

CRITICAL SUCCESS FACTORS FOR PUBLIC-PRIVATE PARTNERSHIPS IN THE DEVELOPMENT OF MEGA POWER GENERATION INFRASTRUCTURES IN SRI LANKA

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Abstract

Ceylon Electricity Board (CEB) seeks alternative financing through Public Private Partnerships (PPP) due to non-cost-reflective tariff losses and debt overhang, relying on maturity in critical success factors. Thus, the research examines the success factors of Public Private Partnerships in developing power generation infrastructures in Sri Lanka, using quantitative data from a questionnaire distributed to stakeholders in CEB. The data analysis tools of descriptive and inferential statistics were used to analyze the collected data. The economic viability of the project, credibility of government policies, legal and regulatory framework, equitable risk allocation, transparent and efficient procurement process, financial market, a strong and good private consortium, and political stability, were found as the main CSFs for the development of mega power plants. The study was concentrated on the public agency of CEB, for generalization investigation to be extended to private investors, practitioners, and policymakers in the power sector. Further, a comprehensive study on the exploration of CSF to attract private investors to PPP for the development of mega power plants in Sri Lanka would be most beneficial to the industry. The framework developed in this research would be the benchmark for identifying critical success factors for improvement in PPP projects in Sri Lanka.

Keywords: Ceylon electricity board, critical success factors, Public-Private partnership

JEL Classification: H54, H57, G32.

1 Introduction

Power generation is a crucial global activity, primarily provided by government-owned utilities, involving the distribution, transmission, and generation of electricity (Kim & Oh, 2017). In Sri Lanka, CEB, a State Owned Entity, holds a monopoly on transmission, generating 71% of the country's power generation capacity and 90% of its power distribution (Ceylon Electricity Board, 2018). The policymakers have entrusted the CEB with the prime

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responsibility of uninterrupted power supply that drives the industries and the economy (Chaurey et al., 2012). However, with the unbearable economic recession faced by the country since 2021, the government has failed to fulfill the energy needs of households and corporations (George et al., 2022; Nimal & Namboodiripad, 2022). The study aims to identify the CSFs for attracting Public-Private Partnerships (PPP) as an alternative financial strategy for Sri Lanka's mega power generation infrastructure development, considering project implementers and CEB officials as case studies.

The Long-Term Generation Expansion Plan (LTGEP) aims to boost power generation capacity by 175%, requiring 2409MW for thermal and 4741MW for renewable energy plants (CEB, 2018). Failure to execute scheduled projects could lead to a power supply shortage, increase electricity unit costs, and significantly impact the economy (CEB, 2018). In 2001, Sri Lanka's economy suffered a significant loss of 81 million USD due to electricity shortage, accounting for 0.65% of GDP and jeopardizing productivity and daily life (Wijayatunga & Jayalath, 2004). It was evident in Ghana that the economic growth rate of 14% in 2011 had dropped to 4% in 2014 because the country experienced a shortage of power (Ameyaw & Alfen, 2017).

The government's decision to offload the CEB from the government budget was implemented in 2015 allowing the CEB to source the funds on its own (Ministry of Finance, 2015) as a result of fiscal constraints and the pressure from the political regime to curtail spending on the public to narrow the budget deficits (Savas, 2000). CEB is facing financial distress due to the government's subsidized tariff policy, relying on foreign financial institutions like Industrial & Commercial Bank China (ICBC), Asian Development Bank (ADB), and Hatton National Bank (HNB) for power generation projects (CEB, 2017). CEB faces credit default risk due to loan covenant non-compliance, sovereign credit downgrade, and debt overhang, necessitating alternative financing for mega power generation infrastructure due to government constraints. The public authorities prefer to pursue PPPs instead of public procurements when fiscal constraints and difficulties are experienced (Buso et al., 2017). CEB has consistently utilized PPP as a financing method for mega power generation plants, a strategy that has proven successful in developing and emerging nations.

CEB has not yet secured a single PPP for mega power infrastructure development but has used Build Own and Operate (BOO) and Build Own Operate and Transfer (BOOT) models for three mega power plants (CEB, 2017). Nevertheless, CEB has not attracted investment, while other developing countries have successfully developed power generation

infrastructures through PPP financing despite budget deficits and fiscal constraints (Osei-Kyei & Chan, 2017a). In Asia, private investments to develop public infrastructures (PPP) grew by 11% annually from 1991 to 2015 and accounted for more than 50% of projects in the energy sector (Asian Development Bank, 2017). The World Bank reported an average public-private investment of around \$46.6 billion in the energy sector from 2015 to 2019, primarily focused on electricity generation projects. (World Bank, 2019). ADB has projected that in Asia, PPP would grow by 400% within the next 25 years, and out of it 200% from the energy sector (Asian Development Bank, 2017).

CEB must investigate private investors' interest in PPPs for Sri Lanka mega power plant development, considering differences in CSF due to social, cultural, and economic conditions in developing countries. (Cheung et al., 2012; Chou & Pramudawardhani, 2015). There is a dearth of research on PPPs in the Sri Lankan electricity sector, hence a fresh study looking into PPP's CSF is required.

The study encourages CEB and Policymakers to design PPPs that attract private sector investors to develop mega power generation infrastructures, avoiding power cuts and reducing generation costs, while also informing prospective researchers on broader stakeholder perspectives like investors policymakers, regulators, and implementors.

The remainder of the document is structured as follows: Section 2 provides the literature review while Section 3 illustrates Data and Method. Section 4 provides Findings and Discussion. The conclusion is in Section 5.

2 Literature Review

2.1 Public-Private Partnership

The concept of Public-Private Partnership (PPP) originated in the USA for joint funding by public and private for educational programs (Yescombe, 2007). In searching for excellence and efficiency in public administration and management, which continued from 1660 to 1970, with the economic crises and fiscal constraints directed something "new" to practice in 1970 by the political agendas in Europe and America, a public management cum private management as a mean of efficient government (Lynn, 2007). In 1993, George Bush's Government Performance Results Act introduced New Public Management (NPM) in America, while Thatcher's reforms in Europe emphasized management over bureaucracy (Lynn, 2007). Accordingly, in 1992, UK Prime Minister John Major initiated Private Finance Initiatives (PFI) to develop public infrastructure and services, attracting private sector

participation through market mechanisms (Origin of Public Private Partnerships, 2013). Market failures in Europe had forced PPPs to share financial assets and risk with both public and private investors and, to bring down the expertise in the private sector like best management practices, advanced technology, and innovations to deliver public services (Broadbent & Laughlin, 2005; Gendron & Cooper, 2001; Hood, 1991). In the extant literature, Researchers argue that PPPs utilize private sector expertise, including best management practices, advanced technology, and innovations, to deliver public services (European Commission, 2007).

Governments must deal with budget shortfalls and financial restrictions, which force them to enter into intergovernmental agreements, privatize, or outsource in order to keep up with the demand for infrastructure. (Brown & Potoski, 2006). Later, it was evident that both politicians and the public had opposed to privatization (Newberry & Pallot, 2003). Hence, the PPP was identified as a means to improve public infrastructures and services through private investment participation. (Linder, 1999). Accordingly, PPP models have been implemented rapidly in past decades to develop the public infrastructure of developing countries (Boyer & Scheller, 2018).

2.2 Public-Private Partnerships in Sri Lanka's Power Industry

Sri Lanka's PPP was primarily implemented to raise capital, without a genuine commitment to involving private participation in policy (European Commission, 2007). Economic progress will be seriously hampered by a lack of power. The country's electricity deficit caused Ghana's economy to grow at a slower rate of 4% in 2014 as opposed to 14% in 2011 (Ameyaw & Alfen, 2017). The government is under political pressure to reduce public spending and address budget deficits due to budgetary constraints (Savas, 2000). As part of the fiscal consolidation program, CEB was eliminated from the government budget (Kang et al., 2019). (Ministry of Finance, 2015). CEB has been unable to hold onto cash flows for project investments in the interim due to increased generation costs (CEB, 2017). In this backdrop, this study, the concept of PPP has been considered as a financial strategy for the development of infrastructures related to power generation, to avoid losses to the economy due to power shortages. It was contended that the best Value for Money (VfM) is to be ensured when choosing finance for infrastructure development (Moro Visconti, 2014). Accordingly, the main objective of CEB is to achieve VfM through the implementation of

PPP through the governments' pursuit to attain two main objectives, VfM and mechanism to mitigate the risk through PPP (Broadent & Laughlin, 2003; Froud Julie, 2003).

CEB is seeking alternative financing for mega power generation infrastructure due to government financial constraints and debt overhang. Public agencies prefer PPPs over conventional procurement due to fiscal constraints Buso et al. (2017) and it's emerged as an alternative to privatization (Brown & Potoski, 2006). Both studies suggest that financial constraints drive PPP, which is the primary financing option for developing power generation infrastructures, and the success of PPP depends on critical factors.

2.3 Critical Success Factors of Public-Private Partnership

The concept of Critical Success Factors (CSF) has been used by many scholars to enhance the knowledge of optimal execution of the PPP for infrastructure development and mostly focused on how to execute PPP successfully (Cheung et al., 2012; Kavishe & Chileshe, 2018; Liu et al., 2014; Osei-Kyei & Chan, 2015b). However, the empirical studies on the CSF of PPP mainly focused on how to execute PPP successfully (Cheung et al., 2012; Kavishe & Chileshe, 2018; Osei-Kyei & Chan, 2015b). Furthermore, a study reveals that the five most highly regarded CSFs in PPP projects from 1990 to 2013 are political support, appropriate risk allocation, transparent procurement, community and public support, and a strong private consortium.(Osei-Kyei & Chan, 2015b).

Another study confirms four PPP success characteristics of power generation in Uganda: goal compatibility, corruption reduction through independent advisers, anticipated risk, and regulation and monitoring. The government must successfully negotiate, execute, and oversee PPPs (Nsasira et al., 2013). Furthermore, a Nigerian study identified six critical CSFs for PPP success: cost-benefit analysis, legal framework, technical feasibility, financial availability, technological innovation, and favorable investment environment. (Babatunde et al., 2016). Kang et al. (2019) identified the successful implementation of PPPs relies on five key factors: political, legislative, economic, financial, and management requirements, with effective management practices, independent agencies, government support, and effective leadership. Again in 2017, an empirical contrast of CSFs for PPPs in two developing economies based on the cases of Ghana and Hong Kong ascertained that, in Ghana, PPPs are very critical if CSFs are subject to sociopolitical and economic constraints(Osei-Kyei & Chan, 2017b) . However, in Hong Kong, the PPP is extremely important if CSF falls under the purview of the organization and relationship of the PPP. Furthermore, both countries' favorable legal and

regulatory frameworks are critical to PPP. It is confirmed that Social, political, and economic conditions are critical factors for expressing government commitment to PPP policy and gaining private sector confidence and involvement (Henderson & McGloin, 2004).

However, it has been examined that in both the availability of government funding assistance, technological innovation, sharing, coordination, and community involvement are less essential for PPPs in Ghana and Hong Kong (Osei-Kyei & Chan, 2017). In developing countries, CSF primarily precedes PPP models, with coordination and community involvement less important. Key seven numbers of CF in China include a readily available financial market, stable political environment, prudent government oversight, open procurement process, project economic viability, robust private sector, and equitable risk allocation.

However, government financial support, technological innovation, sharing, coordination, and community involvement have all been found to be less important for PPP in Ghana and Hong Kong (Osei-Kyei & Chan, 2017a). In developing countries, CSF is often a precursor to the PPP model, with coordination and community participation less critical. In China, seven key CSFs include an available financial market, adequate legal framework, judicious government control, transparent procurement process, project economic viability, and strong private sector. (Chan et al., 2010a).

It was clear from the electricity sector of Sri Lanka that the installation of the nation's largest power plant, a 900 MW coal power plant in Norochchalai, had been delayed for a decade because of opposition from the local community and church, resulting in significant economic losses (Fernando, 2002; Hevage & Hirosh, 2015). Furthermore, sociopolitical factors significantly impact attracting public infrastructure investments in both Sri Lanka and Ghana (Osei-Kyei & Chan, 2017b). For example, the decision to abandon the 500MW coal power plant PPP project at Sampur due to a government change harmed the confidence of private investors (CEB, 2017). Further, the literature review revealed that Political instability, state credibility on policies, regulatory and legal framework, transparent and efficient procurement process, the financial market, and favourable investment climate are the influencing factors for PPP in developing countries (Fernando & Nanayakkara, 2020).

The appendix outlines common CSFs for Public-Private Partnerships (PPPs) in developing countries, including Sri Lanka, as there are no universally accepted factors it seems sensible to conduct a study on common CSFs applicable to the power sector of Sri Lanka as explained below.

Regulatory and Legal Framework, as Sri Lanka doesn't have a separate piece of Law for PPP and applies procurement guidelines which were issued in 1998 (Ismail, 2013; Osei-Kyei & Chan, 2017b). Further, due to the magnitude of the investment it is necessary to bring in foreign investments for the power sector, hence the regulatory and legal framework is vital for developing countries (Gray & Jarosz, 1995). Therefore, by considering the above facts we derive the below hypothesis.

H₁: Regulatory and Legal Framework is significantly influencing the attraction of PPPs as a financial strategy to develop mega power generation infrastructure.

Political Stability, Political power shifts have led to power sector delays, including coal power plant delays and LTGEP implementation delays. (Osei-Kyei & Chan, 2015). Further, the 350MW Coal power plant negotiated for two and half years from 1991 was canceled in 1994 with a change of the government (Appuhami et al., 2011).In this context, political stability plays a crucial role in attracting private investments to the power sector, accordingly, derive the below hypothesis.

H₂: Political Stability is significantly influencing the attraction of PPPs as a financial strategy to develop mega power generation infrastructure.

State Credibility on Policies, The government's credibility is largely determined by its ability to uphold policy commitments, and excessive interference could hinder the smooth operation and openness of the PPP process (Kumaraswamy & Zhang, 2001). Sudden changes in policies related to the power sector as explained above the abandonment of the Sampur Coal Power Plant and hold of the fourth phase of the Norocchalai Coal Power Plant (Appuhami et al., 2011). It is indicated that a lack of state credibility is detrimental to investments in the power sector, hence we derived the below hypothesis.

H₃: State Credibility on Policies is significantly influencing the attraction of PPPs as a financial strategy to develop mega power generation infrastructure.

Transparent and Efficient Procurement Process, it is crucial for a successful PPP project and it ensures equal commitment from both public and private parties. A multi-stage bid process can infringe on bidders' rights, hindering the awarding process. Government commitment is essential for transparency throughout the bid process (Almarri et al., 2017).Also noted that projects are not implemented on the planned time schedule due to litigations and laps in the procurement process (Chan et al., 2010b). Therefore, the following hypothesis could be derived related to the power sector of Sri Lanka.

H₄: Transparent and Efficient Procurement Process is significantly influencing the attraction of PPPs as a financial strategy to develop mega power generation infrastructure.

The Financial Market; as the domestic financial market liquidity is insufficient to finance power projects due to the huge investments involved (Babatunde et al., 2016). However, Sri Lanka frequently finds it challenging to raise both equity and loan capital to finance PPPs due to its relatively underdeveloped capital market and in comparison to India, Sri Lanka's market capitalization accounts for only 30% of GDP (Samarakoon, 2016). Nearly all of the PPPs in the nation have been funded by International Aid Organizations, foreign commercial investors, or both at the same time (Appuhami et al., 2011). Hence, the below hypothesis is derived.

H₅: The Financial Market is significantly influencing the attraction of PPPs as a financial strategy to develop mega power generation infrastructure.

A Strong and Good Private Consortium; due to the mega-size of investments, the probability of handling the project by a single investor is very remote and the existing mega-power projects were handled through consortiums (Hardcastle et al., 2005). The Yugadhanavi Power Plant of 300 MW is in operation by West Coast Power (Pvt) Ltd which is a consortium of investors. However, a weak and badly run consortium would cause problems and ultimately make the PPP project unsuccessful (Osei-Kyei & Chan, 2015a). Therefore, it was decided to test the below hypothesis.

H₆: Strong and Good Private Consortium is significantly influencing the attraction of PPPs as a financial strategy to develop mega power generation infrastructure.

Economic Viability of the Project; as the bankability of the project is crucial to the success of the project for financing (Chan et al., 2010b). It was determined that with Sri Lanka's low traffic volume and high payback period for the road sector, investors might not find it appealing. As a result, a PPP model limited to road construction will not work in Sri Lanka and It will be the same with other sectors (Dabarera et al., 2019). Accordingly, the below hypothesis is to be tested.

H₇: Economic Viability of the Project is significantly influencing the attraction of PPPs as a financial strategy to develop mega power generation infrastructure.

Equitable Risk Allocation. A lack of fair allocation of risk will jeopardize the project as it reduces the investor appetite (Lattemann et al., 2009). It was determined that in Nigeria being a developing country equitable risk-sharing plays a pivotal role in the success of PPP (Muhammad & Johar, 2018). Further, it was concluded that in the implementation of

PPPs in Mainland China, an equitable risk allocation is crucial for success compared to Hong Kong (Cheung et al., 2012). Hence, the below hypothesis is derived to test in the Sri Lankan context.

H₈: Equitable Risk Allocation of the Project is significantly influencing the attraction of PPPs as a financial strategy to develop mega power generation infrastructure.

3 Method and Data

3.1 Population and Sample

To accomplish the goal of the study, we employed a quantitative design using a structured questionnaire. The most suitable response group was determined to be CEB chartered engineers and chartered accountants with over 15 years of professional experience due to the research purpose. The identified population consists of 91 Senior Managers at CEB, 73 of whom were chosen for the study using a systematic random sample technique, removing each 5th in 91 population arranged in cardinal order.

3.2 Data

CSFs were initially found via a survey of the literature, which also filtered out CSFs that are often used in the power sector. Refers to the research design in Figure 1. With minor adjustments to the scale to fit the power sector PPP of Sri Lanka, we employed a comparable questionnaire created by Lam & Yang (2020) to identify influencing elements of PPP in smart city projects in Hong Kong. The seven-point Likert scale was used in the questionnaire to assess the relative relevance of each of the detected CSFs. In PPP research, the use of rating scales and questionnaires to determine crucial aspects was common (Ng et al., 2012). Respondents were emailed the surveys with the request for a response within a week. After that, respondents were reminded of timely responses to the survey.

There were 38 replies, or roughly 52% of the sample, that were received. Out of the 38 respondents, it was found that 15 had experience and were actively involved in power infrastructure development projects. In comparison to 19 responses in a similar study by Choi et al. (2010) for risk perception analysis in participation in China's water PPP market, thirty-eight responses are a respectable number. Data analysis has been done using the SPSS 26. The research procedure is shown in Figure 1 below.

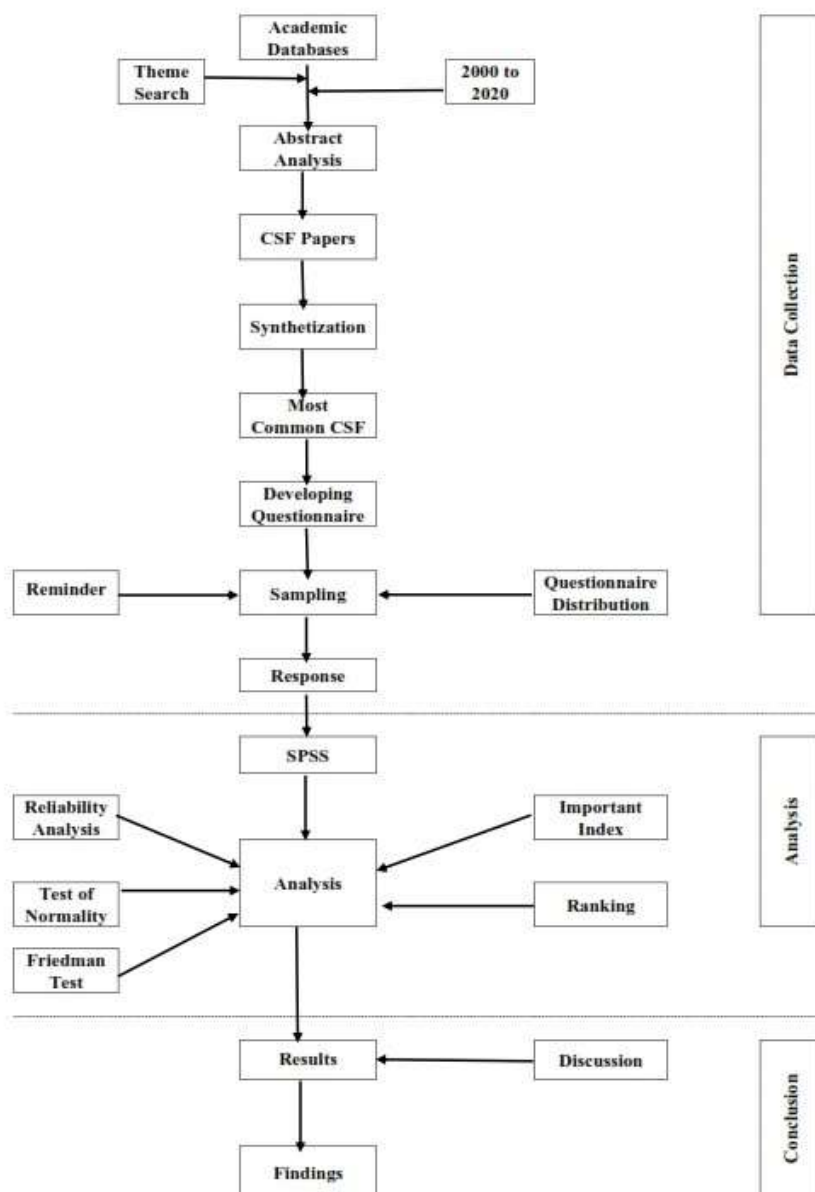


Figure 1: Research Process

Source: Developed by Author

4 Findings and Discussion

4.1 Data Analysis

The reliability test Cronbach's Alpha was used to assess the eight crucial components' internal consistency. The measuring scale's sound internal consistency is satisfied with the consequent Cronbach's alpha reliable coefficient of 0.806 (George et al., 2000).

Table 1 presents the findings of the Kolmogorov-Smirnov significance test with Lilliefors Significance Correction and Shapiro-Wilk.

Table 1: Results of the Kolmogorov-Smirnov and Shapiro-Wilk Tests

Tests of Normality						
Factor	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Q1	.246	38	.000	.827	38	.000
Q2	.228	38	.000	.875	38	.001
Q3	.237	38	.000	.796	38	.000
Q4	.211	38	.000	.915	38	.007
Q5	.215	38	.000	.856	38	.000
Q6	.273	38	.000	.857	38	.000
Q7	.247	38	.000	.836	38	.000
Q8	.235	38	.000	.889	38	.001

a. Lilliefors Significance Correction

The tests indicated above contrast the sample results to a set of scores that are normally distributed and possess the same mean and standard deviation. As per Table I, for all eight factors, Kolmogorov-Smirnov with Lilliefors Significance Correction and Shapiro-Wilk scores are significant by concluding that the distribution is not normal. Thus, a non-parametric test should be employed to achieve the purpose of the study.

4.2 Examination of Significance/Importance of Critical Success Factors to Attract Public-Private Partnerships

The eight critical factors identified have been tested with the same sample using the Friedman Test since data is not normal, but ordinal in the Likert scale. According to Zimmerman and Zumbo (1993), the Friedman test, a moderate statistical power, can be performed in SPSS as K-Related samples by comparing variables on the same respondents. The Friedman test findings are displayed in Tables 2 and 3.

Table 2: Results of the Friedman Test

Question Ref.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Mean Rank	4.58	4.24	5.34	2.93	4.75	4.86	5.29	4.01

Table 3: Results of the Friedman Test

Test Statistics			
N	Chi-Square	Df	Asymp. Sig.
38	33.384	7	.000
a. Friedman Test			

In the Friedman test, it is assumed that all variables have identical mean populations when Asymp.Sig (P-Value) is significant that is P value > 0.05. In this study P value = 0 < 0.05. If the mean ranks are identical Chi-Square equals 0. The resultant Chi-Square of 33.384 means significant variance over the mean ranks existing. This can be seen in Table II through mean rank variation from 5.34 to 2.93. Hence, it is indicated that factors are not ranked similarly. As a result, the importance of the eight CSFs varies when it comes to the appeal of PPP as a financing method for the development of infrastructure for power generation.

4.3 Significance Importance Index and Ranking of Critical Factors

Since the pertinence of critical factors to attract PPP significantly varies, the significance of importance for each variable was calculated by using the following formula as used by Jannadi (1996). Through this process, the relative importance of critical factors could be ascertained.

$$SI_i = \frac{\sum_{i=1}^7 a_i * X_i}{7}$$

where,

SI_i = significance index for the *i*th factor

a_i = constant expressing the weight assigned to the *i*th response, e.g., a₁ = 1 (Not Important) to a₇ = 7 (extremely Important)

X_i = n_i/N

n_i = the variable expressing the frequency of the *i*th response (i.e., Not Important to extremely important)

N = the total number of responses.

Table 4 presents the calculated relative scores for each variable on the 7-point Likert scale, according to the frequency of 38 responders for each variable. The relative scores of eight variables are varying between the range of 0.71 to 0.86.

Table 4: Frequency of Variables and Relative Score

SCALE VALUE	SCALE	FREQUENCY OF VARIABLES							
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
1	Not Important	-	1	-	-	-	-	-	-
2	Very Low Important	2	-	1	1	1	-	-	-
3	Low Important	-	3	-	2	-	1	1	3
4	Moderate Important	7	5	1	8	3	3	3	4
5	Important	4	7	8	14	10	7	6	11
6	Very Important	11	12	14	11	13	17	14	15
7	Extremely Important	14	10	14	2	11	10	14	5
	No of Respondents	38	38	38	38	38	38	38	38
	Xi = ni/N	5.68	5.47	6.00	5.00	5.76	5.84	5.97	5.39
	$SI_i = \frac{\sum_{i=1}^7 a_i * X_i}{7}$	0.81	0.78	0.86	0.71	0.82	0.83	0.85	0.77

As per the assigned relative index value given for the Likert scale in Table 5, a relative score of 0.57 to 0.71 is the variable important, 0.71 to .86 is very important, and 0.86 to 1.00 is extremely important. It is evident from this that all eight factors are important in luring PPP to build massive power generation infrastructures in Sri Lanka, according to the respondents.

Table 5: Variable Relative Score Index and Variable Ranking

SCALE VALUE	SCALE	RELATIVE INDEX	VARIABLES RELATIVE SCORE							
			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
1	Not Important	0.00 < SI ≤ 0.14								
2	Very Low Important	0.14 < SI ≤ 0.29								
3	Low Important	0.29 < SI ≤ 0.43								
4	Moderate Important	0.43 < SI ≤ 0.57								
5	Important	0.57 < SI ≤ 0.71								
6	Very Important	0.71 < SI ≤ 0.86	0.81	0.78	0.86	0.71	0.82	0.83	0.85	0.77
7	Extremely Important	0.86 < SI ≤ 1.00								
Rank of variables from highest to lowest importance			5	6	1	8	4	3	2	7

4.4 Results and Discussion

The study reveals that eight factors from developing countries significantly influence the attraction of PPP for power development infrastructure in Sri Lanka.

The credibility of government policies in Sri Lanka is highly important, with a score of 0.86. Key policy changes have significantly impacted the power sector, leading to changes in plans for projects like a 500 MW LNG and 50 MW solar project. (Appuhami et al., 2011).

The project's economic viability has been ranked second as very significant with a relative score of 0.85. The bankability of the project is very crucial for a private investor to consider a capital contribution to the project. Especially the lenders and rating agencies are very much keen on clearly defined project data related to the future revenue performance of power generation projects (Vignola et al., 2012).

Transparent procurement processes, ranked third with a relative score of 0.83 are crucial for gaining investors' confidence in PPPs. The Government of Sri Lanka introduced PPP in 1992 and established the National Agency for Public-Private Partnership unit within the Ministry of Finance and Mass Media in 2017. PPPs were included in the 2018 procurement guideline. The strong and good private partner has been ranked fourth as very significant with a relative score of 0.82. The complexity of the power projects and huge capital investment requires the ability of private partners is matters a lot to the development of power infrastructures in Sri Lanka. Even in the United Kingdom (UK), a good private partner has been identified as a critical success factor for PPP (Li et al., 2005).

The fifth very important factor with a relative score of 0.81 is the effective regulatory and legal framework. The weak legal and regulatory framework in Sri Lanka significantly impacted investor appetite for PPP, making it a major challenge to implement the scheme (Kelegama, 2006).

The sixth important critical factor with a relative score of 0.78 is the political stability of the country. The political instability of the country has become a major challenge to Sri Lanka to attract PPP (Nataraj, 2007). Political instability in Sri Lanka hindered the construction of a combined power cycle plant project in 1990, increasing risk and affecting the implementation of PPP policies in the electricity industry, leading to increased financing costs. (Appuhami et al., 2011).

In the UK, appropriate risk allocation has been identified as a major critical factor and ranked as second in order (Li et al., 2005). In the case of the Chinese perspective also the shared responsibilities between the public and private sectors have been ranked second in order of 18

CSFs (Chan et al., 2010a). However, The study ranked the respondent's equitable risk allocation as the seventh critical factor out of eight, with a relative score of 0.77.

The financial market has been ranked as an eighth very important critical factor by the respondents having a relative score of 0.71. The concept of PPP worked well in countries like the UK, Australia, and Hong Kong due to the availability of developed capital markets. If the capital market size is large and has higher income will facilitate attracting more PPPs in developing countries (Sharma, 2012).

5 Conclusion

The robust consistent policies of the government are a catalyst for the success of PPP in the power sector. Therefore, the findings of the study are a beacon to the policymakers for sustaining the power sector. Despite this, the study forced CEB to design the PPP project to be bankable to foster the objectives of CEB. In addition, it confirmed the importance of a transparent procurement process for the success of PPP, and promoting it is the collective responsibility of the policymakers and CEB. Hence, the above three findings are of utmost importance to policymakers and CEB to revisit the existing application of PPP in CEB. The potential investors reasoned the study that the power sector PPP investments are envisaged through a consortium that must have a reliable partner, to succeed in the project.

In addition, the validity of having a sound legal and regulatory framework for the success of PPP has been endorsed to open the eyes of policymakers as it is essentially required to look into twenty-five-year-old procurement guidelines. Nevertheless, the study has embraced the potential investors that the political stability in Sri Lanka has not greatly influenced or contributed to lagging behind the application of PPP. Moreover, policymakers and stakeholders can use this knowledge to implement institutional improvements, policy reforms, and stakeholder engagement strategies that aim to promote a favourable environment for PPP investments and promote sustainable development in Sri Lanka's energy infrastructure landscape by connecting these CSF with their wider implications. Further, consideration of the findings in the implementation of PPP ultimately flourishes the livelihood of citizens through the affordable price of electricity.

The study was conducted on a targeted population from a public agent, CEB as a case. From a broader perspective, the examination of other stakeholders of PPP particularly private investors, practitioners, and policymakers in the power sector could be carried out. Further, a comprehensive study on the exploration of critical factors to attract private investors for PPP

to develop mega power generation infrastructures in Sri Lanka would be most beneficial to the industry.

References

- Almarri, K., Engineering, B. A.-H.-J. of, Project, U., And, U., & 2017, U. (2017). Critical success factors for public private partnerships in the UAE construction industry-A comparative analysis between the UAE and the UK. *Journal of Engineering, Project, and Production Management* 2017, 7(1), 21–32. <https://www.academia.edu/download/68374990/d40d95036ee64114e2c469c969c40ee850ac.pdf>
- Ameyaw, C., & Alfen, H. W. (2017). Identifying risks and mitigation strategies in private sector participation (PSP) in power generation projects in Ghana. *Journal of Facilities Management*, 15(2), 153–169. <https://doi.org/10.1108/JFM-07-2016-0030>
- Appuhami, R., Perera, S., & Perera, H. (2011). Coercive policy diffusion in a developing country: The case of public-private partnerships in Sri Lanka. *Journal of Contemporary Asia*, 41(3), 431–451. <https://doi.org/10.1080/00472336.2011.582713>
- Asian Development Bank. (2017). *Sustaining Development Through Public Private Partnership*. ADB Outlook 2017. <https://www.adb.org/sites/default/files/publication/365701/ado2017-update.pdf>
- Babatunde, S. O., Perera, S., Zhou, L., & Udejaja, C. (2016). Stakeholder perceptions on critical success factors for public-private partnership projects in Nigeria. *Built Environment Project and Asset Management*, 6(1), 74–91. <https://doi.org/10.1108/BEPAM-11-2014-0061>
- Boyer, E. J., & Scheller, D. S. (2018). An Examination of State-Level Public–Private Partnership Adoption: Analyzing Economic, Political, and Demand-Related Determinants of PPPs. *Public Works Management and Policy*, 23(1), 5–33. <https://doi.org/10.1177/1087724X17729097>
- Broadbent, J., & Laughlin, R. (2005). The Role of PFI in the UK Government’s Modernisation Agenda. *Financial Accountability and Management*, 21(1), 75–97. <https://doi.org/10.1111/j.0267-4424.2005.00210.x>
- Broadent, J., & Laughlin, R. (2003). Control and legitimation in government accountability processes: The private finance initiative in the UK. *Critical Perspectives on Accounting*, 14(1–2), 23–48. <https://doi.org/10.1006/cpac.2001.0525>
- Brown, T., & Potoski, M. (2006). Contracting for Management: Assessing Management

- Capacity Under Alternative Service Delivery Arrangements. *Policy Analysis and Management*, 25(2), 323–346.
- Buso, M., Marty, F., & Tran, P. T. (2017). Public-private partnerships from budget constraints: Looking for debt hiding? *International Journal of Industrial Organization*, 51, 56–84. <https://doi.org/10.1016/J.IJINDORG.2016.12.002>
- CEB. (2018). *2018 CEYLON ELECTRICITY BOARD*.
- Ceylon Electricity Board. (2017). *Annual Report*.
- Ceylon Electricity Board. (2018). *Long Term Generation Expansion Plan 2018-2037* (Issue June).https://www.ceb.lk/front_img/img_reports/1532407706CEB_LONG_TERM_GENERATION_EXPANSION_PLAN_2018-2037.pdf
- Chan, A. P. C., Lam, P. T. I., Chan, D. W. M., Cheung, E., & Ke, Y. (2010a). Critical success factors for PPPs in infrastructure developments: Chinese perspective. *Journal of Construction Engineering and Management*, 136(5), 484–494. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0000152](https://doi.org/10.1061/(ASCE)CO.1943-7862.0000152)
- Chan, A. P. C., Lam, P. T. I., Chan, D. W. M., Cheung, E., & Ke, Y. (2010b). Critical Success Factors for PPPs in Infrastructure Developments: Chinese Perspective. *Journal of Construction Engineering and Management*, 136(5), 484–494. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0000152](https://doi.org/10.1061/(ASCE)CO.1943-7862.0000152)
- Chaurey, A., Krithika, P. R., Palit, D., Rakesh, S., & Sovacool, B. K. (2012). New partnerships and business models for facilitating energy access. *Energy Policy*, 47(SUPPL.1), 48–55. <https://doi.org/10.1016/j.enpol.2012.03.031>
- 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. *Journal of Facilities Management*, 10(1), 45–58. <https://doi.org/10.1108/14725961211200397>
- Cheung, E., Chan, A. P. C., Lam, P. T. I., Chan, D. W. M., & Ke, Y. (2012). A comparative study of critical success factors for public private partnerships (PPP) between Mainland China and the Hong Kong Special Administrative Region. *Facilities*, 30(13), 647–666. <https://doi.org/10.1108/02632771211273132/FULL/HTML>
- Chou, J. S., & Pramudawardhani, D. (2015). Cross-country comparisons of key drivers, critical success factors and risk allocation for public-private partnership projects. *International Journal of Project Management*, 33(5), 1136–1150. <https://doi.org/10.1016/j.ijproman.2014.12.003>

- Dabarera, G. K. M., Perera, B. A. K. S., & Rodrigo, M. N. N. (2019). Suitability of public-private-partnership procurement method for road projects in Sri Lanka. *Built Environment Project and Asset Management*, 9(2), 199–213. <https://doi.org/10.1108/BEPAM-01-2018-0007>
- European Commission. (2007). *The European Commission and Sri Lanka: Co-operation Strategy*. http://eeas.europa.eu/archives/docs/sri_lanka/csp/07_13_en.pdf
- Fernando, B. R. . (2002). We need three or four coal power plants - IESL president. *Daily News*, 5, April.
- Fernando, S., & Nanayakkara, K. G. M. (2020). Identification of Challenges to Attract Public Private Partnerships for Power Generation Infrastructures: A Review. *Kelaniya Journal of Management*, 9(2), 75. <https://doi.org/10.4038/KJM.V9I2.7644/GALLEY/5930/DOWNLOAD/>
- Froud Julie. (2003). The Private Finance Initiative: risk, uncertainty and the state. *Accounting, Organizations and Society*, 28, 567–589. <https://doi.org/10.1680/imuen.1995.28105>
- Gendron, Y., & Cooper, D. J. (2001). State Auditing, Independence and New. *Accounting, Auditing & Accountability Journal*, 14(3), 278–310.
- George, A. S. H., George, A. S., & Baskar, T. (2022). Sri Lanka 's Economic Crisis : A Brief Overview Partners Universal International Research Journal (PUIRJ). *Partners Universal International Research Journal*, 1(2), 9–19. <https://doi.org/10.5281/zenodo.6726553>
- Gray, C. W., & Jarosz, W. W. (1995). Law and the Regulation of Foreign Direct Investment: The Experience from Central and Eastern Europe. *Columbia Journal of Transnational Law*, 33. <https://heinonline.org/HOL/Page?handle=hein.journals/cjtl33&id=9&div=&collection=>
- Hardcastle, C., Edwards, P., ... A. A.-C. management, & 2005, U. (2005). Critical success factors for PPP/PFI projects in the UK construction industry: a factor analysis approach. *Construction Management and Economics*. http://www.civil.hku.hk/cicid/3_events/32/papers/13.pdf
- Hevage, K., & Hirosh, E. (2015). *Technical and Economic Impacts of the First Coal-fired Power Station in Sri Lanka* (Issue May). <https://www.diva-portal.org/smash/get/diva2:812764/FULLTEXT01.pdf>
- Hood, C. (1991). All Seasons? *Public Administration*, 69(1), 3–19.

<http://dx.doi.org/10.1111/j.1467-9299.1991.tb00779.x>

- Ismail, S. (2013). Critical success factors of public private partnership (PPP) implementation in Malaysia. *Asia-Pacific Journal of Business Administration*, 5(1), 6–19. <https://doi.org/10.1108/17574321311304503>
- Jannadi, M. O. (1996). Factors affecting the safety of the construction industry: A questionnaire including 19 factors that affect construction safety was mailed to the top 200 construction contractors in the UK. Safety officers and workers were asked to indicate how effective . *Building Research and Information*, 24(2), 108–112. <https://doi.org/10.1080/09613219608727510>
- Kavishe, N., & Chileshe, N. (2018). Critical success factors in public-private partnerships (PPPs) on affordable housing schemes delivery in Tanzania: A qualitative study. *Journal of Facilities Management*, 17(2), 188–207. <https://doi.org/10.1108/JFM-05-2018-0033>
- Kelegama, S. (2006). *Development under stress: Sri Lankan economy in transition*. https://books.google.com/books?hl=en&lr=&id=JY-HAwAAQBAJ&oi=fnd&pg=PP1&dq=Development+Under+Stress:+Sri+Lankan+Economy+in+Transition,&ots=6SRLi1giLg&sig=__rjHuyldSncOquH3Yhq7r-_u0Y
- Kim, Y., & Oh, K.-W. (2017). The Emerald Handbook of Public–Private Partnerships in Developing and Emerging Economies. In *The Emerald Handbook of Public–Private Partnerships in Developing and Emerging Economies* (pp. 537–557). Emerald. <https://doi.org/10.1108/9781787144934>
- Kumaraswamy, M. M., & Zhang, X. Q. (2001). Governmental role in BOT-led infrastructure development. *International Journal of Project Management*, 19(4), 195–205. [https://doi.org/10.1016/S0263-7863\(99\)00069-1](https://doi.org/10.1016/S0263-7863(99)00069-1)
- Lattemann, C., Stieglitz, S., Kupke, S., & Schneider, A. M. (2009). Impact of PPPs to broadband diffusion in Europe. *Transforming Government: People, Process and Policy*, 3(4), 355–374. <https://doi.org/10.1108/17506160910997874>
- Li, B., Akintoye, A., Edwards, P. J., & Hardcastle, C. (2005). Critical success factors for PPP/PFI projects in the UK construction industry. *Construction Management and Economics*, 23(5), 459–471. <https://doi.org/10.1080/01446190500041537>
- Linder, S. H. (1999). Coming to terms with the Public -Private Partnership A Grammar of multiple meanings. *American Behavioral Scientist*, 43(01), 35–51. <https://doi.org/0803973233>
- Liu, J., Love, P. E. D., Smith, J., Regan, M., & Davis, P. R. (2014). Life cycle critical success

- factors for public-private partnership infrastructure projects. *Journal of Management in Engineering*, 31(5), 1–7. [https://doi.org/10.1061/\(ASCE\)ME.1943-5479.0000307](https://doi.org/10.1061/(ASCE)ME.1943-5479.0000307)
- Lynn,jr, L. E. (2007). Public Management ,A concise History of the Field. In *The Oxford Handbook of Public Management* (pp. 44–70). Oxford University Press.
- Ministry of Finance. (2015). *Budget Estimates 2015*. <http://www.treasury.gov.lk/web/guest/budget-estimates-2015>
- Moro Visconti, R. (2014). Improving Value for Money in Italian Project Finance. *Managerial Finance*, 40(11), 1058–1077. <https://doi.org/10.1108/MF-07-2013-0171>
- Muhammad, Z., & Johar, F. (2018). Critical success factors of public–private partnership projects: a comparative analysis of the housing sector between Malaysia and Nigeria. *International Journal of Construction Management*, 19(3), 257–269. <https://doi.org/10.1080/15623599.2017.1423163>
- Nataraj, G. (2007). *Infrastructure Challenges in South Asia: The Role of Public-Private Partnerships*. www.adbi.org
- Newberry, S., & Pallot, J. (2003). Fiscal (ir)responsibility: Privileging PPPs in New Zealand. *Accounting, Auditing & Accountability Journal*, 16(3), 467–492. <https://doi.org/10.1108/09513570310482318>
- Nimal C.N, & Namboodiripad, N. (2022). Sri Lanka economic crisis -The symptoms, causes, and possible cures. *International Journal of Business Ethics in Developing Economies*, 11(2), 12–19. <https://ssrn.com/abstract=4407478>
- Origin of Public Private Partnerships*. (2013). <https://www.lawteacher.net/free-law-essays/commercial-law/origin-of-public-private-partnerships-commercial-law-essay.php>
- Osei-Kyei, R., & Chan, A. P. C. (2015a). Review of studies on the critical success factors for public-private partnership (PPP) projects from 1990 to 2013. *International Journal of Project Management*, 33(6), 1335–1346. <https://doi.org/10.1016/j.ijproman.2015.02.008>
- Osei-Kyei, R., & Chan, A. P. C. (2015b). Review of studies on the critical success factors for public-private partnership (PPP) projects from 1990 to 2013. *International Journal of Project Management*, 33(6), 1335–1346. <https://doi.org/10.1016/j.ijproman.2015.02.008>
- Osei-Kyei, R., & Chan, A. P. C. (2017a). Empirical comparison of critical success factors for public-private partnerships in developing and developed countries A case of Ghana and Hong Kong. *Engineering, Construction and Architectural Management*, 24(6), 1222–1245. <https://doi.org/10.1108/ECAM-06-2016-0144>
- Osei-Kyei, R., & Chan, A. P. C. (2017b). Empirical comparison of critical success factors for

- public-private partnerships in developing and developed countries A case of Ghana and Hong Kong. *Engineering, Construction and Architectural Management*, 24(6), 1222–1245. <https://doi.org/10.1108/ECAM-06-2016-0144/FULL/HTML>
- Samarakoon, L. (2016). *Sri Lanka Capital Market Assessment*. Asian Development Bank. <https://www.adb.org/sites/default/files/project-documents//49365-002-tacr-01.pdf>
- Savas E.S. (2000). *Privatisation and Public Private Partnership*. Privatisation and Public Private Partnership. https://s3.amazonaws.com/academia.edu.documents/4617108/sem200601_md02_in.pdf?response-content-disposition=inline%253B filename%253DPrivatization_and_public-private_partner.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%252F202
- Sharma, C. (2012). Determinants of PPP in infrastructure in developing economies. *Transforming Government: People, Process and Policy*, 6(2), 149–166. <https://doi.org/10.1108/17506161211246908>
- Vignola, F., Grover, C., Lemon, N., Energy, A. M.-S., & 2012, U. (2012). Building a bankable solar radiation dataset. *Elsevier*, 86(8), 218–229. <https://www.sciencedirect.com/science/article/pii/S0038092X1200182X>
- Wijayatunga, P. D. C., & Jayalath, M. S. (2004). Assessment of economic impact of electricity supply interruptions in the Sri Lanka industrial sector. *Energy Conversion and Management*, 45(2), 235–247. [https://doi.org/10.1016/S0196-8904\(03\)00132-8](https://doi.org/10.1016/S0196-8904(03)00132-8)
- World Bank. (2019). Private Participation In Infrastructure (PPI) Annual Report 2019. In *World Bank*. <https://doi.org/10.3934/math.2020i>
- Yescombe, A. . (2007). *Public–Private Partnerships Principles of Policy and Finance* (1st Editio, Vol. 148). Elsevier Ltd.

Appendix

The participants are requested to indicate the level of importance of each below factor to attract PPP (Public Private Partnership) investment to develop power generation infrastructure in Sri Lanka.

Critical Factor	Source
Effective regulatory and legal framework	Ismail (2013) , Osei-Kyei & Chan, (2017b) Gray & Jarosz (1995),Nsasira et al., (2013),Babatunde et al., (2016), Henderson & McGloin, (2004), Chan et al., (2010a)
Political Stability	Osei-Kyei & Chan, (2015), Appuhami et al., (2011), Kang et al. (2019), Henderson & McGloin, (2004), Chan et al., (2010a),
State Credibility on Policies	Kumaraswamy & Zhang, (2001), Appuhami et al., (2011)
Transparent and Efficient Procurement Process	Almarri et al., (2017), Chan et al., (2010b), Ismail (2013), Osei-Kyei & Chan, (2017b), Osei-Kyei & Chan, (2015b), Osei-Kyei & Chan, (2017)
The Financial Market	Babatunde et al., (2016),Samarakoon, (2016), Osei-Kyei & Chan, (2017), Chan et al., (2010a), Appuhami et al., (2011),
Strong and Good Private Consortium	Hardcastle et al., (2005),Osei-Kyei & Chan, (2015a), Osei-Kyei & Chan, (2015b),
Economic Viability of the Project	Chan et al., (2010b),Dabarera et al., (2019), Osei-Kyei & Chan, 2017), Chan et al., (2010a),
Equitable Risk Allocation.	Lattermann et al., (2009),Muhammad & Johar, (2018), Cheung et al., (2012), Osei-Kyei & Chan, (2015b), Li et al., (2005)