



Review



Critical Success Factors for PPP Projects: A Systematic Literature Review

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Abstract: This study addresses the lack of an updated systematic synthesis of research on critical success factors (CSFs) for public-private partnership (PPP) projects. A systematic literature review was conducted on journal articles published between 2014 and 2025 through a three-stage process comprising a Scopus search, article screening, and content analysis. The review shows that the literature has expanded steadily over the period, with transportation and general infrastructure remaining the most frequently examined sectors and developing countries constituting the main empirical setting. Methodologically, the field has become more diversified, with continued reliance on questionnaire surveys and interviews alongside increasing use of structured modelling techniques. The literature also shows growing interest in project-phase issues, stakeholder differences, and context-specific applications of CSFs. Overall, the review confirms the continuing importance of CSFs in shaping PPP performance, while indicating clear opportunities for future research on phase-specific dynamics, stronger causal evidence, stakeholder-sensitive analysis, and the integration of financial structuring, ESG considerations, and digital technologies.

Keywords: CSFs; content analysis; public-private partnership

1. Introduction

Public-private partnerships (PPPs) are a procurement arrangement used to deliver public infrastructure and services through long-term collaboration between public and private actors, with the intention of improving value creation and service performance [1–3]. Since the 1990s, PPPs have been adopted widely in both developed and developing economies for infrastructure and public service provision [4–6]. They have been applied across a wide range of sectors, including transportation, sport, energy, public housing, security, water, healthcare, tourism, and education [7]. In parallel, a substantial body of research has examined the development, implementation, and outcomes of PPPs, thereby providing the foundation for a focused review of critical success factors (CSFs).

Ke et al. (2009) argued that academic journals are a valuable source of knowledge for the research community, particularly for early-career scholars seeking to establish a broad understanding of a field [8]. Systematic analysis of journal publications can therefore help researchers identify the current state of knowledge and clarify promising directions for future inquiry. Within PPP research, CSFs have become a prominent topic of investigation. To trace the development of this line of work, Osei-Kyei and Chan (2015) reviewed studies on CSFs in PPP implementation published between 1990 and 2013 [9]. That review provided an important foundation for



understanding the field. However, the evidence base has expanded substantially over the past decade, and developments in PPP policy, governance, sustainability, and delivery practice now justify an updated review.

In recent years, governments in many jurisdictions have continued to use PPPs, while also encountering persistent implementation challenges. For that reason, a structured review of studies published between 2014 and 2025 is valuable for identifying how research on PPP CSFs has evolved. First, it fills a temporal gap and maintains continuity with the earlier review. Second, it captures shifts in research emphasis, including growing attention to sustainability, governance, digital technologies, and social outcomes. Third, comparison between the earlier and more recent periods makes it possible to distinguish recurrent CSFs from newly emerging concerns. An updated review is therefore needed not only to refresh the evidence base, but also to extend understanding of how PPP success is being conceptualised and examined in contemporary scholarship.

Building on this foundation, the present study reviews recent PPP CSF research and addresses the following objectives:

To examine publication trends in studies on CSFs for PPP projects between 2014 and 2025;

To identify the countries or regions of author affiliation and the most active contributors to PPP CSF research during 2014–2025;

To examine the geographical distribution of the study contexts represented in PPP CSF research;

To synthesise, compare, and interpret findings from PPP CSF studies published between 2014 and 2025, and to assess how they extend or differ from the earlier body of work published between 1990 and 2013.

By updating the evidence base on PPP CSFs from 2014 to 2025, this review seeks to provide a more current understanding that can inform future PPP implementation. It also helps to consolidate both persistent and newly emerging themes, thereby offering a useful platform for subsequent empirical, comparative, and theory-building research.

2. Background of PPPs

Public–Private Partnerships (PPPs) were formally introduced into UK public policy in the early 1980s as a means of promoting infrastructure development through collaboration between the public and private sectors [10]. The underlying logic, however, can be traced to earlier forms of cooperation in the provision of public goods. With the expansion of global infrastructure investment, PPPs have developed into a major delivery model worldwide, particularly in developing economies [11,12]. In conceptual terms, a PPP is a long-term contractual arrangement through which a government and one or more private entities deliver public infrastructure or services across the project life cycle, including financing, construction, and operation. Core features commonly include risk sharing, benefit sharing, and whole-life-cycle management [13,14]. Typical contractual forms include build–operate–transfer (BOT), build–own–operate (BOO), and concession arrangements [15].

Despite the strong growth of PPPs in global infrastructure investment [16,17], reported failure rates remain substantial. Prior studies suggest that PPP performance depends heavily on whether key success conditions are established and maintained throughout the project process. This concern has underpinned sustained scholarly interest in identifying and evaluating CSFs for PPP implementation.

3. Critical Success Factors for PPPs Implementation

Since the 1950s, project management scholarship has increasingly sought to identify the factors most critical to successful project delivery. Yet many influences on project success extend beyond formal scheduling and managerial control [18]. These strategically important areas are commonly described as critical success factors (CSFs) [19]. The CSF approach aims to identify the limited number of issues that are fundamental to organisational or project success [20,21]. In the PPP context, recognising these factors is an essential step in building an effective implementation framework and improving the likelihood of successful delivery [4,22–26].

Research on CSFs in PPPs has been ongoing since the 1990s, with extensive effort devoted to identifying and analysing the factors associated with successful project delivery. Over time, many scholars have compiled and compared CSF sets on the basis of literature reviews and empirical investigations. Recent examples include studies on PPP highway projects, high-speed rail infrastructure, airport development, education projects, and infrastructure and housing delivery in different national contexts [27–31]. Taken together, these studies demonstrate the breadth of CSF applications across sectors and institutional settings.

Given the central role of CSFs in PPP performance, a rigorous review of this literature remains necessary. A well-structured review can consolidate existing knowledge, identify unresolved questions, and clarify practical lessons for PPP design and governance. By examining findings across studies and contexts, such a review can also

illuminate how CSFs vary over time, across regions and sectors, and in response to new policy and market conditions [32–35].

4. Research Methodology

A systematic literature review is an appropriate method for synthesising accumulated knowledge, identifying overarching patterns, and highlighting priorities for future research [18] or [33], or [36–39].

To examine previous studies on CSFs in PPP implementation, a systematic review procedure was adopted [39,40], building on the earlier review by Osei-Kyei and Chan (2015) [9]. The overall review procedure is illustrated in Figure 1.

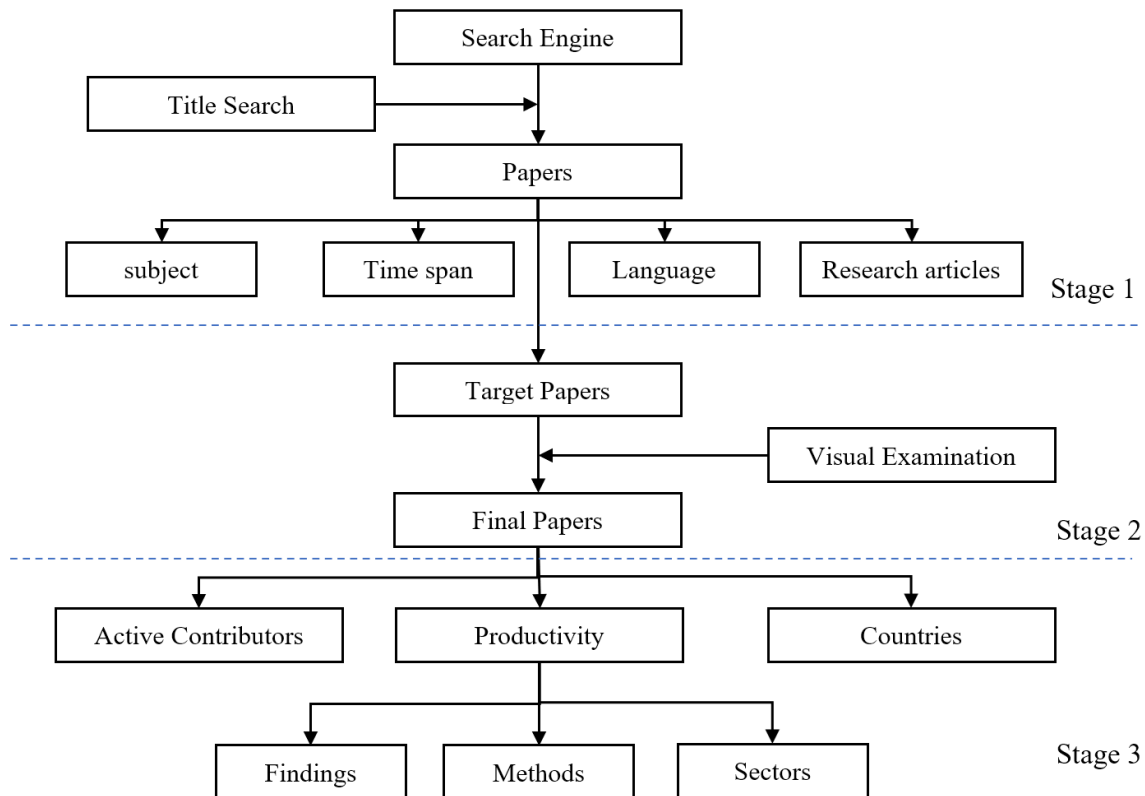


Figure 1. Review process overview.

4.1. Identification of Articles

Scopus was used to identify relevant articles because it indexes a broad range of journals across engineering, management, economics, environmental studies, and the social sciences [18]. In addition to the earlier review by Osei-Kyei and Chan (2015) [9], several related review studies in construction and infrastructure research have also relied on Scopus as a primary database [8] or [41].

Keywords are commonly used to reflect the research focus of authors and reviewers [39]. Following this principle, a title-based search was conducted in Scopus using terms related to CSFs and PPPs, including “critical success factors”, “critical factors”, “success factors”, “public private partnership”, “private finance initiative”, “PPP”, “PFI”, “BOT”, “BOOT”, and “DBFO”. The search was restricted to English-language journal articles and review papers. The search string used to identify potentially relevant studies is presented below:

TITLE (“critical success factor*” OR “critical factor*” OR “success factor*” AND (“public private partnership*” OR “private finance initiative*” OR PPP OR PFI OR BOT OR BOOT OR DBFO)) AND PUBYEAR > 2013 AND PUBYEAR < 2026 AND (LIMIT-TO (SUBJAREA, “ENGI”) OR LIMIT-TO (SUBJAREA, “SOCI”) OR LIMIT-TO (SUBJAREA, “BUSI”) OR LIMIT-TO (SUBJAREA, “ENVI”) OR LIMIT-TO (SUBJAREA, “ECON”) OR LIMIT-TO (SUBJAREA, “ENER”) OR LIMIT-TO (SUBJAREA, “DECI”)).

The review covered publications available up to 7 September 2025. Only peer-reviewed journal articles and review papers were retained, while editorials, book reviews, and conference papers were excluded. This initial search returned 129 records for further screening.

4.2. Visual Inspection

Although the search strategy was designed to be specific, some retrieved records were not directly concerned with CSFs in PPP implementation. A second-stage screening was therefore conducted by examining titles, abstracts, and keywords, and duplicate records were removed on the basis of title and author information. This process resulted in a final sample of 114 papers for content analysis. The journals with at least three relevant papers are listed in Table 1.

Table 1. The journals with more than three articles.

Journal	No.
Construction Innovation	3
Engineering, Construction and Architectural Management	3
Journal of Facilities Management	3
Journal of Financial Management of Property and Construction	3
Journal of Legal Affairs and Dispute Resolution in Engineering and Construction	3
Built Environment Project and Asset Management	4
International Journal of Project Management	4
Journal of Infrastructure Systems	4
International Journal of Construction Management	5
Journal of Management in Engineering	5
Sustainability (Switzerland)	6
Buildings	8

4.3. Content Analysis

Content analysis was used to examine the selected papers systematically in terms of publication year, author affiliation, leading contributors, study context, main findings, and research methods, and to identify broader patterns in the literature [9] or [40]. The analysis comprised both descriptive and thematic components. The descriptive component focused on the basic characteristics of the articles and relied on an initial codebook that was refined iteratively as new categories emerged during the review process. Table 2 presents the final codebook used for descriptive coding. The thematic component was inductive, with themes being developed during close reading of the selected studies rather than being fixed in advance. To enhance reliability, two authors independently coded the full set of papers, compared their coding decisions, and resolved disagreements through discussion.

Table 2. Main codebook used for content analysis in this study.

Code	Description
Year	Year of publication
Article title	Title of the article
Journal title	Publication in which the article was published
Research method	Questionnaire, interview, case study, experiment, conceptual, literature review, models, others
Geographical jurisdiction	Country or region from which the data were collected
success factors definition	key conditions, capabilities, or variables that are essential for achieving desired goals
Critical success factors type	Categorization of success factors according to the specific kind of project objective (s) they can influence
Project type	Subway, general construction projects, water, tourism, others
Project phase	Pre-construction (feasibility, design), construction, operation phases, project lifecycle
Research objectives/questions	Research objectives and/or questions explicitly stated in the paper
Major findings	Major findings explicitly stated in the article
Contributions	Contributions explicitly stated in the article

5. Results and Discussions

5.1. Publication Trends in PPP CSF Research, 2014–2025

Figure 2 presents the annual number of publications on CSFs in PPP research between 2014 and September 2025. The overall pattern is upward, although fluctuations are evident across individual years. Publications increased markedly from 2014 to 2016, suggesting that research interest in this topic was becoming more

established [42,43]. A modest decline followed in 2017 and 2018, which may reflect either shifting research priorities or normal publication variation. Output then remained relatively stable from 2019 to 2021 before rising again between 2022 and 2024, when the number of publications reached its highest level [44,45]. The lower number recorded for 2025 should be interpreted cautiously because the search covered only part of that year.

Compared with the period from 1990 to 2013 [9], the years from 2014 onwards indicate both consolidation and expansion in PPP CSF research. Publication volumes not only exceeded those reported in the earlier review, but also remained comparatively robust across the later period, suggesting that this line of inquiry has moved beyond an exploratory stage and become a more established area of scholarship.

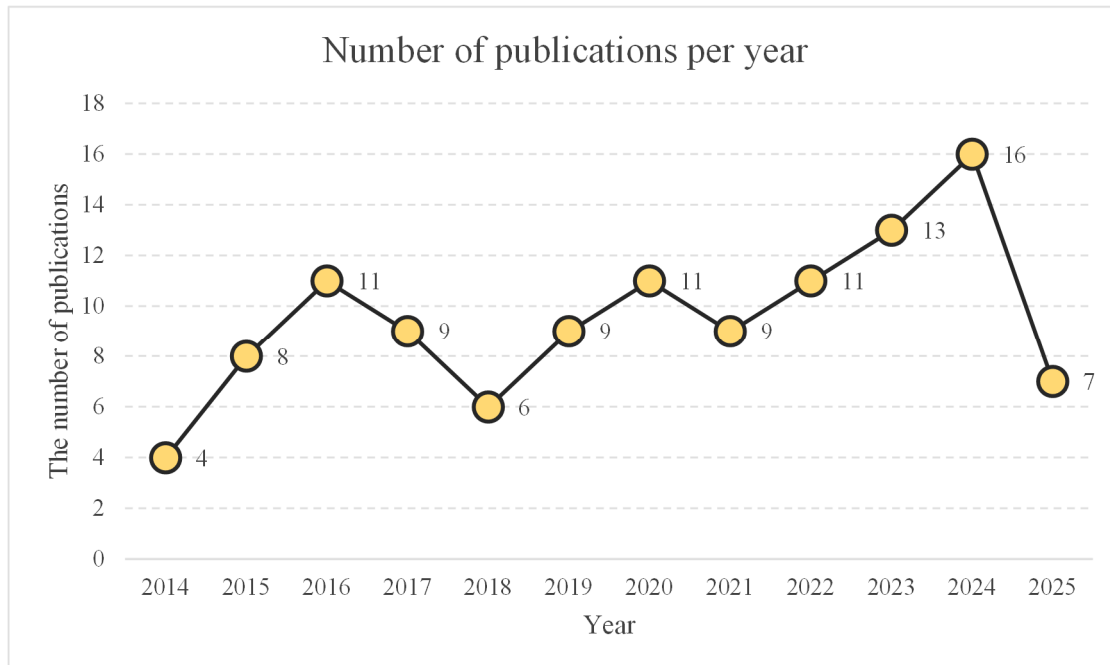


Figure 2. Number of relevant papers published yearly from 2014 to 2025. Note: Publications for 2025 were counted only up to 7 September 2025.

5.2. Authorship Patterns and Leading Contributions

Across the 114 reviewed articles, 359 individual researchers contributed to the PPP CSF literature, reflecting the broad participation and interdisciplinary relevance of the field. At the same time, most authors contributed only one or two papers, indicating that the field is broad in participation but relatively concentrated in terms of sustained output. Figure 3 presents the seven most prolific authors in the reviewed sample. Osei-Kyei, R. and Chan, A. P. C. each authored six papers, while Boussabaine, H., Chileshe, N., Almarri, K., Alkass, S., and Laishram, B. each contributed three papers.

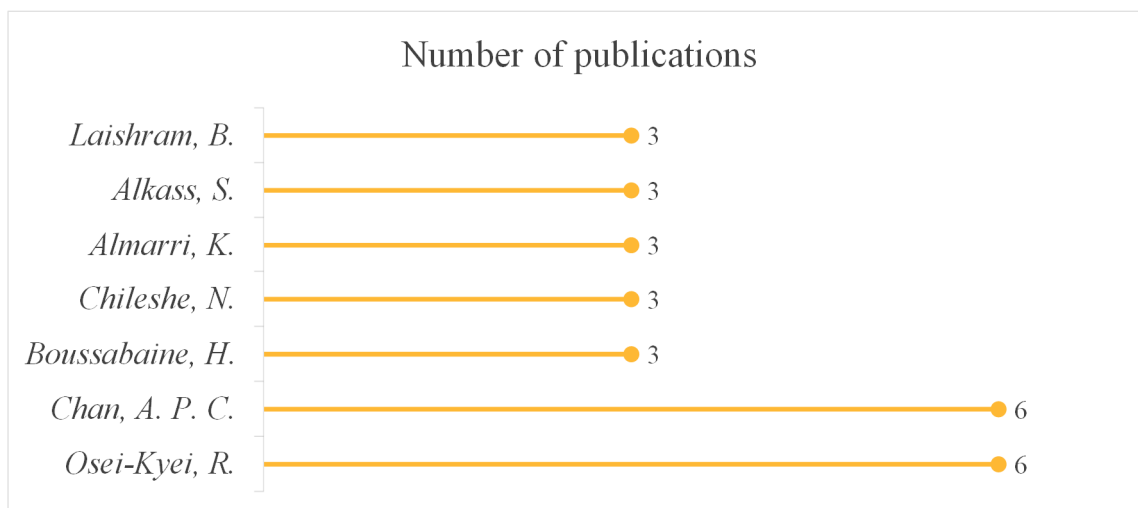


Figure 3. Top seven authors contributing to PPP CSF studies.

The figure shows that, although participation in this research area is wide, sustained publication output is concentrated among a relatively small group of recurring contributors. This pattern suggests some continuity in the development of the PPP CSF literature, especially in studies concerned with the identification and assessment of critical success factors.

5.3. Research Methods Used in PPP CSFs Studies

Figure 4 summarises the research methods reported in the reviewed studies, including literature review, questionnaire survey, interview, case study, factor analysis, content analysis, and modelling approaches such as fuzzy synthetic evaluation (FSE) and the analytic hierarchy process (AHP). Questionnaire surveys and interviews remain the most common approaches, indicating continued reliance on expert judgement and practitioner perceptions. This is unsurprising because many PPP CSFs are institutional, relational, and governance-related in nature [4] or [18], or [46–49], and are therefore often best examined through stakeholder knowledge and experience. Case studies also remain important because they provide context-rich evidence that is not easily captured through survey data alone [46], or [50–52].

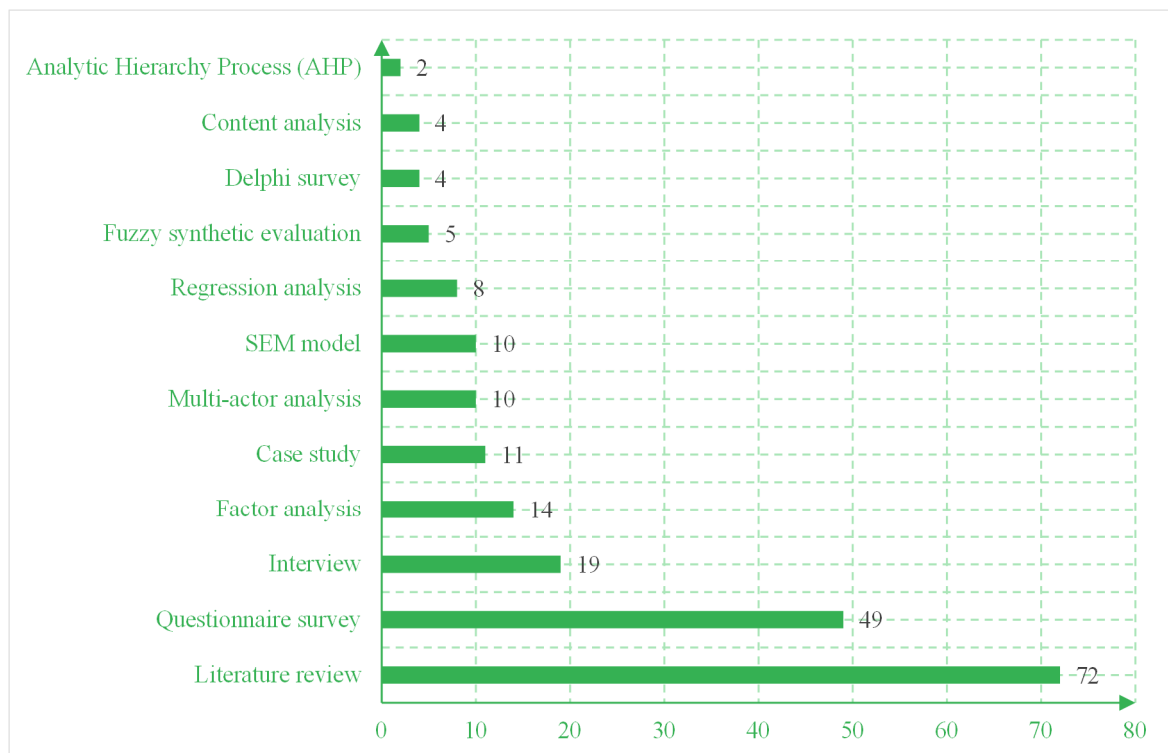


Figure 4. Research methods used in PPP CSF studies.

Compared with the 1990–2013 period, the literature since 2014 shows greater methodological diversification and a more visible use of quantitative and model-based techniques. For example, some studies have combined Delphi procedures with AHP to prioritise success factors [53], while others have used structural equation modelling (SEM) to examine interrelationships among CSFs and their association with project outcomes [54,55]. Fuzzy synthetic evaluation has also been applied to assess the relative importance of CSFs and the likelihood of successful PPP delivery [26] or [44], or [56–58]. These developments suggest a gradual move from simple identification towards more structured analytical assessment.

Qualitative comparative analysis (QCA) has so far received limited attention in this field, but it deserves greater consideration. As a configurational method suited to small- and medium-sized samples, QCA is well positioned to identify combinations of conditions that are sufficient or necessary for successful PPP outcomes [59]. In PPP research, where projects are often treated as cases embedded in distinct institutional contexts, this approach could complement both survey-based and case-based studies by clarifying causal complexity, equifinality, and context dependence [60].

5.4. Sectoral Distribution of PPP Applications

Figure 5 summarises the sectors represented in the reviewed literature, including transportation, water, construction, general infrastructure, affordable housing, education, power, energy, waste, sport, prison, and agriculture. Transportation is the most frequently examined sector, covering ports, airports, highways, roads, metro systems, and other forms of urban rail transit. Transportation and general infrastructure together account for more than half of the reviewed studies. A plausible explanation is that PPP projects in these sectors typically involve substantial capital investment, long concession periods, and comparatively clear revenue or payment structures, all of which make them attractive both for implementation and for academic analysis. By contrast, social-sector PPPs such as education, sport, and prison projects rely more heavily on fiscal support or availability payments and often involve stronger externalities, which may partly explain their lower representation in the literature. This suggests that PPP success is not determined by a single universal set of factors. Rather, while some CSFs recur across sectors, their relative importance varies according to sectoral characteristics such as capital intensity, revenue structure, regulatory dependence, and service-delivery requirements.

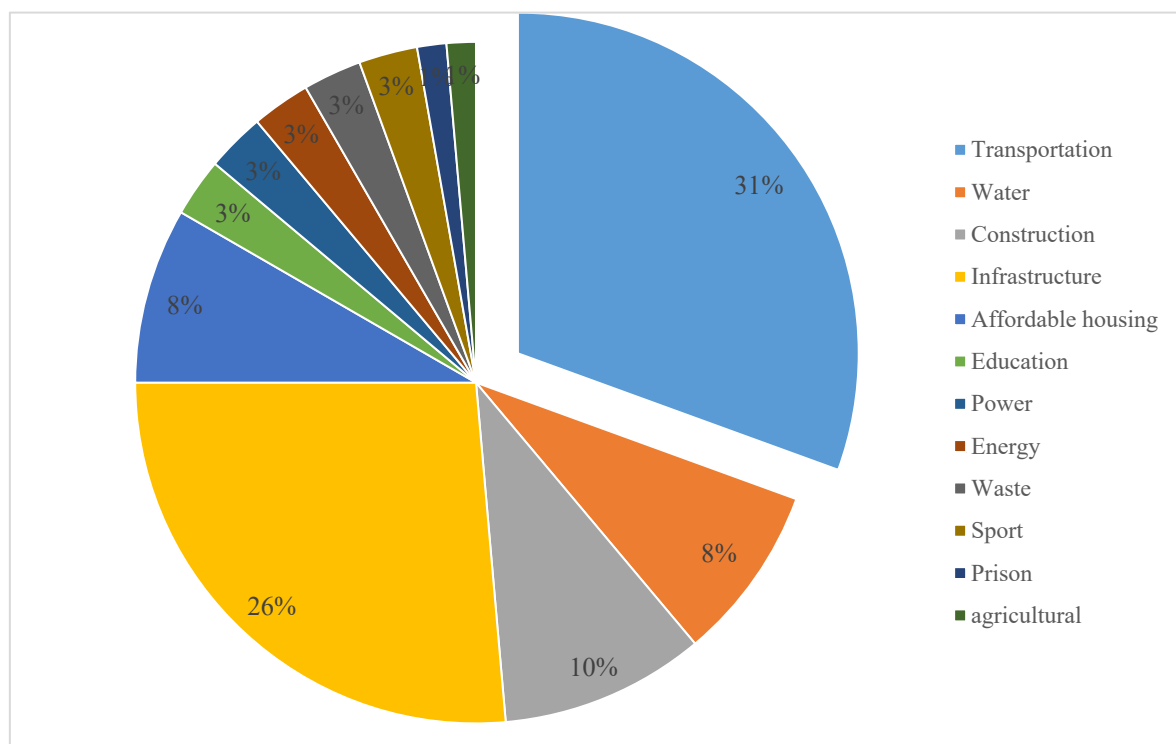


Figure 5. Sectoral distribution of PPP applications in the reviewed studies.

5.5. Geographical Distribution of Study Contexts

Figure 6 illustrates the geographical settings of the empirical studies included in the review. Of the 114 papers, 55 specify a country or region, whereas 59 do not report a clearly identifiable empirical jurisdiction. Among the studies with identifiable locations, developing countries account for the majority of cases, particularly in Asia and Africa. India contributes the largest number of country-specific studies, followed by China and Vietnam. This emphasis on emerging and developing economies is consistent with the strong policy interest in PPPs in contexts where infrastructure deficits, financing constraints, and rapid urban development make PPP delivery especially salient [29] or [53], or [61–66].

A number of studies also adopt an explicitly comparative perspective across countries. For example, Chou and Pramudawardhani compared CSFs across Taiwan, Singapore, China, the United Kingdom, and Indonesia, and found that the Indonesian CSF profile was most similar to that of China [67]. Liu et al. compared the factors affecting PPP tendering efficiency in Australia and China and reported significant differences across several critical items [68]. Osei-Kyei et al. used Ghana and Hong Kong to compare developing and developed contexts and showed that some factors were similarly prioritised, whereas others varied substantially by institutional setting [69]. Muhammad et al. also compared housing PPPs in Malaysia and Nigeria and concluded that CSFs are not readily transferable across countries, even within the same project category [19]. Collectively, these studies indicate that,

while some PPP CSFs recur across contexts, their relative importance remains strongly shaped by institutional and sectoral conditions [60].

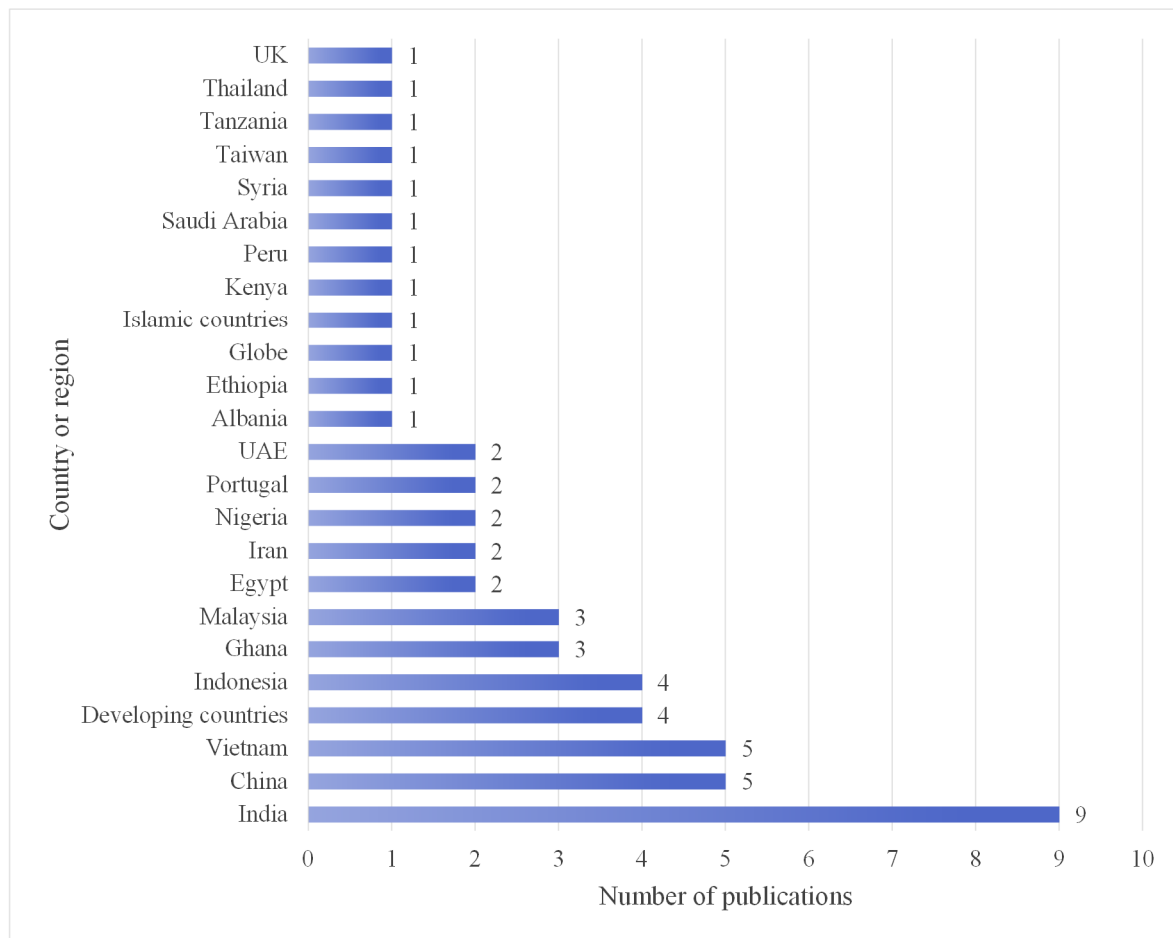


Figure 6. Geographical of study contexts in the reviewed literature.

5.6. Project Phases Addressed in the Literature

Figure 7 shows the project phases covered in the reviewed publications. Existing studies focus predominantly on the whole project life cycle and, to a lesser extent, on the concession and operation phases. By contrast, much less attention has been given to transfer, ex post evaluation, early planning, and tendering. This pattern suggests that scholars have tended either to adopt a broad life-cycle view or to concentrate on phases with direct implications for revenue, risk, and service delivery. However, insufficient attention to the early and late stages of PPP projects weakens understanding of how success conditions are formed, reinforced, or undermined across the full project trajectory.

A closer examination of CSFs across project phases indicates that different stages are associated with different priorities. Life-cycle-oriented studies tend to emphasise the institutional environment, risk-sharing arrangements, and performance-based contracts. Studies focusing on concession and operation phases more often highlight service performance indicators, demand-risk management, and regulatory control, whereas work on the execution stage gives greater attention to project management capability, financial adequacy, and dispute or change management [48], or [70]. The limited evidence available for early planning, tendering, transfer, and ex post evaluation remains a notable weakness in the literature.

Future research should adopt a more explicitly phased and dynamic perspective to investigate how the importance of CSFs changes across project stages and how these factors interact over time. Longitudinal designs and stronger causal strategies would be particularly valuable in the underexplored transfer and ex post evaluation phases. Comparative studies across institutional settings are also needed to distinguish between context-general and context-specific CSFs. In addition, financial structuring, payment mechanisms, digital technologies, and ESG-related considerations should be integrated more systematically into future analytical frameworks.

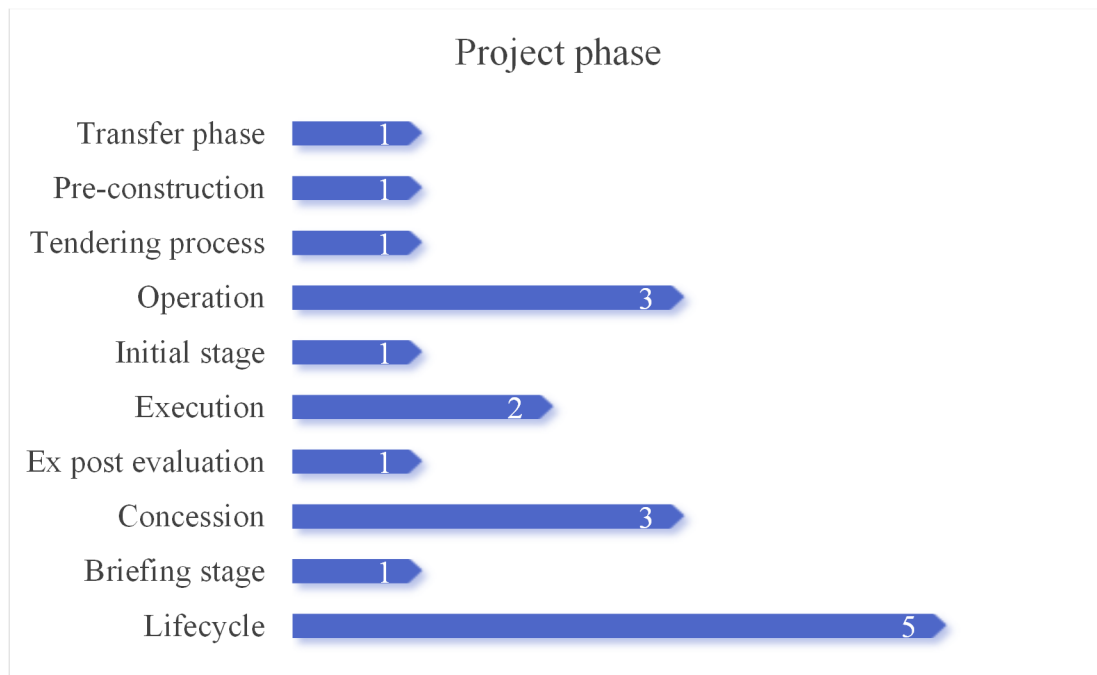


Figure 7. Project phases covered in the reviewed studies.

5.7. Thematic Analysis of Recent PPP CSF Research

Four major thematic patterns were identified in recent PPP CSF research. First, many studies continue to focus on identifying and cataloguing CSFs across PPP settings. Second, a growing stream of work examines the relationship between CSFs and project success more directly. Third, recent studies increasingly explore the micro-level mechanisms through which CSFs operate in practice. Fourth, an emerging body of literature emphasises stakeholder-specific differences in the perception and prioritisation of success factors. Taken together, these themes indicate that the field is gradually moving from descriptive factor listing toward more contextualised and explanatory accounts of PPP success.

5.7.1. Emphasis on the Identification of CSFs

A major finding of the thematic analysis is that the PPP CSF literature still places strong emphasis on identifying and cataloguing recurring success factors across projects and contexts [3,44,71]. Across these studies, certain factors emerge consistently, including appropriate risk allocation, government support, financial viability, and effective contractual design. This suggests that the literature has converged toward a relatively stable core understanding of the conditions commonly linked to PPP success. However, the review also reveals that the relative importance of these factors is not uniform across contexts. Their salience tends to vary depending on the project environment, institutional setting, and implementation conditions. Consequently, the literature supports the view that PPP success cannot be fully explained by a universal checklist alone. Instead, the recurring critical success factors provide an important conceptual foundation, yet they require further contextual interpretation and empirical validation.

5.7.2. Relationships between CSFs and Project Success

Another important finding is that a growing body of research moves beyond factor identification to examine how CSFs relate to project success outcomes more explicitly [72–74]. These studies indicate that success factors are not merely present or absent; rather, they influence performance through specific dimensions such as cost control, timely delivery, service quality, and long-term sustainability. Consequently, the literature points towards a more relational understanding of PPP success, whereby stakeholder communication, financing structures, and regulatory frameworks affect project outcomes through identifiable performance pathways. At the same time, the evidence remains methodologically uneven. While this body of research enhances the explanatory power of the CSF literature, the review suggests that more robust causal research designs are still needed to clarify how, and under what conditions, specific factors lead to particular successful outcomes.

5.7.3. Micro-Level Analyses of Success Factors

The thematic analysis further shows an emerging shift toward micro-level explanations of how success factors operate in practice [75–77]. Rather than treating CSFs as broad and static conditions, these studies examine the concrete organisational and contractual mechanisms through which success is produced, including relationship management, contractual governance, dispute reduction, and knowledge transfer. A key finding from this stream is that PPP success is shaped not only by the presence of favourable factors, but also by the way these factors are enacted, coordinated, and sustained in project practice. This perspective adds analytical depth to the literature by showing that CSFs function through ongoing governance processes rather than as isolated variables. Compared with broad factor-identification studies, micro-level analyses therefore provide a more fine-grained explanation of how PPP outcomes are generated in specific organisational and contractual settings.

5.7.4. Stakeholder-Specific Perspectives

It was also identified that there is considerable divergence, rather than uniformity, in how different stakeholders view PPP success factors [64,65,78,79]. The reviewed studies suggest that public authorities, private investors, operators, and end users may assign different levels of importance to particular success conditions, reflecting their distinct objectives, responsibilities, and risk exposures. Some studies report substantial divergence between stakeholder groups, whereas others find only limited differences. This variation indicates that stakeholder perceptions are themselves context dependent and should not be assumed to converge automatically. The literature therefore suggests that PPP CSF frameworks need to be more stakeholder-sensitive, recognising that what counts as a critical success factor may vary according to position, interest, and governance role within the project.

6. Conclusions

PPP remains an important mechanism for delivering public infrastructure and services, particularly in contexts where investment needs are high and public resources are constrained. Against this background, this study reviewed recent research on critical success factors (CSFs) in PPP implementation published between 2014 and 2025. Based on a structured search, screening, and content analysis process, 114 PPP CSF-related papers were included in the final review sample. The results show that CSFs remain a central concern in PPP research, but the field has also become more differentiated in terms of context, methods, and thematic focus.

Several findings stand out. First, the reviewed literature remains strongly concentrated on identifying and cataloguing CSFs, confirming that factor identification continues to be the dominant orientation in PPP success research. However, the review also shows a gradual shift beyond static factor listing, with increasing attention to project phases, stakeholder-specific perspectives, and more structured analytical models. Second, the empirical evidence is concentrated mainly in developing countries, while transportation and general infrastructure remain the most frequently examined sectors. Third, the field is characterised by broad participation but relatively limited continuity among highly productive contributors. Fourth, although methodological diversity has increased, survey- and interview-based studies still dominate the literature.

The analysis further suggests a progression in recent PPP CSF research towards greater explanatory depth. Alongside continued factor identification, newer scholarship delves into the connections between these factors and project performance, the governance and operational pathways mediating their effect, and the divergent weighting assigned to them by different stakeholder groups. This progression signifies an evolving conceptualisation of PPP success—from a product of generic factors to a contextual and relational process, contingent upon the institutional framework, project dynamics, and the constellation of stakeholder priorities.

These results contribute an updated synthesis of continuity and change in the PPP CSF literature. They suggest that future research should move further toward phase-sensitive analysis, stronger causal designs, and more explicit differentiation between stakeholder perspectives. More systematic attention should also be given to financial structuring, ESG issues, and digital technologies, all of which are becoming increasingly relevant to PPP performance and governance.

This study nevertheless has several limitations. First, the review is confined to Scopus-indexed journal literature and may therefore omit relevant studies published elsewhere. Second, although the review captures developments from 2014 to 2025, it does not reassess the full pre-2014 body of work within the same analytical framework. Third, content analysis provides a structured overview but cannot fully recover the depth and contextual richness of individual case studies. The findings should therefore be interpreted with appropriate caution, and future reviews could use broader databases, longer time horizons, and complementary review methods.

Author Contributions

Y.C.: conceptualization, methodology, framework development, writing-original draft preparation. M.Y.K.: supervision, methodology, framework development, validation. O.M.: methodology, framework development, validation. Y.Z.: resource, writing-editing and review, investigation. Y.S.: resource, writing-editing and review, investigation. All authors have read and agreed to the published version of the manuscript.

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Conflicts of Interest

The authors declare no conflict of interest.

Use of AI and AI-Assisted Technologies

During the preparation of this work, the authors used ChatGPT for language polishing to improve the clarity, grammar, and readability of the manuscript. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

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