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Review of studies on the Critical Success Factors for Public–Private Partnership (PPP) projects from 1990 to 2013

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Abstract

The Critical Success Factors for Public–Private Partnership is a major research interest worldwide therefore this paper aims to methodically review studies on the CSFs for implementing PPP from some selected top tier academic journals from 1990 to 2013 (years inclusive). The search results indicated an increased research interest in the exploration of PPP CSFs since 1990. The mostly identified CSFs are risk allocation and sharing, strong private consortium, political support, community/public support and transparent procurement. It was further noticed that Australia, the U.K., China and Hong Kong have been the countries of focus for most research studies on PPP CSFs. Finally the research approaches adopted are case study, questionnaire survey and mixed methods. The findings revealed provide an overview of CSFs for PPPs in order to enhance future implementations. Moreover a checklist of CSFs for PPPs has been developed, which could be adopted for further empirical studies.
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Keywords: Critical success factors; Public–Private Partnerships; Review; Publications

1. Introduction

Following the 2007–2008 global financial crises there has been an increasing interest in the adoption of public–private partnership (PPP) policy by governments in both developed and developing countries. Many governments across the globe are now seeking to tap the private sector's expertise and capital to minimize their infrastructure deficit; in this regard researchers worldwide have also attempted to investigate into the implementation and operations of this sensitive policy (Chan et al., 2010; Cheung et al., 2012; Grimsey and Lewis, 2002). The publications of these researchers have therefore enabled both practitioners and new researchers to gain more insight into the whole concept of PPP policy (Al-Sharif and Kaka, 2004).

Given the growing interest in PPP since the late 1990s (Li et al., 2005b), different areas of PPP have been explored and

investigated; areas such as risk management (Akintoye et al., 1998; Shen et al., 2006), relationship management (Abdul-Aziz, 2001; Chan et al., 2003; Smyth and Edkins, 2007), financial viabilities (Bakatjan et al., 2003; Wibowo, 2004) and procurement (Ng et al., 2007; Ye and Tiong, 2003) have all been extensively explored by researchers worldwide.

For the past decades, a major area of PPP studies that has received much attention from researchers is PPP success factors. This was revealed in a review of PPP research trend from 1998 to 2008 by Ke et al. (2009); similarly, Tang et al. (2010) pointed out PPP project success as a major research area which is of interest to researchers. The above indications exhibit how researchers worldwide are interested in exploring the best ways of delivering PPP projects. However, there is no doubt that this area of PPP would continue to be of great interest to researchers in future as PPP market keeps growing and maturing in other jurisdictions and sectors (Chan et al., 2010).

Despite the increasing interest in the success factors for PPP projects, the attention given to the need for review and analysis

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of what has already been identified in literature is lacking. It is therefore of value to conduct a systematic and critical review of literature on the critical success factors (CSFs) for PPP so as to broaden the understanding of the best ways of delivering PPP projects to both practitioners and researchers. In this regard, a systematic review of PPP success factors is undertaken in this paper with the following derived objectives:

1. To ascertain the annual publication trends of CSFs for PPP projects from 1990 to 2013;
2. To identify authors' origin/country and the active contributors in exploring the CSFs for PPP projects from 1990 to 2013;
3. To identify countries with most published papers on the CSFs for PPP projects and assess their impact on the countries PPP practices;
4. To summarize, compare and contrast the findings of PPP CSFs studies from 1990 to 2013.

It is believed that the critical review of success factors for PPP would provide relevant practices, which could be adopted in implementing future PPP projects. Additionally this review provides a checklist of CSFs for PPP projects which could be adopted for further empirical research studies.

This paper begins with the background of PPP procurement method. Secondly, an overview of the concept of CSFs in PPP studies is presented. Then the methodology employed in this paper is described. The findings from the selected academic journals from 1990 to 2013 are presented and discussed. Finally conclusions are stated and future research work is proposed.

2. Background of PPPs

Public–private partnership (PPP) has been defined in several ways by researchers and practitioners with each definition varying slightly from each other (Abadie and Howcroft, 2004; Cuttaree and Mandri-Perrott, 2011). Through PPP schemes, the private sector's skill and management expertise is employed in delivering public infrastructure projects (Skietrys et al., 2008). In fact, this method of procurement provides an effective way of delivering “value for money” public infrastructure as well as combining the advantages of competitive tendering, flexible negotiations and risk allocation between parties (Akintoye et al., 2003). With PPP schemes governments can now focus on other sectors of the economy to foster infrastructure growth and development (Cumming, 2007).

A key significant characteristic of PPP is the allocation and sharing of risk among parties (Ke et al., 2010a, 2010b). Unlike other procurement methods, with PPP arrangement, risks are carefully identified and allocated to the party that has better mitigation techniques for such risks (Li et al., 2005a). Additionally PPP is noted for its long term partnership with over 10 years of relationship between the public entity and private consortium, therefore a stable and enduring relationship is often required for its effective operation (Middleton, 2000). Furthermore, in this scheme, each participant brings on some resources that could be material or immaterial to the partnership (Akintoye et al., 2003).

Following the evolution of PPP in the early 19th century, different spectrum of PPP models has been widely implemented including the popular concession structure, Build–Operate–Transfer (BOT) (Kumaraswamy and Zhang, 2001). Other forms of models include Design Build Finance Operate (DBFO), Build Transfer Operate (BTO), Design Build Operate Maintain (DBOM), Build Own Operate Transfer (BOOT), Operate and Maintain (O&M), Design and Build (DB), Build Lease and Transfer (BLT), Design Construct, Manage and Finance (DCMF), Design Construct Manage and Finance (DCMF) and several other similar concession acronyms (Eaton and Akbiyikli, 2005). These models have been widely implemented in different economic sectors especially in the developed countries. For instance the Design Build Finance Operate structure, which is a form of the U.K.'s PFI model, is the mostly adopted model for construction projects (Kwak et al., 2009). However, it is worth noting that the adoption of PPP models varies among countries worldwide and very often the choice depends on the country's objectives and purpose of PPP policy implementation (Abdel Aziz, 2007).

In spite of the huge interest by governments worldwide in PPP, its implementation is still experiencing lots of impediments which need critical attention. Among such obstacles encountered with PPP implementation include high cost of transaction, lengthy procurement process, lack of appropriate skills, unattractive financial market, incomplete risk transfer and higher end user charges (Grimsey and Lewis, 2007; Li et al., 2005a; Liu and Wilkinson, 2011). These obstacles to PPP practices and implementation contribute to the importance of a thorough review of studies on PPP success factors in order to inform future implementations. This will actually enable practitioners to be more enlightened with the success factors for implementing future PPP projects thereby reducing the setbacks towards its implementation.

3. Critical Success Factor model in previous PPP studies

According to Rockart (1982), critical success factors (CSFs) could be defined as the ‘few key areas of activity where favorable results are absolutely necessary for a manager to reach his/her goals’. The CSF model has been employed for management measures since the 1970s (Mohr and Spekman, 1994). This approach actually opens the major areas necessary for ensuring success in management (Boynton and Zmud, 1984).

Since the evolution of PPP, a number of researchers have employed the concept of CSFs to enhance the understanding and best ways of implementing PPP policy for infrastructure development (Liu et al., 2014). This concept has been employed in diverse areas of PPP arrangement ranging from different infrastructure sectors, project models and stages within the PPP arrangement. For instance in the water sector, Meng et al. (2011) investigated into the CSFs for PPP water projects in China which is of a transfer operate transfer model. Likewise other infrastructure sectors of which PPP has been implemented have their CSFs explored and these include the transportation, telecommunication, energy and housing sectors (Liu and Wilkinson, 2013; Abdul-Aziz and Kassim, 2011; Askar and Gab-Allah, 2002; Jamali, 2004; Ozdoganm and Birgonul, 2000).

At various stages within the PPP arrangement, the CSF concept has also been employed; for example, Ng et al. (2012) examined the success factors at the feasibility stage of PPP projects while Tang et al. (2012) focused on the success factors at the briefing stages of PPP. Additionally, Raisbeck and Tang (2013) analyzed the success factors at the initial design stages of PPP projects. Also Gannon and Smith focused on establishing the success factors for outlining a PPP business case to ensure a better forecasting of PPP projects' affordability and success.

Other researchers also employed the CSF concept for general PPP infrastructure projects (Chan et al., 2010; Cheung et al., 2012; Hwang et al., 2013; Tiong et al., 1992; Zhang, 2005b). In fact, attention has also been given to developed and developing countries employing PPP policy to foster infrastructure growth; the CSFs for implementing PPP projects in these countries have also been explored by researchers (Babatunde et al., 2012; Jefferies et al., 2002; Li et al., 2005b).

However, given the wide spectrum and coverage of studies on the CSFs for PPP, it would still be difficult for both practitioners and researchers to identify the most important CSFs for implementing PPP projects irrespective of the country, sector, stages or project model. It is therefore important for the key findings identified in previous studies to be fully summarized, examined and analyzed in order to broaden the understanding of the most important CSFs for delivering PPP irrespective of country, the stage of PPP project, sector and project model adopted.

3. Research methodology

In order to fully review and analyze the findings of previous research studies of a particular topic or research area, a methodical analysis of publications in academic journals is necessary (Tsai and Wen, 2005). In this regard, a similar three stage search process adopted by Yi and Wang (2013); Hong et al (2012) was employed to conduct a content analysis of the success factors of PPP related papers published from 1990 to 2013 (both years inclusive) and this is presented in Fig. 1. The three stages are the identification of academic journals, selection of target papers and examination of the target papers.

3.1. Identifying academic journals

To achieve the research objectives, academic journals with most publications on PPP CSFs were identified. The lists of publications were obtained by using a powerful search engine "Scopus" for a comprehensive search on the subject area. The Scopus search engine was chosen because it covers most publication databases in different research areas such as engineering, business, management, and accounting (Hong and Chan, 2014). Also, Scopus has been considered to perform better with respect to its accuracy and coverage than other search engines such as Web of Science, Google Scholar and PubMed (Falagas et al., 2008). Additionally, the Scopus search engine has been adopted in similar literature review studies in construction management (Hong and Chan, 2014; Hong et al., 2011; Ke et al., 2009; Yi and Wang, 2013; Yuan and Shen, 2011).

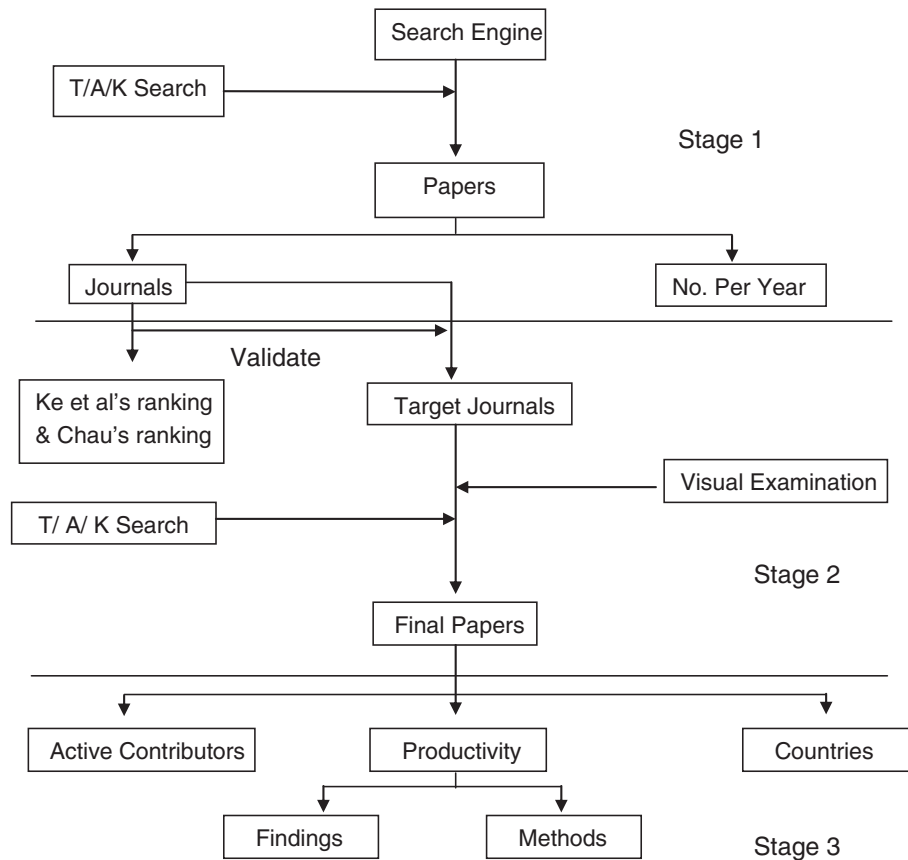
To critically analyze and facilitate a clear illustration of the trend of PPP CSFs research from 1990 to 2013, a comprehensive search was carried out under the "title/abstract/keyword" field of the Scopus search engine. The search keywords included "critical success factors", "critical factors" and "success factors", which are limited to the area of PPPs by using the keyword "public-private partnership", "private finance initiative", "private infrastructure", "public infrastructure", etc. Papers with these specific terms in the title, abstract or keywords were considered to have met the study requirements. Moreover the search was further 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". The full search code is listed as follows:

TITLE-ABS-KEY("critical success factors" OR "success factors" OR "critical factors") AND TITLE-ABS-KEY("public-private partnership" OR "private finance initiative" OR "private infrastructure" OR "public infrastructure" OR "ppp" OR "pfi" OR "bot" OR "boot" OR "dbfo" OR "PPP/PFT") AND DOCTYPE(ar OR re) AND SUBJAREA (ener OR engi OR envi OR busi OR deci OR manag OR econ OR soci) AND PUBYEAR > 1989 AND PUBYEAR < 2014 AND LANGUAGE("english") AND SRCTYPE (j).

The results of the search indicated that the Journal of Construction Engineering and Management (JCEM), Construction Management and Economics (CME), International Journal of Project Management (IJPM), Journal of Management in Engineering (JME), Engineering, Construction and Architectural, Management (ECAM), International Journal of Public Sector Management (IJPSM), Habitat International (HI), and Built Environment Project and Asset Management (BEPAM) have published the most research articles on PPP CSFs with at least two papers; henceforth these journals were selected as the target academic journals for further analysis. Although the Journal of Facilities Management was not identified by the search engine, it was however added to the selected journals due to its high number of publications on PPP CSFs. The outcome of the search indicated that the top targeted journals identified were also ranked as the top-tier construction journals that have published the most PPP related papers by Ke et al. (2009). Additionally, the target journals (i.e. JCEM, CME, IJPM, JME, ECAM) also falls within the six top ranked construction journals by Chau (1997). This clearly indicates that the target journals for this study are of good quality and reliable.

3.2. Selecting target papers

In selecting the target papers for further examination, a more visual and comprehensive search in all the selected journals were conducted at this stage. All publications in the selected journals that belonged to the broad categories of "editorial", "articles in press", "discussions and closures", "letter to the editor", "briefing sheet" and "introduction" were excluded from



Sources: Hong et al (2012); Yi and Wang (2013)

Note: T/A/K -title/ abstract/ keywords

Fig. 1. The research framework for the study.

the analysis. The final number of selected publications from the target journals is presented in Table 1.

In spite of the extensive search for publications on PPP CSFs, the number of papers retrieved from the selected journals for further examination may not be exhaustive and inclusive of all publications in the PPP area under study. Therefore it must be emphasized that analyses are solely based on the data acquired from the specific sampling approach adopted in this study. Additionally this study does not intend to examine a complete population of papers on PPP CSFs but to review the

trend of research on PPP CSFs and the most reported success factor for future implementations.

3.3. Examining target papers

The papers retrieved from the target journals were subjected to the content analysis technique to examine and analyze the annual publications of CSFs for PPP projects, authors' origin/country, active contributors, countries of research focus, findings from the publications and methodologies adopted.

Table 1
Search results of papers on PPP CSFs in selected journals.

Journal name	Number of papers retrieved from search engine	Number of papers relevant to study
Journal of Construction Engineering and Management (JCEM)	7	6
Construction Management and Economics (CME)	6	5
International Journal of Project Management (IJPM)	3	3
Journal of Management in Engineering (JME)	3	3
Engineering, Construction and Architectural Management (ECAM)	2	2
Journal of Facilities Management (JFM)	2	2
International Journal of Public Sector Management (IJPSM)	2	2
Habitat International (HI)	2	2
Built Environment Project and Asset Management (BEPAM)	2	2
Total	29	27

However, to determine authors' origin/country and active contributors, a quantitative method proposed by Howard et al. (1987) was adopted. They produced a formula for calculating the contribution of authors to a multi authored paper.

The formula produced was based on the assumption that the actual contribution of an author to a multi authored paper varies and that the first author contributes more than the second author and the second more than the third and so on. This formula produced by Howard et al. (1987) has been employed in other literature review studies for ranking the contribution of authors to a multi authored paper (Ke et al., 2009; Tsai and Wen, 2005; Yi and Wang, 2013).

The formula is therefore given as:

$$\frac{1.5^{n-1}}{\sum_{i=1}^n 1.5^{n-i}}$$

where n denotes the number of authors of the paper and i is the order of each author.

In applying the formula each publication was given one point irrespective of the number of authors. The one point is therefore divided into corresponding parts for each author using the formula. A detailed score distribution for authors is presented in Table 2 based on the formula.

5. Results and discussions

5.1. Annual publications on critical success factors for PPP projects from 1990 to 2013

From the initial search results, a total number of 72 publications on the CSFs for PPP projects were identified with 52 different journals from 1990 to 2013 (years inclusive). This clearly is an indication of the growing concept of PPP since its evolution in the early 1990s (Gunnigan and Rajput, 2010). However as mentioned in the research methodology section the journals, Journal of Construction Engineering and Management (JCEM), Construction Management and Economics (CME), International Journal of Project Management (IJPM), Journal of Management in Engineering (JME), Engineering, Construction and Architectural Management (ECAM), Journal of Facilities Management (JFM), International Journal of Public Sector Management (IJPSM), Habitat International (HI) and Built Environment Project and Asset Management (BEPAM) were selected as the target journals due to their high number of publications on the CSFs for PPP projects. Each journal has

published at least two papers on the critical success factors for PPP projects (refer to Table 1).

The annual number of publications from the selected journals from 1990 to 2013 is presented in Fig. 2. It is worth noting that the figure only shows years with publications in the selected journals considered in this study.

As shown in the figure, the total number of papers published in the selected journals from 1990 to 2013 is 27 with an increasing trend of one publication in 1992 to 6 publications in 2013. In fact, the rapid increase in publication began in 2010, which then steadily progressed to a peak of 6 publications in 2013. Indeed, this indicates the gradual rising of interest in exploring the best ways of delivering PPP projects since its evolution. Also the results statistics reinforces the assertion that PPP success factor research is one key area of interest to researchers (Ke et al., 2009; Tang et al., 2010).

It is also not surprising with this statistics as after the 2007/2008 global economic crunch, many governments were forced to adopt PPP policy hence more attention was then given to how this policy could be effectively and successfully implemented to reduce a country's infrastructure deficit (Kappeler and Nemoz, 2010). According to the search results between 1990 and 2000 (a decade) only three publications had been made on PPP CSFs; this reveals that between these years the concept of PPP was still at infancy stage and only a couple of countries had initiated few projects through this scheme to foster infrastructure growth (Deloitte, 2006). However between the period 2001 and 2013, 24 papers have been published on PPP CSFs, again an indication of the growing and maturing of the world's PPP market between these years.

It must be clearly emphasized that the trend of increasing research on CSFs for PPPs would continue as more governments are now embracing and implementing this policy after its success in other jurisdiction (Liu et al., 2014). Moreover the number of PPP projects worldwide is increasing which would obviously foster more research studies into the success factors for implementing future projects.

5.2. Authors' origin/country and active contributors of CSFs for PPPs

In determining researchers' origin for publications on PPP CSFs and active contributors, the score matrix presented in Table 2 was used. The score for each author either in a multi authored or sole authored publication was accumulated for each country and contributions based on this score matrix. For instance Cheung and Chan from Hong Kong collaborated with Kajewski from Australia to publish a paper, therefore the score for each author is 0.47, 0.32 and 0.21 respectively hence in measuring the authors' origin, research center and contribution a score of 0.79 (0.47 + 0.32) is awarded to Hong Kong while 0.21 for Australia. A similar approach applies to a sole authored publication. Calculating in this way the country/origin of researchers is delineated in Table 3 along with the number of researchers, identified papers, score of each origin and research centers.

Table 2
Score matrix for multi authored papers.

No. of authors	Order of authors				
	1	2	3	4	5
1	1				
2	0.6	0.4			
3	0.47	0.32	0.21		
4	0.42	0.28	0.18	0.12	
5	0.38	0.26	0.17	0.11	0.08

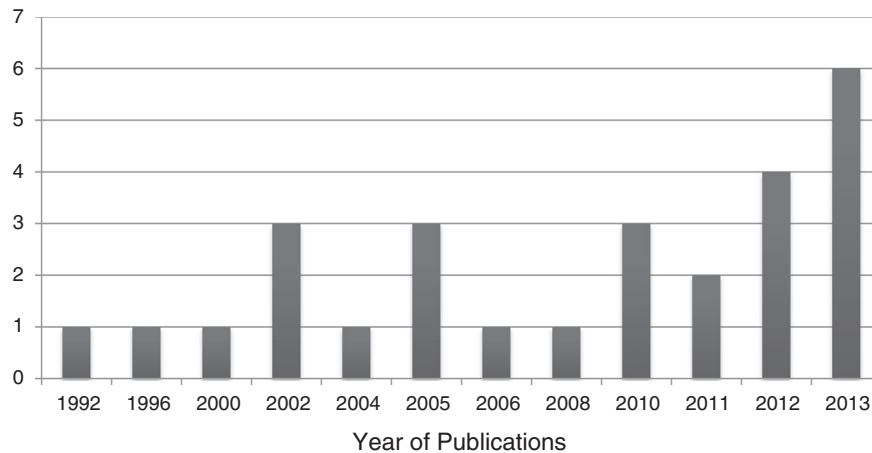


Fig. 2. Annual number of publications on PPP CSFs from 1990 to 2013.

As presented in Table 3 Hong Kong, the U.K. and Australia with scores of 5.55, 4.30 and 3.08 respectively have the highest number of researchers contributing to the exploration of PPP CSFs for the past 23 years. In Hong Kong, 11 researchers from 2 different research centers have contributed to 9 publications while in the U.K., 10 researchers from 8 different research centers have published 6 papers on PPP CSFs. Similarly in Australia, 10 researchers from 5 different research centers have published 6 papers on PPP CSFs. In fact, the above statistics from Table 3 clearly indicate how widespread and developed the PPP concept has been over the past 23 years in these countries hence more researchers from different centers are realized in studying the operation of this policy. It is noticeable that more than one paper came from researchers in the developed countries except China which is still a developing country but with a rapidly growing economy; however contributions from researchers in the developing countries are very low. This could be due to the fact that PPP concept is yet to be fully explored in these countries hence very few

publications are realized in the selected journals. Additionally such low score from developing countries could be the publication of PPP CSFs in other journals, which were not considered in this study. As mentioned earlier, 52 journals were identified by the search engine to have published on the CSFs for PPP projects therefore not considering all the journals could be considered as a research limitation to this study.

The active contributors of PPP CSFs from 1990 to 2013 are presented in Table 4. As indicated, six researchers from different research centers have a score of at least one point with one or more papers, again an affirmation of the huge interest from researchers worldwide to enhance PPP implementation and practice.

Among the most active authors is Zhang, X.Q. from the Ministry of Water Resources of China who published two sole authored papers. Other active contributors are Tiong, R.L.K and Jefferies, M. It is observed that even though countries like Hong Kong, the U.K. and Australia have contributed to a high number of publications, their individual researcher's contributions are very low and this is due to the large number of researchers contributing to a particular publication hence individual contribution scores are very low. Nevertheless this fact also implies the widespread of PPP knowledge among researchers in these countries due to their well-implemented and developed PPP policy.

Table 3
Country of researchers for PPP CSFs studies.

Country	Research centers	No. of researchers	Papers	Score
Hong Kong	2	11	9	5.55
U.K.	8	10	6	4.30
Australia	5	10	6	3.08
Singapore	3	6	4	2.97
China	3	3	4	2.40
USA	2	2	4	1.00
Lebanon	1	1	1	1.00
Nigeria	2	3	1	1.00
Egypt	1	2	1	1.00
Turkey	1	2	1	1.00
Malaysia	1	2	1	1.00
New Zealand	1	2	1	1.00
UAE	1	2	1	0.70
Serbia	1	2	1	0.70
Germany	1	1	1	0.18
Slovenia	1	1	1	0.12

Table 4
Authors scored at least one point.

Author	Papers	Affiliations	Country	Score point
Zhang, X. Q.	2	The Ministry of Water Resources of China	China	2
Tiong, R.L.K.	2	Nanyang Technological University	Singapore	1.47
Jefferies, M.	2	The University of Newcastle	Australia	1.47
Tang, L.	2	The Hong Kong Polytechnic University	Hong Kong	1.02
Jamali, D.	1	American University of Beirut	Lebanon	1
Nisar, T.M.	1	University of Southampton	U.K.	1

5.3. Countries with the most PPP CSFs studies and their impact on the countries PPP practices

Publications of research are among the major means through which universities' research studies inform industrial practices and policy development. The number of publications in a research area in a country relates to the extent to which industrial and policy practices progress in that country. In order to ascertain countries with most PPP CSFs studies, a simple counting of papers on countries was conducted. However publications with research focus in more than one country were considered 'International', therefore were not attributed to any specific country. This is because such publications discuss more on international best practices of PPP rather than being country specific. With this approach, the countries with most studies are presented in Fig. 3.

As shown in Fig. 3 Australia, the U.K., China and Hong Kong have the highest publications on the CSFs for PPP projects from 1990 to 2013 in the selected journals. These countries have 4, 3, 3 and 2 publications on PPP CSFs respectively.

Since the rebirth of the Build–Own–Operate–Transfer (BOOT) concept to Design Build Finance Operate (DBFO) in the year 2000 (English, 2006), there has been an impressive progress in the Australian PPP market hence it is currently considered as one of the matured PPP markets in the world (Raisbeck et al., 2010). Exploration of success factors in Australia's PPP market with case studies like the Sydney Super Dome and Stadium Australia has actually informed practitioners on future practices for Australia's PPPs (Jefferies, 2006). Some of these findings are mostly incorporated in government's guidelines to facilitate the practice of PPPs (State Government of Victoria, 2013).

China as well is one of the leading countries with most PPP CSFs studies as shown in Fig. 3. In previous years the socialist planned economic system in China actually limited the private sector's participation in public infrastructure delivery. However since the early 2000s, more local government authorities have allowed the participation of the private sector in providing

public services and this has made researchers interested in identifying the success factors for implementing PPP in China (Ho, 2006). With the exploration of the CSFs, China's PPP practice is improving with more cities initiating and implementing more projects (Chan et al., 2010).

From Fig. 3, it is not surprising with the U.K. and Hong Kong as part of the leading countries with much research focus on PPP CSFs. Since the introduction of PFI concept in the U.K. in 1992, there has been an increasing interest by researchers to uncover the success factors for implementing PFI in the U.K. (Li et al., 2005a, 2005b). This has actually continuously improved the practice of the PFI concept, although not perfect yet but since 1992, a tremendous improvement has been recorded with more PFI projects being initiated and implemented in various sectors (HM Treasury and Infrastructure U.K., 2013). Similarly, Hong Kong's PPP practice has improved through the exploration of possible success factors for Hong Kong PPP projects. Like Australia, most of these findings are often embedded in government guidelines to inform practitioners of the appropriate practices for procuring PPP projects (Efficiency Unit, 2008).

It is noticeable that although the United States is considered one of the originators of the PPP concept, it was not part of the leading countries with most PPP CSFs. This is possibly due to the fact that since PPP has already been well implemented with over USD54.3 billion projects initiated only in the transportation sector from 1989 to 2011 (Reinhardt, 2011), researchers have turned their attention towards other equally important areas of PPP studies such as enhancing value for money, risk management, financial viabilities, and relationship management (Aziz and Nabavi, 2014; Garvin, 2009; Peng et al., 2014).

Surprisingly, 7 publications from the selected journal focused on exploring the international practices for a successful PPP implementation. International best practices for PPP are very essential especially for international private developers and governments planning to employ the PPP concept in delivering public infrastructure. It provides more insight into what practices transpire internationally in the world's PPP market (Cheung et al., 2012). In fact the high number of publications on international

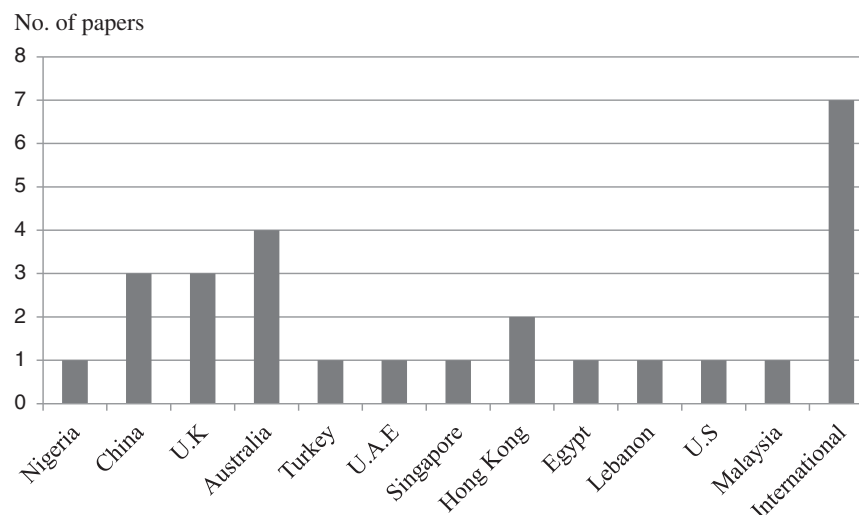


Fig. 3. PPP CSFs publications by country focus.

PPP practices over the past 23 years reveals the gradual shift of interest from exploring country specific PPP CSFs to international best PPP practices.

5.4. Analysis of findings from studies on CSFs for PPP projects

By means of a comprehensive review on the 27 publications considered in this study, the summary of findings for each publication is presented in Table 5. The total number of critical success factors identified from the 27 publications is 57; however the findings presented in Table 5 are factors which were identified in at least two papers.

As shown in the table, the publications are indicated in numbers with their respective paper representatives presented in the Appendix A section. Additionally the number of times a CSF is identified by author(s) is accumulated and presented. The accumulation was however used to rank the CSFs identified from 1990 to 2013.

It is observed from Table 5 that several factors account for successful PPP projects however the top most five factors are appropriate risk allocation and sharing, strong private consortium, political support, community/public support and transparent procurement. Each of these factors was identified 13, 12, 9, 8 and 8 times by the 27 papers considered in this study respectively. This reveals how important these factors are to the success of PPP projects irrespective of jurisdiction, the stage of project, sector or project model.

5.3.1. Appropriate risk allocation and sharing

Allocating and sharing risk is one of the fundamental components of PPP arrangement (Jin and Doloi, 2008). It is not surprising that this factor was identified by 13 different publications as an important factor to PPP success. Risk allocation involves identifying risks and appropriately sharing it among parties (public and private sectors) (Ke et al., 2010a, 2010b). During negotiations, risks are clearly defined and allocated to the party that has better mitigation techniques to manage (Roumboutsos and Anagnostopoulos, 2008).

It must be highlighted that one unique feature which differentiates PPP from the conventional procurement is the allocation of risk hence a proper mechanism must be developed to help in allocating risk effectively and efficiently. It is also important for governments to refrain from the idea of transferring all project risk to the private sector as this could affect the progress or future participation of private investors in PPP projects. However, the public partner must retain risks that obviously go beyond the control of the private sector.

5.3.2. Strong private consortium

A reliable and well-structured private sector company is very crucial for PPP success. This factor was identified by 12 publications as a critical factor for PPP success.

The complex nature of PPP projects makes it very difficult for a single construction company to execute the project hence different companies often come together to form a consortium. However the structure and compatibility of this entity influences the success of the project. A weak and poorly managed consortium would

obviously result in difficulties and eventually a failure to undertake the PPP project successfully. In this regard, consortium must be equipped with strong technical, operational and managerial capacity to be able to undertake PPP projects (Zhang, 2005b).

Additionally in countries where the local companies' structure is weak especially in developing countries, governments could assist in strengthening the local companies both financially and technically to build their capacity to be able to compete with international project companies for PPP projects locally and as well as internationally.

5.3.3. Political support

Political support was identified in 9 different publications on the CSFs for PPP projects. It is obvious that PPP as a public policy has a direct relation with the political setting of the host country (Li et al., 2005b). Without the necessary political support, an approval for public expenditure on public project and work would not be granted (Jacobson and Choi, 2008) hence it is understandable that this factor is identified as very important to PPP development and success. Moreover, the necessary support from political leaders attracts more investors to a particular economy. In jurisdictions where political backing is not strong, the political risk is considered to be high, which limits competition in the tendering process, as many investors would not like to tender in such environment (OECD, 2008). A notable example of a country that is observed to have an overwhelming political acceptability for PPP is the U.K. (Hardcastle et al., 2005). Despite the criticism by the Labour party when in opposition, they continued the PFI concept when assumed in office in 1997. Today the U.K. is considered the home of PFI/PPP concept with lots of projects initiated through this scheme in various sectors (Kwak et al., 2009).

5.3.4. Public/community support

Public or community support was identified in 8 publications. The acceptance and understanding by the public community be it the media, trade unions, civil societies and other non-governmental organizations is very important in ensuring the progress of PPP projects. Public and community support at the initial stages help minimize any sort of delays such as acquisition of lands for project development. Additionally it reduces the cost of production as most local people could be engaged as workers.

However for a host government to ensure the support from the public, the creation of awareness and public education is very essential (Yong, 2010). It is also important for the host government to give assurance to the public or community of good and quality services as well as reasonable end user fees for PPP projects (OECD, 2010).

5.3.5. Transparent procurement

Transparent procurement process is ranked 5th among the top five important critical success factors identified in literature and was identified in 8 different publications. PPP is a procurement process, therefore there is a need for transparency throughout this process. It must be highlighted that transparency does not only apply to the tendering process but it must be observed throughout

Table 5
Findings from studies on PPP CSFs from 1990 to 2013 (years inclusive).

Critical success factors (CSF)	Publications																											Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
Appropriate risk allocation and sharing	X					X	X			X			X			X	X	X		X		X	X	X	X			13
Strong private consortium		X	X							X	X		X			X	X	X	X	X		X			X			12
Political support				X		X							X	X	X		X	X						X		X		9
Public/community support						X							X	X				X				X	X			X	X	8
Transparent procurement	X				X			X		X	X		X	X								X	X			X		8
Favorable legal framework	X				X					X			X				X							X	X			7
Stable macroeconomic condition	X	X															X	X						X	X	X		7
Competitive procurement	X			X			X																X	X		X		6
Strong commitment by both parties						X	X			X			X	X											X			6
Clarity of roles and responsibilities among parties				X		X	X		X	X																X		6
Financial capabilities of the private sector			X					X							X				X			X						5
Technology innovation		X															X		X	X		X						5
Good feasibility studies	X				X								X				X					X						5
Open and constant communication				X		X	X	X			X																	5
Detailed project planning	X			X		X														X				X				5
Government providing guarantees		X	X												X									X		X		5
Trust					X	X					X											X						4
Selecting the right project								X											X	X		X						4
Long term demand for the project	X		X				X								X													4
Clear project brief and design development				X			X					X												X				4
Political stability	X																	X					X					3
Competitive financial proposals								X									X			X								3
Mature and available financial market													X		X								X					3
Acceptable level of tariff			X																	X	X							3
Streamline approval process		X																				X	X					3
Compatibility skills of both parties				X																		X						2
Choosing the right partner																		X		X								2
Good leadership and entrepreneurship skills																			X	X								2
Sound economic policy													X		X									X				2
Well organized and committed public agency										X			X															2
Good governance										X			X													X		2
Clear goals and objectives			X					X																				2
Employment of professional advisors						X	X																					2
Financial accountability				X	X																							2
Consistent monitoring				X			X																					2
Reliable service delivery			X				X																					2
Environmental impact of project																				X		X						2

the delivery of the PPP project. However transparency rests on the shoulders of cordial and constant communication among parties and external stakeholders (Li et al., 2005b). Parties should openly consult each other for any clarification on the projects' delivery. Additionally both the public and private sectors must be transparent and open to the external stakeholders or users. In fact information and reports on the projects must be made publicly available.

Moreover it is always important for government to clear any doubts or rumors within the public domain concerning the delivery of PPP projects, as negative public perception could affect the successful implementation of projects.

5.4. Methodologies adopted for studies on PPP CSFs

A further examination of publications on the methods adopted to explore the CSFs for PPP projects was undertaken. Three major categories of research approaches were identified viz case studies, questionnaire survey and mixed method (questionnaire

and cases studies). The respective numbers of papers for the various categories are presented in Fig. 4. As demonstrated in the figure, case study is the most favored approach in exploring the CSFs for PPP projects from 1990 to 2013 accounting for 41% of the total number. This statistical result is understandable as the case study approach provides an in depth information about the phenomenon under study (Cavaye, 1996).

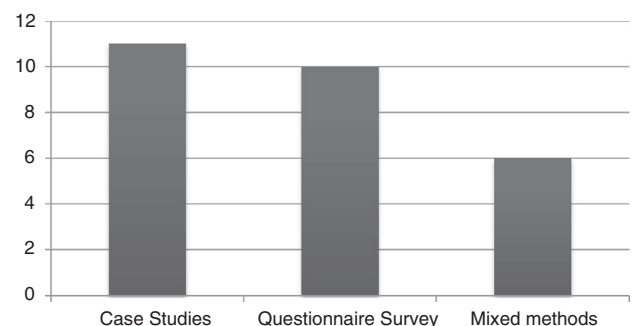


Fig. 4. Research methods adopted for PPP studies on CSFs.

Another favored research method adopted for the past 23 years on PPP CSFs studies is the questionnaire survey. This research method accounts for 37% of the total number of publications. Questionnaire survey has always been the preferred method in construction management research (Holt, 2010); it allows more experts to participate in the research study especially a sensitive and public policy like PPP. The third research method adopted is the mixed approach.

This also accounts for 22% of the total number of publications. The mixed method adopted involves a mix of interviews, case study and questionnaire survey. For instance Zhang (2005a) adopted both interviews and questionnaire survey in exploring the CSFs for PPP projects. This method presents some advantages by combining the positive of different methods to study a particular phenomenon. However it must be noted that the use of a particular method to explore the CSFs for PPP projects depends on the time and jurisdiction of study.

6. Conclusions

To bridge their huge infrastructure gaps, governments across the world are increasingly adopting PPP policy. In this regard, researchers worldwide have conducted considerable investigations into the CSFs for implementing this policy since its inception. To review the trend of research on PPP CSFs, a three-stage review of publications from 1990 to 2013 (years inclusive) was conducted. The Scopus search engine was used for the initial search for journals with high publications on the CSFs for PPP projects and a further vigorous visual examination of related publications in 9 top tier selected journals was undertaken. Indeed this study has provided a profound evidence for assertions made that PPP success factors is one major area attracting attention from researchers in PPP studies.

Over the past 23 years of PPP inception, researchers' interest in exploring the CSFs for PPPs has been increasing with one publication in 1992 to six publications in 2013; a total of 27 publications over the past years in the selected journals. Researchers from Hong Kong have been the originators of most PPP CSF publications since 1990, followed by the U.K., Australia, Singapore, China and the U.S. However publications on PPP CSFs from developing countries have been considerably low and the potential reason could be that the PPP concept is not yet fully explored in these regions or is due to the limited journals considered in this study. The active contributors in exploring the best ways of delivering PPP projects from 1990 to 2013 includes Zhang X.Q., Tiong R.K. and Jefferies M. from The Ministry of Water Resources, China, The Nanyang Technological University, Singapore and The University of Newcastle, Australia respectively, again an affirmation of PPP CSFs as a major area of PPP research worldwide. The study found out that most research studies on PPP CSFs have been conducted in Australia, the U.K., China and Hong Kong. Consequently, the available success factors from these research studies in these countries have contributed to a tremendous improvement in their implementation practices. Most of these

findings have been incorporated in government guidelines to inform local practitioners on the best ways to manage and deliver PPP projects. It was further found that there has been a gradual shift of research interest over the years from identifying country specific PPP CSFs to international best practices. Five most reported CSFs over the past 23 years are risk allocation and sharing, strong private consortium, political support, community/public support and transparent procurement. While the most preferred research method adopted by researchers in exploring PPP CSFs is the case study approach. The reason for this widely adopted approach is the rich and in-depth information the method provides to researchers especially for a sensitive policy like PPP.

The findings revealed in this study have provided a solid foundation for future research on PPP CSFs in terms of the scope and method to be adopted for future PPP research studies. Also this study has provided a list of publications from leading academic journals which could be useful to researchers seeking to conduct future studies for PPP CSFs. Governments and international private developers seeking to enter the PPP market would be informed of the most important critical success factors for engaging in PPP projects irrespective of country, sectors and project model. It is recommended that the checklist of CSFs for PPP projects developed in this study would be used for further empirical analysis to allow for comparison to the results identified in this study.

Conflict of Interest

Authors confirm that the study presented in this paper has no conflict of interest.

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Appendix A

Papers on CSFs for PPP projects in selected journals from 1990 to 2013.

Number	Journal	Year	Authors
1	BEPAM	2013	Mladenovic, G., Vajdic, N., Wüdsch, B., & Temeljotov-Salaj, A.
2	BEPAM	2013	Liu, T., Wilkinson, S.
3	HI	2012	Ng, S.T., Wong, Y.M.W., Wong, J.M.W.
4	HI	2011	Abdul-Aziz, Jahn Kassim, P.S.
5	IJPSM	2004	Jamali, D.
6	IJPSM	2008	Jacobson C., Choi, S.O.
7	JME	2011	Meng, X., Zhao, O., Shen, Q.
8	JME	2013	Tang, L., Shen, Q., Skitmore, M., Cheng, E.W.L.
9	JME	2002	Askar, M.M., Gab Allah
10	IJPM	2013	Hwang, B., Zhao, X., Gay, M.J.S.

Appendix A (continued)

Number	Journal	Year	Authors
11	IJPM	2013	Tang and Shen, Q.
12	CME	2013	Raisbeck, P., Tang L.C.M.
13	CME	2005	Li, B., Akintoye, A., Edwards, P.J., Hardcastle, C.
14	CME	2011	Gannon, M.J., Smith, N.J.
15	CME	2000	Ozdoganm, I.D., Talat, Birgonul, M.
16	IJPM	2013	Nisar, T.M.
17	CME	2010	Dulaimi, M.F., Alhashemi, M., Ling, F.Y.Y., Kumaraswamy, M.
18	JCEM	2005a	Zhang, X.
19	JCEM	1992	Tiong, R.L.K., Yeo, K.T., McCharthy, S.C.
20	JCEM	1996	Tiong, R.L.K.
21	JCEM	2005b	Zhang, X.Q.
22	ECAM	2002	Jefferies, M., Gameson, R., Rowlinson, S.
23	ECAM	2006	Jefferies, M.
24	JFM	2012	Babatunde S. O., Opawole, A., Olusengun, A. E.
25	JFM	2012	Cheung, E., Chan, P.C., Kajewski, S.
26	JCEM	2010	Chan, P.C., Lam, P.T.I., Chan, D.W.M., Cheung, E., Ke, Y.
27	JCEM	2002	Kumaraswamy, M.W., Morris, D.A.

References

- Abadie, R., Howcroft, A., 2004. Developing PPPs in New Europe. Price Waterhouse Coopers.
- Abdel Aziz, A.M., 2007. Successful delivery of public–private partnerships for infrastructure development. *J. Constr. Eng. Manag.* 133 (12), 918–931.
- Abdul-Aziz, A.R., 2001. Unraveling of BOT scheme: Malaysia's Indah water Consortium. *J. Constr. Eng. Manag.* 127 (6), 457–460.
- Abdul-Aziz, A.R., Kassim, J.P.S., 2011. Objectives, success and failure factors of housing public–private partnerships in Malaysia. *Habitat Int.* 35 (1), 150–157.
- Akintoye, A., Taylor, C., Fitzgerald, E., 1998. Risk analysis and management of private finance initiative projects. *Eng. Constr. Archit. Manag.* 5 (1), 9–21.
- Akintoye, A., Hardcastle, C., Beck, M., Chinyio, E., Asenova, D., 2003. Achieving best value in private finance initiative project procurement. *Constr. Manag. Econ.* 21 (5), 461–470.
- Al-Sharif, F., Kaka, A., 2004. PFI/PPP topic coverage in construction journals. *Proc., 20th Annual ARCOM Conf. vol. 1. Heriot Watt University, Edinburgh, Scotland, U.K.*, pp. 711–719.
- Askar, M., Gab-Allah, A., 2002. Problems facing parties involved in build operate, and transport projects in Egypt. *J. Manag. Eng.* 18 (4), 173–178.
- Aziz, A.A., Nabavi, H., 2014. Unsolicited proposals for PPP projects: private sector perceptions in the USA. *Construction Research Congress. Construction in a Global Network. ASCE*, pp. 1189–1198.
- Babatunde, S.O., Opawole, A., Akintoye, O.E., 2012. Critical success factors in public–private partnership (PPP) on infrastructure delivery in Nigeria. *J. Facil. Manag.* 10 (3), 212–225.
- Bakatjan, S., Arikian, M., Tiong, R.L.K., 2003. Optimal capital structure model for BOT power projects in Turkey. *J. Constr. Eng. Manag.* 129 (1), 89–97.
- Boynton, A.C., Zmud, R.W., 1984. An assessment of critical success factors. *Sloan Manag. Rev.* 17–27 (Summer).
- Cavaye, A.L.M., 1996. Case study research: a multi-faceted research approach for IS. *Inf. Syst. J.* 6 (3), 227–242.
- Chan, A.P.C., Chan, D.W.M., Ho, K.S.K., 2003. An empirical study of the benefits of construction partnering in Hong Kong. *Constr. Manag. Econ.* 21 (5), 523–533.
- Chan, A.P.C., Lam, P.T.I., Chan, D.W.M., Cheung, E., Ke, Y., 2010. Privileges and attractions for private sector involvement in PPP projects. In: Ghafoori (Ed.), *Challenges, Opportunities and Solutions in Structural Engineering and Construction*. Taylor & Francis Group, London.
- Chau, K.W., 1997. The ranking of construction management journals. *Constr. Manag. Econ.* 15 (4), 387–398.
- Cheung, E., Chan, A.P.C., Kajewski, S., 2012. Factors contributing to successful public private partnership projects, comparing Hong Kong with Australia and the United Kingdom. *J. Facil. Manag.* 10 (1), 45–58.
- Cumming, D., 2007. Government policy towards entrepreneurial finance. *Innovation investment funds. J. Bus. Ventur.* 22 (2), 193–235.
- Cuttaree, V., Mandri-Perrott, X.C., 2011. *Public–Private Partnerships in Europe and Central Asia: Designing Crisis-resilient Strategies and Bankable Projects*. World Bank Publications.
- Deloitte, 2006. Closing the infrastructure gap: the role of public–private partnerships. Deloitte Dev. LLC 2006.
- Eaton, D., Akbiyikli, R., 2005. PFI and the Delivery of Public Services. RICS Publications (Available from: www.rics.org/pfi).
- Efficiency Unit, 2008. *Serving the Community by Using the Private Sector — An Introductory Guide to Public Private Partnerships (PPPs)*. 2nd ed. HKSAR Government, Hong Kong.
- English, L.M., 2006. Public private partnerships in Australia: an overview of their nature, purpose, incidence and oversight. *UNSWLJ* 29, 250.
- Falagas, M.E., Pitsouni, E.I., Malietzis, G.A., Pappas, G., 2008. Comparison of PubMed, Scopus, web of science, and Google scholar: strengths and weaknesses. *FASEB J.* 22, 338–342.
- Garvin, M.J., 2009. Enabling development of the transportation public–private partnership market in the United States. *J. Constr. Eng. Manag.* 136 (4), 402–411.
- Grimsey, D., Lewis, M.K., 2002. Evaluating the risks of public private partnerships for infrastructure projects. *Int. J. Proj. Manag.* 20, 107–118.
- Grimsey, D., Lewis, M., 2007. Public private partnerships and public procurement. *Agenda* 14 (2), 171–188.
- Gunnigan, L., Rajput, R., 2010. Comparison of Indian PPP Construction Industry and European PPP Construction Industry: Process. Thresholds and Implementation.
- Hardcastle, C., Edwards, P.J., Akintoye, A., Li, B., 2005. Critical Success Factors for PPP/PFI Projects in the UK Construction Industry: A Factory Analysis Approach. In *Proceedings: Public Private Partnerships e Opportunities and Challenges*, February 22. Hong Kong Convention and Exhibition Centre, Hong Kong, p. 75e83.
- HM Treasury and Infrastructure U.K., 2013. PFI Projects Data: March 2013. Available at: <https://www.gov.uk/government/statistics/pfi-projects-data-march-2013> (accessed on Dec. 2014).
- Ho, P.H., 2006. Development of public private partnerships (PPPs) in China. *International Roundup* 19 (1).
- Holt, G., 2010. Contractor selection innovation: examination of two decades' published research, construction innovation: information, process. *Management* 10 (3), 304–328.
- Hong, Y., Chan, D.W., 2014. Research trend of joint ventures in construction: a two-decade taxonomic review. *J. Facil. Manag.* 12 (2), 118–141.
- Hong, Y., Chan, D.W., Chan, A.P., Yeung, J.F., 2011. Critical analysis of partnering research trend in construction journals. *J. Manag. Eng.* 28 (2), 82–95.
- Howard, G.S., Cole, D.A., Scot, M.E., 1987. Research productivity in psychology based on publication in the journals of the American Psychological Association. *Am. Psychol.* 42, 975–986.
- Hwang, B.G., Zhao, X., Gay, M.J.S., 2013. Public private partnership projects in Singapore: factors, critical risks and preferred risk allocation from the perspective of contractors. *Int. J. Proj. Manag.* 31 (3), 424–433.
- Jacobson, C., Choi, S.O., 2008. Success factors: public works and public–private partnerships. *Int. J. Public Sect. Manag.* 21 (6), 637–657.
- Jamali, D., 2004. Success and failure mechanisms of public private partnerships (PPPs) in developing countries, Insights from the Lebanese context. *Int. J. Public Sect. Manag.* 17 (5), 414–430.
- Jefferies, M., 2006. Critical success factors of public private sector partnerships: A case study of the Sydney SuperDome. *Engineering, Construction and Architectural Management* 13 (5), 451–462.
- Jefferies, M., Gameson, R., Rowlinson, S., 2002. Critical success factors of the BOOT procurement system: reflections from the stadium Australia case study. *Eng. Constr. Archit. Manag.* 9 (No. 4), 352.
- Jin, X.H., Doloi, H., 2008. Interpreting risk allocation mechanism in public–private partnership projects: an empirical study in a transaction cost economics perspective. *Constr. Manag. Econ.* 26 (7), 707–721.

- Kappeler, A., Nemoz, M., 2010. Public–private partnerships in Europe-before and during the recent financial crisis (No. 2010/04). Economic and Financial Reports/European Investment Bank.
- Ke, Y., Wang, S., Chan, A.P., Cheung, E., 2009. Research trend of public–private partnership in construction journals. *J. Constr. Eng. Manag.* 135 (10), 1076–1086.
- Ke, Y., Wang, S., Chan, A.P., 2010a. Risk allocation in public–private partnership infrastructure projects: comparative study. *J. Infrastruct. Syst.* 343.
- Ke, Y., Wang, S., Chan, A.P., Lam, P.T., 2010b. Preferred risk allocation in China's public–private partnership (PPP) projects. *Int. J. Proj. Manag.* 28 (5), 482–492.
- Kumaraswamy, M.M., Zhang, X.Q., 2001. Governmental role in BOT-led infrastructure development. *Int. J. Proj. Manag.* 19 (4), 195–205.
- Kwak, Y.H., Chih, Y., Ibbs, C.W., 2009. Towards a comprehensive understanding of public private partnerships for infrastructure development. *Calif. Manag. Rev.* 51 (2), 51–78.
- Li, B., Akintoye, A., Edwards, P.J., Hardcastle, C., 2005a. The allocation of risk in PPP/PFI construction projects in the UK. *Int. J. Proj. Manag.* 23 (1), 25–35.
- Li, B., Akintoye, A., Edwards, P.J., Hardcastle, C., 2005b. Critical success factors for PPP/PFI projects in the UK construction industry. *Constr. Manag. Econ.* 23 (5), 459–471.
- Liu, T., Wilkinson, S., 2011. Adopting innovative procurement techniques: obstacles and drivers for adopting public private partnerships in New Zealand. *Constr. Innov.* 11 (4), 452–469.
- Liu, T., Wilkinson, S., 2013. Can the pilot public-private partnerships project be applied in future urban rail development? A case study of Beijing Metro Line 4 project. *Built Environment Project and Asset Management* 3 (2), 250–263.
- Liu, J., Love, P.E., Smith, J., Regan, M., Davis, P.R., 2014. Life cycle critical success factors for public–private partnership infrastructure projects. *J. Manag. Eng.* 04014073. [http://dx.doi.org/10.1061/\(ASCE\)ME.1943-5479.0000307](http://dx.doi.org/10.1061/(ASCE)ME.1943-5479.0000307).
- Meng, X., Zhao, Q., Shen, Q., 2011. Critical success factors for transfer–operate–transfer urban water supply projects in China. *J. Manag. Eng.* 27 (4), 243–251.
- Middleton, N., 2000. Public Private Partnerships — A Natural Successor to Privatisations? <http://www.pwcglobal.com/uk/eng/about/svcs/pfp/ppp.html> (Accessed in Oct 2013).
- Mohr, J., Spekman, R., 1994. Characteristics of partnership success: partnership attributes, communication behaviour, and conflict resolution techniques. *Strateg. Manag. J.* 15, 135–152.
- Ng, S.T., Xie, J.Z., Cheung, Y.K., Jefferies, M., 2007. A simulation model for optimizing the concession period of public–private partnerships schemes. *Int. J. Proj. Manag.* 25 (8), 791–798.
- Ng, S.T., Wong, Y.M., Wong, J.M., 2012. Factors influencing the success of PPP at feasibility stage—a tripartite comparison study in Hong Kong. *Habitat Int.* 36 (4), 423–432.
- Organisation for Economic Cooperation and Development, 2010. Progress in Public Management in the Middle East and North Africa; Case Studies on Policy Reforms. OECD Publications.
- Organisation for Economic Co-operation and Development (Paris), 2008. Public–Private Partnerships: In Pursuit of Risk Sharing and Value for Money. OECD Publications.
- Ozdoganm, I.D., Birgonul, M.T., 2000. A decision support framework for project sponsors in the planning stage of build–operate–transfer (BOT) projects. *Constr. Manag. Econ.* 18 (3), 343e353.
- Peng, W., Cui, Q., Lu, Y., Huang, L., 2014. Achieving value for money: an analytic review of studies on public–private partnerships. *Construction Research Congress, Construction in a Global Network*. ASCE, pp. 1189–1198.
- Raisbeck, P., Tang, L.C., 2013. Identifying design development factors in Australian PPP projects using an AHP framework. *Constr. Manag. Econ.* 31 (1), 20–39.
- Raisbeck, P., Duffield, C., Xu, M., 2010. Comparative performance of PPPs and traditional procurement in Australia. *Constr. Manag. Econ.* 28 (4), 345–359.
- Reinhardt, W., 2011. The role of private investment in meeting US transportation infrastructure needs. *Public Works Financing* 260, 1–31.
- Rockart, J.F., 1982. The changing role of the information systems executive: a critical success factors perspective. *Sloan Manag. Rev.* 24 (1), 3–13.
- Roumboutsos, A., Anagnostopoulos, K.P., 2008. Public–private partnership projects in Greece: risk ranking and preferred risk allocation. *Constr. Manag. Econ.* 26 (7), 751–763.
- Shen, L.Y., Platten, A., Deng, X.P., 2006. Role of public private partnerships to manage risks in public sector projects in Hong Kong. *Int. J. Proj. Manag.* 24 (7), 587–594.
- Skietrys, E., Raipa, A., Bartkus, E.V., 2008. Dimensions of the efficiency of public–private partnership. *Econ. Eng.* 3, 45.
- Smyth, H., Edkins, A., 2007. Relationship management in the management of PFI/PPP projects in the UK. *Int. J. Proj. Manag.* 25 (3), 232–240.
- State Government of Victoria, 2013. Partnerships Victoria Requirements. State of Victoria, Australia.
- Tang, L., Shen, Q., Cheng, E.W., 2010. A review of studies on public–private partnership projects in the construction industry. *Int. J. Proj. Manag.* 28 (7), 683–694.
- Tang, L., Shen, Q., Skitmore, M., Cheng, E.W., 2012. Ranked critical factors in PPP briefings. *J. Manag. Eng.* 29 (2), 164–171.
- Tiong, R.L.K., Yeo, K.T., McCarthy, S.C., 1992. Critical success factors in winning BOT contracts. *J. Constr. Eng. Manag.* 118 (2), 217–228.
- Tsai, C.C., Wen, M., 2005. Research and trends in science education from 1998 to 2002: a content analysis of publication in selected journals. *Int. J. Sci. Educ.* 27 (1), 3–14.
- Wibowo, A., 2004. Valuing guarantees in a BOT infrastructure project. *Eng. Constr. Archit. Manag.* 11 (6), 395–403.
- Ye, S., Tiong, R.K.L., 2003. The effect of concession period design on completion risk management of BOT projects. *Constr. Manag. Econ.* 21 (5), 471–482.
- Yi, H., Wang, Y., 2013. Trend of the research on public funded projects. *Open Constr. Build. Technol. J.* 7, 51–62.
- Yong, H.K. (Ed.), 2010. Public–Private Partnerships Policy and Practice: A Reference Guide. Commonwealth Secretariat.
- Yuan, H., Shen, L., 2011. Trend of the research on construction and demolition waste management. *Waste Manag.* 31, 670–679.
- Zhang, X.Q., 2005a. Criteria for selecting the private-sector partner in public–private partnerships. *J. Constr. Eng. Manag.* 131 (6), 631–644.
- Zhang, X.Q., 2005b. Critical success factors for public–private partnerships in infrastructure development. *J. Constr. Eng. Manag.* 131 (1), 3–14.