

Critical success factors of public-private partnership from 2000 to 2019: A literature review

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Abstract

Public-Private Partnership (PPP) is one of the schemes that have inspired many countries in infrastructure development. One of the most discussed PPP topics by researchers is the concept of Critical Success Factors (CSF). Therefore, this study examines CSF publications for PPP projects from selected journal sites from 2000-2019. The results showed that research on CSF in PPP began to increase in 2012. The most identified CSFs were appropriate risk allocation and sharing, competitive and transparent procurement processes, favorable and efficient legal frameworks, commitment and responsibility of the public and private sectors, and a robust and reliable private consortium. Furthermore, it was also found that most countries that were the objects of research on PPP CSF were China, followed by Hong Kong and Australia. The results also show that the dominant research focuses on multi-sector types of infrastructure where CSF can be applied to all infrastructure sectors. The findings obtained in this study can provide an overview of CSFs for projects with PPP schemes in the future. Besides, the identified CSFs can be applied to any PPP infrastructure sector. They can assist stakeholders in increasing the likelihood of PPP project success and can be adopted for further research.

Keywords: *Critical Success Factors, Public-Private Partnership, Infrastructure*

JEL Classification: G32, M21, M41

INTRODUCTION

Governments worldwide are increasingly adopting Public-Private Partnership (PPP) policies to terminate large infrastructure gaps, and there is growing interest in adopting these policies in both developed and developing countries. Many governments around the world are now trying to use private sector expertise and resources. It to reduce infrastructure shortages, especially those related to public services.

PPPs are an increasingly valuable tool for public infrastructure development and the provision of public services. PPP has drawn many researchers' interest since this type of partnership was introduced to the construction sector. By identifying the most critical features of the project, several researchers have sought to enhance PPP projects' functionality to find valuable strategies for better implementation (Ke et al., 2009).

Over the years, research on PPP has been carried out in various aspects following the growing popularity of PPP in the world's eyes. These various aspects include risk management and risk allocation (Li et al., 2001; Grimsey and Lewis, 2002; Hwang et al., 2013), financial feasibility studies (Zhang, 2005), and Value for Money (Cheung et al.,

2009; Siemiatycki and Farooqi, 2012).

From that period, discussion of Critical Success Factors (CSF) has also gained much more focus, following research trends on PPP from 1998 to 2008 conducted by Ke et al. (2009) and research conducted by Tang et al. (2010). CSF is one aspect of PPP that is of particular concern to researchers.

With the growth of research on CSF in PPP projects, it is considered necessary to conduct a literature review to (1) observe the development of CSF research on PPP projects from 2000 to 2019, (2) identify countries that are the subject of CSF research, (3) identify the infrastructure sectors that have been explored in previous CSF studies, and (4) identify the dominant CSF from the results of previous research.

METHODS

A systematic analysis of journal publications is necessary to thoroughly review and analyze the results from previous research on a specific subject or field of study. In this regard, three stages needed consists of (1) selection of target journals, (2) selecting target papers, and (3) examining target papers.

Selection of target journals

The academic journals published articles with CSF research were identified first. The publications used are only publications with the Q1 category whose validity was obtained through the Scimagojr.com website.

The articles used in this study were all national and international scientific articles published on these databases: ScienceDirect, Emerald Insight, AsceLibrary, Sage Journal, Directory of Access Journal, Springer, and Wiley Online Library.

The search keywords included “critical success factors”, “critical factors”, and “success factors”, which are limited to the PPP area by using the keyword “public-private partnership”. Papers with these specific terms in the title, abstract, or keywords were considered to have met the study requirements. Moreover, the search restricted to the subject areas of “social sciences”, “business”, “accounting”, “management”, “engineering”, “environment”, “econometrics, finance and economics”, “energy”, “environmental science” and “decision sciences” with the document type of “article or review”.

Based on the research results, academic journals that publish articles about PPP CSF and within the Q1 category obtained as follows: Engineering, Construction and Architectural Management (ECAM), Journal of Construction Engineering and Management (JCEM), Facilities, Cities, Global Journal of Flexible Systems Management, Habitat International, International Journal of Project Management (IJPM), International Journal of Public Sector Management (IJPSM), Journal of Management in Engineering (JME), Maritime Economics and Logistics, Project Management Journal, Public Administration Review, and Transport Policy. Henceforth these journals were selected as the target academic journals for further analysis.

Selecting target papers

From 7 search engines obtained 2,448 articles, then checked briefly by reading the abstract and its contents to filter out unrelated papers. Based on 13 journals that were selected, 28 articles are about PPP CSF within the Q1 category.

Regardless of the extensive search for publications on the PPP CSF, the number of articles extracted from journals selected may not be complete and does not include all publications in the field of PPP under study. Therefore, it must be emphasized that the analysis is based solely on data obtained using the specific sampling approach adopted in this study. Moreover, this study not intended to examine the entire article on CSF PPP.

However, it is expected to provide an overview of CSF PPP research trends and the most frequently cited success factors for future implementation.

Examining target papers

The articles obtained are then analyzed by reading the entire article content includes the research objectives, framework, methods, results, and conclusions. The results presented into four categories: (1) the development trend of PPP CSF research in the 2000-2019 period, (2) the most researched countries as research objects, (3) the infrastructure sector, which was the most researched, and (4) identification of findings most CSF in research during 2000-2019.

RESULTS AND DISCUSSION

Publication statistics for critical success factors on PPP Projects

Figure 1 presents the number of publications per year from 2000 to 2019. The numbers presented are the results of searching for articles through seven portals that have been selected for use in this study. Figure 1 shows that the total published articles found according to the predetermined criteria are 28 articles from 2000 to 2019.

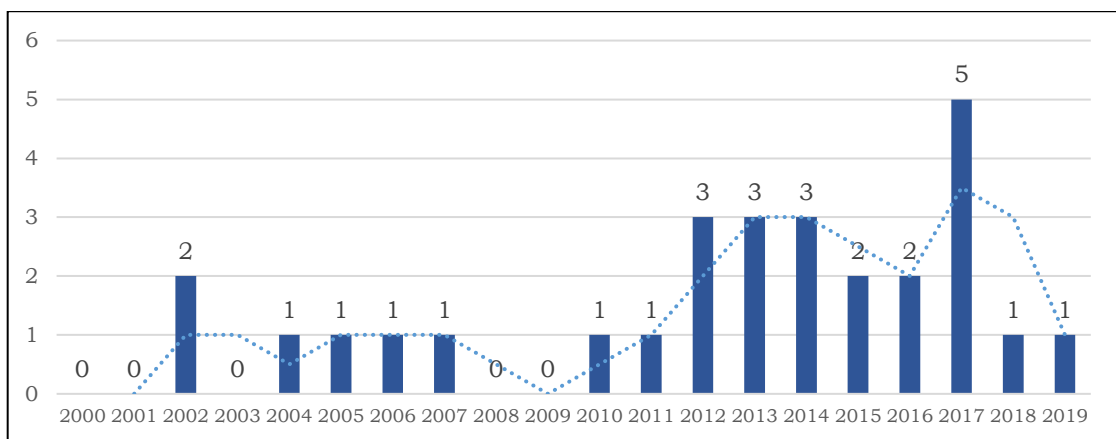


Figure 1. Publication statistics for critical success factors on PPP Projects in 2000-2019

There were 8 CSF articles for PPP from 2000 to 2011. It indicates that even though PPP had developed sufficiently in various countries, only a few researchers made CSF for PPP as their study's focus. However, there was an increase from 2012 to 2019 when 20 articles were obtained. It illustrates that PPP is a reasonably significant means of realizing infrastructure development accompanied by public services. Simultaneously, researchers are increasingly involved in reviewing infrastructure development practices with the PPP scheme and developing various methods to better implement PPP. Findings in previous research indicate that CSF is one of the topics of interest to researchers (Ke et al., 2009).

CSF research object countries in PPP Projects

Not all articles use only one country as the object of research. Several studies observed several countries within a study to compare PPP in these countries (Chou & Pramudawardhani, 2015; Zhang et al., 2012; Osei-Kyei & Chan, 2017a; Abdel Aziz, 2007). Several studies also conceptualize CSF research at the international level to apply to any country (Osei-Kyei & Chan, 2017b; Zhang, 2005; Kumaraswamy & Morris, 2002).

Figure 2 shows that the discussion on 35 countries is contained in 28 research articles. By setting aside the international concept, China appears to be the region widely studied as the research objects (5 publications), followed by Hong Kong and Australia with three publications.

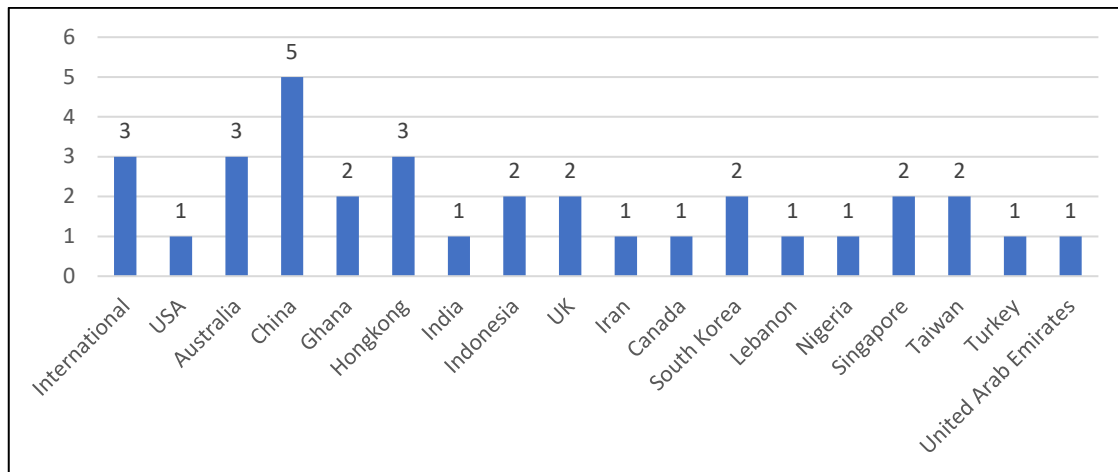


Figure 2. Countries as CSF research object on PPP Projects

China is the country with the PPP scheme that is the most widely used as the CSF research object. In China, PPP was firstly introduced to the Shajiao B power plant project in mid-1980. Since 1996, several projects began to be promoted with PPP under the Build-Operate-Transfer (BOT) scheme, such as the Laibin B power plant project and the Chengdu No. 6 water project. Since then, the private sector's involvement in infrastructure development in China has steadily increased (Ke et al., 2014). Research on CSF is necessary to understand better the factors that can determine PPP projects' success in China (Chan et al., 2010).

Based on Figure 2, Hong Kong ranks as the most studied country after China. The financial instability in Asia in the late 1990s had a significant impact on the Hong Kong government. With the various protests filed for better public service improvements due to Hong Kong's rapid development, alternative funding for the development is required, i.e., PPP. With the advantage that Hong Kong is the gateway to mainland China, foreign companies can enter the Asian market, where private contributions play a major role (Chan et al., 2007). Like China, PPP has increased in Hong Kong by exploring potential success factors for PPP projects (Cheung et al., 2012).

Australia occupies a position with the same score as Hong Kong (See Figure 2). PPP in Australia has been used to implement projects such as main toll roads, hospitals, prisons, schools, services, and sports facilities. Exploring PPP success factors in Australia includes case studies, such as the Sydney Super Dome and Australia Stadium, which have informed future practice practitioners for Australian PPP (Jefferies, 2006).

Infrastructure sectors in CSF research

PPPs have been used in various sectors to acquire several types of assets and facilities. Some countries merely focus on the use of PPP in specific sectors. This justification is intended to assist the government's investment priority policies, improve service performance, and prioritize areas where PPP is expected to be more successful (World Bank, 2017).

Table 1 presents the results of the search process for the infrastructure sector used in previous studies. As shown in Table 1, 15 articles applied the multi-sector concept to CSF research. It is assumed that the CSF identification results in the research can be applied to PPP projects in any sector. Five articles examined the success factors in the transportation infrastructure sector (Bae & Joo, 2016; Chou et al., 2012; Babatunde & Perera, 2017; Kulshreshtha et al., 2017; Min & Jun 2014). Meanwhile, the other two articles examined the road infrastructure sector and sports facilities and infrastructure (Ahmadabadi & Heravi, 2019; Wang, 2015; Jefferies et al., 2002; Jefferies, 2006).

Table 1. Infrastructure sector in CSF research

Infrastructure Sector	Total article	%
Drinking-Water Infrastructure	1	3.6
Sports Facilities and Infrastructure	2	7.1
Road Infrastructure	2	7.1
Housing Infrastructure	1	3.6
Water Resources and Irrigation Infrastructure	1	3.6
Telecommunication and Informatics Infrastructure	1	3.6
Transportation Infrastructure	5	17.9
Multi-sector	15	53.6
Total	28	100.0

Source: Processed data

Identification of CSF findings on PPP Projects

A summary of findings for identifying CSFs for each article is presented in Table 2. From 28 publications, the number of CSFs identified is 20 CSFs. The top five factors are appropriate risk allocation and sharing (identified in 19 articles), followed by a competitive and transparent procurement process, a favorable and efficient legal framework, and public and private sector commitments and responsibilities. Finally, a robust and reliable private consortium factor occupies the fifth position, discovered in 13 published articles.

Table 2. CSF findings on PPP Projects from 2000-2019

No.	CSFs	Authors	Total
1	Appropriate risk allocation and sharing	Chou & Pramudawardhani (2015); Hwang et al. (2013); Chou et al. (2012); Wang (2015); Babatunde & Perera (2017); Zhang et al. (2012); Osei-Kyei & Chan (2017); Jefferies (2006); Wang et al. (2018); Jamali (2004); Osei-Kyei & Chan (2017)a; Zhang (2005); Gurgun & Touran (2014); Tang et al. (2013); Kumaraswamy & Morris (2002); Abdel Aziz (2007); Kulshreshtha et al. (2017); Min & Jun (2014); Yang et al. (2013)	19
2	Competitive and transparent procurement process	Chou & Pramudawardhani (2015); Hwang et al. (2013); Abdul-Aziz & Kassim (2011); Chou et al. (2012); Ng et al. (2012); Babatunde & Perera (2017); Wibowo & Alfen (2014); Osei-Kyei & Chan (2017); Jefferies et al. (2002); Jefferies (2006); Jamali (2004); Chan et al. (2010); Abdel Aziz (2007); Almarri & Boussabaine (2017); Kulshreshtha et al. (2017); Min & Jun (2014)	16
3	Favorable and efficient legal framework	Chou & Pramudawardhani (2015); Hwang et al. (2013); Chou et al. (2012); Ng et al. (2012); Ameyaw & Chan (2016); Babatunde & Perera (2017); Wibowo & Alfen (2014); Zhang et al. (2012); Wang et al. (2018); Jamali (2004); Osei-Kyei & Chan (2017)a; Gurgun & Touran (2014); Kumaraswamy & Morris (2002); Abdel Aziz (2007); Kulshreshtha et al. (2017); Yang et al. (2013)	16
4	Commitment and responsibility of the public and private sectors	Ahmadabadi & Heravi (2019); Chou & Pramudawardhani (2015); Hwang et al. (2013); Abdul-Aziz & Kassim (2011); Chou et al. (2012); Ameyaw & Chan (2016); Babatunde & Perera (2017); Zhang et al. (2012); Osei-Kyei & Chan (2017); Wang et al. (2018); Jamali (2004); Chan et al. (2010); Tang et al. (2013); Almarri & Boussabaine (2017); Kulshreshtha et al. (2017); Min & Jun (2014)	16
5	A robust and reliable private consortium	Ahmadabadi & Heravi (2019); Chou & Pramudawardhani (2015); Hwang et al. (2013);); Chou et al. (2012); Ng et al. (2012); Wang (2015); Babatunde & Perera (2017); Zhang et al.	13

No.	CSFs	Authors	Total
		(2012); Osei-Kyei & Chan (2017); Jefferies et al. (2002); Zhang (2005); Kumaraswamy & Morris (2002); Kulshreshtha et al. (2017)	
6	Stable macroeconomic conditions	Ahmadabadi & Heravi (2019); Chou & Pramudawardhani (2015); Chou et al. (2012); Ng et al. (2012); Zhang et al. (2012); Osei-Kyei & Chan (2017); Zhang (2005); Chan et al. (2010); Gurgun & Touran (2014); Kumaraswamy & Morris (2002); Almarri & Boussabaine (2017); Kulshreshtha et al. (2017)	12
7	Legal, political and social support	Ahmadabadi & Heravi (2019); Chou & Pramudawardhani (2015); Bae & Joo (2016); Chou et al. (2012); Ng et al. (2012); Ameyaw & Chan (2016); Babatunde & Perera (2017); Osei-Kyei & Chan (2017); Chan et al. (2010); Kumaraswamy & Morris (2002); Almarri & Boussabaine (2017); Kulshreshtha et al. (2017)	12
8	Good governance	Ahmadabadi & Heravi (2019); Chou & Pramudawardhani (2015); Chou et al. (2012); Ng et al. (2012); Ameyaw & Chan (2016); Wibowo & Alfen (2014); Wang et al. (2018); Chan et al. (2010); Kulshreshtha et al. (2017); Yang et al. (2013)	10
9	Clear and precise project identification and summary	Ahmadabadi & Heravi (2019); Ameyaw & Chan (2016); Babatunde & Perera (2017); Wibowo & Alfen (2014); Osei-Kyei & Chan (2017); Jefferies (2006); Wang et al. (2018); Tang et al. (2013); Kumaraswamy & Morris (2002); Abdel Aziz (2007)	10
10	Availability of financial markets	Ahmadabadi & Heravi (2019); Chou & Pramudawardhani (2015); Bae & Joo (2016); Chou et al. (2012); Babatunde & Perera (2017); Wibowo & Alfen (2014); Zhang et al. (2012); Kulshreshtha et al. (2017); Yang et al. (2013)	9
11	Government involvement by providing guarantees	Ahmadabadi & Heravi (2019); Chou & Pramudawardhani (2015); Chou et al. (2012); Babatunde & Perera (2017); Osei-Kyei & Chan (2017); Almarri & Boussabaine (2017); Kulshreshtha et al. (2017); Yang et al. (2013)	8
12	Technical and economic feasibility	Ahmadabadi & Heravi (2019); Chou & Pramudawardhani (2015); Abdul-Aziz & Kassim (2011); Chou et al. (2012); Wang (2015); Babatunde & Perera (2017); Abdel Aziz (2007);	7
13	Financially attractive projects and profitable investments	Wang (2015); Ameyaw & Chan (2016); Wibowo & Alfen (2014); Wang et al. (2018); Tang et al. (2013); Kumaraswamy & Morris (2002);	6
14	Comprehensive and realistic cost / benefit assessment	Chou & Pramudawardhani (2015); Chou et al. (2012); Babatunde & Perera (2017); Jefferies et al. (2002); Yang et al. (2013)	5
15	Clear goals and objectives	Chou & Pramudawardhani (2015); Chou et al. (2012); Jamali (2004); Tang et al. (2013); Min & Jun (2014)	5
16	Efficient payment mechanism	Ng et al. (2012); Osei-Kyei & Chan (2017); Wang et al. (2018); Osei-Kyei & Chan (2017)a; Kumaraswamy & Morris (2002)	5
17	Appropriate procedures and arrangements for contracts and concession periods	Ahmadabadi & Heravi (2019); Chou & Pramudawardhani (2015); Wibowo & Alfen (2014); Jefferies (2006); Abdel Aziz (2007)	5
18	Safe, sound, and secure economic policy	Chou & Pramudawardhani (2015); Chou et al. (2012); Ng et al. (2012); Wibowo & Alfen (2014);	4
19	Well organized public sector	Chou & Pramudawardhani (2015); Hwang et al.. (2013); Chou et al.. (2012)	3
20	Technology transfer and innovation	Bae & Joo (2016); Babatunde & Perera (2017); Osei-Kyei & Chan (2017)	3

Table 2. indicates that irrespective of the project stage, infrastructure sector, or PPP project model, these factors are significant in supporting a PPP project's success.

1. **Appropriate risk allocation and sharing**
Infrastructure development is a costly and complicated endeavor where project risks may arise if not handled properly. It is not surprising that a significant portion of identification was obtained through risk allocation and risk-sharing factors. Nineteen published articles from 2000 to 2019 considered this in the research.
Allocation and risk-sharing are one of the core components in the preparation of a PPP project. It is expected that a better CSF may result in better risk management through the process of clearly defining risks and allocating them to parties with more appropriate means of managing these risks, be it private or public (Osei-Kyei and Chan, 2015).
2. **The competitive and transparent procurement process**
A competitive and transparent procurement process ranks second out of the top five CSF rankings based on 16 articles.
A transparent and efficient procurement process is essential to reduce transaction costs and shorten negotiation and contract times. A clear description of the project and the required requirements may help achieve this during the tender process. In most cases, bidding alone cannot produce a robust private consortium that benefits the public (Chan, 2010).
3. **Favorable and efficient legal framework**
A total of 16 articles identified a favorable and efficient legal framework as an efficient factor in facilitating PPP projects' success. Sufficient legal resources must be available at a reasonable cost to maintain the legal structure and necessary documentation. A transparent and stable legal framework may assist in making contracts and agreements bankable. A proper dispute resolution system may help ensure the stability of the PPP contract. Governance rules, regulations, and appropriate reference manuals related to PPP have been well-established in several developed countries (such as the UK, Australia, Canada, and South Africa) to facilitate the potential adoption of the PPP procurement approach (Zhang et al., 2012).
4. **Commitment and responsibility of the public and private sectors**
Sixteen articles have identified the topic of commitment and responsibility of the public and private sectors. It is important to define and share the responsibilities of each party appropriately. It is important to create a strong relationship so that PPP can work smoothly as well. The attitude of stakeholders in PPP projects may affect the quality of project results. Therefore, the relationship and management among stakeholders must also be considered. For projects to be implemented, the public and private sectors must demonstrate an equal commitment to the PPP project's objectives (Chan, 2010; Almarri, 2017).
5. **A robust and reliable private consortium**
The final factor is a robust and reliable private consortium, identified in 13 articles from 28 published articles considered in this study.
Although the government is generally in a better position to create an enabling environment for private sector participation in public infrastructure development, the private sector plays a significant role in successfully implementing several PPP projects. The PPP project's complexity made it difficult for a construction company to complete the project, so many companies gathered to form a consortium. However, the structure and compatibility of these entities may affect the success of the project. A weak and poorly managed consortium created difficulties and ultimately caused PPP projects to fail. In this regard, the consortium must have strong technical, operational, and management skills to implement PPP projects (Osei-Kyei and Chan, 2015; Zhang, 2005).

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

It is noteworthy that while there were historically no publications in 2000, there was an improvement and hit the most publications in 2017 with five publications by 28 papers from 2000 to 2019 included in this analysis. China became the most popular country studied in CSF research in the 2000-2019 period, followed by Hong Kong and Australia. There is little research in developing countries. The PPP concept has not received much development in those countries, or the documents used in this study are insufficient. Research for multi-sector infrastructure is ranked first as a sector considered in previous studies. It is expected so that CSF can be applied to any infrastructure sector in PPP projects to facilitate PPP implementation in the future. The transportation infrastructure sector is the next sector examined in the previous article, followed by the road infrastructure sector and the sports facilities infrastructure sector.

Five CSFs identified in 19 years of research considered appropriate risk allocation and sharing, competitive and transparent procurement process, favorable and efficient legal framework, commitment and responsibility of the public and private sectors, and the last one a robust and reliable private consortium.

The findings obtained in this study can provide an overview of CSFs for projects with PPP schemes in the future. The identified CSFs can also be applied to any PPP infrastructure sector and help stakeholders increase the likelihood of PPP project success and be adopted for further research.

Recommendations

The CSFs developed in this study can be used for further analysis or compare with other research results, and further research can expand the database used for more significant results.

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