Journal of Engineering, Project, and Production Management
2024, 14(4), 0034

# Risk Management Capability for Risk Allocation in Social Infrastructure Public Private Partnerships: A New Zealand Perspective

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Project Management
Received November 22, 2023; received revision November 18, 2024; accepted November 21, 2024
Available online November 28, 2024

**Abstract:** The use of Public-Private Partnerships (PPPs) has become increasingly popular as an innovative way for procuring public infrastructure projects. One of the main reasons for this widespread adoption is the transfer and allocation of risks. Research has shown that fair allocation of risks is crucial for the success of a PPP. This study recognized the significance of fair risk distribution and examined seven crucial risk allocation criteria (RAC) along with 16 risks that are often improperly assigned based on previous research. An online questionnaire through Qualtrics was administered to experts who had prior involvement in three schools and two prison PPP projects in New Zealand to obtain data on risk management capability. The data collected from 43 respondents was analysed using mean score analysis. Relevant statistical tests such as Cronbach's alpha and independent sample t-tests were performed to ensure the accuracy of the analysis results. The objective of this study is to offer valuable insights to PPP stakeholders on the most efficient measures to achieve fair risk allocation and the state of risk management capabilities of public and private sectors in New Zealand. To accomplish fair risk allocation, the study proposes considering the risk management capacities of both the public and private sectors in the context of the identified RAC. The findings of the study are anticipated to aid PPP stakeholders in formulating strategies that can enhance risk management and establish a balanced distribution of risks.

**Keywords**: Public-private partnership, risk allocation criteria, risk allocation, risk management capability.


DOI 10.32738/JEPPM-2024-0034

## 1. Introduction

Governments worldwide are facing challenges with increasing infrastructure demand and investment requirements (Tirumala and Tiwari, 2023). Consequently, they have turned to the private sector for financial assistance and increased private sector participation, leading to the emergence of innovative project delivery approaches, including Public-Private Partnerships (PPPs). Engaging the private sector has also resulted in enhanced project performance (Liu et al., 2015). The primary reason for achieving superior outcomes in such arrangements is the alignment of interests between the public and private entities involved. Therefore, PPPs have emerged as a favorable and effective approach for infrastructure provision, particularly in large-scale investments like road infrastructure projects (Sastoque et al., 2016).

There is substantial evidence supporting the notion that PPPs yield better performance compared to traditional procurement systems, where the public sector bears sole responsibility for project delivery (Koppenjan et al., 2022, Xiong et al., 2017). However, it should be noted that PPPs are not without challenges, as they involve complex financial arrangements, high investor expectations of returns, extended contract durations and inherently risky project environments (Kukah et al., 2022). Therefore, effective risk allocation and risk management strategies are critical to ensuring a successful risk transfer and achieving the desired outcomes in PPP projects. Risk transfer is a key benefit of PPPs, enabling the public and private sectors to assume and manage specific project risks (Debela, 2022). This facilitates efficient risk allocation, enhances performance accountability, enables access to private financing and promotes long-term asset management.

Previous research has explored the issue of risk transfer and sharing in PPP projects and has identified inefficient risk allocation as a common problem (Shrestha et al., 2018). Numerous studies have compared the actual distribution of risks in PPP projects with recommended allocations based on expert opinions, often using surveys (Rasheed et al., 2022). These studies have consistently revealed a significant mismatch between the preferred and actual risk distributions, resulting in inefficiencies in risk allocation. Recently, some scholars have proposed best practices aimed at evaluating each party's ability to manage identified risks (Ameyaw and Chan, 2016, Mazher et al., 2019). The goal is to prevent the misallocation of risks. This approach is based on the principle of risk allocation in PPP projects, which states that risks should be allocated to the party best equipped to handle them (Koppenjan et al., 2022).

There exists a knowledge gap in capability-based risk allocation research in the social infrastructure PPP sector. This paper aims to fill this gap by assessing the risk management capabilities of the public and private sectors in New Zealand's social infrastructure PPP projects by employing various RAC derived from existing literature. The research findings have implications for both practical applications and academic studies in the field of risk management for PPP projects. Additionally, the results offer valuable insights for international companies planning to invest in infrastructure construction projects in New Zealand.

## 2. Literature Review

### 2.1. Risk Management in PPP

Risk can be defined as an uncertain event or condition that can have either positive or negative impacts on project objectives, including scope, quality, cost and schedule, as well as individual, group or organizational objectives (Project Management Institute, 2013, Mazher et al., 2022). In the context of construction projects, risks are inherent and significant (Vegas-Fernández and Rodríguez-López, 2018). However, when compared to traditional procurement methods, PPP projects tend to be riskier. This is primarily due to factors such as extended concession periods, substantial capital investments, complex contractual arrangements, diverse motives and interests of project participants and nonrecourse financing arrangements (Zhang, 2005). Moreover, traditional risk management approaches encounter greater challenges when applied to long-term PPP projects that have considerably longer contract periods compared to short-term traditional projects (Xiong et al., 2017).

Effective project risk management entails identifying, assessing, allocating and mitigating risks throughout the project lifecycle (Jokar et al., 2023). It involves a comprehensive understanding of the potential risks involved, establishing appropriate risk allocation mechanisms and fostering collaboration and communication between the public and private partners (Project Management Institute, 2013). By proactively managing risks, including financial, operational and legal uncertainties, PPP projects can navigate challenges and increase the likelihood of achieving their intended objectives. Furthermore, robust governance frameworks, transparency and accountability are vital elements in PPPs to ensure the equitable sharing of risks and benefits between the public and private sectors. Adequate oversight and monitoring mechanisms should be established to evaluate project progress, address potential issues and make necessary adjustments when required.

The complexity and unique characteristics of PPP projects expose them to a broader range of risks. The extended concession periods associated with PPPs introduce uncertainties that may arise over time, such as changes in market conditions, regulatory frameworks and stakeholder expectations. The large capital investments required for PPP projects also amplify financial risks, as they often involve long-term financing commitments and potential revenue fluctuations (Esty, 2004). Furthermore, the complexity of contractual arrangements with multiple parties involved creates additional risks related to coordination, communication and potential conflicts of interest. The diverse motives and interests of various stakeholders participating in PPP projects, including the public sector, private companies and the community, can introduce conflicting objectives and increase the overall project risk. Recognizing the significance of these risks, Ibrahim et al. (2006) emphasized the importance of all stakeholders involved in PPPs being fully aware of the potential risks.

Traditionally, risk management has been primarily emphasized before the initiation of projects, aiming to identify and address risks proactively. However, in the context of PPP projects, which often involve long contract durations, this conventional approach has been found to be more challenging and costly (Xiong et al., 2017). The extended duration of PPP contracts introduces complexities and uncertainties that require a more dynamic and comprehensive approach to risk management. As a result, there is a pressing need to enhance the efficacy of risk management practices specifically tailored to the unique characteristics of PPP initiatives. Recognizing this need, there has been a growing interest in research focusing on various aspects of risk management in recent years.

Equitable risk allocation is another focal point of research in the field of PPP risk management (Ke et al., 2011). Achieving a fair and balanced distribution of risks between the public and private sectors is essential to fostering collaboration and ensuring mutual accountability. By identifying key risk allocation criteria (RAC) and defining clear roles and responsibilities, stakeholders can establish a framework that promotes transparency and enables effective risk sharing.

Recognizing the importance of risk sharing and transfer between the public and private sectors, several researchers have investigated the issue of ineffective risk allocation and misallocation. Comparing actual and preferred risk allocation, Ke et al. (2010) conducted a study evaluating the impact of risk misallocation on performance of PPP projects in China. Their findings revealed that higher levels of risk misallocation led to decreased project performance. The study further identified land acquisition, corrupt practices and approvals of permits as the most significant risks affecting project performance. Shrestha et al. (2018) performed a similar study focusing on risk allocation inefficiency utilizing a questionnaire survey to gather data on actual and preferred risk allocation from respondents in a water supply PPP in China. Their research uncovered risk allocation inefficiencies, particularly in risk transfer to the private sector. Furthermore, external risks such as

environmental, social, political and demand were also found to be inadequately allocated, with the private sector bearing a disproportionate burden.

These studies highlight challenges and shortcomings in risk allocation for PPP projects, emphasizing the negative impact of misallocated risks on project performance. The identified risks, both project-specific and external, emphasize the need for more precise and equitable risk allocation strategies. Misallocated risks can result in financial burdens, delays, disputes and project failures, necessitating a systematic and objective approach to risk allocation. Robust frameworks, methodologies and decision-support tools are needed to evaluate risk management capabilities and guide the fair distribution of risks among stakeholders. Several other studies in PPP research have highlighted the significance of proper risk transfer and sharing as crucial factors for success (Rasheed et al., 2019, Osei-Kyei and Chan, 2015). Risks within PPP projects are allocated to various parties based on their capacity to identify, plan and manage them effectively. It is important to note that not all project risks can be entirely transferred to private sector, as some risks are better handled by the public sector due to their nature or expertise.

Although the principle of allocating risks to the party best suited to manage them is theoretically sound, implementing it in practice poses significant challenges. Assessing the owner's ability to manage a particular risk is subjective and inherently complex. This subjectivity introduces challenges and complexities into the process of risk allocation. Consequently, the process becomes somewhat ambiguous, leading to the misallocation of risks. Various studies have highlighted the suboptimal allocation of risks observed in real-world scenarios (Ameyaw and Chan, 2016, Rasheed et al., 2022). Researchers have described this principle as effective, but also criticized its vagueness (Mazher, 2019). Ng and Loosemore (2007) argue that assessing the risk management capability of a party is complex and influenced by external factors such as complex financial arrangements, bargaining power of parties involved and requirements imposed by different stakeholders.

### 2.2. Risk Allocation Criteria

In response to the issue of misallocated risks and minimizing subjectivity, some recent studies have introduced RAC to assess the risk management capability of each party involved in PPP projects (Mazher, 2019). These criteria provide guidance on determining "what, which, and how" risks should be allocated to specific parties. In other words, they outline which risks should be allocated to which party and how the allocation process should be conducted. To capture the widely used RACs in PPP research, a comprehensive review of literature has been conducted and the findings have been summarized in Table 1. These criteria serve as benchmarks or standards for evaluating the ability of the party undertaking the risk to effectively manage it. The RACs offer a systematic approach to risk allocation by considering various factors that influence risk management capabilities. These factors may include financial strength, technical expertise, experience, operational efficiency and risk appetite. By assessing the capability of each party against these criteria, project stakeholders can make informed decisions regarding risk allocation, ensuring that risks are assigned to the parties best equipped to handle them.

**Table 1.** Risk allocation criteria (modified with permission from Rasheed et al., 2022)

| RACs | Description of the criteria | Other examples in literature |
|---|---|---|
| Risk foresight (RAC_1) | The capacity of the party to recognize and evaluate risk by foreseeing the likelihood of its occurrence and the potential consequences in occurrence. | (Chan et al., 2011, Mazher et al., 2019, Ameyaw and Chan, 2016) |
| Risk response (RAC_2) | The capability of the party to proactively reduce both the likelihood and consequences of risk prior to its occurrence. | (Chan et al., 2011, Mazher et al., 2019, Ameyaw and Chan, 2016) |
| Curtail risk loss (RAC_3) | The capacity of the party to mitigate losses or minimize the impact of the risk if it materializes. | (Chan et al., 2011, Mazher et al., 2019, Ameyaw and Chan, 2016) |
| Absorb risk impact (RAC_4) | The party's capacity to endure the impact of the risk based on their prior experience. | (Chan et al., 2011, Mazher et al., 2019, Ameyaw and Chan, 2016) |
| Reduce risk cost (RAC_5) | The party's capability to handle risk with the lowest feasible cost. | (Chan et al., 2011, Mazher et al., 2019, Ameyaw and Chan, 2016) |
| Acquire risk premium (RAC_6) | The capacity to obtain compensation for a loss incurred due to the occurrence of risk. | (Chan et al., 2011, Mazher et al., 2019, Ameyaw and Chan, 2016) |
| Risk exploitation (RAC_8) | To leverage specific risks based on an organization's exceptional capability and experience in handling those risks adeptly. | (Chan et al., 2011, Ameyaw and Chan, 2016, Irwin, 2007) |
| Risk attitude (RAC_7) | The stance of a party regarding risk management, such as being risk-averse, risk-seeking, risk-neutral or risk-transfer. | (Mazher et al., 2019, Ameyaw and Chan, 2016) |

The traditional approach to risk allocation in PPP projects involves negotiation among risk specialists from both sectors (Wan et al., 2022). Undoubtedly, negotiation plays a crucial role in PPPs, as it allows stakeholders to address their concerns and find mutually acceptable solutions. However, relying solely on negotiation may not always be the most effective tool for risk allocation practices. The suitability of negotiation for risk allocation depends on the project stage and the relative

control that each party holds. For instance, during the procurement stage, the public sector typically has greater authority and bargaining power compared to the private parties. This power dynamic has been exploited in the past, resulting in the excess transfer of risks to the private sector, often exceeding its capability to effectively manage them.

To address the limitations of negotiation-based risk allocation, this study proposes an alternative allocation process that considers the risk management capabilities of each party for allocation of risk. This assessment is conducted in light of the identified RAC derived from the literature reviewed (Rasheed et al., 2022, Mazher, 2019, Ameyaw and Chan, 2016). This approach aligns with the risk-sharing principle of PPP, which states that "risks should be allocated to the party best equipped to manage them". In addition to the RACs, a thorough examination of existing studies and research was conducted to identify a comprehensive list of risks associated with PPP projects. From this extensive list, 16 risks were identified that were not explicitly allocated to either the public or private sector or have been of contentious nature in the reviewed literature. Presented in Table 2, these risks were considered for inclusion in the research to ensure a comprehensive analysis of risk allocation practices.

By taking into account each party's risk management capabilities, a more optimal and efficient risk allocation can be achieved. This approach acknowledges that different parties possess varying levels of expertise, resources and experience in managing specific risks. Consequently, risks can be allocated in a manner that leverages the strengths of each party and minimizes potential vulnerabilities.

Considering risk management capabilities also helps prevent the overburdening of any one party with excessive risks. This proactive assessment ensures that risks are allocated within the capacity of each party, mitigating the potential for project delays, cost overruns and other negative impacts. Implementing an approach that incorporates risk management capabilities and RACs enhances the objectivity and fairness of the risk allocation process. It reduces the reliance on power dynamics and subjective negotiations, promoting a more rational and informed allocation of risks. Ultimately, this approach contributes to more efficient risk management, improved project performance and a higher likelihood of successful PPP outcomes. However, it is important to note that even capability-based risk allocation process should be tailored to the specific characteristics and context of each PPP project. Flexibility and adaptability are necessary to accommodate the unique circumstances and dynamics of individual projects. Regular reassessment and refinement of risk allocation strategies based on lessons learned and emerging best practices further enhance the effectiveness of the approach.

In summary, while negotiation has traditionally been employed for risk allocation in PPPs, its limitations and potential for imbalanced outcomes necessitate the adoption of alternative approaches. The risk allocation process should consider risk management capabilities of each party. By aligning risks with parties' capabilities, this approach has the potential to enhance the efficiency and effectiveness of risk allocation, contributing to the overall success of PPP projects.

## 3. Methodology

The research commenced with an extensive literature review, delving into the realm of risk allocation in PPPs. Through this literature review, a list of risks and relevant RAC were initially extracted and documented, providing a foundation for the subsequent research activities. To validate and reinforce the relevance and usefulness of the identified RACs and risks, the expertise of individuals well-versed in PPP projects was sought. Two academics and two industry professionals, recognized as experts in the field, were engaged in the study. The identified RACs and risks were presented to these experts, who evaluated their adequacy and usefulness based on their extensive knowledge and experience. The input and feedback provided by the experts played a crucial role in refining and validating the RACs and risks. Minor phrasing changes were proposed to improve the clarity of certain risks and one criterion was suggested for removal due to its lack of clarity.

A two-part questionnaire survey was administered to gather data using Qualtrics. By employing a questionnaire survey, the study aimed to gather insights and perspectives from a diverse range stakeholders with experience in three schools and two prison PPP projects in New Zealand. This data collection approach facilitated the examination of risk management capabilities within the context of identified RACs and provided valuable input for the analysis and findings of the study.

The first part of the questionnaire focused on gathering information about the respondents' profiles to assess their relevant experience and knowledge of PPP projects. The second part aimed to capture the perceived risk management capability of the respondents' organizations for each identified RAC in relation to the identified risks. To measure this, a five-point Likert scale was adopted, ranging from 1 (least important) to 5 (most important). This scale allowed respondents to rate the perceived ability of their organization to address risks associated with each RAC. In cases where respondents felt they did not have sufficient experience or knowledge to answer certain questions, a "no idea" (NI) option was provided. This option allowed respondents to indicate their lack of confidence in responding to specific questions, ensuring the data collection process accounted for varying levels of expertise among the participants.

The study used a combination of non-probability sampling methods, namely convenience sampling and judgment sampling, due to the lack of an exact population for random sampling. Convenience sampling was employed to select participants based on accessibility and willingness to take part. Professionals from PPP organizations experienced in New Zealand's social infrastructure PPP projects were targeted. Judgment sampling was also used, with researchers selecting participants based on their expertise and potential insights. The researchers made informed decisions using industry knowledge and personal networks. To gather enough survey responses, professionals were individually contacted via email and platforms like LinkedIn. It is important to acknowledge that the use of convenience and judgment sampling techniques may introduce certain limitations to the study. The sample obtained through these techniques may not be fully representative of the entire population of PPP stakeholders in New Zealand. However, given the specific context of the research and the

scarcity of PPP projects in the country, these sampling techniques were considered appropriate for gathering relevant and valuable insights from professionals with first-hand experience in the field.

The collected data from the questionnaire survey underwent several analysis techniques to gain insights and draw conclusions. These techniques included mean score analysis, reliability analysis and independent sample t-test analysis. These analyses provide confidence in the accuracy and consistency of the data used in the study. The reference to previous studies (Mazher et al., 2018, Osei-Kyei and Chan, 2021) highlights the widespread use of Cronbach's alpha in other PPP-related literature. The latest versions of Microsoft Excel and Statistical Package for Social Sciences (SPSS) were utilized for these analyses. Mean score analysis was employed to determine the risk management capability of both the public and private sectors concerning all of the risks in light of selected RAC. Overall, through these analyses, the researchers were able to assess risk management capabilities, establish rankings based on mean scores and ensure the reliability of the collected data. These insights contribute to a comprehensive understanding of the research topic and support the conclusions drawn from the questionnaire survey.

## 4. Results

A total of 43 valid responses were obtained for the study. To assess the adequacy of the sample size, comparisons were made with similar studies that utilized questionnaire surveys. Osei-Kyei et al. (2021) collected 48 responses and Ameyaw and Chan (2015) obtained 35 responses in their respective studies. In light of these comparisons, the sample size in the current study was considered sufficient for further analysis. It should be noted that the number of PPP projects in New Zealand is relatively small, and considering the advanced nature of the study area, the collection of 43 responses was considered appropriate. For a comprehensive understanding of the participants, Figure 1 provides an overview of their background information. According to the figure, it is evident that 61% of the respondents possess more than five years of experience in the field of PPP and/or retirement village development and practice.

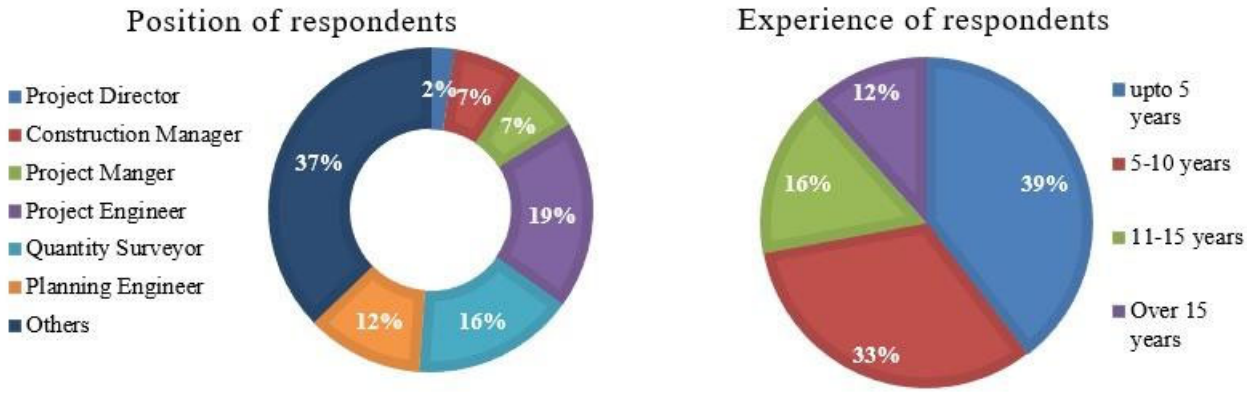


**Fig. 1.** Background information of respondents

The first step in the analysis involved conducting a reliability test using Cronbach's alpha coefficient. The primary purpose of this test was to examine the internal consistency of the factors and their corresponding Likert scale in measuring the intended construct. The Cronbach's alpha coefficient, a widely used measure of internal consistency, was employed for this assessment, ranging from 0 to 1. According to George and Mallery (2019), a minimum threshold of 0.7 is recommended, while a score of 0.8 or higher is considered an excellent indicator of internal consistency. Upon analyzing the data, it was found that the overall alpha value for the seven RAC was determined to be 0.721, surpassing the recommended threshold. This result suggests a good level of consistency in the survey responses. Thus, the reliability test confirmed that the factors and the Likert scale used in the study reliably measured the intended construct.

Additionally, an independent 2-sample t-test was conducted to investigate whether there existed a significant difference in the mean value responses between two distinct groups of respondents: the public sector and the private sector. This analysis aimed to explore potential variations in perceptions regarding the 16 risks discussed in the study. A significance level of 0.05 was used as the threshold to determine if the observed differences were statistically significant. Out of the t-test outcomes for the allocation of these risks, seven risks yielded results below the significance level of 0.05.

Among the 16 risks examined, the t-test results indicated that for the majority of risks, there was no significant discrepancy in the mean value responses between the public and private sectors. This suggests a similarity in the way both groups perceive and evaluate nine of the risks. However, for remaining risks, the mean responses differed significantly between the two sectors, as they fell below the designated significance level of 0.05. These divergent perceptions may indicate contrasting attitudes, priorities or risk management approaches between the public and private sectors for those particular risks.

Table 3 presents detailed analysis of survey results. Mean scores of each RAC from public and private sector respondents are presented against the 16 risks. From private respondents' data across all RAC, RF_8 "Supply risk" scored highest with a score of 4 against RAC_1 "risk foresight" and RF_5 "Public opposition to project" scored lowest with a score of 1.5 against RAC_7 "Risk attitude". Similarly, from public sector respondents' data across all RAC, RF_9 "Delay in project approvals and permit" scores highest with a score of 3.82 against RAC_1 "Risk foresight" and RF_3 "Interest rate fluctuation" scored

lowest with a score of 1.64 against RAC_7 "Risk attitude". Furthermore, an overall risk management capability score (WRMC) for both sectors obtained by weighted average of the seven RAC for each risk is also presented. For simplicity each RAC is given equal weightage in calculating the overall RMC score. Top risk factors in terms of RMC from public and private sectors are discussed further below.

**Table 2.** Identified risk from literature and t-test results

| Risk ID | Risk | F | t | sig. |
|---|---|---|---|---|
| RF_1 | Inflation | 1.042 | 2.587 | 0.016* |
| RF_2 | Variation in foreign exchange rate | 0.615 | 2.889 | 0.008* |
| RF_3 | Interest rate fluctuation | 0.511 | 2.641 | 0.015* |
| RF_4 | Land acquisition | 0.058 | 3.309 | 0.003* |
| RF_5 | Public opposition to project | 0.421 | 4.04 | 0.001* |
| RF_6 | Change in law/regulation | 0.065 | 2.936 | 0.007* |
| RF_7 | Unexpected geotechnical conditions | 31.194 | -1.142 | 0.087 |
| RF_8 | Supply/resourcing risk | 1.649 | -0.868 | 0.212 |
| RF_9 | Delay in project approvals and permit | 2.437 | 1.079 | 0.132 |
| RF_10 | Insurance risk | 2.542 | -1.019 | 0.125 |
| RF_11 | Unforeseen project characteristics | 0.742 | 0.566 | 0.398 |
| RF_12 | Financing risk | 5.009 | -1.7 | 0.035* |
| RF_13 | Lack of PPP experience | 0.16 | -0.193 | 0.693 |
| RF_14 | Weather risk | 2.145 | 1.122 | 0.157 |
| RF_15 | Change in government | 2.791 | 0.515 | 0.108 |
| RF_16 | Design changes | 0.142 | -0.628 | 0.51 |

F = equality of variance assumed (Levene's test), t = t-test value for equality of means, sig. = significance

## 5. Discussion

### 5.1. Land Acquisition (RF_4)

The risk of land acquisition in a PPP project refers to the challenges and uncertainties associated with acquiring the necessary land for the project's development or expansion. Land acquisition scored the highest among public sector respondents with a risk management capability score of 3.41. Literature shows that risk of land acquisition is mostly allocated to the public sector (Bing et al., 2005, Ke et al., 2010).

When constructing a new infrastructure facility or upgrading an existing one, the responsibility for providing the land to the concessionaire depends on who owns the land. If the land is already owned by the contracting authority or another public entity, it is generally the land or facility owner's duty to make it available to the concessionaire. However, if the preferred site is owned by a third party or includes third-party-owned sites, the private party undertaking the project assumes the risks associated with acquiring the land. Nonetheless, the government authority has the option to coordinate and even take control of the land acquisition process if needed. In situations where voluntary acquisition becomes challenging and expensive, and if the government is intended to become the ultimate owner of the land, it may be more cost-effective for the government to assume responsibility for the process. This includes utilizing its legal powers of compulsory acquisition, if necessary.

The reason for this arrangement is that negotiating with multiple landowners, especially when there are a significant number of owners involved, can lead to delays and increased costs. Additionally, in certain jurisdictions, complex procedures are required to establish the legitimacy of each owner's title. Considering these factors, it is not suitable for the concessionaire to take on the responsibility of acquiring land for a project when the land is not already owned by the contracting authority. To prevent unnecessary delays and cost overruns, it is typically the role of the contracting authority to handle land acquisition in such cases.

Land acquisition is a crucial component of infrastructure projects, but it comes with various risks. The negotiation process with landowners can be complex and time-consuming, especially when dealing with multiple owners and differing interests. Validating land titles can be challenging due to legal procedures and potential disputes. Opposition from local communities can lead to protests and delays, while limited availability of suitable land can complicate the search. High land prices pose financial challenges for private sector partners. To mitigate these risks, early and transparent communication with stakeholders is crucial. Thorough studies and fair negotiations help address challenges. Involving local communities fosters inclusivity and sustainability. Proactive risk management, including surveys and collaboration with experts, is essential. Adherence to legal requirements and stakeholder engagement builds trust and minimizes conflicts. Overall, effective stakeholder engagement and risk management are crucial to successful land acquisition in PPP projects.

### 5.2. Delay in Project Approvals and Permits (RF_9)

The risk of project approvals and permits in a PPP project refers to the challenges and uncertainties associated with obtaining the necessary regulatory approvals and permits required to initiate and proceed with the project. These approvals and permits are typically obtained from government authorities at various levels, such as local, regional or national agencies, depending on the nature and scale of the project. In terms of the risk management capability of the public sector, this risk ranked second with an RMC score of 3.34. The private sector ranked this risk at fourth place with an RMC score of 3.06. Ke et al., (2010) suggest that this risk should be mostly borne by public sector; however Bing et al., (2005) argue in favor of allocation based on characteristics of project.

**Table 3.** Mean score analysis results of risks against RAC

| | RAC_1 | | RAC_2 | | RAC_3 | | RAC_4 | | RAC_5 | | RAC_6 | | RAC_7 | | WRMC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pb | Pr | Pb | Pr | Pb | Pr | Pb | Pr | Pb | Pr | Pb | Pr | Pb | Pr | Pb | Pr |
| RF_1 | 3.27 | 2.64 | 2.18 | 1.93 | 3.18 | 2.57 | 3.36 | 2.93 | 3.00 | 2.33 | 2.40 | 1.75 | 1.82 | 1.38 | 2.75 | 2.22 |
| RF_2 | 3.09 | 2.46 | 1.91 | 1.77 | 2.64 | 2.31 | 3.55 | 2.92 | 3.27 | 2.42 | 2.44 | 1.75 | 1.82 | 1.38 | 2.67 | 2.14 |
| RF_3 | 3.18 | 2.69 | 2.40 | 1.92 | 2.73 | 2.38 | 3.36 | 3.15 | 3.27 | 2.33 | 2.60 | 2.00 | **1.64** | 1.62 | 2.74 | 2.30 |
| RF_4 | 3.79 | 2.64 | 3.27 | 1.82 | 3.55 | 2.23 | 3.73 | 2.64 | 3.55 | 2.31 | 3.64 | 2.26 | 2.36 | 1.82 | **3.41** | 2.25 |
| RF_5 | 3.73 | 2.57 | 3.55 | 2.07 | 3.27 | 2.36 | 3.55 | 2.46 | 3.71 | 2.31 | 3.18 | 2.15 | 2.18 | **1.50** | **3.31** | 2.20 |
| RF_6 | 3.55 | 2.29 | 3.27 | 2.14 | 3.18 | 2.71 | 3.27 | 2.71 | 3.55 | 2.62 | 2.91 | 2.69 | 2.09 | 1.62 | 3.12 | 2.40 |
| RF_7 | 2.27 | 3.07 | 2.00 | 2.91 | 2.55 | 3.36 | 2.73 | 3.14 | 2.67 | 3.08 | 2.40 | 2.92 | 1.73 | 2.18 | 2.34 | 2.95 |
| RF_8 | 2.55 | **4.00** | 2.45 | 3.21 | 3.18 | 3.07 | 3.09 | 3.07 | 2.73 | 2.93 | 2.64 | 2.54 | 2.55 | 2.14 | 2.74 | 2.99 |
| RF_9 | **3.82** | 3.07 | 3.73 | 3.21 | 3.36 | 3.57 | 3.45 | 3.21 | 3.36 | 3.08 | 3.45 | 3.00 | 2.18 | 2.31 | **3.34** | 3.06 |
| RF_10 | 2.56 | 2.85 | 2.78 | 2.92 | 2.89 | 3.15 | 2.78 | 2.92 | 2.67 | 2.92 | 2.78 | 2.62 | 2.11 | 2.08 | 2.65 | 2.78 |
| RF_11 | 2.82 | 2.79 | 2.55 | 2.86 | 3.09 | 2.86 | 3.18 | 2.93 | 2.82 | 2.93 | 2.91 | 2.62 | 1.91 | 1.69 | 2.75 | 2.67 |
| RF_12 | 2.18 | 3.71 | 2.09 | 3.21 | 2.26 | 3.73 | 2.58 | 3.43 | 2.34 | 3.13 | 2.26 | 3.21 | 2.08 | 2.15 | 2.26 | 3.23 |
| RF_13 | 3.18 | 3.43 | 3.09 | 3.55 | 3.09 | 3.38 | 3.18 | 3.43 | 2.73 | 3.36 | 3.18 | 2.58 | 2.09 | 2.46 | 2.93 | **3.17** |
| RF_14 | 3.18 | 3.14 | 2.55 | 2.21 | 3.20 | 2.86 | 3.09 | 2.57 | 2.91 | 2.46 | 2.73 | 2.31 | 2.18 | 1.71 | 2.83 | 2.47 |
| RF_15 | 3.10 | 2.57 | 2.50 | 1.93 | 2.40 | 2.29 | 2.80 | 2.64 | 3.00 | 2.31 | 2.30 | 2.15 | 1.90 | 1.71 | 2.57 | 2.23 |
| RF_16 | 3.36 | 3.73 | 3.27 | 3.64 | 3.27 | 3.55 | 3.09 | 3.57 | 3.27 | 3.46 | 2.91 | 3.36 | 1.91 | 2.36 | 3.01 | **3.38** |

Pb = Public, Pr = Private, WRMC = Weighted risk management capability

Several factors contribute to the risk of project approvals and permits in a PPP project. The complexity of the regulatory framework and the numerous approvals and permits required can cause significant delays and administrative burdens. Involvement of multiple stakeholders and authorities further complicates the process, as each may have different priorities and requirements. Public perception and potential opposition can also impact approvals, leading to increased scrutiny and resistance. Political factors, such as changes in government or public policy, can introduce uncertainties and affect the regulatory landscape. To mitigate these risks, effective communication and collaboration among stakeholders are crucial. Early engagement with regulatory authorities and communities helps address concerns and streamline the approval process. Thorough assessments of the regulatory environment and proactive measures during project development help identify and address potential issues. Careful planning, stakeholder engagement and proactive risk management are vital for navigating the complex regulatory landscape and ensuring successful project implementation.

### 5.3. Public Opposition to Project (RF_5)

The risk of public opposition to a PPP project refers to the potential resistance, criticism or objections from the general public or specific interest groups towards the project. This opposition can manifest in various forms, such as protests, legal challenges, media scrutiny or negative public perception. Understanding and addressing this risk is crucial for the successful implementation of a PPP project. Public sector respondents ranked this risk at third place, with an RMC score of 3.31 representing moderate to high capability for managing it. Bing et al., (2005) propose that the primary responsibility for managing this risk should lie with the public sector, although Ke et al. (2010) contend in favor of distributing it equally between the two sectors.

Public opposition to PPP projects often stems from concerns about negative outcomes associated with private sector involvement in public infrastructure. These concerns include increased costs, reduced public control, potential loss of public services and profit motives of private entities. Environmental impact and social/community impacts are also common areas of concern, with objections related to harm to the environment, loss of natural habitats, displacement of communities, disruption of livelihoods and cultural heritage. Political factors can also influence opposition. According to Chung et al., (2010), the risk of public misperception can have negative consequences for public infrastructure projects. It often results in a lack of public support, leading to delays in project approval and variations in contracts.

To address the risk of public opposition, effective communication and stakeholder engagement are essential. Engaging with the public, community leaders and relevant stakeholders from the project's early stages builds trust and addresses concerns. Transparency in decision-making and providing opportunities for public input, such as through consultations, help incorporate public feedback and reduce opposition. Comprehensive environmental and social impact assessments, along with proactive community engagement programs, demonstrate a commitment to sustainable development and minimize disruptions. Transparency in procurement, clear project objectives and benefits, and demonstrating value for money help mitigate scepticism. Compliance with legal and regulatory requirements related to public engagement is crucial, as is addressing concerns in public forums and engaging with the media to counter misinformation. By recognizing and addressing the risk of public opposition, PPP stakeholders can create a more supportive environment, foster public acceptance and mitigate delays, conflicts or reputational damage.

### 5.4. Design Changes (RF_16)

The risk of design changes in a PPP project refers to the potential need for modifications or revisions to the project's original design. Design changes can arise due to various factors, including evolving project requirements, unforeseen challenges, stakeholder input or technical issues. Survey data showed that the private sector has the highest RMC score for this risk (3.38), whereas the public sector RMC score for this risk ranked fifth (3.01). Both sectors represent moderate to high capability to manage this risk. The existing body of research demonstrates that the burden of design change risk is predominantly assigned to the private sector, as evidenced by studies such as Bing et al. (2005) and Ke et al. (2010).

Design changes in a PPP project can occur due to unforeseen technical complexities, evolving project requirements and stakeholder input. Technical or engineering challenges, site conditions and limitations may emerge during project implementation, necessitating adjustments to the original design. Shifting regulatory standards, environmental considerations or community expectations may also require design modifications. Stakeholder engagement and public consultations can prompt changes to address concerns and incorporate suggestions. Design changes can impact risk allocation and may require contract renegotiations. To mitigate these risks, thorough project planning, feasibility studies and risk assessments are crucial. Effective communication and collaboration among all stakeholders, including authorities and communities, help identify and address design-related issues. Flexibility in project contracts and clear decision-making protocols aid in streamlining the process. Open communication and transparent reporting keep stakeholders informed. Effective risk management and contingency planning are essential for successful implementation and minimizing disruptions caused by design changes in a PPP project.

### 5.5. Lack of PPP Experience (RF_13)

The risk of "Lack of PPP experience" in a PPP project refers to the potential challenges and uncertainties that arise when one or more parties involved in the project have limited or insufficient experience in implementing and managing PPP arrangements. This lack of experience can affect various aspects of the project and may introduce risks that need to be addressed. With an RMC score of 3.17, the private sector ranked this risk third and the public sector ranked it at sixth place with a score of 2.93. In their risk allocation investigation within the realm of UK's PPP, Bing et al. (2005) discovered that the risk allocation decision associated with lack of PPP experience varies significantly depending on the project.

Lack of PPP experience can impact project planning, procurement and implementation. Inexperienced parties may struggle with project assessment, risk identification and establishing realistic timelines and financial models, hindering the project's success. The quality of the procurement process may be compromised, resulting in suboptimal partner selection and inadequate risk allocation. Inexperienced parties may face challenges in contract management, project monitoring and performance assessment, leading to delays and cost overruns. Building capacity and expertise within the organizations involved, seeking assistance from experienced entities, conducting thorough studies and employing experienced advisors can mitigate the risk of lack of PPP experience. By addressing this risk, projects can enhance outcomes and improve overall success.

## 6. Conclusion

The transfer of risk is crucial in achieving value-for-money in PPP projects. However, implementing this risk transfer has faced criticism and challenges. To ensure the success of PPP projects, it is imperative to achieve the optimal allocation of risks. The conventional method of risk allocation has been scrutinized for misallocation of risk by a number of previous

studies. Capability-based risk management has been identified as an alternative risk allocation approach. This study aimed to address this issue by investigating the risk management capability of the public and private sectors in New Zealand's social infrastructure PPP projects based on seven RAC for 16 risks.

Data for the study was collected through a questionnaire survey from two schools and three prisons PPP projects in New Zealand. The research employed mean value analysis and independent t-test to determine the risk management capability and significance variance in perception of both sectors. Results show that public sector's overall risk management capability is highest for risk factor "land acquisition" and lowest for "financing risk". Similarly, private sector's participants demonstrated highest level of RMC for risk factor "design changes" and lowest for "variation in foreign exchange rate". Independent sample t-test results showed that the opinions of public and private sector for seven out of 16 risks were significantly different. Among these seven risks, most risks were of either regulatory or macroeconomic nature.

The generalizability of the research findings could be restricted due to several factors. Firstly, despite making every effort to boost response rates, the number of received responses was relatively low. Nonetheless, it is important to note that the sample size was considered adequate when compared to similar studies. Therefore, even with this limitation, meaningful conclusions can still be drawn and applied in future practices and as a reference point. Secondly, the less common mode of PPPs in New Zealand, particularly the Design-Build-Finance-Maintain-Operate (DBFMO) model, might impact the transferability of the results to other regions of the world. However, it is essential to recognize the unique nature of PPPs in New Zealand, which in itself presents an opportunity for learning and understanding distinct risk allocation practices. Despite potential limitations in generalizability, the research findings hold significant value in guiding future investigations and informing international policy practices.

**Acknowledgments**

The authors express gratitude to the professionals from the industry who contributed to this study, as well as to the editors and anonymous reviewers for their valuable comments that enhanced the overall quality of this paper.

**Author Contributions**

Nasir Rasheed contributed to conceptualization, methodology, analysis, data collection, draft preparation, manuscript editing. Wajiha Mohsin Shahzad and James Olabode Bamidele Rotimi contributed to methodology, data curation, manuscript reviewing, editing, visualization, supervision and project administration. All authors have read and agreed with the manuscript before its submission and publication.

**Funding**

This research is an aspect of an ongoing Doctoral programme funded by the Higher Education Commission of Pakistan.

**Institutional Review Board Statement**

Not applicable.

**References**

Akomea-Frimpong, I., Jin, X., and Osei-Kyei, R. (2020). A holistic review of research studies on financial risk management in public–private partnership projects. *Engineering, Construction and Architectural Management.* https://doi.org/10.1108/ECAM-02-2020-0103

Ameyaw, E. E. and Chan, A. P. (2015). Risk ranking and analysis in PPP water supply infrastructure projects. *Facilities,* 33, 428-453. Available: https://doi.org/10.1108/F-12-2013-0091

Ameyaw, E. E. and Chan, A. P. (2016). A fuzzy approach for the allocation of risks in public–private partnership water-infrastructure projects in developing countries. *Journal of Infrastructure Systems*, 22, 04016016. https://doi.org/10.1061/(ASCE)IS.1943-555X.0000297

Bing, L., Akintoye, A., Edwards, P.J., and Hardcastle, C., (2005). The allocation of risk in PPP/PFI construction projects in the UK. *International Journal of Project Management,* 23(1), 25-35. https://doi.org/10.1016/j.ijproman.2004.04.006

Chan, A. P. C., Yeung, J. F. Y., Yu, C. C. P., Wang, S. Q., and Ke, Y. (2011). Empirical study of risk assessment and allocation of public-private partnership projects in China. *Journal of Management in Engineering*, 27, 136-148. https://doi.org/10.1061/(ASCE)ME.1943-5479.0000049

Chung, D., Hensher, D. A., and Rose, J. M. ( 2010). Toward the betterment of risk allocation: Investigating risk perceptions of Australian stakeholder groups to public-private-partnership tollroad projects. *Research in Transportation Economics*, 30, 43-58. https://doi.org/10.1016/j.retrec.2010.10.007

Debela, G. Y. (2022). Driving factors for adopting public-private partnership in Ethiopia and comparison with other countries. *International Journal of Energy Sector Management*, 16, 493-510.

Esty, B. C. 2004. Why study large projects? An introduction to research on project finance. *European Financial Management*, 10, 213-224. https://doi.org/10.1111/j.1354-7798.2004.00247.x

George, D. and Mallery, P. (2019). *IBM SPSS statistics 26 step by step: A simple guide and reference.* New York: Routledge. https://doi.org/10.4324/9780429056765

Ibrahim, A., Price, A., and Dainty, A. 2006. The analysis and allocation of risks in public private partnerships in infrastructure projects in Nigeria. *Journal of Financial Management of Property and Construction,* 11, 149-164. https://doi.org/10.1108/13664380680001086

Irwin, T. (2007). *Government guarantees: Allocating and valuing risk in privately financed infrastructure projects,* Washington, DC. World Bank Publications.

Jokar, E., Aminnejad, B., and Lork, A., (2023). A risk allocation model among the elements of freeway projects in public-private partnership (PPP) method using integrated fuzzy multi-criteria decision-making techniques. *Australian Journal of Civil Engineering,* 21(1), 116-140. https://doi.org/10.1080/14488353.2022.2083288

Ke, Y., Wang, S., and Chan, A. P. C. (2011). Equitable risks allocation of projects inside China: Analyses from Delphi survey studies. *Chinese Management Studies,* 5, 298-310. https://doi.org/10.1108/17506141111163372

Ke, Y., Wang, S., Chan, A. P. C. & Lam, P. T. I. (2010). Preferred risk allocation in China's public-private partnership (PPP) projects. *International Journal of Project Management,* 28, 482-492. https://doi.org/10.1016/j.ijproman.2009.08.007

Koppenjan, J., Klijn, E.-H., Verweij, S., Duijn, M., van Meerkerk, I., Metselaar S., and Warsen, R. (2022). The performance of public–private partnerships: An evaluation of 15 years DBFM in Dutch infrastructure governance. *Public Performance Management Review*, 45, 998-1028. https://doi.org/10.1080/15309576.2022.2062399

Kukah, A. S. K., Owusu-Manu, D.-G., Badu, E., and Edwards, D. (2022). Reasons for entering into Ghanaian public-private partnership (PPP) power projects. *Journal of Engineering, Design Technology.* 22(3), 854-878. https://doi.org/10.1108/JEDT-11-2021-0631

Liu, J., Love, P. E., Smith, J., Regan, M., and Palaneeswaran, E. (2015). Review of performance measurement: implications for public–private partnerships. *Built Environment Project and Asset Management,* 5, 35-51. https://doi.org/10.1108/BEPAM-12-2013-0070

Mazher, K. M. (2019). *Risk assessment and allocation model for public-private partnership infrastructure projects in Pakistan.* The Hong Kong Polytechnic University.

Mazher, K. M., Chan, A. P. C., Choudhry, R. M., Zahoor, H., Edwards, D. J., Ghaithan, A. M., Mohammed, A., and Aziz, M. (2022). Identifying Measures of Effective Risk Management for Public–Private Partnership Infrastructure Projects in Developing Countries. *Sustainability,* 14, 14149. https://doi.org/10.3390/su142114149

Mazher, K. M., Chan, A. P. C., Zahoor, H., Ameyaw, E. E., Edwards, D. J., and Osei-Kyei, R. (2019). Modelling capability-based risk allocation in PPPs using fuzzy integral approach. *Canadian Journal of Civil Engineering,* 46, 777-788. https://doi.org/10.1139/cjce-2018-0373

Mazher, K. M., Chan, A. P. C., Zahoor, H., Khan, M. I., and Ameyaw, E. E. (2018). Fuzzy Integral-Based Risk-Assessment Approach for Public-Private Partnership Infrastructure Projects. *Journal of Construction Engineering and Management,* 144. https://doi.org/10.1061/(ASCE)CO.1943-7862.0001573

Ng, A. and Loosemore, M. (2007). Risk allocation in the private provision of public infrastructure. *International Journal of Project Management,* 25, 66-76. https://doi.org/10.1016/j.ijproman.2006.06.005

Osei-Kyei, R. and Chan, A. P. (2015). Review of studies on the Critical Success Factors for Public–Private Partnership (PPP) projects from 1990 to 2013. *International Journal of Project Management,* 33, 1335-1346. https://doi.org/10.1016/j.ijproman.2015.02.008

Osei-Kyei, R. and Chan, A. P. (2021). *Model for Assessing the Success Index of Public-Private Partnership Projects. International Best Practices of Public-Private Partnership: Insights from Developed & Developing Economies.* 91-108 Springer. https://doi.org/10.1007/978-981-33-6268-0_6

Osei-Kyei, R., Tam, V., and Ma, M. (2021). Effective strategies for developing retirement village public–private partnership. *International Journal of Housing Markets Analysis,* 14, 821-841. https://doi.org/10.1108/IJHMA-08-2020-0092

Project Management Institute. (2013). *A guide to the Project Management Body of Knowledge (PMBOK guide).* Newton Square, Pennsylvania: PMI.

Rasheed, N., Cresencio, J. A. T., Shahzad, W., and Rotimi, J. O. (2019). Critical success factors of pubic-private partnerships (PPPs) in New Zealand. *43RD Australasian Universities Built Environment Association Conference*, 223.

Rasheed, N., Shahzad, W., Khalfan, M., and Rotimi, J. O. B. (2022). Risk identification, assessment, and allocation in PPP projects: A systematic review. *Buildings,* 12, 1109. https://doi.org/10.3390/buildings12081109

Sastoque, L. M., Arboleda, C. A., and Ponz, J. L. (2016). A proposal for risk allocation in social infrastructure projects applying PPP in Colombia. *Procedia Engineering,* 145, 1354-1361. https://doi.org/10.1016/j.proeng.2016.04.174

Shrestha, A., Chan, T. K., Aibinu, A. A., Chen, C., and Martek, I. (2018). Risk Allocation Inefficiencies in Chinese PPP Water Projects. *Journal of Construction Engineering and Management,* 144. https://doi.org/10.1061/(ASCE)CO.1943-7862.0001457

Tirumala, R.D. and Tiwari, P. (2023). Are PPP Arrangements Different in Green Infrastructure Sectors? an Exploratory Analysis of Indian PPP Projects. *In Axes of Sustainable Development and Growth in India: Essays in Honour of Professor Jyoti K. Parikh* (pp. 259-272). Singapore: Springer Nature Singapore.

Vegas-Fernández, F. and Rodríguez-López, F. (2018). Methodology for determining the most severe risks of a construction project and identification of risky projects. *Journal of Construction,* 17(3), 423-435. https://doi.org/10.7764/RDLC.17.3.423

Wan, S., Liu, Y., Ding, G., Runeson, G., and Er, M. (2022). Risk allocation for energy performance contract from the perspective of incomplete contract: A study of commercial buildings in China. *International Journal of Climate Change Strategies Management.15*(4), 457-478. https://doi.org/10.1108/IJCCSM-11-2021-0130

Xiong, W., Zhao, X., Yuan, J.-F., and Luo, S. (2017). Ex post risk management in public-private partnership infrastructure projects. *Project Management Journal,* 48(3), 76-89. https://doi.org/10.1177/875697281704800305

Zhang, X. (2005). Financial viability analysis and capital structure optimization in privatized public infrastructure projects. *Journal of Construction Engineering and Management,* 131(6), 656-668. https://doi.org/10.1061/(ASCE)0733-9364(2005)131:6(656)

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