2. The partnership strategy map of project 1.

Table 1
Data collection.

Data collection phases and instruments	Number of interactions
Phase 1 - workshop for project 1	1 including multiple participants
Phase 2 - survey	44 respondents
Phase 3 – semi-structured interviews, project comparison	2 staff representatives 4 Alliance Managers 1 Chief On-shore Logistic Support 2 Chief Procurement Managers 2 Chief Engineers 1 Chief Assortment Manager
Total number of interactions	Approx. 57

The various data collection approaches are summarized in Table 1.

3.3. Data analysis

Data analysis proceeded in accordance with the three empirical phases. First, with the help of designing a partnership strategy map, the workshop participants identified risks facing the PPSMP project. The workshop participants jointly described for each of the identified risks, the issue at hand. Then, the risks were offered to the survey participants to validate their probability of occurrence and impact. To ensure that the survey group applies a consistent approach to estimating the probabilities for all the risks, a pre-developed qualitative description was included in the survey (see Tables 2 and 3). Subsequently, we mapped out the average rating on a risk impact/probability chart. This gave us a quick, albeit imprecise, view of the priority that was needed to give to each.

Next, according to their position in the chart risks were prioritised and assigned to risk score groups to deduce the desired response strategies. We developed the criteria (see Table 4) based on risk management literature (Klinke and Renn, 2002; Massingham, 2010).

Third, by means of qualitative content analysis the data of the interview transcriptions was systematically searched to find instances of potential risk scenarios and factors in their immediate context. Next, to identify the relationship between risks, risk factors were sub-categorized based on existing literature into both organisational areas of focus and ownership roles (i.e. management areas of responsibility) (see Table 5) (Kaplan and Norton, 1996; Kaplan et al., 2010; Kinney and Wiruth, 1976). Lastly, by means of interactive text analysis (discussions among the researchers) we assessed the appropriateness of controls put in place by the public organisation under scope, informing the discussion of this paper.

Table 2
Risk probability descriptor.

Description	Qualitative description	Probability of occurrence
Almost certain	This scenario is almost certain to occur at least one during the project formation.	10
Likely	It is likely that this scenario will occur during project formation. It has been known to occur in the past.	6
Unlikely	It is unlikely, though possible, that this scenario will occur during project formation. There is no evidence of it happening anywhere.	1
Extremely unlikely	It is considered almost impossible that the scenario will occur during project formation.	0,1

Table 3
Risk impact descriptor.

Description	Qualitative description	Impact score
Catastrophic	There is an insurmountable problem stagnating project formation or causing abortion.	10
Major	There is major effect on the (cost & time adequately) realisation of project formation.	6
Minor	There is minor effect on a smooth formation process.	3
Insignificant	There is no effect on the formation process	1

3.4. Research quality

Data quality elements included completeness of the data, consistency and construct validity (Henneberg and Mouzas, 2008). Concerning completeness of the data, in-depth interviews were performed with all the public organisation's key middle and senior managers having a role in the process of PPP formation. To secure consistency, data was gathered from different sources (the alliance strategy map, the surveys and the in-depth interviews) and triangulated (Yin, 2009). For construct validity, interviews were conducted on the basis of an interview protocol (Fielding and Thomas, 2008). To enhance the richness of research findings and provide more contextual background, results were discussed with senior managers by means of informal conversations.

4. Results

4.1. Risks identification and categorisation (research phases 1 and 2)

By means of the partnership strategy map (see Fig. 2) and the cross-industry survey in the research programme, seven potential risks relating PPP project management were identified. The figure shows a strategy map framework, which should be read from top to bottom to reason from foundation (values) to desirable output (mission/shared stakeholder objectives). Plus symbols show a positive influence in accordance with system dynamics methods. We added the risks we found to the map elements, they are depicted in boxes with italics lining at the levels business processes, employees and organisation, and values.

Next to this, a risk matrix shows risks' rating on a risk impact/probability chart. The probability that a risk will occurs is represented on one axis of the chart, and the impact of the risk for the development of the project, if it occurs, on the other axis (see Fig. 3).

Table 4
Risk score groups.

Risk characteristic	Definition and desired response
High probability and impact (top right corner of the chart)	Definition: intolerable risk Desired response: These risks are of critical importance, and as such need a great deal of management time and attention. Do not start or continue the project at this risk level, since the risks will prevent achieving the primary objectives of the partnership.
High probability, low impact (top left corner of the chart)	Definition: undesirable risk Desired response: These risks are of moderate importance. If these risks occur, you can cope with them, however they will influence secondary aspects of the project (e.g. realisation within time and budget). One should try to reduce the likelihood that they will occur.
Low probability, high impact (bottom right corner of the chart)	Definition: undesirable risk Desired response: these risks are of high importance if they occur, but they are very unlikely to happen. Be prepared to take these risks and have contingency plans applied to reduce their impact if they occur.
Low probability and impact (bottom left corner of the chart)	Definition: acceptable risk Desired response: these risks can be considered acceptable and ignored.

Based on the content and score of risks, we distinguish *Intolerable risks* up to risk 5, and *Undesirable risks* for risks 6 and 7.

4.1.1. Intolerable risks

1. The highest risk relates to the *insufficient representation of qualified employees* affecting the potential of partners to frame the project objectives. This potentially concerns leadership lacking strategic directives and mandate, management skills,

and occurrence interpersonal conflicts. It manifests early during formation. If ignored, it may result in unproductive cooperation causing formation delay or even partnership abortion. As such, this risk is considered to have a show-stopping effect on formation.

2. The risk with the second most negative effect on formation *concerns the inadequacy or absence of a shared performance system*, including collaborative-based performance matrices to effectively monitor performance. It includes a common set of measures to record performance, track progress towards outcomes, and to learn what is and is not working in the group’s collective approach. Employees responsible for formation fail to grasp its significance or lack performance data. Although this risk does not always occur, it may manifest itself after choosing the PPP partner and when planning the formal establishment. It hampers the control of achieving formation within budget and on time.
3. The most likely risk concerns the fact *that partners do not assign responsibilities and decision-making authority with respect to partnership processes within their organisation*. The public partner can address this risk for themselves, but has limited or no capacity to address it in partner organisations. As such, there is absence of an partnership hierarchical structure with authority and decision-making capability to coordinate and align actions between partners. The problem can arise due to partners’ lack of knowledge of the specific tasks that need to be carried out, or due to lack of a clear hierarchical structure within each partners’ own organisation. Consequently, the PPP has difficulties in achieving collective goals, or it is likely to operate in an inefficient manner.
4. Another risk often occurring concerns the establishment of an *impractical or inappropriate partnership agreement* during the final formation event. Impractical implies that there are issues concerning the fair distribution of liability and accountability,

Table 5
Indicators of key variables.

Variable	Indicator	Sample quote from interviews
<i>Types of factors:</i>		
Organisational factor (e.g. size, business and information structure, management support, security culture, policy, legislation)	Factors of the organisation that contribute to risks	“Due to organisational fragmentation, it is difficult to identify risk owners” (#1)
Human factor (e.g. management knowledge, communication skills, judgement competence (e.g. risk awareness))	Factors of individual attitude and behaviour that contribute to risks	“The success of cooperation depends on individual performance” (#5)
Technical factor (e.g. system and network complexity, compatibility, vulnerability)	Factors of technology that contribute to risks	“SAP is generating management information, but not a lot so far” (#4)
<i>Areas of management responsibility:</i>		
Project governance	The framework for effective project decision making (it concerns key decisions that shape the project and its direction, e.g. defining roles and responsibilities, management control processes, and reporting)	“... my reporting to the board was always postponed, since they had more important things to take care off” (#4)
Process management	The ensemble of activities of planning and monitoring project progress and development	“We had developed and agreed upon a project programme, whereupon we got together with the project teams every six weeks” (#4)
Project management	Principles, techniques, and tools used for planning, executing, and monitoring project processes	“I do believe we should monitor the project performance better, although it is very difficult for us to define KPIs and collect performance information” (#2; #6)

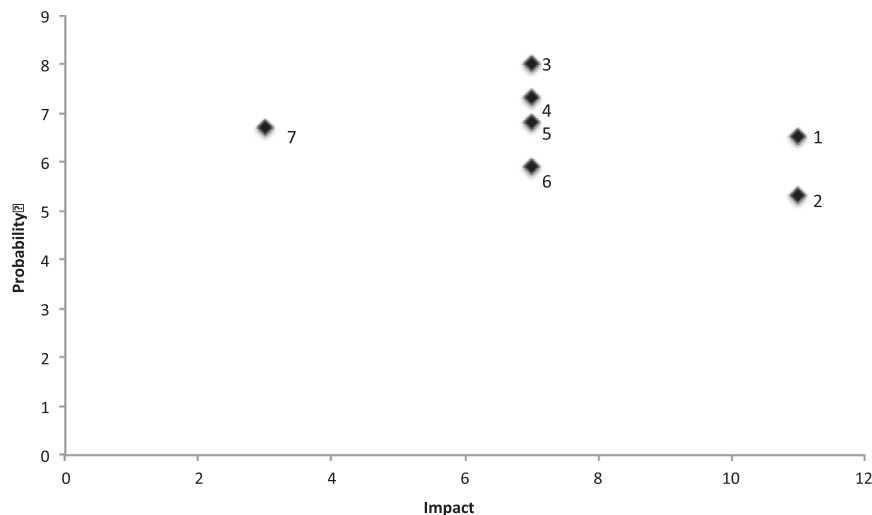


Fig. 3. Risk matrix.

and equal distribution of profits and expenses between public and private partners. Inappropriate refers to business ethics and integrity practices by which the organisations deal with stakeholders when compliance with internal procedures or (international) legislation is in jeopardy. As a result, undesirable organisational behaviour is not managed ex ante and may interfere with PPP operations.

5. The final intolerable risk has to do with *the moment at which the partnership initiative is launched*, influencing managers' capabilities and their intent to manage the project. If there are too many other business issues with higher priority, there is little involvement and participation of managers to develop the strategic plan for cooperation. In addition, fleet owners may become vendor locked-in when they make a service proposal after system acquisition instead of before. Hence, they may become dependent on the strategic interest of the OEM since they are unable to switch to another vendor without major costs and efforts.

4.1.2. Undesirable risks

6. A less likely risk concerns the *inadequate sharing of information between employees of both organisations*, which should be controlled before the partnership becomes operational to enable joint operations. There are a number of potential behavioral causes referring to employees' misunderstanding or their inability to transfer relevant information.
7. The risk with the least negative effect on successful PPP formation concerns *inadequate project planning, consultation meetings and consultation structures between partners*. The risk implies problems with respect to effective and efficient control of formation progress. It manifests within the alliance board and project workgroups

4.2. Conceptual framing: examining areas of responsibility

By analysing the data, risks were assigned to areas of responsibility that may be allocated in a typical large organisation.

These types of responsibility structured the presentation of results of our third phase. Tables 6a and 6b provide a bird's-eye view of the results, which are subsequently described. The table is split for readability, with Table 6a presenting risks associated with project governance and process management (the first two responsibilities), and Table 6b presenting those associated with project management (the final responsibility).

4.3. Risks and areas of responsibility (phase 3)

We elaborate on the three areas of management responsibility. After the tables more empirical evidence is provided. Potential risk factors with their performance impact were identified and assigned to being either an organisation, human, or technical risk factor. That is, the last column identifies the type of risk factor (large category and specific example) as a step to better understanding the various needs for risk management measures.

4.3.1. Project governance and process management

First, with respect to project governance, results indicate that two intolerable risks. Project governance is defined as "a process-oriented system by which projects are strategically directed, integratively managed, and holistically controlled, in an entrepreneurial and ethically reflected way" (Renz, 2007).

Risks involved the presence of an inadequate management delegation, and the wrong momentum for the partnership – fall under the responsibility of project governance. These risks are to be secured by senior management. Their commitment, guidelines, and mandate is necessary to set direction, ensure that the PPP receives the necessary resources (e.g. mitigate the likelihood by acquiring the expertise), and to give representatives power and back-up to act (e.g. improving staff consultation).

Second, one undesirable risk was related to partnership process management. Partnerships develop throughout a sequence of phases coinciding with the moment in the project (Das and Teng, 2001). The risk had to do with issues regarding inadequate project planning, consultation meetings and structures. It encompasses

Table 6a
Risk factors and areas of responsibility (project governance and process management).

Risk	Type of responsibility	Potential Risk factors	Performance impact	Type of risk factor
Insufficient representation of qualified people in the decision-making process of defining the strategic objectives (prio 1 risk)	Project governance	People without strategic directives and mandate	Task conflict leading to delayed formation	Organisational factor – distribution of responsibilities
	Project governance	People with clashing personalities	Relationship conflict leading to dysfunctional teams and poor outcomes	Human factor – personal relationships
Wrong momentum of the partnering initiative (prio 5 risk)	Project governance	People without the necessary knowledge or personality traits	Process conflict leading to loss of motivation and representatives dropping out	Organisational factor – management selection & knowledge acquisition
	Project governance	Failure of senior management to give quidens to the partnership due to other businesses priorities	Impossible to develop a strategic plan	Organisational factor – business prioritisation
Inadequate project planning, consultation meetings and structures (prio 7 risk)	Process management	The foundation of the relationship between partners is already laid during system acquisition, new negotiations about how to organize the relationship for system maintenance are superfluous	Lack of strategic rationale, commitment	Organisational factor – business coordination
	Process management	Level of representatives does not match the level of significance of the issue at hand	Process conflict leading to loss of motivation and representatives dropping out	Organisational factor – project structure
		The need for consultation is not aligned with the amount of issues at hand	Task conflict leading to delayed formation	Organisational factor – project planning
		The need of a consultation moment is not aligned with the timeline of a decision	Inefficient meetings	Organisational factor – project planning

activities such as the arrangement of meetings between functional specialists, security of effective inter- and intraorganisational communications, and coordination of business efforts between partners. These activities are key for a consistent approach for managing the development process of the partnership.

We provide empirical evidence of the appropriateness of control put in place by the public organisation under scope concerning PPSMP project 1 and 2.

4.3.1.1. Insufficient representation of qualified people in the decision-making process of defining the strategic objectives (prio 1 risk). The results show that within project 1 it is unclear who is given mandate to make alliance decisions. As such, representatives come and go based upon their own motivation; and they bring and take with them their own understanding and influence. Also, job rotation negatively influences the progress of the alliance process and therefore control measures are required. Furthermore, without knowledge of each other and without corporate directives, they try to identify business complementarity to define the strategic rationale for the alliance. Also, within project 1 a limited number of management representatives is considered a benefit for achieving quick results. In contrast, in project 2 people are aware of the importance of designating an alliance manager and delegating responsibilities to different functional process specialists within the alliance management team. However, due to insufficient knowledge of the required management competencies and organisational fragmentation, it proves difficult to accomplish broad support for the alliance decision-making process. Yet in project 2, interviewees seem aware of the necessary professional qualities of decision-makers: they should be (more) decisive, resourceful, inventive and tactical. The importance of matching personalities when establishing the alliance board had not been given consideration.

4.3.1.2. Wrong momentum of the partnering initiative (prio 5 risk). Although formation responsibility can be delegated to an alliance board, alliance management is often a secondary task. Hence, decisions are often disrupted by other business priorities. Alliance management commitment and dedication come second after core business responsibilities.

Concerning project 1, the momentum of the alliance should have been coordinated with business practice since there were conflicting business interests. Project 2, to avoid this priority problem, assigned a dedicated contract manager or alliance manager to coordinate the formation process and encourage decision makers. With respect to the importance of the momentum of initiating a service alliance partnership with a system manufacturer, managers’ opinions differ. Some believe acquisition and exploitation agreements can be established separately when there is a clear delineation of obligations. Others believe responsibilities should be integrated to increase maintenance effectiveness and decrease costs. Nevertheless, the tactic applied to obtain approval of the acquisition of a new and expensive system is to adjust expectations with respect to product quality and to economize on post-acquisition care products and services. As such, product manufacturers are reticent to predict system failure (provide failure mode analysis); when spares are to be used a new tendering procedure must be initiated. Project 2 attempted to

Table 6b
Risk factors and areas of responsibility (project management).

Risk	Type of responsibility	Potential risk factors	Performance impact	Type of risk factor
Absence of a shared performance system including collaborative-based performance matrices to determine and evaluate performance (prio 2 risk)	Project management	Lack of shared vision for the system and its relation to achieve broader goals	Lack of initiative	Human factor – knowledge and competence
		Inadequate IT	Inability to implement IT-based resources	Technical factor – technology
Partners do not delegate partnership responsibilities and decision-making authority to process owners within their organisation (prio 3 risk)	Project management	Lack of information organisation and governance	Lack of supply chain information	Organisational factor – information management
		Partners lack of knowledge of the specific tasks need to be carried out	Lack of coordination	Human factor – supply chain knowledge
Impractical or inappropriate partnership agreement (prio 4 risk)	Project management	Lack of a clear hierarchical structure within partners' own organisation	Lack of control	Organisational factor – business structure
		Lack of an appropriate partnership business plan in which among other things is determined: (1) the level of liability each partner is responsible for, (2) how profits and expenses will be shared, (3) dissolution and expulsion rules	Business transactions are not pre-secured	Organisational factor – formal arrangements
Inadequate information sharing between employees of both organisations (prio 6 risk)	Project management	Not in accordance with internal procedures or (inter) national legislation, such as the Law “Market and Government”, and the European Tendering Act	Chance of being sued or formation shut down	Organisational factor – regulatory compliance
		Fear for (intentional) misuse of operational resources	Difficulties in achieving the partnership goals due to lack of trust/engagement	Human factor – trust
	Project management	Employees are unwilling to share information to maintain their status and influence (knowledge is power)	Unilateral focus on individual objectives	Human factor – behaviour
		Business partners use (expert) information as bargaining power	Unilateral focus	Organisational factor – behaviour
		Lack of relevant information sharing due to lack of common understanding and terminology	Miscommunication posing a risk to successful performance	Human factor – supply chain knowledge
		Lack of (interorganisational) information structure	Inadequate flow of information	Organisational factor – process structure

counter this tendency by developing an alliance strategy. This can provide continuity of the partnering initiative.

4.3.1.3. Inadequate project planning, consultation meetings and structures (prio 7 risk). In both projects, the organisation is aware of the importance of including representatives with different expertise and from different management levels within the decision-making process. Yet, due to organisational fragmentation it is difficult to identify whom should be included as a key decision-maker. Also, it is considered important to make a good project plan as a basis for monitoring that the collaboration develops within time and budget. Nevertheless, project managers have insufficient experience to plan in which goals are scheduled in a logical sequence. Although the number of meetings is considered sufficient, it is difficult to agree on meeting based on urgency. Project 2, given the dedicated alliance manager, seemed to be better embedded in the organisation. Project 1 lacked such a manager and suffered from job rotation.

4.3.2. Project management

The third area of responsibility includes project management. Project management is the process of controlling achievement of project objectives (Munns and Bjeirmi, 1996). The undesirable risks related to the effect of partnership operations. One of them concerns the lack of decision-making authority of project members (based on their specific knowledge), due to insufficient mandate given by project governance. Others relate to the absence of an appropriately defined business arrangement, inadequate performance metrics, and inadequate interorganisational information sharing. Similar factors underlie these risks, referring to lack of guidelines, domain knowledge, and trust.

We provide empirical evidence of the appropriateness of control put in place by the public organisation under scope concerning PPSMP project 1 and 2.

4.3.2.1. Absence of a shared performance system including collaborative-based performance matrices to determine and evaluate performance (prio 2 risk). In both projects, the organisation experiences that potential private partners should have desirable unique competences, operate flexibly to respond to changing demands, and aim to secure their income rather than maximize profit.

In project 1, imposed alliance targets are missing which is why the collaboration seems not to be thriving. The motivation of the organisation is to participate in the experiment to increase cooperation knowledge against minimal investments and minimal risks. There is appropriate information technology to share business information between partners. Nevertheless, the organisation of what is inadequate to extract sufficient management information from the ERP system and the organisation is inadequate in measuring important soft performance indicators. This risk has been accepted without demanding control measures.

4.3.2.2. Partners do not delegate partnership responsibilities and decision-making authority to process owners within their organisation (prio 3 risk). In project 1, partners have insufficient experience with each other to develop themselves an

alliance business model. Instead, the responsibility is transferred to researchers. In project 2, on systems where there is a tradition of working close together, partners have more knowledge of each other's competences and goodwill trust. Consequently, they know better how to divide (sub)process responsibilities. Nevertheless, there is insufficient knowledge of the partner's competence to control budgets. Also, concerns arise how to cover the private partner's bankruptcy. In addition, often discussions about responsibilities occur only after the alliance has become operational, which is why people stress the importance of a dedicated contract manager to monitor execution. Managers consider formal governance mechanisms important to control alliance operations and informal governance mechanisms important for alliance initialisation. They consider contracts to be important to cover disparities but fail to consistently regulate all actions. Therefore, they believe it is key to have also trust in partner's willingness to invest efforts and costs in the partnership exceeding individual benefits. As such, contracts and trust should coexist. Nevertheless, organisational fragmentation of responsibilities causes performance inefficiency and makes it difficult to enact formal accountability.

4.3.2.3. Impractical or inappropriate partnership agreement (prio 4 risk). Contrary to project 2, in project 1 the organisation is unaware of the importance to design an alliance business model. When confronted with this notion during an interview, the absence is considered to be an "easy" convenience of experimenting. In project 2 they try but nevertheless find it hard to distribute accountability among partners, to cover bankruptcy, and to settle financial aspects. As a tactic they develop and evaluate the business model throughout the alliance. This is also why according to the public organisation the contract should support a certain amount of operational flexibility to shape cooperation throughout time. In both projects, the public organisation was aware of the fact that partner selection should be in accordance with the European Tendering Act. However, since the organisation has the objective to contribute to local employment, they prefer an experiment with local partners. However, this objective is not supported by the organisation's top management level. Their alliance objectives are limited to an increase of availability or decrease of cost. It follows that project 1 runs the risk of becoming unlawful when it is translated into practice. Due to the law, the public organisation is unable to include geographical location requirements, nor any other informal governance mechanisms as partner selection criteria when sourcing commercial services or goods. Also, due to the long time it takes to establish a service alliance agreement, the systems under scope could have become obsolescent. Regardless of the residual capacity and a minimum volume of work required to uphold skills and knowledge, the law also makes it impossible to commercially exploit services or resources also available on the market.

4.3.2.4. Inadequate information sharing between employees of both organisations (prio 6 risk). Employees are willing to share knowledge and information if they have a high level of job involvement, (technical) interests between employees of different

organisations match, and people have developed relationships. These conditions were absent in project 1 and present in project 2, and they even outweigh the fear employees may have of losing business. The alliance negotiations are held by means of open conversations, however the sharing of intellectual property is treated with considerable caution. Also, a balance sheet is considered a precondition for information exchange between partners. When not established at first, employees became suspicious of the intention of the alliance partner within project 2. In both projects we noticed the relevance to establish a common understanding of terminology between alliance partners, for example to define key performance indicators for the alliance. Due to organisational fragmentation it appeared difficult and time consuming to get those involved informed on time and secure widespread support.

One final observation includes that, considering high to low scoring risks, results indicate that most risks are caused by organisational followed by human factors.

4.3.3. Comparing IRM across projects: concluding remarks

Our findings identified a number of common PPP project risks. With regards to these risks, management is indispensable to seize and leverage partnership opportunities.

A first condition for effective risk management is well-developed risk awareness. It concerns recognising and acknowledging risks. Our findings reveal a differences in terms of project stakeholders' risk awareness, in particular when it comes to project governance responsibilities.

A second condition for effective risk management is risk differentiation. It concerns differentiating risk priorities, risk factors and appropriate measures. Our findings show that the main risk to the project stems from the direction project governance is taking. A serious risk is associated with a human (trust related) as well as organisational (control related) performance factors.

Project management is the area most at risk, in terms of the multiplicity and diversity of risk factors that require coverage in order for the project more likely to succeed. Finally, process management has the lowest risk.

5. Discussions

This paper investigates from a project management perspective a public organisation's capability to manage PPP projects as a factor influencing collaborative performance. There is much research on PPPs and performance management. Current work provides insights in partnership capability by means of building experience (Anand and Khanna, 2000; Draulans et al., 2003; Kale and Singh, 2009; Zollo and Winter, 2002), exploring risks involved, or discussing the effectiveness of trust and control (de Man and Roijackers, 2009). Notwithstanding their significant contribution, limited academic attention has so far been paid to organisations' integrated risk management in practice (Elmuti and Kathawala, 2001) for partnership project benefit realisation (Ofer and Smyrk, 2015). In addition, limited insight has been provided in benefit realisation differences between different partnership projects of one organisation (i.e. organisation as an embedded unit

of analysis in interorganizational partnerships (Yin, 2009)). As a consequence, studies on organisations' capability to establish successful partnerships have been criticised for not capturing the "content" of what organisations do (Gulati, 1998; Heimeriks et al., 2005). Hence, there is a need for a comprehensive understanding of how organisations monitor the overall result by integrated project risk management. A qualitative sequential mixed methods approach was therefore adopted to empirically examine this topic. Results suggest that the most and serious risks are related to project governance and project management responsibility, rather than process management.

This implies, that the development of the partnership process may occur smoothly, while the substantive outcome will be unsuccessful in the sense of partnership objectives not being realised.

5.1. Theoretical and practical implications

Referring to the main conclusions of this study, several contributions can be identified. First, research has fallen short of defining direct and indirect factors and their interrelationship that underlie organisations' capability to manage PPP projects. The analysis of this study has sought to uncover the different areas of project responsibility that lies at the root of this capability. This study found that organisations' capability to manage PPP projects is in particular related to its governance and project management capability.

Project *governance* requires a long-term effort of senior management to secure strategic "fit" of the project with the overall business objectives, and investments of resources for process and project management (Abednego and Ogunlana, 2006; Akintoye et al., 2008: 60). Project *management* requires involvement of specialists on specific issues. Project management specialist may be more committed to their profession and included in the project on top of their role in routine operations. Hence, both project governance and project management need to be strongly committed. They must put incentives in place to manage the partnership risks effectively or else they may suffer from inaction or counterproductive behaviour (Spira and Page, 2003).

In addition, our results contribute to research on the link between risks, trust, and control (de Man and Roijackers, 2009; Gurcayiliar-Yenidogan, 2014). Our results shine in particular light on human and organisational factors that simultaneously influence partnership project performance. By suggesting that intra-firm responsibilities play a role in management success, the results help to address understanding of partnership performance differences within and capability differences between organisations (Ireland et al., 2002). Hence, this study complements current literature on partnership capability by showing internal implications concerning cross-organisational responsibility. In an age of increasing inter-organisational networking for collective innovation, our findings contribute to emerging research on how intraorganisational governance influences the development of Public-Private Partnerships (Brinkerhoff and Brinkerhoff, 2011; Ebrahim et al., 2014; Gurcayiliar-Yenidogan, 2014; Klijn and Koppenjan, 2012;

Pateli, 2009; Ruuska et al., 2011). Complementing project management research on risks and performance management (Ofer and Smyrk, 2015), our study highlights the importance of introspective capabilities in the sense of strategic involvement in project governance, management accountabilities and a focus on benefit realisation. Dovetailing these with partner-oriented capabilities seems a recipe for success.

There are also a few important managerial implications. Practitioners can benefit from this study's insights as it increases awareness of flaws within their risk management practice in relation to public-private partnership projects. While integrated risk management could seem remote from the vibe of an (early stage) innovation process, our work highlights the need to discuss it, possible by including someone playing the "devil's advocate". The areas of management responsibility enable reflection on organisations' level of capability before they make the final decision on starting up a PPP initiative or not.

5.2. Limitations and future research

Despite the contributions of this study, it is subject to several limitations. First, although the validity of the types of responsibilities is verified in various ways, interrelationship between them has remained implicit. Our results suggest it is likely that only together they facilitate integrated risk management. Future research should try to extend our analysis by empirically verifying the interaction effects among them. Second, our study consisted of mostly qualitative research, except for the short survey in phase 2. Especially for mature projects, researchers could use compensatory multi-attribute scoring models to develop a quantitative risk analysis. Third, to counter the bias of studying two PPP projects at the same organisation, PPP researchers could explore both organisations involved in a partnership, including the commercial partner. This could reveal perception of risks within and across organisations. Last, given the instrumental case study used, more research is required to validate and substantiate our findings by type of organisation or partnership. In addition, an essential point of departure for follow-up research may be to study managerial (limited) interest in taking sufficient risks management responsibility.

6. Conclusion

This paper analyses by means of IRM a public organisation's experience of and capability to manage PPP project risks, as a factor influencing PPP performance. We conducted qualitative sequential mixed methods research to identify risks and categorise them, assess the appropriateness of controls put in place, and inform discussions in relation to the overall organisational strategy. As results suggest, public organisations in PPP can face several potential risks. Most of them are considered to be "intolerable" since they will prevent achieving the primary objectives of the partnership. The risks relate in particular to project governance and project management responsibilities, rather than process management. This implies, that the development of the partnership process may occur smoothly, while the substantive outcome will be

unsuccessful in the sense of partnership objectives not being realised.

The results furthermore indicate that risks are primarily caused by organisational and human factors.

Conflict of interest

The authors have not experienced a conflict of interest while conducting the study reported in this paper.

References

- Abednego, M.P., Ogunlana, S.O., 2006. Good project governance for proper risk allocation in public-private partnerships in Indonesia. *Int. J. Proj. Manag.* 24 (7), 622–634.
- Akintoye, A., Beck, W., Hardcastle, C., 2008. *Public-Private Partnerships: Managing Risks and Opportunities*. Wiley-Blackwell, Hoboken, NJ.
- Anand, B.N., Khanna, T., 2000. Do firms learn to create value? The case of alliances. *Strateg. Manag. J.* 21 (3), 295–315.
- Ansari, S., Reinecke, J., Spaan, A., 2014. How are practices made to vary? Managing practice adaptation in a multinational corporation. *Organ. Stud.* 35 (9), 1313–1341.
- Bamford, J.D., Gomes-Casseres, B., Robinson, M.S., 2003. *Mastering Alliance Strategy: A Comprehensive Guide to Design, Management, and Organization*. Wiley, San Francisco, CA.
- Bellamy, C., Raab, C., 2005. Joined-up government and privacy in the United Kingdom: managing tensions between data protection and social policy, part II. *Public Adm.* 83 (2), 393–415.
- Bobbink, M.L., Hartmann, A., 2014. Extended enterprise performance management: a value co-creation perspective. Paper Presented at the Performance Management: Designing the High-Performance Organization, Aarhus, Denmark.
- Bovaird, T., 2004. Public-private partnerships: from contested concepts to prevalent practice. *Int. Rev. Adm. Sci.* 70 (2), 199–215.
- Brax, S.A., Jonsson, K., 2008. Developing integrated solution offerings for remote diagnostics: a comparative case study of two manufacturers. *Integr. Solution Offerings* 29 (5), 539–560.
- Brinkerhoff, D.W., Brinkerhoff, J.M., 2011. Public-private partnerships: perspectives on purposes, publicness, and good governance. *Public Adm. Dev.* 31 (1), 2–14.
- Bromiley, P., McShane, M., Nair, A., Rustambekov, E., 2015. Enterprise risk management: review, critique, and research directions. *Long Range Plan.* 48 (4), 265–276.
- Cambra-Fierro, J., Florin, J., Perez, L., Whitelock, J., 2011. Inter-firm market orientation as antecedent of knowledge transfer, innovation and value creation in networks. *Manag. Decis.* 49 (3), 444–467.
- Chang, S.C., Chen, S.S., Lai, J.H., 2008. The effect of alliance experience and intellectual capital on the value creation of international strategic alliances. *Omega* 36 (2), 298–316.
- Crié, D., Micheaux, A., 2006. From customer data to value: what is lacking in the information chain? *J. Database Market. Cust. Strategy Manag.* 13 (4), 282–299.
- Das, T.K., Teng, B., 2001. Trust, control, and risk in strategic alliances: an integrated framework. *Organ. Stud.* 22 (2), 251–283.
- de Man, A.-P., Roijakkers, N., 2009. Alliance governance: balancing control and trust in dealing with risks. *Long Range Plan.* 42 (1), 75–95.
- Dekker, H.C., 2004. Control of inter-organizational relationships: evidence on appropriation concerns and coordination requirements. *Acc. Organ. Soc.* 29 (1), 27–49.
- Draulans, J., De Man, A.-P., Volberda, H.W., 2003. Building alliance capability: management techniques for superior alliance performance. *Long Range Plan.* 36, 151–166.
- Dunford, R., Jones, D., 2000. Narrative in strategic change. *Hum. Relat.* 53 (9), 1207–1226.

- Dussauge, P., Garrette, B., 1993. Industrial alliances in aerospace and defence: an empirical study of strategic and organizational patterns. *Def. Econ.* 4 (1), 45–62.
- Dyer, J.H., Hatch, W., 2006. Relation-specific capabilities and barriers to knowledge transfers: creating advantage through network relationships. *Strateg. Manag. J.* 27 (8), 701–719.
- Ebrahim, E., Battilana, J., Mair, J., 2014. The governance of social enterprises: mission drift and accountability challenges in hybrid organizations. *Res. Organ. Behav.* 34, 81–100.
- Elmuti, D., Kathawala, Y., 2001. An overview of strategic alliances. *Manag. Decis.* 39 (3), 205–217.
- Feller, J., Parhankangas, A., Smeds, R., Jaatinen, M., 2013. How companies learn to collaborate: emergence of improved inter-organizational processes in R&D alliances. *Organ. Stud.* 34 (3), 313–343.
- Fielding, N., Thomas, H., 2008. Qualitative interviewing. In: Gilbert, N. (Ed.), *Researching Social Life*. Sage, London.
- Grimsey, D., Lewis, M.K., 2002. Evaluating the risks of public private partnerships for infrastructure projects. *Int. J. Proj. Manag.* 20 (2), 107–118.
- Gulati, R., 1998. Alliances and networks. *Strateg. Manag. J.* 19 (4), 293–317.
- Gulati, R., Nohria, N., Zaheer, A., 2000. Strategic networks. *Strateg. Manag. J.* 21, 203–2015.
- Gulati, R., Wohlgezogen, F., Zhelyazkov, P., 2012. The two facets of collaboration: cooperation and coordination in strategic alliances. *Acad. Manag. Ann.* 6 (1), 531–583.
- Gurcayiliyar-Yenidogan, T., 2014. Complementarity between formal and relational governance mechanisms in inter-organizational networks: combining resource-based and relational governance perspectives. In: Windsperger, J. (Ed.), *Interfirm Networks*. Springer International, Bern.
- Hartley, K., 2008. Collaboration and European defence industrial policy. *Def. Peace Econ.* 19 (4), 303–315.
- Heimeriks, K.H., Duysters, G., Vanhaverbeke, W., 2005. Developing alliance capabilities: an empirical study. Paper Presented at the Academy of Management Conference, Honolulu, Hawaii.
- Henneberg, S.C., Mouzas, S., 2008. Final customers' value in business networks. In: Woodside, A.G., Golfetto, F., Gibbert, M. (Eds.), *Creating and Managing Superior Customer Value*. JAI/Emerald, Bingley, UK.
- Humphries, A.S., Wilding, R., 2004. UK defence supply chain relationships. *Manag. Decis.* 42 (2), 259–276.
- Hwang, B.G., Zhao, X., Gay, M.J.S., 2013. Public private partnership projects in Singapore: factors, critical risks and preferred risk allocation from the perspective of contractors. *Int. J. Proj. Manag.* 31 (3), 424–433.
- Ireland, R.D., Hitt, M.A., Vaidyanath, D., 2002. Alliance management as a source of competitive advantage. *J. Manag.* 28 (3), 413–446.
- Jamali, D., 2004. Success and failure mechanisms of public private partnerships (PPPs) in developing countries. *Int. J. Public Sect. Manag.* 17 (5), 414–430.
- Joha, A., Janssen, M., 2010. Public-private partnerships, outsourcing or shared service centres? Motives and intents for selecting sourcing configurations. *Transform. Gov. People Process Policy* 4 (3), 232–248.
- Kale, P., Singh, H., 2009. Managing strategic alliances: what do we know now, and where do we go from here? *Acad. Manag. Perspect.* 45–62.
- Kaplan, R.S., Norton, D.P., 1996. Using the balanced scorecard as a strategic management system. *Harv. Bus. Rev.* (January-February), 3–13.
- Kaplan, R.S., Norton, D.P., 2004. *Strategy Maps: Converting Intangible Assets into Tangible Outcomes*. Harvard Business Press, Boston.
- Kaplan, R.S., Norton, D.P., Rugelsjoen, B., 2010. Managing alliances with the balanced scorecard. *Harv. Bus. Rev.* (January-February), 114–120.
- Keers, B.B.M., van Fenema, P.C., 2015. Alliance performance management in service logistics. *J. Organ. Des.* 4 (1):12–28 (<http://www.jorgdesign.net/article/view/18194/18299>).
- Kerkhof, R.M., Akkermans, H.A., Noorderhaven, N.G., 2016. Knowledge lost in data: organizational impediments to condition-based maintenance in the process industry. In: Zijm, H., Klumpp, M., Clausen, U., ten Hompel, M. (Eds.), *Logistics and Supply Chain Innovation: Bridging the Gap between Theory and Practice*. Springer International Publishing, Cham.
- Kickert, W.J.M., Klijn, E.-H., Koppenjan, J.F.M., 1999. *Managing Complex Networks: Strategies for the Public Sector*. Sage, London.
- Kinney, G.F., Wiruth, A.D., 1976. *Practical Risk Analysis for Safety Management*. NWC TP 5865, California.
- Kleemann, F.C., Essig, M., 2013. A providers' perspective on supplier relationships in performance-based contracting. *J. Purch. Supply Manag.* 19, 185–198.
- Klijn, E.H., Koppenjan, J.F.M., 2012. Governance network theory: past, present and future. *Policy Polit.* 40 (4), 187–206.
- Klinke, A., Renn, O., 2002. A new approach to risk evaluation and management: risk-based, precaution-based, and discourse-based strategies. *Risk Anal.* 22 (6), 1071–1094.
- Koppenjan, J.F.M., 2005. The formation of public-private partnerships: lessons from nine transport infrastructure projects in The Netherlands. *Public Adm.* 83 (1), 135–157.
- Lam, J., 2014. *Enterprise Risk Management: From Incentives to Controls*. Wiley, Hoboken, NJ.
- Levering, R., Ligthart, R., Noorderhaven, N.G., Oerlemans, L.A.G., 2013. Continuity and change in interorganizational project practices: the Dutch Shipbuilding Industry, 1950–2010. *Int. J. Proj. Manag.* 31 (5), 735–747.
- Luo, Y., Shenkar, O., Gurnani, H., 2008. Control-cooperation interfaces in global strategic alliances: a situational typology and strategic responses. *J. Int. Bus. Stud.* 39, 428–453.
- Majchrzak, A., Jarvenpaa, S.L., Bagherzadeh, M., 2015. A review of interorganizational collaboration dynamics. *J. Manag.* 41 (5), 1338–1360.
- Massingham, P., 2010. Knowledge risk management: a framework. *J. Knowl. Manag.* 14 (3), 464–485.
- Möller, K., Rajala, A., 2007. Rise of strategic nets - new modes of value creation. *Ind. Mark. Manag.* 36 (7), 895–908.
- Mukherjee, D., Gaur, A.S., Gaur, S.S., Schmid, F., 2013. External and internal influences on R&D alliance formation: evidence from German SMEs. *J. Bus. Res.* 66 (11), 2178–2185.
- Munns, A.K., Bjeirmi, B.F., 1996. The role of project management in achieving project success. *Int. J. Proj. Manag.* 14 (2), 81–87.
- Nelson, J.C., Rashid, H., Galvin, V.G., Essien, J.D.K., Levine, L.M., 1999. Public/private partners: key factors in creating a strategic alliance for community health. *Am. J. Prev. Med.* 16 (3), 94–102.
- Nijkamp, P., van der Burch, M., Vindigni, G., 2002. A comparative institutional evaluation of public-private partnerships in Dutch urban land-use and revitalisation projects. *Urban Stud.* 39 (10), 1865–1880.
- Nwaka, S., Ridley, R.G., 2003. Science & society: virtual drug discovery and development for neglected diseases through public-private partnerships. *Nat. Rev. Drug Discov.* 2 (11), 919–928.
- Ofer, Z., Smyrk, J., 2015. Project governance: balancing control and trust in dealing with risk. *Int. J. Proj. Manag.* 33 (4), 852–862.
- Oliver, C., 1990. Determinants of interorganizational relationship: integration and future directions. *Acad. Manag. Rev.* 15 (2), 241–265.
- Osei-Kyei, R., Chan, A.P.C., 2015. Review of studies on the critical success factors for public-private partnership (PPP) projects from 1990 to 2013. *Int. J. Proj. Manag.* 33 (6), 1335–1346.
- Otto, B., Lee, Y.W., Caballero, I., 2011. Information and data quality in networked business. *Electron. Mark.* 21 (2), 79–81.
- Pateli, A., 2009. Decision making on governance of strategic technology alliances. *Manag. Decis.* 47 (2), 246–270.
- Patton, M.Q., 2002. *Qualitative Research and Evaluation Methods*. 3rd ed. Sage, Thousand Oaks, CA.
- Peeters, C., Thienpont, I., Van Hese, C., Djohan, S., Webers, H., 2012. *De Nederlandse Maritieme Cluster Monitor 2012*. Stichting Nederland Maritiem Land, Rotterdam.
- Pintelon, L., Pinjala, S.K., Vereecke, A., 2006. Evaluating the effectiveness of maintenance strategies. *J. Qual. Maint. Eng.* 12 (1), 7–20.
- Pitsis, T.S., Komberger, M., Clegg, S.R., 2004. The art of managing relationships in interorganizational collaboration. *Management* 7 (3):47–67 (<http://www.management-aims.com>).
- Pongsiri, N., 2002. Regulation and public-private partnerships. *Int. J. Public Sect. Manag.* 15 (6), 487–495.
- Provan, K.G., 1984. Interorganizational cooperation and decision making autonomy in a consortium multihospital system. *Acad. Manag. Rev.* 9 (3), 494–504.
- Rausser, G., Simon, L., Ameden, H., 2000. Public-private alliances in biotechnology: can they narrow the knowledge gaps between rich and poor? *Food Policy* 25 (4), 499–513.

- Renz, P.S., 2007. *Project Governance: Implementing Corporate Governance and Business Ethics in Nonprofit Organizations*. Springer Science & Business Media, Berlin.
- Ruuska, I., Ahola, T., Artto, K., Locaetti, G., Mancini, M., 2011. A new governance approach for multi-firm projects: lessons from Olkiluoto. *Int. J. Proj. Manag.* 29 (6), 647–660.
- Samaddar, S., Nargundkar, S., Daley, M., 2006. Inter-organizational information sharing: the role of supply network configuration and partner goal congruence. *Eur. J. Oper. Res.* 174, 744–765.
- Sampson, R.C., 2004. The cost of misaligned governance in R&D alliances. *J. Law Econ. Org.* 20, 484–526.
- Schemm, J., Legner, C., 2008. Toward the inter-organizational product information supply chain – evidence from the retail and consumer goods industries. *J. Assoc. Inf. Syst.* 9 (4), 120–152.
- Smith, K.G., Carroll, S.J., Ashford, S.J., 1995. Intra- and Interorganizational cooperation: toward a research agenda. *Acad. Manag. J.* 38 (1), 7–23.
- Spira, L., Page, M., 2003. Risk management: the reinvention of internal control and the changing role of internal audit. *Account. Audit. Account. J.* 16 (4), 640–661.
- Taplin, R., 2007. *Innovation and Business Partnering in Japan, Europe and the United States*. Routledge, Abingdon, Oxon.
- Tatham, P., 2013. An exploration of trust and shared values in UK defence supply networks. *Int. J. Phys. Distrib. Logist. Manag.* 43 (2), 148–166.
- Tjemkes, B., Vos, P., Burgers, K., 2012. *Strategic Alliance Management*. Routledge, Oxon, UK.
- Uiterwijk, D.J.W.B., Soeters, J.M.M.L., van Fenema, P.C., 2013. Aligning national 'Logics' in a European Military Helicopter Program. *Def. Secur. Anal.* 29 (1), 54–67.
- Van Ham, H., Koppenjan, J., 2001. Building public-private partnerships: assessing and managing risks in port development. *Public Manag. Rev.* 3 (4), 593–616.
- Vlaar, P.W.L., Van den Bosch, F.A.J., Volberda, H.W., 2006. Towards a dialectic perspective on formalization in interorganizational relationships: how alliance managers capitalize on the duality inherent in contracts, rules and procedures. *Organ. Stud.* 28 (4), 437–466.
- Wilkinson, J., Olin, A., Lund, T., Stjernström, E., 2013. Understanding leading as travelling practices. *School Leadersh. Manag.* 33 (3), 224–239.
- Williamson, O.E., 1981. *The economics of organization: the transaction cost approach*. *Am. J. Sociol.* 87 (3), 548–577.
- Williamson, O.E., 1985. *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*. Free Press, New York.
- Yin, R.K., 2009. *Case Study Research: Design and Methods*. Sage, Newbury Park, CA.
- Zollo, M., Winter, S.G., 2002. Deliberate learning and the evolution of dynamic capabilities. *Organ. Sci.* 13 (3), 339–351.
- Zou, W., Kumaraswamy, M., Chung, J., Wong, J., 2014. Identifying the critical success factors for relationship management in PPP projects. *Int. J. Proj. Manag.* 32 (2), 265–274.