Towards a Public–Private Partnership Investment Model for Real Estate Development: A Systematic Review of Success Factors and Risks Across PPP Sectors

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DOI: https://doi.org/10.47772/IJRISS.2026.100601095

Received: 10 June 2026; Accepted: 15 June 2026; Published: 13 July 2026

ABSTRACT

Public–private partnerships (PPPs) have become an important procurement and investment mechanism for delivering infrastructure and real estate development, particularly in contexts characterized by fiscal constraints, rapid urbanization and increasing demand for integrated urban development. However, investment decision-making frameworks for real estate PPPs remain conceptually fragmented, as existing studies tend to examine success factors and risks separately and often within sector-specific boundaries. This paper aims to establish a conceptual foundation for developing a PPP investment model for real estate development by synthesizing cross-sectoral evidence on PPP success factors and risks. Guided by the PRISMA 2020 protocol, a systematic literature review was conducted using Scopus, Web of Science and ScienceDirect databases, covering peer-reviewed studies published between 2015 and 2025. Following the screening process, 176 studies were included for thematic analysis and frequency mapping. The review identified 25 success factors, classified into five themes: institutional, financial, governance, stakeholder and project factors. It also identified 22 risk factors, grouped into seven categories: political, financial, market, construction, legal and regulatory, operational and environmental risks. The findings indicate that institutional and financial factors are the most dominant success themes, while political and financial risks are the most pervasive risk categories across PPP sectors. More importantly, the synthesis demonstrates that success factors do not merely function as project enablers but also operate as risk mitigation mechanisms. Ten success–risk interaction pairs were mapped to explain how specific success factors may reduce or manage corresponding PPP risks. Based on these findings, the paper proposes a preliminary PPP investment framework that integrates success factors, risk management and investment performance considerations. The study contributes theoretically by linking success factor theory, risk allocation logic and value-for-money perspectives; practically by offering decision-support categories for public and private actors; and methodologically by providing a structured foundation for subsequent Delphi validation within the Malaysian real estate PPP context.

Keywords: public-private partnership; PPP investment model; success factors; risk factors; real estate development; risk mitigation

INTRODUCTION

Public-private partnerships (PPPs) have moved from experimental procurement arrangements to mainstream policy instruments for delivering infrastructure, urban development and public assets (Liu et al., 2015; Opawole et al., 2019). Their emergence is commonly linked to persistent fiscal constraints, rising infrastructure demand and the expectation that private sector participation can improve efficiency, innovation and lifecycle performance (Nguyen et al., 2020). In mature PPP markets, such as the United Kingdom, Australia and Canada, PPPs have been used for transport, healthcare, education and municipal infrastructure (Rybnicek et al., 2020). In Asian contexts, PPPs have been applied to urban rail, highways, housing, mixed-use development and smart-city-related infrastructure (Nguyen et al., 2020; Xu et al., 2022). Malaysia's PPP trajectory reflects similar policy objectives, particularly the use of private capital and expertise to support highways, rail-related infrastructure, major urban districts and affordable housing initiatives (Ike et al., 2024; Valipour et al., 2019).

The relevance of PPP to real estate development is significant because contemporary urban projects increasingly combine infrastructure provision with land development and long-term asset management (Ng et al., 2017). Such projects may integrate land assembly, transport access, residential components, commercial space and public facilities within the same development envelope (Xu et al., 2022). They also require complex financing structures involving public land or support, private equity, commercial debt, concession arrangements, land value capture and phased revenue realization (Alqahtani et al., 2024). Real estate PPPs are exposed to property market cycles, demand volatility, planning approval risk, stakeholder resistance and long development periods before revenue stabilization (Shittu et al., 2022). These characteristics make real estate PPPs more complex than conventional infrastructure PPPs and justify an investment-oriented model that incorporates both enabling factors and risk exposure (Xu et al., 2022; Alqahtani et al., 2024).

Existing PPP literature provides substantial evidence on success factors (Liu et al., 2015; Nguyen et al., 2020), risk allocation (Albalate et al., 2015; Almarri et al., 2019), value for money (Opawole et al., 2019; Mazher et al., 2022) and project performance (Fathi, 2024). However, this knowledge remains fragmented because many studies focus on specific sectors, such as transport, water, housing or healthcare, rather than synthesising evidence across sectors for real estate investment model development (Rybnicek et al., 2020; Kwofie et al., 2024). Success factors and risk factors are also commonly treated as separate research streams (Fathi, 2024). This separation limits understanding of how enabling conditions, such as government support, financial capability, contract governance and stakeholder collaboration, may reduce risks such as political uncertainty, financial exposure, legal disputes, market volatility and operational failure (Almarri et al., 2019; Mazher et al., 2022; Rakpanitmanee & Pathranarakul, 2023).

Problem Statement

Despite long experience with PPP implementation, PPP projects continue to experience delays, cost overruns, renegotiations, early termination and investment inefficiencies (Carbonara et al., 2015; Rybnicek et al., 2020). These failures weaken the assumed advantages of PPP and raise questions about whether risks are being properly identified, allocated and mitigated (Mazher et al., 2022; Almarri et al., 2019). In real estate development, the problem is more complex because project viability depends not only on infrastructure delivery but also on land value, market demand, planning conditions, stakeholder acceptance and long-term asset performance (Ng et al., 2017; Xu et al., 2022; Alqahtani et al., 2024).

A second problem is the fragmented treatment of PPP success and risk. Success factor studies typically identify institutional, financial, governance, stakeholder and project-level enablers of performance (Liu et al., 2015; Nguyen et al., 2020), whereas risk studies identify political, financial, market, construction, legal, operational and environmental threats (Mazher et al., 2022). However, these streams rarely explain how the presence or absence of particular success factors changes the likelihood or severity of particular risks (Fathi, 2024). This is a major limitation for investment model development because investment decisions require simultaneous assessment of enabling conditions and uncertainty parameters (Albalate et al., 2015; Almarri et al., 2019).

A third problem concerns the absence of an investment-oriented framework for real estate PPP decision-making. Existing tools often focus on individual aspects, such as risk checklists (Rybnicek et al., 2020), value-for-money tests (Opawole et al., 2019; Mazher et al., 2022) or procurement procedures (Kwofie et al., 2024). These tools do not provide an integrated logic showing how success factors, risk management, investment process and performance outcomes are linked across the project lifecycle (Liu et al., 2015; Fathi, 2024). For public agencies, this limits the ability to appraise PPP proposals, structure risk allocation and monitor performance; for private investors and developers, it limits the ability to assess bankability, price risk and align commercial return with public objectives (Valipour et al., 2019; Alqahtani et al., 2024).

Research Gap, Aim and Objectives

Three gaps justify this review. The theoretical gap lies in the absence of a unified synthesis that links PPP success factors and risk factors within an investment model logic, despite separate theoretical advances in lifecycle success factors (Liu et al., 2015), risk allocation (Albalate et al., 2015; Almarri et al., 2019), stakeholder

management (Rakpanitmanee & Pathranarakul, 2023) and value for money (Opawole et al., 2019; Mazher et al., 2022). The contextual gap lies in the sectoral fragmentation of PPP studies, where evidence from infrastructure, housing, urban development and commercial development is rarely integrated for real estate PPPs (Kwofie et al., 2016; Xu et al., 2022; Alqahtani et al., 2024). The practical gap lies in the lack of decision-support guidance that can help public agencies, developers and financiers structure PPP investments systematically (Nguyen et al., 2020; Fathi, 2024).

The aim of this paper is to establish a conceptual foundation for developing a PPP investment model by synthesising success factors and risks reported across PPP sectors. The specific objectives are: (1) to identify and thematically categorise success factors influencing PPP project performance; (2) to identify and thematically categorise risks affecting PPP project performance; and (3) to develop a preliminary conceptual framework that integrates success factors, risks and their interactions into a PPP investment process model for real estate development.

Contribution of the Paper

This paper contributes to PPP scholarship in three ways. First, it offers an integrated cross-sectoral synthesis of success factors and risk factors, addressing the separation between success-factor studies (Liu et al., 2015; Nguyen et al., 2020) and risk-oriented studies (Rybnicek et al., 2020; Mazher et al., 2022). Second, it reframes success factors as active risk mitigation mechanisms, building on risk allocation logic that emphasises allocating and managing risks through the party or mechanism best able to control them (Albalate et al., 2015; Almarri et al., 2019). Third, it proposes a preliminary conceptual framework that can support subsequent Delphi validation and model development for real estate PPPs (Fathi, 2024).

Practically, the paper provides structured categories that can support public agencies, private developers, financiers and policy actors during project appraisal, procurement and contract structuring (Opawole et al., 2019; Kwofie et al., 2024). For doctoral research, the success factor taxonomy supports Objective 1 of the thesis, the risk taxonomy supports Objective 2 and the preliminary framework supports the later development and validation of the PPP investment model.

LITERATURE REVIEW

Conceptualizing PPP

PPP is generally understood as a long-term contractual arrangement between public and private actors for the delivery of public assets or services, where the private party assumes substantial management responsibility and risk, and remuneration is linked to performance (Liu et al., 2015; Opawole et al., 2019). Across institutional and scholarly definitions, PPPs commonly involve long-term relationships, resource sharing, private finance or expertise, allocation of responsibilities, performance-based payment and continuing public interest in asset or service outcomes (Nguyen et al., 2020; Mazher et al., 2022).

PPP differs from traditional procurement because the private partner is not merely a construction contractor but may participate in financing, operation, maintenance and lifecycle management (Liu et al., 2015). It also differs from full privatisation because the public sector normally retains strategic oversight, public value objectives and ultimate responsibility for ensuring that the asset or service meets societal needs (Opawole et al., 2019; Mazher et al., 2022). This hybrid position makes PPP attractive but complex: it promises efficiency, innovation and risk sharing, but requires strong institutions, clear contracts, financial discipline and stakeholder legitimacy (Rakpanitmanee & Pathranarakul, 2023).

For real estate development, PPP is relevant because public agencies often control land, planning powers and policy objectives, while private developers possess finance, development expertise and market knowledge (Ng et al., 2017; Xu et al., 2022). PPP can therefore combine land assembly, infrastructure delivery, housing provision, commercial development and urban regeneration (Kwofie et al., 2016; Alqahtani et al., 2024).

However, this also means that PPP real estate investments must deal with both infrastructure-style risks and property market risks (Xu et al., 2022).

PPP Project Types and Cross-Sectoral Evidence

The review covers evidence across infrastructure, housing, urban development and commercial development because real estate PPPs are usually multi-functional (Xu et al., 2022). Infrastructure and transport PPPs provide mature evidence on concession design, demand forecasting, construction risk, traffic risk, government support, procurement transparency and value-for-money assessment (Carbonara et al., 2015; Opawole et al., 2019). These lessons are relevant to transit-oriented and infrastructure-led real estate projects because such projects often combine transport assets with land value capture and development revenues (Ng et al., 2017; Xu et al., 2022).

Housing PPPs provide evidence on affordability objectives, public acceptance, land provision, financing constraints and the tension between commercial returns and social outcomes (Chileshe et al., 2020; Shittu et al., 2022). They are directly relevant to real estate PPPs because many public-private development projects include affordable housing or public housing components (Kwofie et al., 2024; Alqahtani et al., 2024). Urban development and regeneration PPPs provide evidence on stakeholder coordination, planning approvals, land value capture, mixed-use integration and long development timelines (Ng et al., 2017; Xu et al., 2022). Commercial and mixed-use PPPs contribute insights into revenue diversification, property market exposure, tenant demand, asset management and phased implementation (Almarri et al., 2019; Alqahtani et al., 2024).

Using cross-sectoral evidence is therefore methodologically defensible because the aim is not to treat all PPP sectors as identical, but to identify transferable success and risk patterns that can inform real estate PPP investment model development (Liu et al., 2015; Rybnicek et al., 2020; Mazher et al., 2022).

Success Factors in PPP Projects

The literature identifies a wide range of success factors, which can be organised into five analytical themes (Liu et al., 2015; Nguyen et al., 2020). Institutional factors include government support, political commitment, policy stability and regulatory framework, and these factors establish the enabling architecture for PPP investment (Hsueh & Chang, 2017; Opawole et al., 2019). Without credible institutions and policy continuity, private partners face elevated sovereign risk and may demand higher returns or refuse to participate (Bosire, 2015; Ike et al., 2024).

Financial factors include access to finance, financial viability, revenue certainty, investment attractiveness and value for money (Nguyen et al., 2020; Opawole et al., 2019). These factors determine whether the project is bankable, whether cash flows can service debt and equity, and whether the PPP option provides better value than conventional procurement (Mazher et al., 2022). For real estate PPPs, financial factors are especially important because revenue may depend on property sales, rental income, occupancy, tariff arrangements or cross-subsidies (Ng et al., 2017; Xu et al., 2022; Alqahtani et al., 2024).

Governance factors include transparency, accountability, contract governance, monitoring mechanisms, procurement transparency and effective contract management (Kwofie et al., 2024; Mazher et al., 2022). These factors reduce information asymmetry, opportunistic behaviour and legal uncertainty (Opawole et al., 2019; Almarri et al., 2019). Good governance is essential because PPPs involve long-term contractual relationships in which future events cannot be fully predicted at the point of contract signing (Liu et al., 2015; Rybnicek et al., 2020).

Stakeholder factors include trust, collaboration, communication, stakeholder engagement, public acceptance and the strength of the private consortium (Miño López & Marakas, 2023; Rakpanitmanee & Pathranarakul, 2023). These factors affect social legitimacy, demand reliability and operational continuity (Raharja et al., 2025). Real estate PPPs often affect local communities directly; therefore, stakeholder acceptance is not a peripheral issue but part of investment risk management (Kwofie et al., 2016; Alqahtani et al., 2024).

Project factors include risk allocation, technical capability, planning quality and project management (Liu et al., 2015; Albalate et al., 2015). These factors relate to the execution capacity of the project and influence whether planning, construction and operation can be delivered within expected cost and time parameters (Carbonara et al., 2015; Rodhi, 2023). Even where institutions and financing are strong, poor feasibility studies, weak technical capability or poor project management can lead to cost overrun, delay and underperformance (Shittu et al., 2022; Alqahtani et al., 2024). Thematic synthesis therefore suggests that PPP success depends on alignment across all five domains rather than on one isolated factor (Liu et al., 2015; Fathi, 2024).

Risk Factors in PPP Projects

The literature also identifies a broad set of risks, which are grouped here into seven categories (Rybnicek et al., 2020; Mazher et al., 2022). Political risks include political instability, government change, policy reversal and approval delays (Rybnicek et al., 2020; Ike et al., 2024). These risks affect contract continuity and investor confidence because PPP concession periods usually exceed political cycles (Hsueh & Chang, 2017; Bosire, 2015).

Financial risks include inflation, interest rate fluctuation and funding shortage (Yin et al., 2015; Ike et al., 2024). These risks affect capital structure, debt service, refinancing and project affordability (Valipour et al., 2019; Almarri et al., 2019). In highly leveraged PPPs, small changes in financial assumptions can significantly affect equity returns and debt service coverage (Liu et al., 2015; Carbonara et al., 2015).

Market risks include demand uncertainty, economic downturn, market volatility and property market fluctuation (Rybnicek et al., 2020; Raharja et al., 2025). These risks are especially important for real estate PPPs because revenue may be linked to property value, occupancy, sales absorption, rent levels or commercial demand (Ng et al., 2017; Xu et al., 2022; Alqahtani et al., 2024).

Construction risks include delay, cost overrun and design changes, which directly affect capital expenditure and delay revenue generation (Carbonara et al., 2015; Rodhi, 2023). Legal and regulatory risks include regulatory changes and legal disputes, which can increase compliance costs or disrupt project implementation (Mazher et al., 2022; Opawole et al., 2019). Operational risks include poor maintenance, operational inefficiency and service failure, which affect lifecycle cost and service performance (Sanda et al., 2020; Liu et al., 2015). Environmental risks include climate risk, natural disasters and sustainability compliance; although these risks appear less frequently than political or financial risks, they are becoming increasingly relevant due to climate exposure, ESG expectations and green building regulations (Alqahtani et al., 2024; Xu et al., 2022).

METHODOLOGY

Research Design and Protocol

This paper adopts a systematic literature review design to synthesise evidence on PPP success factors and risks. Systematic literature review is appropriate when a body of literature is extensive, dispersed across sectors and methods, and requires transparent identification, screening, extraction and synthesis (Rybnicek et al., 2020; Mazher et al., 2022). The review follows PRISMA 2020 principles because PRISMA emphasises transparent and replicable reporting of systematic reviews, including search, screening and inclusion processes (Page et al., 2021).

The search covered Scopus and Web of Science as primary databases, with ScienceDirect used as a supporting source. The review period was limited to 2015-2025 to capture contemporary PPP studies and recent developments in risk and performance research. The search strategy combined PPP terms with success, risk and performance terms, reflecting terminology commonly used in PPP success-factor studies and PPP risk studies. Indicative search terms included 'public private partnership', 'PPP', 'P3', 'private finance initiative', 'success factor', 'determinant', 'enabler', 'risk', 'risk allocation', 'risk management', 'investment', 'performance', 'infrastructure', 'housing', 'real estate' and 'urban development'.

Table 1. Search Strategy

Component	Search terms
PPP terms	"public private partnership" OR PPP OR P3 OR "private finance initiative" OR concession
Success terms	"success factor" OR determinant OR enabler OR driver OR performance factor
Risk terms	risk OR "risk allocation" OR "risk management" OR uncertainty OR challenge
Sector terms	infrastructure OR transport OR housing OR "real estate" OR "urban development" OR construction

Inclusion, Exclusion and Data Extraction

Studies were included if they were English-language peer-reviewed journal articles or full conference papers published between 2015 and 2025, focused on PPP, and discussed success factors, risks, investment performance or project outcomes. Studies were excluded if they were not PPP-related, did not address success or risk, were purely descriptive without analytical content, were unavailable in full text or fell outside the publication period. These criteria align with systematic review practice, which requires transparent eligibility rules to reduce selection bias and improve replicability (Page et al., 2021; Rybnicek et al., 2020).

A structured extraction template was used to capture author, year, country or region, sector, research method, PPP model where available, success factors, risk factors, key findings and relevance to PPP investment model development. Thematic analysis was applied because it supports systematic identification and organisation of patterns across qualitative evidence (Braun & Clarke, 2006). Open coding identified factor-level terms used in the literature, axial coding grouped related terms into sub-themes, and theme development consolidated sub-themes into five success factor categories and seven risk categories. Frequency analysis was then used to identify the relative prominence of each category across the included studies (Liu et al., 2015; Rybnicek et al., 2020; Fathi, 2024).

Table 2. Inclusion and Exclusion Criteria

Criterion	Inclusion	Exclusion
Language	English	Non-English studies
Publication period	2015–2025	Before 2015 or outside the review period
Publication type	Peer-reviewed journal articles and full conference papers	Books, dissertations, editorials and non-peer-reviewed grey literature
Subject focus	PPP studies addressing success factors, risks, investment or performance	Non-PPP studies or studies unrelated to success/risk/performance
Availability	Full text available	Full text unavailable

RESULTS

Descriptive Overview

The review included 176 studies published between 2015 and 2025. Publication activity increased after 2018 and was strongest between 2020 and 2023, indicating growing academic and policy interest in PPP risk and performance (Rybnicek et al., 2020; Fathi, 2024). The geographic distribution was dominated by China, India, the United Kingdom and Australia, with emerging market studies from Malaysia, Ghana, Nigeria, Kenya and other countries also represented. This distribution indicates that the evidence base reflects both mature PPP

markets and developing contexts where institutional capacity and investment risk remain major concerns (Bosire, 2015; Kwofie et al., 2016; Chileshe et al., 2020).

In terms of sector, infrastructure and transport studies were most common, consistent with the maturity of concession-based transport PPP research (Carbonara et al., 2015; Albalate et al., 2015). Housing and affordable housing studies were also prominent, reflecting growing use of PPP for housing provision and affordability objectives (Kwofie et al., 2016; Chileshe et al., 2020; Alqahtani et al., 2024). Urban development, utilities and commercial or mixed-use projects were less frequent but highly relevant to real estate PPP model development (Ng et al., 2017; Xu et al., 2022). Methodologically, the studies used case studies, surveys, AHP and other multi-criteria methods, structural equation modelling, fuzzy methods and systematic reviews, indicating methodological diversity but also a tendency toward factor-ranking rather than predictive modelling (Fathi, 2024; Mazher et al., 2022).

Table 3. Descriptive Profile of Included Studies

Dimension	**Main pattern**	**Implication**
Publication trend	Increase after 2018; strongest between 2020 and 2023	PPP success and risk research are a current and active field
Country distribution	Dominated by China, India, UK and Australia, with emerging-market studies from Malaysia, Ghana, Nigeria and Kenya	Findings reflect both mature and developing PPP markets
Sector distribution	Infrastructure/transport and housing dominate; urban development and mixed-use PPPs are growing	Cross-sector evidence is needed for real estate PPP model development
Method distribution	Case studies, surveys, AHP/MCDA, SEM, fuzzy methods and reviews	Evidence is methodologically diverse but often factor-ranking oriented

Success Factor Findings

The review identified 25 success factors grouped into five themes. Institutional factors appeared most frequently, which is consistent with studies that emphasise government support, policy stability and regulatory clarity as foundational to PPP performance (Hsueh & Chang, 2017; Nguyen et al., 2020; Opawole et al., 2019). Financial factors were almost equally prominent because PPP bankability depends on access to finance, revenue certainty, financial viability and value for money (Liu et al., 2015; Valipour et al., 2019; Mazher et al., 2022). Governance factors were strongly represented through transparency, accountability, contract governance, procurement transparency and monitoring (Kwofie et al., 2024; Almarri et al., 2019). Stakeholder factors were especially visible in housing and urban development studies, where collaboration, communication and public acceptance influence project continuity (Kwofie et al., 2016; Rakpanitmanee & Pathranarakul, 2023; Raharja et al., 2025). Project factors, including technical capability, planning quality and project management, appeared as necessary execution conditions (Liu et al., 2015; Alqahtani et al., 2024).

The results suggest that PPP success is multi-dimensional. Institutional and financial factors provide the foundation for investment confidence (Hsueh & Chang, 2017; Nguyen et al., 2020), governance factors regulate behaviour and reduce uncertainty (Mazher et al., 2022; Kwofie et al., 2024), stakeholder factors support social legitimacy (Rakpanitmanee & Pathranarakul, 2023), and project factors determine implementation performance (Liu et al., 2015; Carbonara et al., 2015). For real estate PPPs, all five categories must be incorporated because such projects involve public land and policy, private capital, long-term contractual governance, affected communities and complex construction (Ng et al., 2017; Xu et al., 2022; Alqahtani et al., 2024).

Table 4. Success Factor Taxonomy

Theme	Representative factors	Role in PPP investment model
Institutional	Government support; political commitment; policy stability; regulatory framework	Reduces sovereign and political uncertainty; strengthens investor confidence
Financial	Access to finance; financial viability; revenue certainty; investment attractiveness; value for money	Determines bankability, risk-adjusted return and financing structure
Governance	Transparency; accountability; contract governance; monitoring; procurement transparency; contract management	Reduces information asymmetry, legal disputes and opportunistic behaviour
Stakeholder	Trust; collaboration; communication; stakeholder engagement; public acceptance; strong private consortium	Improves social legitimacy, demand reliability and operational continuity
Project	Risk allocation; technical capability; planning quality; project management	Reduces delivery, cost, time and operational risks

RISK FACTOR FINDINGS

The review identified 22 risks organised into seven categories. Political risk was the most frequently reported risk category, reflecting concerns over policy change, government transition, approval delay and contract continuity (Rybnicek et al., 2020; Ike et al., 2024). Financial risk was also highly prevalent because inflation, interest rate fluctuation and funding shortage affect project affordability and financing stability (Yin et al., 2015; Valipour et al., 2019). Construction risk appeared consistently because delays, cost overruns and design changes directly affect capital expenditure and revenue timing (Carbonara et al., 2015; Rodhi, 2023). Market risk was especially relevant to projects exposed to demand uncertainty, economic downturns and property market fluctuation (Ng et al., 2017; Xu et al., 2022; Raharja et al., 2025).

Operational risk affects long-term performance through maintenance, efficiency and service quality (Sanda et al., 2020; Liu et al., 2015). Legal and regulatory risks affect contract enforceability and compliance costs (Mazher et al., 2022; Opawole et al., 2019). Environmental risks, although less dominant in earlier PPP studies, are increasingly important due to climate exposure and sustainability requirements (Alqahtani et al., 2024; Xu et al., 2022). The risk synthesis implies that a real estate PPP investment model must not focus only on financial return; it must also integrate political, market, regulatory and operational uncertainty into the appraisal process (Rybnicek et al., 2020; Fathi, 2024).

Table 5. Risk Factor Taxonomy

Risk category	Representative risks	Relevance to investment appraisal
Political	Political instability; government change; policy reversal; approval delays	Affects contract continuity, approval timeline and sovereign risk premium
Financial	Inflation; interest rate fluctuation; funding shortage	Affects cost of capital, debt service and refinancing
Market	Demand uncertainty; downturn; volatility; property market fluctuation	Affects revenue, occupancy, sales absorption and residual value
Construction	Delay; cost overrun; design changes	Affects capital cost, completion date and revenue commencement

Legal/Regulatory	Regulatory changes; legal disputes	Affects compliance cost and contract enforceability
Operational	Poor maintenance; inefficiency; service failure	Affects lifecycle cost, service quality and asset performance
Environmental	Climate risk; natural disasters; sustainability compliance	Affects resilience, insurance, retrofit cost and ESG compliance

Regional Patterns in PPP Success and Risk Evidence

Although this review synthesises evidence across PPP sectors, the findings indicate that success factors and risks are not experienced uniformly across regional and institutional contexts. Mature PPP markets such as the United Kingdom, Australia and Canada tend to place greater emphasis on value for money, contract governance, lifecycle performance and efficient risk transfer. This pattern is consistent with PPP environments where legal frameworks, procurement systems and public-sector capability are relatively well established. In such contexts, the key issue is often not whether PPP can be implemented, but whether PPP delivers superior long-term value compared with conventional procurement. This explains why studies on mature PPP systems frequently emphasise lifecycle performance, contractual completeness, accountability, risk allocation and value-for-money assessment (Liu et al., 2015; Opawole et al., 2019; Rybnicek et al., 2020).

By contrast, studies from emerging PPP markets in Asia tend to highlight institutional capacity, policy stability, financing constraints and political risk. In these contexts, PPP implementation is frequently shaped by the credibility of government commitments, regulatory clarity, investor confidence and the availability of long-term finance. Hsueh and Chang (2017), for example, show that political commitment and institutional readiness remain central to PPP infrastructure delivery, while Nguyen et al. (2020) emphasise the importance of government support, financial viability and partner capability in emerging PPP environments. Similarly, studies on risk management in developing countries suggest that political, legal and financial risks become more prominent where regulatory systems are still evolving and project preparation capacity is uneven (Mazher et al., 2022; Valipour et al., 2019).

African PPP studies, particularly those related to housing and urban infrastructure, place stronger emphasis on affordability, public acceptance, institutional weakness, land-related challenges and stakeholder engagement. Kwofie et al. (2016) demonstrate that PPP public housing delivery in Ghana depends heavily on institutional support, financial capacity and stakeholder cooperation. Chileshe et al. (2020) similarly argue that PPP infrastructure and housing projects in Kenya are shaped by government support, technical capacity and risk allocation. In Nigeria, Shittu et al. (2022) show that housing PPP projects are exposed to risks associated with funding constraints, construction delays, legal uncertainty and weak implementation capacity. These findings suggest that in developing housing and urban development contexts, PPP success cannot be assessed only through financial viability; it must also consider public affordability, social legitimacy and institutional support.

For Malaysia and comparable Southeast Asian contexts, the regional evidence is particularly relevant because real estate PPPs often combine public land, private capital, infrastructure provision, urban redevelopment, affordable housing and long-term asset management. Malaysia's PPP context therefore requires an investment model that is sensitive to policy continuity, land governance, public-sector coordination, market demand and private-sector financing capacity. While the cross-sectoral synthesis provides a general conceptual foundation, its application to Malaysia should be validated through expert judgement because institutional arrangements, property market conditions and public-sector governance structures differ across regions. Therefore, the proposed PPP investment framework should be interpreted as an adaptable framework rather than a universal model. The subsequent Delphi validation phase is necessary to assess whether the success factors, risk categories and success–risk interaction pathways identified in this review are relevant to the Malaysian real estate PPP context.

Table 6. Regional Patterns in PPP Success and Risk Evidence

Region / Country Group	Dominant PPP Evidence Pattern	Key Success Factors Emphasised	Key Risks Emphasised	Implication for PPP Investment Model
Mature PPP markets, e.g., United Kingdom, Australia and Canada	PPP systems are relatively institutionalised, with stronger emphasis on performance, contract governance and value for money.	Value for money, contract governance, accountability, monitoring, lifecycle performance and effective risk allocation.	Contract performance risk, renegotiation risk, lifecycle cost risk and value-for-money failure.	The investment model should include lifecycle performance indicators, contract monitoring mechanisms and value-for-money assessment.
Emerging Asian PPP markets, e.g., China, India, Vietnam and Taiwan	PPP implementation is strongly influenced by institutional credibility, policy stability and financing capacity.	Government support, political commitment, regulatory clarity, financial viability and private-sector capability.	Political risk, regulatory risk, financing risk, demand uncertainty and approval delay.	The investment model should assess institutional readiness, bankability, political commitment and financial risk exposure.
African PPP housing and infrastructure contexts, e.g., Ghana, Kenya and Nigeria	PPP projects are shaped by affordability constraints, institutional capacity gaps and public acceptance issues.	Government support, stakeholder engagement, technical capacity, public acceptance and financing access.	Funding shortage, legal uncertainty, construction delay, affordability risk and stakeholder resistance.	The investment model should incorporate affordability, social legitimacy, land governance, stakeholder acceptance and capacity constraints.
Malaysia and Southeast Asian real estate PPP context	PPP real estate projects often combine public land, private capital, infrastructure, urban development and housing objectives.	Policy continuity, land governance, public-sector coordination, private finance, transparent procurement and stakeholder engagement.	Political risk, land approval risk, market risk, financial risk, construction risk and regulatory uncertainty.	The framework should be validated locally through Delphi to test the relevance of success factors, risks and interaction pathways in Malaysian real estate PPPs.

This regional comparison shows that PPP investment model development should not assume that success factors and risks operate identically across all countries. Instead, the model should allow contextual adjustment. In mature PPP markets, the emphasis may be placed on value for money, lifecycle monitoring and contract optimisation. In emerging markets, greater attention is needed on institutional credibility, financing constraints and political risk. In housing and real estate PPPs, social legitimacy, land-related issues and market demand become more prominent. This supports the argument that the proposed framework is suitable as a preliminary foundation, but it must be refined and validated for the Malaysian real estate PPP context before being operationalised as a final investment model.

DISCUSSION

Why Institutional and Financial Factors Dominate

The dominance of institutional and financial factors reveals that PPP success is determined by both enabling environment and bankability. Institutional conditions matter because PPP investments are long-term arrangements that depend on credible public commitments (Hsueh & Chang, 2017; Ike et al., 2024). Weak institutions increase sovereign risk, contract uncertainty and approval delays (Bosire, 2015; Rybnicek et al., 2020). Strong institutions reduce investor risk perception and support lower risk premiums by improving the credibility of public commitments and contract enforcement (Opawole et al., 2019; Mazher et al., 2022).

Financial factors dominate because PPPs are fundamentally investment structures. Even where policy support exists, a PPP project cannot proceed if it is not financially viable (Liu et al., 2015; Nguyen et al., 2020). Bankability depends on realistic demand assumptions, cost estimates, financing availability, revenue certainty and acceptable risk-adjusted returns (Valipour et al., 2019; Mazher et al., 2022). In real estate PPPs, bankability is more complex because revenues may be phased and market dependent through land value capture, occupancy assumptions and property market performance (Ng et al., 2017; Xu et al., 2022). Therefore, financial viability must be assessed alongside property market risk, land value capture, occupancy assumptions and long-term asset management (Alqahtani et al., 2024).

Why Political, Financial and Construction Risks Are Pervasive

Political risk is pervasive because PPP contracts often last longer than political cycles, exposing projects to changes in government priorities, regulatory regimes and approval processes (Hsueh & Chang, 2017; Ike et al., 2024). Financial risk is pervasive because PPPs rely heavily on debt and long-term cash flow forecasting, so interest rate changes, inflation and funding constraints can significantly affect project viability (Yin et al., 2015; Valipour et al., 2019).

Construction risk remains central because PPP projects require major upfront capital expenditure before revenue generation begins (Carbonara et al., 2015; Rodhi, 2023). Delays and cost overruns increase financing costs, reduce investor returns and can trigger contract disputes (Carbonara et al., 2015; Shittu et al., 2022). For real estate PPPs, construction risk interacts with market risk: if construction is delayed, the project may enter the market under different demand conditions, rental levels or property values than originally forecast (Xu et al., 2022; Alqahtani et al., 2024).

Success Factors as Risk Mitigation Mechanisms

The central analytical contribution of this paper is the argument that success factors function as risk mitigation mechanisms. Government support can reduce political risk by signalling public commitment and providing guarantees (Bosire, 2015; Hsueh & Chang, 2017). Financial capability can reduce funding and refinancing risk by improving access to debt and equity (Nguyen et al., 2020; Valipour et al., 2019). Governance quality can reduce legal disputes and regulatory uncertainty through clear contracts, transparent procurement and accountability mechanisms (Kwofie et al., 2024; Mazher et al., 2022). Stakeholder collaboration can reduce operational disruption and public opposition by improving trust, communication and participation (Rakpanitmanee & Pathranarakul, 2023; Raharja et al., 2025). Technical capability and planning quality can reduce construction delays and cost overrun by improving feasibility assessment, design quality and implementation control (Liu et al., 2015; Rodhi, 2023).

This success-risk interaction logic moves the discussion beyond listing factors. In investment model terms, a success factor changes the probability, severity or allocation of a risk (Albalate et al., 2015; Almarri et al., 2019). Transparent procurement may reduce legal challenge risk (Kwofie et al., 2024), public acceptance may reduce market and operational risk (Raharja et al., 2025), and appropriate risk allocation may reduce construction and operational inefficiency by assigning risks to capable parties (Albalate et al., 2015; Valipour et al., 2019). Therefore, a robust PPP investment model should not treat success factors and risks as separate checklists but

should map each factor to the risks it mitigates and incorporate these relationships into appraisal, contract design and monitoring (Fathi, 2024).

Table 7. Success–Risk Interaction Matrix

Success factor	Risk mitigated	Investment implication
Government support	Political risk	Lower sovereign risk premium and stronger policy continuity assumptions
Financial capability	Financial risk	Improves access to debt/equity and reduces funding shortage risk
Governance quality	Legal/regulatory risk	Reduces dispute probability and contract enforcement uncertainty
Stakeholder collaboration	Operational and social risk	Reduces public opposition and operational disruption
Risk allocation	Construction and operational risk	Aligns risk with party best able to manage it
Technical capability	Construction risk	Reduces design errors, delays and cost overruns
Public acceptance	Market and operational risk	Improves demand reliability and social legitimacy
Value for money	Financial and policy risk	Supports the justification of the PPP structure and reduces renegotiation pressure

Implications for PPP Investment Model Development

A real estate PPP investment model should integrate four analytical layers. The first layer is success factor assessment, which evaluates whether institutional, financial, governance, stakeholder and project conditions are sufficiently strong (Liu et al., 2015; Nguyen et al., 2020). The second layer is risk assessment, which identifies exposure across political, financial, market, construction, legal, operational and environmental categories (Rybnicek et al., 2020; Mazher et al., 2022). The third layer is interaction mapping, which determines which success factors mitigate which risks (Albalate et al., 2015; Fathi, 2024). The fourth layer is performance appraisal, which considers financial returns, value for money and service delivery (Opawole et al., 2019; Mazher et al., 2022).

This integrated approach is especially important for real estate PPPs because they combine public policy, land development, infrastructure provision and private investment (Ng et al., 2017; Xu et al., 2022). Decisions cannot be made solely based on projected returns; they must also consider whether the institutional setting is credible (Hsueh & Chang, 2017), whether risks are allocated to capable parties (Albalate et al., 2015), whether the project has social acceptance (Rakpanitmanee & Pathranarakul, 2023), and whether market demand is resilient under adverse scenarios (Alqahtani et al., 2024).

Dynamic Interaction of Political and Financial Risks Across the PPP Lifecycle

The interaction between political and financial risks in PPP projects should not be interpreted as static. Instead, these risks evolve across the PPP lifecycle and are continuously shaped by institutional and governance conditions. PPPs are long-term contractual arrangements, and their risk profile changes as projects move from planning to procurement, financing, construction and operation. Liu et al. (2015) emphasise that success factors in PPP projects vary across lifecycle stages, while Rybnicek et al. (2020) show that PPP risks differ in their timing, impact and mitigation requirements. Therefore, a real estate PPP investment model must recognise not only the existence of political and financial risks, but also how these risks interact dynamically with governance quality, policy stability and institutional capacity throughout the project lifecycle.

During the planning and project identification phase, political risk is closely associated with policy clarity, public-sector commitment and institutional readiness. If government objectives are unclear, approval authority is fragmented or policy support is uncertain, private investors may perceive the project as politically unstable before procurement begins. Hsueh and Chang (2017) argue that political commitment is a key success factor because it provides continuity and confidence for PPP implementation. In investment terms, weak political commitment may increase sovereign risk perception, delay investor participation and raise the expected risk premium. Conversely, clear public objectives, stable policy direction and credible government support can reduce early-stage uncertainty and make the project more attractive to private bidders.

During the procurement and financing phases, political and financial risks become more directly connected. Transparent procurement processes and clear evaluation criteria reduce the likelihood of legal challenge, bid dispute and perceived political interference. Opawole et al. (2019) link PPP performance to public-sector organisational capacity and transparent governance, while Mazher et al. (2022) emphasise that effective risk management in developing-country PPPs depends on clear institutional and contractual arrangements. Where procurement is perceived as opaque or politically influenced, investors and lenders may respond by increasing required returns, reducing leverage or withdrawing from the bidding process. In this sense, weak governance does not merely create administrative problems; it directly affects project bankability.

The financing phase also illustrates the interaction between political credibility and financial viability. PPP projects are often highly leveraged, and their feasibility depends on access to long-term debt, acceptable interest rates and predictable revenue streams. Valipour et al. (2019) show that risk assessment is central to PPP investment decision-making, while Almarri et al. (2019) demonstrate that risk allocation influences the cost and pricing of PPP risks. If government support, payment mechanisms or revenue assumptions are uncertain, lenders may price the project as riskier. This may increase the cost of capital, weaken debt service coverage and reduce equity returns. Therefore, political and institutional conditions influence financial assumptions within the investment model.

During the construction phase, financial risk interacts strongly with governance and project-level risks. Construction delay, cost overrun and design changes directly increase capital expenditure and extend the period before revenue generation. Carbonara et al. (2015) show that motorway PPPs require careful risk mitigation and sharing because construction and demand risks can significantly affect project outcomes. Strong contract governance, clear variation procedures, monitoring mechanisms and appropriate risk allocation can reduce the severity of construction-related financial stress. However, where governance is weak, construction problems may escalate into disputes, renegotiation, additional financing requirements or project distress. In real estate PPPs, this interaction is particularly important because delayed completion may cause the project to enter the property market under different demand, pricing or rental conditions than originally forecast.

During the operational phase, political and financial risks continue to interact through tariff regulation, availability payments, maintenance requirements, service quality and market demand. If public agencies fail to honour payment commitments or if regulatory changes alter revenue assumptions, long-term financial viability may be weakened. Similarly, poor maintenance or operational inefficiency may lead to public dissatisfaction, political intervention or reduced revenue performance. Sanda et al. (2020) highlight the importance of lifecycle risk management in PPP housing projects, while Rakpanitmanee and Pathranarakul (2023) emphasise the importance of stakeholder collaboration for sustainable infrastructure delivery. These studies suggest that operational performance is not merely a technical matter; it can also trigger political and financial consequences.

For real estate PPPs, this lifecycle interaction is especially significant because project revenue may depend on property sales, rental yield, occupancy, land value capture, sales absorption, commercial demand and long-term asset management. Political stability, planning approval, land-use regulation, financing structure, stakeholder acceptance and governance quality therefore interact continuously. A project may appear financially viable at the appraisal stage but become vulnerable if political support changes, planning approvals are delayed, interest rates rise, market demand weakens or construction costs increase. Therefore, a robust PPP investment model should incorporate lifecycle-based risk assessment by examining how institutional and governance conditions affect risk exposure during planning, procurement, financing, construction and operation.

Table 8. Dynamic Interaction of Political and Financial Risks Across the PPP Lifecycle

PPP Lifecycle Phase	Dominant Political / Financial Risk	Institutional and Governance Interaction	Investment Model Implication
Planning and project identification	Policy uncertainty, weak political commitment, unclear approval authority and early-stage investor uncertainty.	Strong government support, policy clarity and institutional readiness reduce sovereign risk perception and improve project credibility.	The investment model should assess institutional readiness, policy continuity and public-sector commitment before financial appraisal.
Procurement	Political interference, lack of procurement transparency, bid disputes and legal challenge risk.	Transparent procurement, clear evaluation criteria and accountability mechanisms reduce dispute probability and improve investor confidence.	The model should include governance quality and procurement transparency as variables affecting investor participation and risk premium.
Financing	Funding shortage, high cost of capital, weak revenue certainty, interest rate exposure and lender withdrawal.	Credible government support, bankable contracts, appropriate risk allocation and reliable payment mechanisms improve financing confidence.	The model should link political credibility and contract quality to cost of capital, debt service assumptions and bankability.
Construction	Cost overrun, construction delay, design changes and extended financing cost.	Contract governance, monitoring mechanisms, technical capability and clear variation procedures reduce escalation of construction risk.	The model should include construction risk contingencies, delay scenarios and risk allocation mechanisms.
Operation	Payment uncertainty, tariff changes, maintenance failure, service dissatisfaction and revenue instability.	Monitoring, accountability, stakeholder engagement and regulatory stability protect long-term performance and reduce renegotiation risk.	The model should include lifecycle performance monitoring, operational risk assessment and long-term revenue sensitivity analysis.

This lifecycle analysis strengthens the conceptual argument of the paper by showing that political and financial risks do not operate independently. Political risk can affect financial viability through investor confidence, cost of capital, revenue certainty and contract continuity. Financial stress can also trigger political consequences when projects fail to deliver value for money or when public users experience service failure, high tariffs or poor maintenance. Therefore, institutional and governance factors should be treated as continuous risk-shaping mechanisms across the PPP lifecycle, rather than as one-off conditions assessed only at project approval stage.

Preliminary Conceptual Framework

Framework Rationale and Components

The preliminary framework developed from the review comprises five linked components: success factors as enabling inputs, PPP investment process, risk management, investment performance and the PPP investment model. Success factors provide the enabling conditions for investment by shaping institutional credibility, bankability, governance quality, stakeholder legitimacy and execution capacity (Liu et al., 2015; Nguyen et al., 2020). The PPP investment process involves project identification, structuring, financing, procurement and contracting, which correspond to key decision points in PPP lifecycle and procurement frameworks (Opawole et al., 2019; Mazher et al., 2022). Risk management involves identifying, assessing, allocating and mitigating risks throughout the project lifecycle (Rybnicek et al., 2020; Almarri et al., 2019). Investment performance is assessed through financial returns, value for money and service delivery (Liu et al., 2015; Opawole et al., 2019).

The PPP investment model is therefore the integrated output that guides decision-making for real estate PPPs (Fathi, 2024; Alqahtani et al., 2024).

The framework is preliminary because it is based on literature synthesis rather than empirical validation. Its role is to organise evidence and provide a conceptual base for the next stage of the thesis. In the subsequent Delphi phase, experts can evaluate the relevance, completeness and logical coherence of the factors, risks and interaction pathways, which is appropriate for refining conceptual models where expert judgement is required before empirical testing (Fathi, 2024; Kwofie et al., 2024).

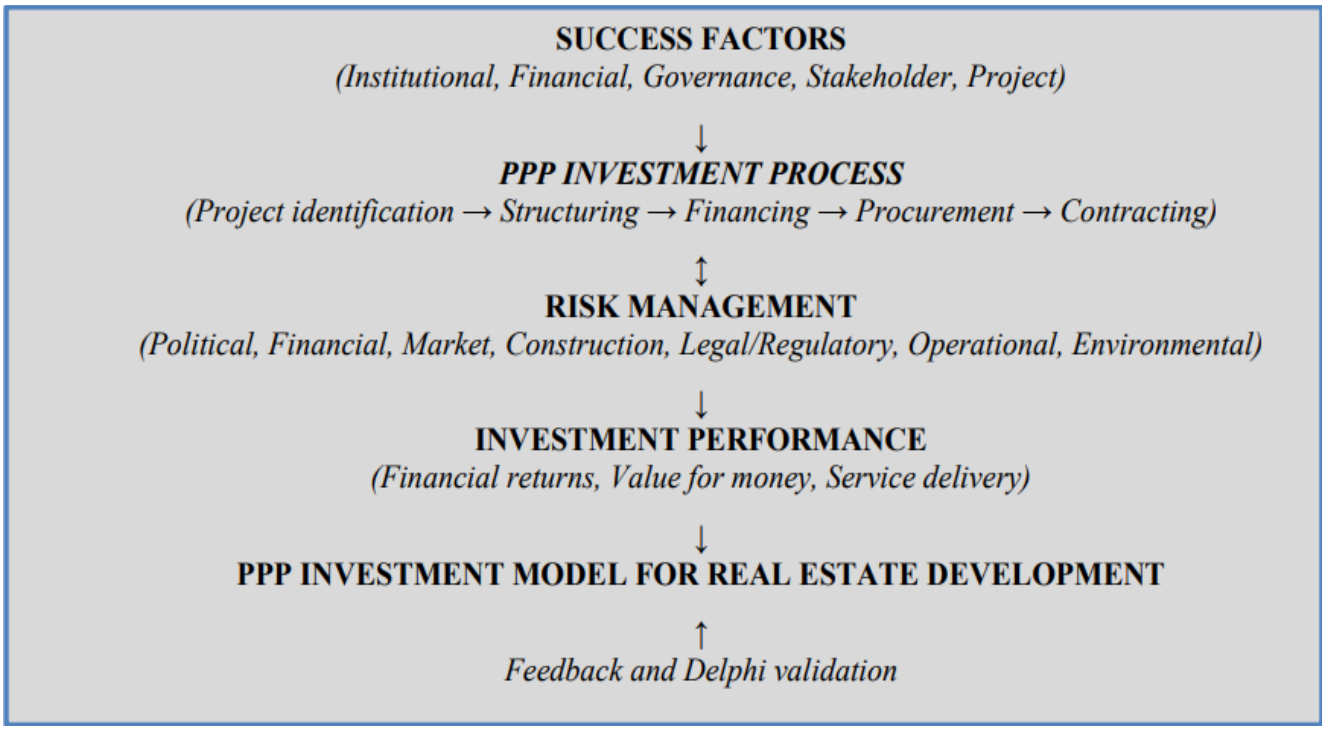

Figure 1. Preliminary PPP Investment Framework (Source: Author own)

Framework Logic

The framework begins with success factors because institutional, financial, governance, stakeholder and project factors determine whether a PPP proposal is feasible and attractive (Liu et al., 2015; Nguyen et al., 2020). These factors shape the investment process by influencing project selection, financing options, procurement design and contract structure (Opawole et al., 2019; Mazher et al., 2022). The investment process then interacts with risk management because every decision creates, transfers or mitigates risk (Albalate et al., 2015; Rybnicek et al., 2020).

Risk management operates across political, financial, market, construction, legal/regulatory, operational and environmental categories (Rybnicek et al., 2020; Ike et al., 2024). These risks affect investment performance through their impact on cost, revenue, time, service quality and public value (Carbonara et al., 2015; Mazher et al., 2022). Performance outcomes then feed back into the model by revealing which success factors and risk mitigation strategies are most effective, enabling the model to evolve as projects are implemented and evaluated (Liu et al., 2015; Fathi, 2024).

In practical terms, the framework can be used as a diagnostic tool. A project with weak policy stability, uncertain revenue, poor stakeholder engagement and high construction complexity would have a high-risk investment profile because these weaknesses correspond to political, financial, stakeholder and construction risk exposure (Hsueh & Chang, 2017; Rybnicek et al., 2020; Rodhi, 2023). Conversely, a project with strong government support, clear legal framework, bankable revenue structure, transparent procurement and capable private consortium would have a more favourable risk-return profile (Nguyen et al., 2020; Kwofie et al., 2024; Opawole et al., 2019). The framework therefore supports both public appraisal and private investment due diligence.

CONCLUSION

Conclusion and Future Research

This paper synthesised PPP literature across sectors to develop a foundation for a PPP investment model for real estate development. The review identified 25 success factors under five themes and 22 risks under seven categories. The findings show that institutional and financial factors dominate the success literature, while political and financial risks are the most pervasive. More importantly, the paper demonstrates that success factors are not merely general enablers but can function as risk mitigation mechanisms (Liu et al., 2015; Rybnicek et al., 2020; Fathi, 2024).

The paper contributes theoretically by integrating success factors, risk allocation, value-for-money and stakeholder perspectives (Liu et al., 2015; Albalate et al., 2015; Opawole et al., 2019; Rakpanitmanee & Pathranarakul, 2023). It contributes practically by providing success and risk categories that can support investment appraisal, contract structuring and project monitoring (Mazher et al., 2022; Kwofie et al., 2024). It contributes to policy by highlighting the importance of institutional quality, transparent governance and credible public commitment for PPP investment (Hsueh & Chang, 2017; Ike et al., 2024).

The main limitation is that the framework is based on literature synthesis and therefore requires validation. Future research should validate the success factor taxonomy, risk taxonomy and interaction matrix using Delphi expert consultation. Subsequent work should operationalise the framework into a practical investment model and test it in the Malaysian real estate PPP context. This would allow the preliminary framework developed in this paper to evolve into an empirically validated model for improving PPP investment decision-making.

Limitations and Future Research

This study has several limitations that should be acknowledged. First, the PPP investment framework proposed in this paper is conceptual and has not yet been empirically validated. Although it is grounded in a systematic literature review of 176 studies, the framework should be interpreted as a preliminary conceptual framework rather than a final validated investment model. This limitation is important because literature-based synthesis can identify conceptual relationships, but it cannot confirm whether those relationships are accepted by practitioners or whether they operate consistently in actual PPP real estate projects. Therefore, further validation is required before the framework can be used as a practical decision-making model.

Second, this study relies on secondary data derived from existing PPP literature. As a result, the findings may inherit the methodological limitations, contextual biases and reporting tendencies of the original studies. Rybnicek et al. (2020) note that PPP risk studies differ in scope, context and methodological quality, which can affect how risks are identified and prioritised. Similarly, studies on PPP success factors often use different methods, such as case studies, surveys, multi-criteria decision analysis or structural equation modelling, which may produce different emphases (Liu et al., 2015; Nguyen et al., 2020). This means that the frequency of a success factor or risk in the literature should not automatically be interpreted as its actual importance in every PPP context.

Third, although thematic analysis was conducted systematically, the classification of success factors and risks inevitably involves interpretive judgement. Similar ideas may appear under different labels across studies. For example, government support, political commitment and policy stability are related but not identical concepts. Likewise, regulatory risk may overlap with political risk or legal risk depending on how individual studies define it. Braun and Clarke (2006) explain that thematic analysis involves researcher interpretation in identifying, grouping and naming themes. Therefore, while the taxonomy developed in this paper is analytically grounded, it should be tested through expert validation to confirm whether the categories are conceptually clear and practically meaningful.

Fourth, the review provides only a limited regional comparison. Although the synthesis identifies broad differences between mature PPP markets, emerging Asian PPP contexts, African housing and infrastructure PPPs, and the Malaysian/Southeast Asian context, the paper does not conduct a detailed country-by-country

comparative analysis. This limitation matters because PPP performance is shaped by institutional maturity, legal systems, public-sector capacity, financial market depth, land governance and political stability. Future research should therefore expand the regional comparison to examine how success factors and risks vary between developed and developing PPP markets, and between infrastructure-focused and real estate-focused PPP systems.

Fifth, this paper discusses the dynamic interaction of political and financial risks across the PPP lifecycle, but it does not empirically test the strength, direction or magnitude of those interactions. Political risk may affect financial risk through policy uncertainty, approval delay, government payment credibility and investor confidence. Financial risk may also create political consequences when projects face affordability issues, renegotiation pressure or service dissatisfaction. However, this paper does not quantify these relationships. Future research could apply structural equation modelling, system dynamics, regression analysis or expert-based modelling to examine how institutional and governance factors influence political and financial risk mitigation across project phases.

Future research should proceed in three main directions. First, Delphi expert validation should be conducted to assess the relevance, importance and completeness of the identified success factors, risk categories and success–risk interaction pairs in the Malaysian real estate PPP context. The Delphi process would allow experts from government, private developers, financiers, consultants and academia to evaluate whether the proposed taxonomy reflects actual PPP investment practice. Second, the framework should be operationalised into measurable indicators that can support investment appraisal. For example, institutional factors could be translated into policy stability indicators, financial factors into bankability indicators, governance factors into procurement and contract management indicators, and risk categories into probability-impact assessment criteria. Third, empirical testing should be conducted using Malaysian real estate PPP case studies to examine whether the framework can explain investment performance, risk allocation quality and project outcomes.

In summary, this paper should be understood as a foundation study rather than a final model validation study. Its primary contribution is to organise cross-sectoral PPP evidence into a structured conceptual framework that links success factors, risks, investment process and performance outcomes. The next stage of research should validate and refine this framework through expert consensus and empirical testing. Through this process, the preliminary framework proposed in this paper can evolve into a context-sensitive and empirically validated PPP investment model for real estate development.

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