

**APPLICATION OF PUBLIC-PRIVATE
PARTNERSHIPS MODEL AND EFFECT ON
PUBLIC INFRASTRUCTURE CONSTRUCTION
PROJECTS IN SRILANKA**

**MASTER OF SCIENCE
IN
CONSTRUCTION PROJECT MANAGEMENT**

G.A.A.U. Perera

Department of Civil Engineering

University of Moratuwa

December 2021

**APPLICATION OF PUBLIC-PRIVATE
PARTNERSHIPS MODEL AND EFFECT ON
PUBLIC INFRASTRUCTURE CONSTRUCTION
PROJECTS IN SRILANKA**

BY

Garagoda Arachchige Amila Udara Perera

Supervised by

Dr. Chandana Siriwardana

“This dissertation was submitted to the Department of Civil Engineering of the University of Moratuwa in partial fulfilment of the requirements for the Master of Science in Construction Project Management”

Department of Civil Engineering

University of Moratuwa

December 2021

DECLARATION OF THE CANDIDATE & SUPERVISOR

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university to the best of my knowledge and believe it does not contain any material previously published, written or orally communicated by another person or myself except where due reference is made in the text. I also hereby give consent for my dissertation, if accepted, to be made available for photocopying and for inter-library loans, and for the title and summary to be available to outside organizations.

Signature of the Candidate

02.07.2022

Date

The above particulars are correct to the best of my knowledge

Signature of the Supervisor

Date

ACKNOWLEDGEMENTS

First, I express my immense gratitude to my thesis Supervisor Dr. Chandana Siriwardana for his valuable guidance during the planning and implementation of this research work and the Staff of University of Moratuwa for guiding me in completing this study.

Also, I wish to express my great appreciation to my wife, and family for the encouragement they gave and for bearing with me during the rough periods.

Further, I am grateful to my Employer, Sri Lanka land Development Corporation and the General Manager Mrs Eng. Srimathi Senadhera for creating a decent working environment for me during the course.

A special word of gratitude is due to all the respondents took part in the questionnaire survey.

Finally, I would like to acknowledge all who helped me in numerous ways in completion of this work.

ABSTRACT

Public Private Partnership is defined as a long-term contract between a private party and a government Agency, for providing public infrastructure and services, in this concept, there is an appropriate risk will be to the private party and where the private party bears investment and management responsibility on a long term basis .it reflects a continued collective effort between the public sector and the Private sector to achieve common objectives while both parties track their own individual goals.

The government of Sri Lanka will require to think about substitute financing options to look over the monetary limitations and inadequate capital to develop infrastructure projects such as the Public Private Partnership financial model. However, the application of a centralized procurement model such as public-private partnership to develop infrastructure in Sri Lanka, trends to create financial implications attitudinal problems in government officers, control issues and difficulties in the management of contracts at the execution stage of the development project which needs to be completely understood by stakeholder institutes and strategy makers. Therefore, this study intended to identify the above consequences, barriers and the critical success factors that influence for application of the PPP model to develop infrastructure in Sri Lanka.

The main objectives of this study were, Explore and study the critical factors identified in previous research for the successful delivery of PPP projects internationally. Identify current deficiencies and barriers in PPP practices and the critical factors that affect the Successful delivery of that model for infrastructure development projects in Sri Lanka and propose, areas to be addressed the identified issues for the successful implementation of the PPP model in Sri Lanka by consolidating the above objectives 1 & 2.

Information and the data for the study were gathered by reviewing various types of literature, conducting questionnaire surveys among professionals and semi-structured interviews with the ten selected industrial experts for the PPP procurement method.

Identification of critical success factors of the international concept was done considering the identified critical factors by the ten studies carried out in the different regions of the world related to the same topic of this study. Used frequency of occurrence method to identify the most critical factors under the above research studies

and ten factors were selected as the most critical factors for successful application of the PPP model to the international concept. These factors were incorporated into the questionnaire survey to analyze the effect of those factors on the Sri Lankan concept

Delphi method and the average ranking method were used to analyze the responses received through the questionnaire survey. Ten critical success factors were identified as the most critical success factors that affected the application of the PPP model to develop infrastructure in Sri Lanka and validation of these factors was carried out by conducting interviews with the selected ten experts in the industry.

Ranking of the above critical factors was done using the average ranking method .accordingly Project technical feasibility, Good governance, availability of financial market/viability funding, Sound financial package, effective negotiation between parties, political Support, the well-prepared contract document, competitive/transparent procurement process, Sound economic condition/ economic Viability, Appropriate risk allocation risk sharing. Between public and private parties were identified as the most critical factors that affect the application of the PPP model for the successful delivery of the infrastructure project under the PPP procurement model in Sri Lanka.

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Background and Problem Identification	1
1.2	Problem Statement	5
1.3	Objectives	5
1.4	Research Methodology in brief.....	6
1.5	Limitations of the study	8
1.6	Chapters of the Research Study	8
1.6.1	Chapter 01 - Introduction.....	8
1.6.2	Chapter 02 – Literature Survey.....	8
1.6.3	Chapter 03 – Research Methodology.....	8
1.6.4	Chapter 04 – Data Collection and Analysis	9
1.6.5	Chapter 05 – Conclusions and Recommendations.....	9
2	LITERATURE SURVEY	10
2.1	Introduction.....	10
2.2	Infrastructure development of a country.....	10
2.3	Infrastructure development in Sri Lanka	10
2.4	Definition of the Public Private Partnership (PPP).....	11
2.4.1	What is not a Public private partnership projects	13
2.4.2	Key different between PPP and the traditional procurement system.....	13
2.4.3	Key benefits of the PPP approach to develop infrastructure.	14
2.4.4	Limitation of the PPP approach to develop infrastructure.....	15
2.4.5	Types of public private partnership Model	16
2.5	Application of public private partnership in world wide	19
2.5.1	Public private partnership trends in globally	19
2.5.2	Regulatory Frame work and the institutional Arrangement of PPP's....	21
2.5.3	Requirement of a Public Private Partnership unit.....	23
2.6	Application of public private partnership for Sri Lankan context	23
2.6.1	Evolution of Public private partnership in Sri Lanka	24
2.6.2	Establishment of National PPP Agency.....	25
2.6.3	Current institutional issues for PPP in Sri Lanka.....	26
2.6.4	Public private partnership guide lines.....	27
2.6.5	Prominent features of the latest PPP Guidelines of Sri Lanka.....	27
2.6.6	Public private partnership previous experience and project in pipeline	30

2.6.7	Public private partnership frame work in Sri Lanka	32
2.7	Problem encountered in the application of PPP in the world wide.....	33
2.7.1	Critical factors that affect application of the PPP model to develop infrastructure in the international framework	33
2.7.2	Critical factors that affect the application of PPP model in Sri Lanka ..	38
3	RESEARCH METHODOLOGY.....	39
3.1	Introduction.....	39
3.2	Selection of study plan and the proposal	39
3.3	Method of data collection	40
3.4	Method of data analysis	42
4	DATA COLLECTION AND ANALYSIS	46
4.1	Literature review	46
4.2	Questionnaire survey	47
4.2.1	Outcomes of the different sections of the questionnaire survey	48
4.2.2	Respondent's Academic qualifications.....	49
4.2.3	Primary role of the respondents	50
4.2.4	Respondents general experience in the PPP procurement model	50
4.2.5	Respondents competency on PPP	51
4.3	Discussion on Results	61
4.4	Comparison of the research findings with the critical factors identified through the literature	66
5	CONCLUSION AND RECOMMONDATION	68
5.1	Conclusion	68
5.2	Recommendations.....	69
6	REFERANCES	73

LIST OF FIGURES

Figure 1: PPP Reference guide overview	2
Figure 2: Flow Diagram of Research Methodology	7
Figure 3: Degree of involvement of public party.....	17
Figure 4: type of institutional arrangement adopted to implementation of PPP internationally.	22
Figure 5: Government institutes and function of the PPP unit for PPP practices.....	23
Figure 6: Cross section of the respondent's (Profession wise).....	49
Figure 7: Cross section of the respondent's primary role	50
Figure 8: Respondent's awareness on public private partnership procurement model	51
Figure 9: Respondent's competency on the PPP Model.....	52
Figure 10: Respondent's experience in project wise	52
Figure 11: frequency distribution of the responses (project technical feasibility, good governance, shared authority)	57
Figure 12: Frequency distribution (political support, sound economic condition ,availability of financial market)	58
Figure 13: Frequency distribution (transparency, social financial package, social support)	59
Figure 14: frequency distribution (effective negotiation between parties)	59
Figure 15: Frequency distribution (skilled efficient parties, well prepared contract document)	60

LIST OF TABLE

Table 2-1: Different models of Public private partnership	16
Table 2-2: Description of the selected type of public private partnership	18
Table 2-3: Scattering of PPP- Countries in different region in the world	20
Table 2-4: Functions of PPP units	25
Table 2-5: Roles and responsibilities of key institution to implementing PPP in Sri Lanka.....	28
Table 2-6 : project completed using public private partnership.....	30
Table 2-7: PPP Project pipeline in Sri Lanka	31
Table 2-8: Critical factors that effect for success of PPP project in the world	34
Table 2-9: Critical factors that effect for success of PPP in Sri Lanka.....	38
Table 3-1 : Weightages for Likert scale of the questionnaire survey	43
Table 4-1: Most common critical factors for successful delivery of infrastructure through PPP in the international frame work.....	46
Table 4-2: Practicing discipline of the respondents	48
Table 4-3: Education qualification of the respondents	49
Table 4-4: Practicing discipline of the respondents (Sector wise).....	50
Table 4-5: Critical factors for successful delivery of PPP model in Sri Lanka	53
Table 4-6: Ranking of criticality for identified critical factors.....	55
Table 4-7; Ranking of criticality for identified critical factors (Cont.)	56

LIST OF ABBREVIATIONS

Abbreviation	Description
AHP	Analytic Hierarchy Process
ADB	Asian Development Bank
AR	Average Ranks
BOO	Build Own Operate
BOT	Build Own Operate
BOOT	Build Own Operate and Transfer
BII	Bureau of Infrastructure Investment
BOI	Board of Investment of Sri Lanka
CANC	Cabinet Appointed Negotiation Committee
CRF	Critical Risk Factor
CRF	Critical Risk Factor
CBSL	Central Bank Sri Lanka
CE	Chief Engineer
DPD	Deputy Project Director
EBRD	European Bank for Reconstruction and Development
EOI	Expression of Interest
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GOSL	Government of Sri Lanka
JV	Joint Venture
MMWD	Ministry of Megapolis & Western Development
MOF	Ministry of Finance

MS	Microsoft
NPC	National Procurement commission
NAPPP	National agency for Public private partnership
PPP	Public Private Partnership
RFP	Request for proposal
URA	Urban Redevelopment Authority of Singapore
USA	United States of America

LIST OF APPENDICES

Appendix	Description	Page
Appendix - A	Sample of the questionnaire	76
Appendix - B	Frequency of occurrence of identified critical factors in the world	86
Appendix - C	Details of the interview participant	88

1 INTRODUCTION

1.1 Background and Problem Identification

The development of infrastructure globally is exceeding the tolerable limit of developing countries to deliver required public facilities and services for their citizens. Most of the Ministries, departments and urban development authorities in developing countries in the world lack the own capacities and monetary resources to implement identified development plans for relevant financial years.

Over the last thirty years, Public-Private Partnership (PPP) has become a trend to develop public facilities (Singh & Prakash, 2010) all over the world due to their benefits in delivering public infrastructure projects. However, in international practices, experiences with the above procurement model have not been totally effective.

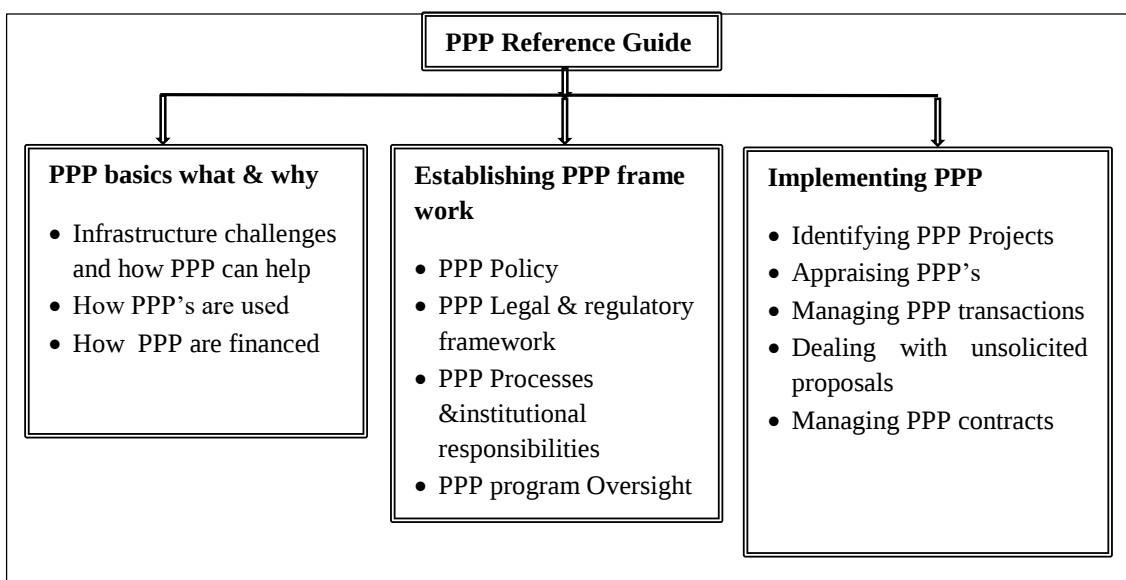
The long-term contract between a private party and a government agency to build up infrastructure or services is defined as Public Private Partnership, there is an appropriate transfer of risk to the private party and where the private party bears investment and management responsibility on a long-term basis. It represents a continued combined effort between the public sector and the Private sector to work for a common objective for the achievement of their own individual goals.

However, private partners of this contract are investing money in the development of the infrastructure but they are not doing it for free. They are willing to generate income out of their investment. As an example consider the expressway development project, here the private partners have the right to collect fees from the users. By collecting tolls on highways for road projects and generating income to recover their investment or the government can reimburse the private partner for their development cost through the availability of payments for the delivery of assets over time.

In the above context, the government may check the quality of the assets developed by the private party at regular intervals. If the assets develop according to the quality standards defined in the contract, that means, the quality of the road surface is sufficient payment for the developed work will be released. If the availability criteria are met. However at some point, if the assets no longer fully meet the availability criteria, then the payment by the government is reduced. This approach encourages the private partner to maintain his cash flows for the performance of assets at the time.

Critical factors for the successful delivery of Public Private Partnership projects were identified as the elementary set of principles of the project despite of the uniqueness available in every Public-Private Partnership project. The project identification of such drivers is viewed as a prerequisite for the development of workable and efficient project procurement and implementation (Kwak et al., 2009)

The World Bank has prepared a reference guide which assists Public private partnership practitioners to enhance their knowledge and understanding for the successful implementation of the Project. This guide focuses on two main areas; namely having in place a PPP policy, legal and institutional framework that ensures the effectiveness of the projects as well as exercising the basic requirement for effective project appraisal and implementation as shown in figure 1.



Source: world Bank 2012

Figure 1: PPP Reference guide overview

Public sector organizations in Sri Lanka also faced a lot of difficulties to face the rising demand for infrastructure and services. As observed by the central bank Sri Lanka, (CBSL, 2018) the budgetary allocations for the development of urban infrastructure are not sufficient as the city development of the country appears to be growing beyond management capacities and the available resources. Since the current account has consistently been in deficit, revenue is insufficient to meet recurrent expenditures. Therefore the entirety of capital expenditure has to be borrowed. However, Sri Lanka no longer has access to a large volume of concessional financing at low rates and long repayment windows. It is clear that Sri Lanka lacks the fiscal space

to continue capital expenditure in business as usual scenario and thus the expenditure for infrastructure investment requires alternative models such as Public-Private Partnership structures whenever there is potential commercial feasibility.

Having known the importance of the development of the infrastructure for the socio-economic development of the societies, the government assigned these tasks to the state-owned enter prices. However, the result was disappointing because of the inefficiency of the public sector. Due to the incapability of the public sector to come across the demand for enhanced public infrastructure development, there have to be looked for alternative strategies. Like many countries, particularly developing countries in the world, Sri Lankan government also adopted the Public-Private Partnership strategy in 1994 as the preferred investment to traditional procurement approaches to handle the increasing demand for the development of public infrastructure and services. By adapting to this procurement approach the country's debt burden could be eased by

Selling off non –strategic state assets and then subsequently using the proceeds to reduce debt. Furthermore, new Public-private partnership investments could be formed between private parties and state corporations. Resulting in greater profits and broadening of the tax base.

Sri Lanka has a 20 years history of securing over \$6bn in PPP investment in port, power, telecommunications, real estate, housing and health all of which are operating successfully. Prior to the early 2000s separate division was established to look after the function of the PPP project under the Board of Investment Sri Lanka and it was named as Bureau of Infrastructure Investment (BII). This separate division act as a catalyst for driving Foreign Direct Investment (FDI) into the country. From 1997 to 2000 the unit produced around 45% Sri Lankan FDI with closing transactions valued at over \$ 800Mn (Sri Lanka Economy view in online reader). Furthermore, Sri Lanka has pioneered in the port and telecommunication sector since the mid to late 1990's. today as a result of a combination of privatization of state-owned assets and new investment via public-private partnership the country became the most competitive and efficient port and telecommunication infrastructure in south Asia region. As a result, setting up the National Agency for Private Public Partnership (NAPPP) for Sri Lanka was established as a separate division in the Ministry of Finance (MOF) in January 2017 and it was established as a separate Agency in July 2017.

As explained by (Ke et al., 2011) (Cheung & Chan, 2011); adegoke is developed to experiment and replace the traditional methods of procurement of public projects. The issues include lack of single-point responsibility, the tendency to argumentative relationships, unsatisfactory utilization of construction knowledge, and backwardness in innovativeness among others. Due to these reasons, the private sector involvement in public infrastructure development and services increasing rapidly across a wide range of industry sectors such as port development and the construction industry.

However, PPP models are not suitable for every type of project, even in countries that apply this model actively. But only limited public projects have been developed through this model .application of this model works satisfactorily when there are long term foreseeable needs for infrastructure services, but it doesn't work well in sectors with rapid change. In light of this, if the infrastructure is to be operative for the next 20 years, then the public-private partnership will be workable.

Structurally complex PPP projects can create high transaction costs. Hence, the project must be sufficient to justify such increased procurement costs. In these circumstances, most of countries apply the PPP model only for the project with budgets above certain inception.

The unavailability of required capacities in the local companies to deliver this type of project will be one of the limitations of this procurement approach. If the Local companies are not equipped to manage the associated risk related to the above type of projects this model couldn't be worked. Successive application of this procurement model to develop infrastructure is politically sensitive. Therefore, it is necessary to have strong political support for the success of projects which are planned to use this procurement model.

The disadvantage of the public-private partnership model structure is relatively inflexible and accommodating changes is not allowed. Once the project has been awarded it might be costly for the public entity to modify project specifications.

Therefore this research aims to identify the most critical improvement that the Sri Lankan government should work on to improve the environment for the application of this procurement model to develop infrastructure in Sri Lanka.

1.2 Problem Statement

Sri Lanka has also applied the Public Private Partnership financial model to full fill the budget deficit and funding gap to develop a few infrastructure projects like other developing countries in the region since 1994.

However, the application of a centralized procurement model like public private partnerships to develop infrastructure in Sri Lanka, trends to create attitudinal problems in government officers, control issues difficulties in the management of contracts at the execution stage of the development project. Therefore it is vitally important to identify the consequences and the barriers to implementing public private partnership model for future infrastructure development projects in Sri Lanka.

Hence, the study intends to identify the above consequences, barriers and common drivers (critical success factors) that influence for application of the PPP model to develop infrastructure in Sri Lanka. Thereby identifying the most critical improvements, which the Sri Lankan government should work to improve the environment for the application of the public private partnership model to develop infrastructure development in Sri Lanka.

1.3 Objectives

Based on the above overview of the research study following objectives were selected as the findings of this research.

1. Explore and study the critical factors identified in previous research for successful delivery of PPP projects in the international concept.
2. Identify current deficiencies and barriers in PPP practices and the critical factors that affect the Successful delivery of that model for infrastructure development projects in Sri Lanka.
3. The proposal will be submitted on the areas that need to be addressed for the identified critical factors of the PPP model in Sri Lanka by consolidating the above objectives 1 & 2.

1.4 Research Methodology in brief

The methodology begins with identifying the suitable mechanism and developing the same to fulfil the objectives of the research study stated in the above section.

The main objectives of this study are to identify the projects that applied public private partnership procurement model to develop infrastructure in Sri Lanka learn the deficiencies and barriers in the existing system and then study the concept of PPP practice applied in the global context to suggest upgrading to the existing PPP procurement system in Sri Lankan

The methodology of this study is based on the collection of data through the quantitative and qualitative methods. This task has been achieved from the review of various literature to get a comprehensive understanding of Public Private Partnerships.

After reviewing the literature, identified the research gap and then a questionnaire was developed and distributed among the industry professionals who involve with the infrastructure development project in Sri Lanka.

Meantime the view of the industry professionals on the application of the PPP and critical success factors of this procurement model has been collected by conducting interviews.

The finding of the questionnaire survey regarding the relevant importance of critical success factors and the procedural deficiencies in past and current PPP practices in Sri Lanka were identified and these findings have been further clarified by conducting a second round of interviews with the industrial experts. Finally, different viewpoints concerning the Average ranking method of the Criticality of the success factors and implications for the successive application of Sri Lankan context will be presented to achieve the objectives of this research study.

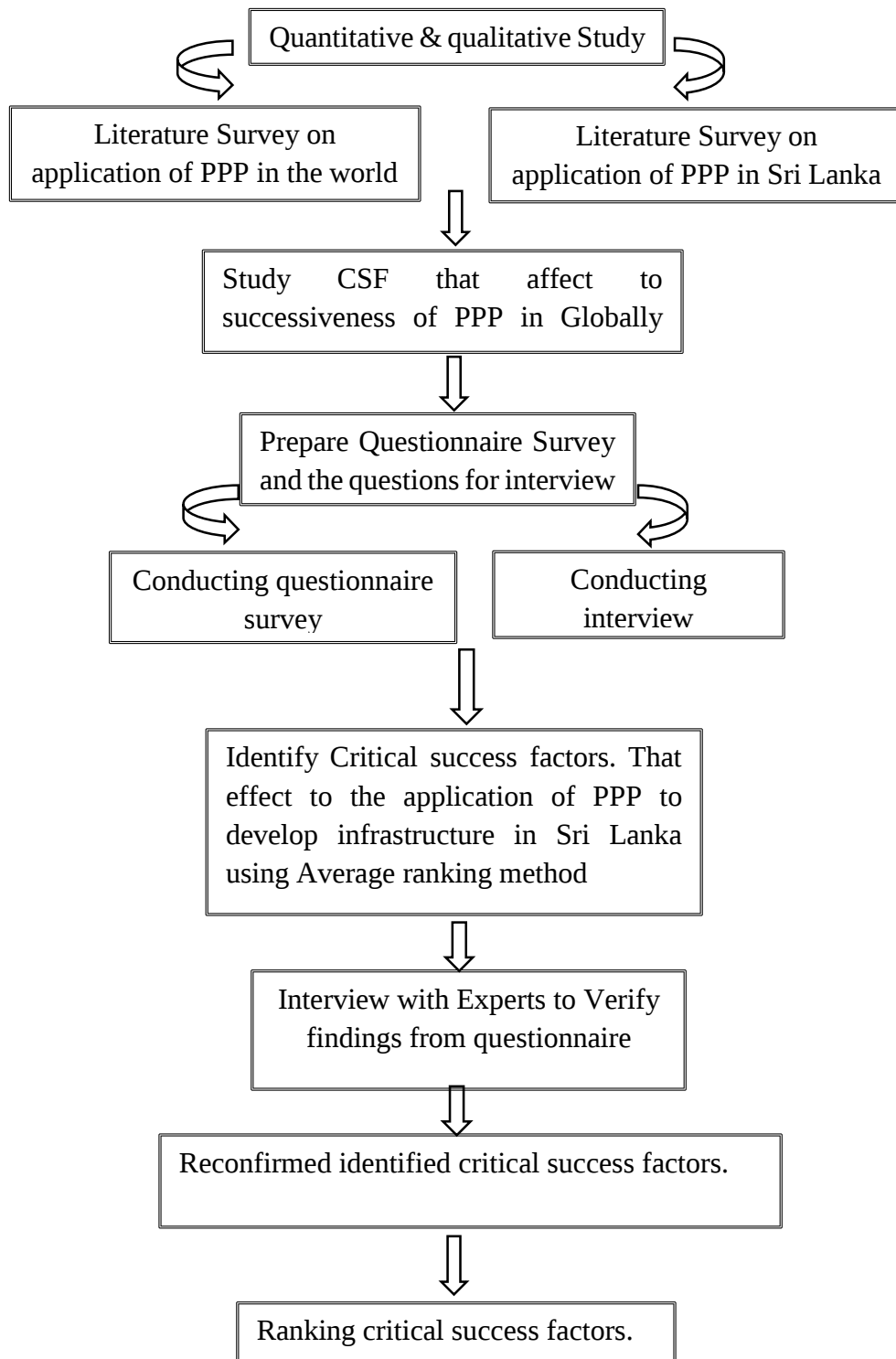


Figure 2: Flow Diagram of Research Methodology

1.5 Limitations of the study

- This study is limited to recognize the critical factors that affect to successful application of PPP Model for public infrastructure development projects in Sri Lanka.
- Most of the constructions professionals in the industry are not aware with the PPP and response to questionnaire was very less.
- Most of the interviewees are senior level officers in the public sector organization and therefore it's very difficult to get their appointment and the time devote for the interview was very less.
- Unwillingness to participate questionnaire survey due to various reasons.
- Collection of data by visiting relevant authorities was not possible due to COVID pandemic situation.

1.6 Chapters of the Research Study

1.6.1 Chapter 01 - Introduction

The Introduction describe a brief outline of the research background, public private partnership procurement model, problem identification, importance of the study with compared to the traditional procurement method and objective of the study.

1.6.2 Chapter 02 – Literature Survey

Chapter 2 discusses the definitions of this procurement model and different types of the model it describes about procurement method and how it help to Sri Lankan government to full fill the budget deficit to develop infrastructures. It further elaborate Limitation of procurement method when it apply for the infrastructure development and what are the critical success factors which helps to successful applications of PPP projects internationally. Finally it evaluate the international experiences and the framework that used to successful delivery of PPP projects for Sri Lankan context.

1.6.3 Chapter 03 – Research Methodology

This chapter deliberates on the research methodology used in conducting the study .it deals among other things, with the data acquisition tools, the sample size and the sampling method, the data analysis technique.it delivers interpretations of the systems used and how approaches used to achieve the objective and purposes of the study.

1.6.4 Chapter 04 – Data Collection and Analysis

Chapter four presents the data collected through the questionnaire survey and the interview carried out with experts in the industry. Obtained data analyzes using the DELPHI technique and it will describes how it used to achieve the targeted objectives of the study.

1.6.5 Chapter 05 – Conclusions and Recommendations

Chapter five presents the summary of the main findings of the preceding chapters and the conclusions arrived with suggestions and recommendations. The concluding chapter also discusses the provisions for future studies to improve the environment for the application of the PPP model to develop the infrastructure project in Sri Lanka.

2 LITERATURE SURVEY

2.1 Introduction

Since the aim of this research is to identify the most important improvements that the Sri Lankan Government should work to improve the environment for delivery of the Public-Private Partnership model to develop infrastructure projects in Sri Lanka, it is important to lay background to study the application of the PPP procurement model to develop infrastructure globally with an idea about the critical factors which supported to the successful delivery of the above procurement model for infrastructure development of Sri Lanka.

Therefore, the key objectives of this section is to elaborate the fundamental of the Public Private Partnership, its various model available to practice in global concept, application of PPP's, its frame work to develop infrastructure internationally and identify the possible risk and issues which could be found in the implementation stage. Accordingly it can be learned how to adapt this concept for development infrastructure in Sri Lanka.

2.2 Infrastructure development of a country

Infrastructure is typically defined as the development of technical structures such as roads, water supply systems, power plants, port development, telecommunication that support the society and upgrade their lifestyle. It is one of the most important tools for accelerating economic development in any country.

Infrastructure development is divided into two broad types such as the economic infrastructure and social infrastructure. Economic infrastructure comprising road, railways, port, airports, dam and reservoirs, water head work, recreational activities development, power generation facilities and the social infrastructure comprising the development of the school and other education facilities, hospital and other health facilities,

2.3 Infrastructure development in Sri Lanka

Sri Lanka has experienced significant growth in GDP since the 1990s. However, its growth rate has slowed insignificantly from year 2012 falling below the target of 8% (Bank, 2014). It is further disclosed in the Global competitive Index for infrastructure. The competitive index of Sri Lanka currently ranks as 75 out of the 138 countries and it was ranked as 68 out of 140 countries in the year 2016. This declining trend highlights the urgent need for Sri Lanka to address large gap of the budget deficit for the development of the infrastructure as infrastructure spending needs to increase to sustain

a higher economic growth rate. According to the central bank records in Sri Lanka, actual spending on infrastructure as a percentage of the GDP has been declining since 2012 and it was budgeted only 1.6% of the GDP in 2015. However, to achieve the target growth of the economy it should be 7 %. p.a. (Bank, 2014) Challenges in borrowing money for infrastructure development in Sri Lanka

Sri Lanka needs to maintain fiscal discipline and continue to bring down the budget deficit to the targeted level to maintain access to the global financial market to roll over upcoming debt at an affordable rate. The current account of the country is consistently in deficit since revenue is insufficient to maintain recurrent expenditure. Therefore entirety of capital expenditure has to be borrowed (CBSL, 2018). Sri Lanka no longer has access to large volumes of concessional financing at low rates and long repayment windows. It is clear that Sri Lanka lacks the financial space to continue capital expenditure in a business as usual scenario and thus the development of infrastructure requires alternative models such as Public-private partnerships whenever there is potential commercial feasibility. This will free up resources for government to overcome the budget deficit to develop infrastructure in the country.

2.4 Definition of the Public Private Partnership (PPP)

Public private partnership is a special predetermined procurement arrangement among a public sector Ministry, Corporation or authority and a private partner company for developing a public infrastructure asset or service, while there is an appropriate allocation of risk to the private party where the private party bears investment and management responsibility on a long term basis. (X. Zhang, 2005b)

In this model, the main tasks of the private partner are the design of the infrastructure development project, construction, funding, operation and management an asset to hand it over directly to the government or public end users. The private partner will receive a stream of payments from the public sector or through charges levied from end users, or both, as a return on the investment and tolerate risk associated with such investment.

As stated by (Ismail, 2013) the PPP procurement model is an internationally accepted procurement model, in which public organizations utilized the expertise, funds and assets of the private sector, and transfer the responsibility of developing public infrastructure and services to the private sector.

As explained by (Chan & Cheung, 2013) Public-private partnership is new procurement paradigms and alternative models to face challenges in the conventional procurement

methods to develop the infrastructure of any country. Most of the developed and the developing countries in the region, the private sector is increasingly getting more involved in the provision of public infrastructure and services under the PPP model into the wide range of infrastructure development projects, including power, transportation, water supply and disposal, telecommunication, development of schools, hospitals etc. in order to alleviate the spending on government budget.

According to the study carried out by (Hardcastle et al., 2002), he recognized that private companies come in all sizes and types when the application of the PPP. (Li et al. 2003) also stated that, application of the PPP for the development of infrastructure like education, health and transportation sector has been initiated since the 1990s globally. This could be considered as a paradigm shift in the infrastructure development process in the global concept. (Hardcastle et al., 2002), further explained that the government is no longer worried about providing infrastructure and public services since they have used advantages of the PPP such model as the private finance initiative to recognized as important approaches to solving problems for the government in providing infrastructure development.

The study done by (Pessoa, 2006) further elaborates on public-private partnership as while the government achieve the service delivery objectives to the general public the private partner line up with the profit objectives. This means a shared commitment to a partnership, does not necessarily mean sharing expectations and goals.

As explained by (Solomon et al., 2012), the concept of PPP is to allow governments to utilize private sector investment, expert knowledge in technology and entrepreneurship to deliver infrastructure efficiently and effectively to meet household tasks and fulfil the requirement of the general public.

2.4.1 What is not a Public private partnership projects

- The projects where the government provide a sovereign guarantee to the lending institution of the private partner's debt are not considered a public private partnership project.
- The government or any of its financial institution's finances by itself either through public funds, loans, grants, gifts, donations, and contributions, for the development of infrastructure, services or purchase of goods are not considered as the PPP procurement model.
- Outright sales or long- term lease of any government assets to the private party has also not a public private partnership.
- The project where the government retained the whole of life assets risk is not a private public partnership project since the above risk in the PPP is retained in the private party.

2.4.2 Key different between PPP and the traditional procurement system

In the infrastructure project development under the traditional procurement system, the payment is made upfront while in the Public-private partnership model, the government does not release any funds during the implementation stages. Payment for the contractors (private partners) will be paid as interim payments during the duration of the project.

The second key difference between public-private partnership and traditional procurement models is the duration. In traditional procurement, the contract between the government's agency and the contract will finish when the scope of the development work is over. In PPP's connection between the government and the private partner will continue up to the end of the contract period normally more than 20 years beyond completion of construction work or after delivery of the services, due to the responsibility of the private partner for building the infrastructure and operating it for a set number of years. Correspondingly the public authority is essential to monitor the performance of the private operator all over the contract. In this model after the contract agreement rights of the developed properties revert to the public authority.

A third element that differentiates public private partnerships from the traditional project is government mentioned their requirements in the agreement which is defined in terms of outputs while traditional procurement focuses on inputs. For

example, consider the development of a two-terminal in the Airport. In this contract, the government required two terminals with a handling capacity of 10 million air passengers per year as output and whereas two terminals each at least 250,000 sq.m will be delivered as an input. Using this concept of output specification, the private sector will be encouraged with the opportunity to come up with innovative solutions for generating facilities for the public which influence result in significant cost savings for the government.

The other key benefit of the PPPs distinct from traditional procurement approaches concerns risk allocations, whereas in traditional procurement most risks have been tolerated by the public sector. In public private partnership, a risk-sharing process will be imposed between the public and the private partner.

2.4.3 Key benefits of the PPP approach to develop infrastructure.

One of the key benefits of the PPP procurement model is the possibility of attracting private capital to develop infrastructure. Therefore in this type of project, the private sector has to be remunerated for their investment. It can provide short term financial relief by using this procurement approach to develop the infrastructure of countries. However, the application of this concept will only ease the issues of funding for infrastructure development to some extent and the private party can be charged user fees or generate additional revenue from the public assets.

Consider the development of passenger, terminal for airports under the PPP approach, in this type of project the general public mainly sees this development as a project which provides transportation services to passengers and airlines .however, under this approach the private sector might be able to identify and develop other sources of revenue from these assets to such as shops, hotels, car parks and other facilities related to airport development. These revenue sources of the private partner can be used to partly fund the operation and management of the proposed development.

The other benefit and the reason for encouraging for application of the PPP model is the realization of efficiency gains through the improved projects. Access to technology and the experience related to development could be adopted by the government sector by taking advantage of private-sector efficiency.

The next benefit identified with the Public-private partnership model is the creation of long term solutions for the development identified under the PPP contract will seek out the issues such as poor construction quality and inadequate maintenance as the investor

is responsible for operating 20-30 years and he should make sure that assets are built properly. Similarly, the government will be suspended from the payment to the private partner, if the assets fail to meet performance standard then the government need to assure allocation for maintenance work.

The other benefit of this type of procurement model is government funds are protected against possible cost overruns that are often significant in public infrastructure projects. Due to transfer risk to the private sector,

2.4.4 Limitation of the PPP approach to develop infrastructure

Application of Public-private partnership is not workable for every type of project. Even most of the countries where PPP's have been promoted actively, developed only limited types of public projects through this model. This model doesn't work for the project which occurs rapid changes such as it used for a short period. But it works better when there is a long term concession provided through the Agreements. However, the key issue of this type of model is the complexity of the structures proposed to develop under this model. In light of this, the projects can create high transaction costs and then it is essential the project must be large enough to recover such increased procurement cost.

Another limitation of the approach of this type of model is the lack of capacity of local companies to deliver the project. Local companies might not be equipped to manage the risk related to a PPP project. It can also be sensitive from a political point of view. The public might feel that the government is going too much or is been too generous with private sponsors. In addition, the establishment of a public-private partnership might coincide with the introduction of the user-pay principle which can create public discontent. In light of this strong political support is critical for the success of this public-private partnership.

Finally, the public-private partnership model can be relatively inflexible and poor at accommodating changes and modifying project specifications once the project has been awarded.

2.4.5 Types of public private partnership Model

There are few types of PPP models practiced in the world and these models lie in between two extremes traditional procurement and privatization. Based on this concept any combination between the above two extremes is considered a type of model of the public-private partnership (Perera, 2011). The National Council for Public-Private Partnership situated in 2020/k Street NW, Suite 650 in Washington, describes the different PPP models (total of 18) partnerships as described in the table below (federal transit administration, n.d.)

Table 2-1: Different models of Public private partnership

No	Type of PPP	Description
1	O&M	Operation and Maintenance
2	OMM	Operations, Maintenance & Management
3	DB	Design -Build
4	DBM	Design Build and Maintain
5	DBO	Design Build Operate
6	DBOM	Design Build Operate &Maintain
7	DBFOM	Design Build Finance Operate Maintain
8	DBFOMT	Design Build Finance Operate Maintain Transfer
9	BOT	Build Operate Transfer
10	BOO	Build Own Operate
11	BBO	Buy Build Operate
12	DF	Developer Finance
13	EUL	Enhanced Use Leasing or Underutilized Asset
14	LDO or BDO	Lease Develop Operate or Build Develop Operate
15		Lease/Purchase
16		Sale/Leaseback
17		Tax-Exempt Lease
18		Turnkey

As described by (Kwak et al., 2009) Public-private partnership is a different partnership option along specific fields matched with the extent of responsibilities given to each partner. (Muhammad et al., 2016) further, explain that the degree of involvement of both public and the private party will depend on the different types of PPP models. The following figure no 3 shows the degree of involvement of the public and party for the types of PPP models. According to the literature review, it was found that the following five models were most widely used in global practice.

- Operate and maintenance model (OM)
- Design Build Operate Model (DBO)
- Design Build Finance Operate (DBFO)
- Build Operate Transfer Model (BOT)
- Build Own Operate Model (BOO)

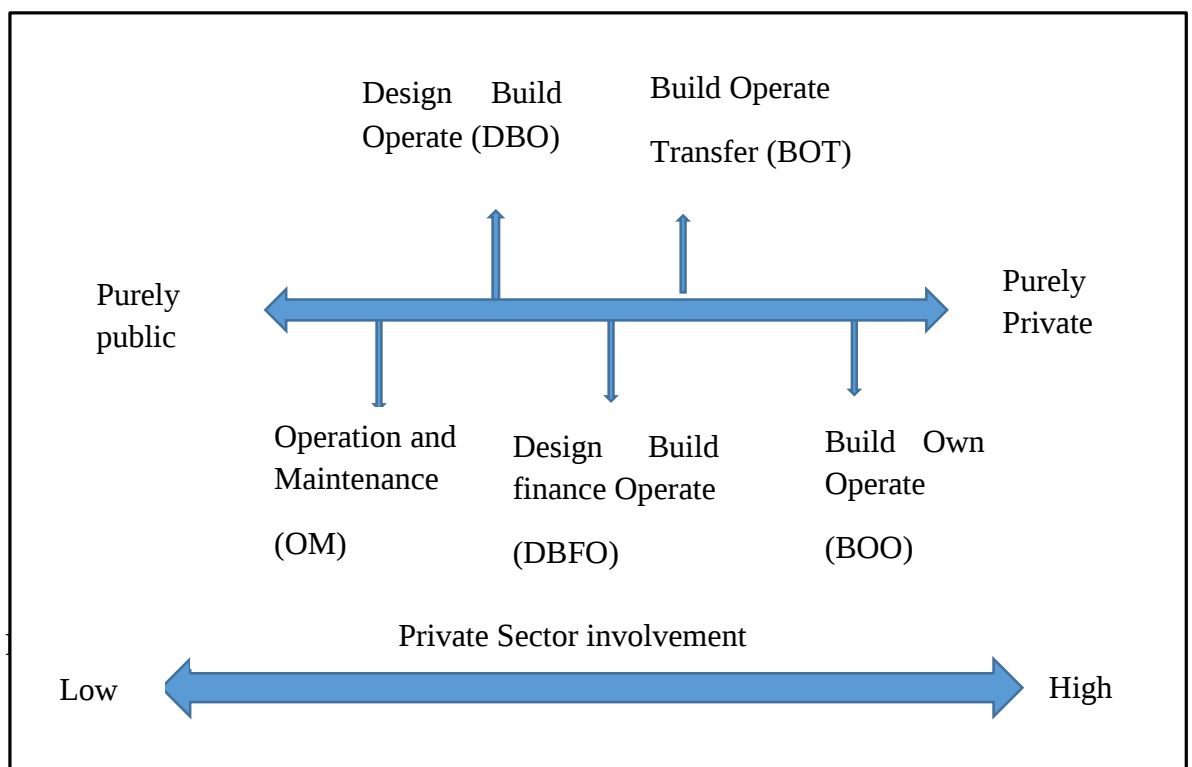


Figure 3: Degree of involvement of public party

Types of the public private partnership model and detail description of these models are further summarized in the table shown below.

Table 2-2: Description of the selected type of public private partnership

Type of PPP	Description
Operation & Maintenance	• All aspects of operation and maintenance will be done by the private sector. • Private sector has not the responsibility for funding but they manage government fund and determine how the fund should be utilize together with the public sector.
Design Build Operate	• The private party responsible for development of project for a free agreed duration prior hand it over to the public sector.
Deign Build Finance Operate	• Funding, design, construction operation and maintenance of the project will be done by the private Party. • Full authority of the project will be hold by the public sector
Build Operate Transfer	• Funding, development, operation and maintenance of the project for a concession period will be responsible by the private sector • The assets will handed over to the government at the end of concession period at zero cost.
Build Own Operate	• Funding, development, operation and maintenance of the project for a concession period will be responsible by the private sector • Private sector retains ownerships of the assets. • The government purchase the services produced for a fixed length of time

2.5 Application of public private partnership in world wide

The evolution of the PPP concept has been started from the 1980s in the world and first, this concept was applied to develop infrastructure in the United Kingdom. Then it has been adopted by European countries like Australia, Canada, and most of the countries in entire Europe in the 1990s. After that, it was spread to China and the Middle East countries as the best model for financing infrastructure projects. Asian countries like India and Malaysia are used the public-private partnership model since 1994 to develop their infrastructure.

The application of the public-private partnership in the Sri Lanka context begin in 1994 and it was used rapidly to develop economic growth by developing infrastructure in 1998. However, Asian countries like India, Malaysia and, Singapore are at a higher-level for using PPP compared to Sri Lanka.

2.5.1 Public private partnership trends in globally

The public-private partnership has spread across the globe rapidly from 2002 to 2011 and 134 developing countries implemented new infrastructure development projects under this model. According to the World Bank supported document of PPP (The World Bank, 2012), private sector investment in developing countries contributed 15% to 20% of the total investment in infrastructure during the last 10 years. The reason behind that was the application of public-private partnerships slowed down from 1997 to 2004 due to the Asian financial crisis. However, investment in the project using this procurement model is rises after the global financial crisis happening in 2008. Investment in projects using PPP was highest in 1997 at \$ 60 billion per year. After that, it subsequently increased to \$79 billion per year in 2008.

Although initially, this procurement model was restricted to economic infrastructure development then it has diversified into the development of social infrastructures such as schools, hospitals, and health services and it spread over middle-income countries such as Latin America, the Caribbean, East Asia, and Pacific region

Table 2-3: Scattering of PPP- Countries in different region in the world

Region in the World	No of Counties	List of countries
East Asia and Pacific	12	Cambodia, China, Indonesia, Malaysia Mongolia, Myanmar, Papua new Guinea Philippines, Singapore, Thailand, Vietnam.
Europe and central Asia	13	Albania, Moldova, Armenia, Romania Bosnia, Russian Federation, Bulgaria, Tajikistan, Kazakhstan, Turkey, Republic, Ukraine, Lithuania
Latin America, Caribbean	14	Argentina, Brazil, Colombia Costa Rica, Dominican republic Ecuador, Guatemala, Honduras Peru, Jamaica, Uruguay, Mexico
Middle East & North Africa	7	Algeria, Lebanon, Egypt Arab Rep, Morocco, Iraq, Tunisia Jordan
OECD high Income	10	Australia, Canada, Chile, France Italy, Korea, Poland, Portugal United kingdom ,United states
Sub-Saharan Africa	20	Angola, Ghana, Senegal, Benin, Kenya, South Africa, Cameroon, Madagascar, Tanzania, Congo Dem, Malawi, Togo, Congo, Rep, Mauritius, Uganda, Zambia, Gabon, Nigeria.
South Asia	6	Afghanistan, Nepal, Bangladesh, Pakistan India, Sri Lanka.

Source: Benchmarking PPP procurement 2017

2.5.2 Regulatory Frame work and the institutional Arrangement of PPP's

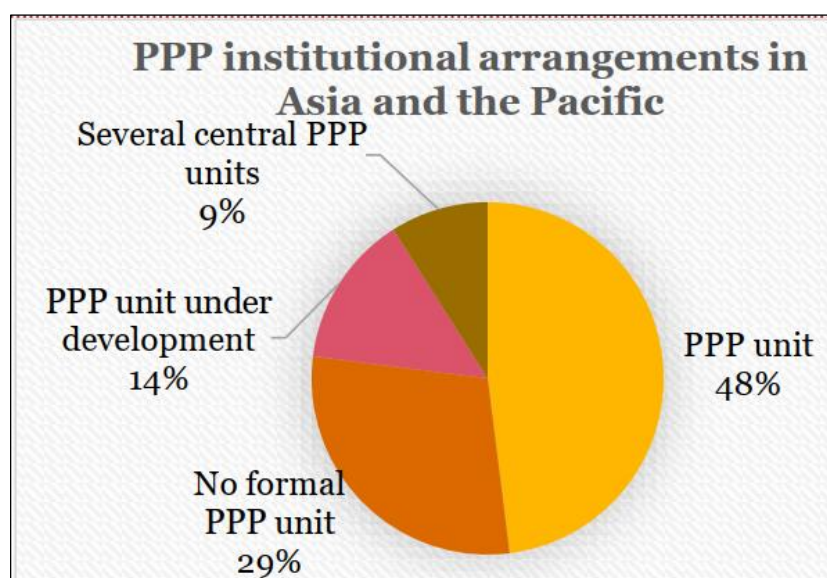
Regulatory frame work

According to the literature review, most of the countries in the world have practices, a public-private partnership model, without an overall policy. That will leads to Indefinite goals and a greater possibility of problems with the project.to overcome these situations the UN guidebook advised the countries that practice public-private partnership to develop their infrastructure, PPP process requires sound that lay down clear objectives and principles to identify the potential projects and set a realistic target and the means of achieving them. The type of the legal system in most countries heavily influences the type of PPP regulatory framework available in those countries. Further, the countries that practice public private partnership using the domestic legal system tends to depend on guidelines. However, the countries that practice PPP with the domestic legal system are possible to set up a detailed public-private partnership framework which can influence detailed rules and regulations with legal force. (World Bank group, 2018)

There is a wide range in how public private partnership frameworks are regulated between the countries even if they work within a similar legal system. The reason behind that is that even though this procurement model is regulated completely using a single legal document but it's developed different legal mechanisms such as laws, regulations, decrees, enacted policies and guide. Thesis carried out by the word bank to measure countries' economies by benchmarking PPP procurement revealed that most of the countries adopted law or act that specifically regulate for Public private partnership laws and regulation practices in countries, although not focuses on entirely PPP but it has an impact on them when regulating matters such as land ownership or public financial management. For examples, Vietnam imposes PPP through an administrative declaration instead of using a law while Cambodia, Chile, costa, Rica, Mongolia, Nicaragua and the Panama legislated only concession laws.(World bank group, 2018)

Institutional Arrangement

As the public-private partnership is structured in different methods, initiation and execution of PPP projects also function within a different organizational arrangement. According to the literature 85% of the countries that used PPP practices to develop infrastructure in the world, form a PPP unit with full or partial assistance of the government. The intended goals of this unit were to provide support and evaluate, multiple Public-private partnership agreements available in the government institution. According to the research carried out by the World Bank in 2018, the function and the role of public-private partnership institutions vary with the economic factors in the countries internationally. However, 16% out of 85% of the countries have formed public-private partnership units with a dynamic role in the process of PPP procurement. 69% of the countries practice the PPP unit with an advising role to the procuring authority. It was revealed that around 15% of the countries are practicing a public-private partnership procurement model to develop infrastructure without forming a public-private partnership Unit. More than 71% of countries in the Asia Pacific region are used public-private partnership units to build the required expertise for developing public-private partnership programs. These units provide advisory services such as public-private partnership regulation policy and guidance, technical support in implementing PPP projects, capacity building for other government entities, and oversight of project implementation to relevant line ministries.



Source:
Benchmarking PPP
Procurement 2017

Figure4: type of institutional arrangement adopted to implementation of PPP internationally.

2.5.3 Requirement of a Public Private Partnership unit

To address the weakness and the constrained in the public private partnership market in world practice, most countries establish public private partnership units to develop their infrastructure. it will support to functions of the relevant government institution and overcome the limitations faced due to the application of this procurement model.

The following figure shows the function and limitations of the government agency for implementation of the PPP process and how it is overcome by the public private partnership units.

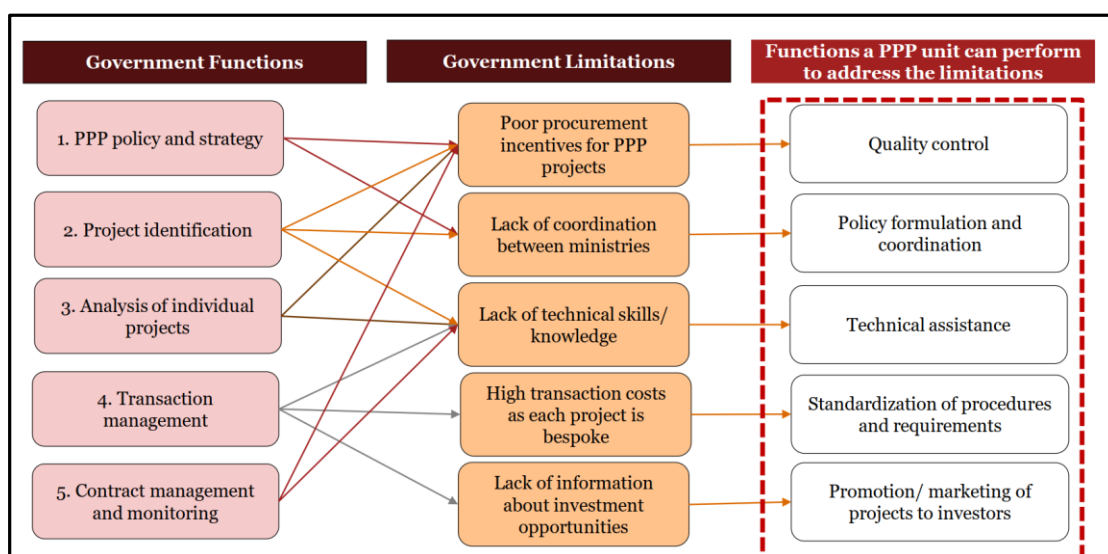


Figure 5: Government institutes and function of the PPP unit for PPP practices

Source: The World Bank and PPIAF, 2007, Public-Private Partnership Units

2.6 Application of public private partnership for Sri Lankan context

In general practice, the Sri Lankan government funded for development of all major infrastructure projects and private investment is used as an anchor for economic growth in the past.

Most of the above major projects were funded through borrowed funds due to the economic situation in the country. it is further complicated as such borrowings to be serviced from tax revenue and the economic returns from those investments are insufficient to service debts.

Many countries in the world, as well as Sri Lanka, have initially depended on government funding for infrastructure development and the deficit in infrastructure financing has increased during the last few decades. Therefore, due to difficulties in

finding finance for infrastructure development government has to pursue private sector participation on a commercial basis.

In this context, Sri Lanka has adopted a public-private partnership as a successful alternative model to facilitate the rapid development of critical infrastructure like other developing countries. This model contributed to the acceleration of industrial development. Further, it has been paying attention to obtaining Foreign Direct Investment (FDI) which subsequently contributed to the stabilization of economic balances.

2.6.1 Evolution of Public private partnership in Sri Lanka

The secretariat for infrastructure development and investment (SIDI) with the private sector infrastructure development cooperation (PSIDC) in Sri Lanka tried to implement the concept of Private-public partnership to develop infrastructure in the early 1990s. In 1996 SIDI was absorbed by the Board of Investment (BOI) Sri Lanka and it was renamed the Bureau of Infrastructure Investment. It was officially inaugurated the PPP unit in 2006 within the board of investment Sri Lanka and the project is being within the BOI was operated under this unit (Mel & Rathbone, 2018). Under the setup of the BOI, a number of PPP projects reach financial closer both more quickly and more efficiently. Therefore setting up the national agency for public private partnership units inside the Ministry of finance has been identified as a major requirement to facilitate financial and legal expertise to ministries to cater the future projects in the country. Accordingly, the Public private partnership unit under the Ministry of Finance was established in January 2017. Thereafter it was identified the government a division within the ministry was inadequate and proposed to have an agency for PPP with adequate legal, administrative and financial authority. Accordingly, the PPP unit within the finance ministry was winding up and the National Agency for public private partnership is set up in 2018 as a single facilitation point for all stakeholders in designing and implementing public private partnership.

2.6.2 Establishment of National PPP Agency

The creation of the National Agency for Public-Private Partnership in 2017 under the Ministry of Finance is one of the positive steps taken by the government to restructure PPP activities in Sri Lanka. The main role of this unit is to prepare guidelines in association with the National procurement commission, establish standards, and collaborate and facilitate relevant line ministries. Allocation of the risks in a public-private partnership project fairly between the public sector and the private sector is one major goal of the National Agency of PPP. Public finance, fiscal policy and national planning are directly related to Infrastructure investments in the country. Therefore setup the national agency of public-private partnership inside the Ministry of Finance encourages private investors to invest in Sri Lanka. Further, this Agency will facilitate the line ministries coordinate and corporate with the public finance and fiscal operations to implement a successful Public-Private Partnership regime. The function of the PPP unit in the world varies widely as this replicates the country's priorities and its constrained by applications of this procurement model to develop infrastructure. The following table shows variations in the function of PPP units in the Philippines and South Africa compared to Sri Lanka.

Table 2-4: Functions of the PPP units

Table 2.4: Functions of PPP Units	PPP Centre Philippines	PPP unit South Africa	NAPPP Sri Lanka
Policy Guidance	✓	✓	✓
Project Screening	✓	✓	✓
Appraisal of Feasibility studies	✓	✓	✓
Assisting the approval of PPP Projects	✓	✓	✓
Managing the procurement process	x	x	x
Bid Approval	✓	✓	✓
Managing monitoring and enforcing ongoing PPP Contract	✓	✓	x
Other facilities such as projects preparation and VGF	✓	x	✓

Source: NAPPP, Asian Development Bank 2017, Organization for Economic Co-operation and Development 2010

2.6.3 Current institutional issues for PPP in Sri Lanka

According to the diagnostic assessment carried out by the World Bank regarding the application of the PPP model to the Sri Lankan context found following institutional issues and constraints in the PPP market in the country.(World Bank, 2017)

- No overall assessment of infrastructure needs or prioritization of the projects
- Overconfidence in an unsolicited proposal
- Lack of coordination between multiple agencies will lead to difficulties in the project approvals process.
- Unrealistic budgeting for infrastructure development and hence over dependence on public funds leads to fiscal constraints
- Proposals and the structure of the projects planned under the PPP concept were not attractive to the investor and the commercial lenders.
- Unavailability of a centralized database for knowledge sharing on the PPP applications.

As a solution to the above issues, the World Bank proposed the following action to deliver future PPP projects successfully. (World Bank, 2017)

- Optimize public resources and priorities investment.
- Establish an institutional framework.
- Strength and improve the policy environment.
- Strength procurement guidelines.
- Develop a liability management framework
- Build PPP capacity and awareness

2.6.4 Public private partnership guide lines

The public-private partnership guideline is a guide for government and private partners to develop a project.

The main purpose of the guideline is to promote the efficient and sustainable delivery of the projects. It ensures and guides the selection of potential PPP projects that are structured with appropriate risk allocation to achieve value for money invested by a private party. Further, the guideline is a device to ensure that projects are managed in a transparent way. According to the guidelines used in many countries, the articulate objective of the project and the type of project to which it applies, well-defined procedures, decision criteria and institutional responsibilities and policy documents with the legislative structure are the common features of well-structured properly documented guidelines.

2.6.5 Prominent features of the latest PPP Guidelines of Sri Lanka

After the establishment of the National Agency for public private partnership as a separate entity in 2018, the existing guideline has been revised with force full features for the successful delivery of infrastructure in the country.in this process, the method of the PPP procurement process is promoted to a achieve reasonable balance between the following features. Value for money,

- timeliness during implementation and quality,
- adherent to prescribe standards, specifications, rules and regulations and good governance
- Compliance with laws and regulations
- Transparency and consistency in the evaluation and selection process.
- Confidentiality of information provided by the project proponent.

Table 2-5: Roles and responsibilities of key institution to implementing PPP in Sri Lanka

Institution /committee	Role and responsibilities
Line Ministry/ Agency	• Identifies the needs for PPP projects • Manages and owns the entire PPP procurement process comprising pre-feasibility studies, tenders preparation and execution of PPP Project Agreements, and the monitoring of the partner over the contract term
Ministry of Finance, department of national planning other related agencies with fiscal responsibility	• Appraising the recommended project for implementation • Evaluation of PPP business model, economic and financial analysis • Appointing CANC and project committee members. • Project risk assessment and allocated risk between private entity and public entity. • Evaluation of requirement of Gap financing and sources and term of funding. • Monitoring procurement process in order to avoid delay and maintain efficiency.
National Procurement commission (NPC)	• Formulate processes and directives for the procurement of goods and services, work consultancy contract series by the GOSL • Monitor and reports on whether appropriate authorities abide by the guide lines and that procurement process are fair and transparent.
National Agency for Public private partnership(NAPPP)	• Act as a facilitation point for all stakeholders in designing and implementing PPP's • Facilitates the successful delivery of all types all types of PPP project.

Institution /committee	Role and responsibilities
Cabinet appointed negotiation committee (CANC)	• Address and clarifies policy issues governing PPP transaction in consultation with NAPPP. • Establishes time frames for PPP transaction. • Gives final approval of the feasibility study and bid document. • Select pre-qualified bidders and preferred bidders for final approval of the cabinet ministers.
Project Committee	• Guide the PPP through its various stages of implementation • Steer the preparation of RFP/EOI and screen proposal. • Prepare evaluation and required report on bids for consideration by CANC • Coordinates all correspondence and supply written answers to all question during the bid.
Attorney General department	• Approving legal aspect only of the bidding document.
PPP appeal board	• Hear and determine bidders against contracting authorities in respect of the PPP procurement process • Resolve disputes and complaints, conducting proceedings in accordance with the appeal board rules.

Source: Ministry of Finance (April, 2018): 8th Draft Guidelines for Public-Private Partnership Projects: 2018

2.6.6 Public private partnership previous experience and project in pipeline

Sri Lanka has a 20 years history of securing over \$6 Billion PPP investment in port, power, telecommunication, real estate, housing and health sectors which were operating (World Bank, 2017) successfully. Sri Lanka has not had a single failed PPP before to the 2000s. All of these projects were implemented under the separate division of the Board of Investment Sri Lanka. This separate division is named as Bureau of Infrastructure Investment (BII) and it was acting as a promoter for driving foreign direct investment (FDI) to the country. From 1997 to 2000 the BII unit produced around 45% of the country's FDI (World Bank, 2017), with an \$800m closing transactions value. Furthermore, Sri Lanka pioneered public-private partnerships in the port and telecommunications sectors during the period 1997 to 2000. As a result, the combination of privatization of state-owned assets and new investments through Public-private partnerships is generated in the country. due to the application of this procurement model to develop infrastructure, Sri Lanka has the most competitive and efficient port and telecommunications infrastructure in South Asia.

Table 2-6 : project completed using public private partnership

	Project Name	Sector	Year of Financial closer	Total Investment Cost U\$\$ in Mn
1	Colombo port	Port	1999	240.00
2	AES Kelanitissa power project	Electricity	2001	104.00
3	Norochcolai Coal Power Plant	Electricity	2010	450.00
4	Boardlands hydropower plant	Electricity	2010	82.00
5	Colombo South Container terminals	Port	2011	500.00
6	Kankasanthrei Wind/solar power plant	Electricity	2012	280.00
7	LAUFS Liquefied petroleum gas terminal	Port	2017	120.00
8	Thumbowila Waste to Energy Plant	Treatment Disposal	2017	105.00

9	Western Power Company Waste to Energy	Treatment Disposal	2018	81.94
10	Dendro Biomass power plant	Electricity	2014	13.59
11	Renewgen Kaduwela Biomass Plant	Electricity	2012	29.0
12	Daily life Kalpitiya wind farm	Electricity	2012	16.8
13	Pwergen uppudaluwa Wind Farm	Electricity	2012	14.0
14	Lower Kothmale oya SHPP	Electricity	2012	6.4
15	Helius Kattamurichchana Bio Mass Plant	Electricity	2012	3.0

Source: World Bank Source cited on Wikipedia at

https://en.wikipedia.org/wiki/Economy_of_Sri_Lanka

There are a few projects implemented under a different model of public private partnership in the port sector, affordable housing project and the infrastructure development project under the megapolis ministry of Sri Lanka. Details of the PPP project in the pipeline are shown in Table 2.6

Table 2-7: PPP Project pipeline in Sri Lanka

	Project Name	Sector
1	Colombo port city project	Port
2	Inland water transportation project	Transport
3	Elevated highway from new kelani bridge to Rajagiriya	Transport
4	Marine drive extension/underground tunnel to port city.	Transport
5	Domestic Air Transport(western region light rail transit project	Transport
6	300MV Kerawalapitiya LNG power plant	Power
7	Solar park Monaragala and pooneryn	Power
8	Walivita water supply scheme	Water
9	Biyagama &port city university project	Education
10	Dedduwa integrated development	Tourism
11	Cruise terminal at Bandaranayke Quay	Tourism

12	Transit smart Card	Digital Infrastructure
13	Affordable housing for National housing development Authority	Real State
14	Recreational beach development wellawatta	Real State

Source: workshop on the responsibilities of the national Agency for PPP on 5th April 2018 at Galle face hotel Colombo

2.6.7 Public private partnership frame work in Sri Lanka

Public sector agencies in Sri Lanka faced key challenges due to the unavailability of proper policy frame work, institutional framework and legal framework while implementing the public private partnership procurement model to develop infrastructure in the country.to overcome these issues the government established National Agency for Public private partnership in 2015.

Establishment of the NAPPP and board of governors with other institutional arrangements have been developed under the institutional framework of the country. Development of PPP policy, preparation of guidelines and the communication strategy were developed as a Public private partnership policy frame work. The Solution to weakness of the investment climate and assessment of the legal framework in each sectors have been addressed under the legal frame work of the public private partnership frame work in Sri Lanka. (Akintoye et al., 2015).There are five phases followed in the PPP project cycle in Sri Lanka like in the other countries in the Asian region.

- Identification of project
- Project feasibility analysis and preparation
- Procurement and selection of the private developer
- Project award and contract signature
- Project agreement management and performance monitoring

In this process, NAPPP provides policy and legal expertise to address PPP related policy issues. provide transaction advice on risk allocation payment mechanism etc., assist with coordination between line ministries/agencies, securing transaction specific approvals, reviewing environment and social reports, assisting in recruiting external consultant, assisting to develop tender documents and project agreements, providing

financial, legal and technical input during the evaluation of bids and assisting to negotiate with the preferred bidder.

2.7 Problem encountered in the application of PPP in the world wide

According to the literature, various problems have been encountered during the application of public-private partnerships to develop infrastructures worldwide. The slow progress of the projects during the implementation of PPP is one of the main problems faced by government institutes in the world. The strong public opposition, political instability, the various stakeholder involvement, lack of awareness and the experience with PPP and expertise in many countries and regions are the other major issues in the world for the application of PPP to develop infrastructure.

In the above context, various type of research have been attended to identify the critical factors that affect the success of Public-private partnership model and most of the researchers initiated to identify the most critical success factor that affects the successful delivery of the PPP based on a public-private win-win principle.

2.7.1 Critical factors that affect application of the PPP model to develop infrastructure in the international framework

The important areas of activities which needs to be focused on to confirm competitive performance towards the strategic goal of the public private partnership procurement system are defined as the critical success factors of the projects.

According to the literature, the successful delivery of the PPP project, it must be designed to benefit both the public and private sectors. The dealing of public private partnership projects has to be commercially attractive to the private sector while delivering value for money to the public sector. (Herath H.M.L.C, Moratuwa, 2009)

The literature makes known that there are several type of researches internationally concentrated on the critical success factor of the PPP and findings on critical factors for the successful delivery of the PPP project in different countries in the world are summarized in table 2.8. according to the research done by P.C. Chan and P.T.I Lam to identify probable complications for successful application of public-private partnership in china identified critical factors for the successful delivery of the PPP project globally are categorized into seven groups and recommended to address the

following factors while implementing public-private partnership projects.(Chan et al., 2010)

- Equitable allocation of risk
- capable private sector
- Judicious government control
- The transparent and efficient procurement process
- Project economic viability
- Available financial market

Table 2-8: Critical factors that affect the success of PPP projects in the world

Country	Research Project	Critical Factors
United Kingdom	CSF for the UK construction industry. (Hardcastle et al., 2002)	Transparent procurement process, competitive procurement process, good governance, well organized and committed public agency. Social support, shared authority between the public and private sector through realistic cost/benefit assessment, project technical feasibility, appropriate risk allocation and risk sharing, commitment/responsibility of public /private sector, strong and good private consortium, favorable legal framework, government involvement by providing guarantees, multi benefits objectives, political support, stable macro-economic conditions, sound economic policy and available financial market.
China	CSF for PPP in infrastructure development. (X. Zhang, 2005a)	Favorable investment environment, economic viability, reliable concessionaire consortium with the strong technical strength, sound financial package and appropriate risk allocation via reliable contractual arrangement.
United Arabic emirate	Execution of PPP in the UAE	Approval process, negotiation, client brief/outcomes, bid features, business diversification, viability, competition, environmental impact, innovation and

Country	Research Project	Critical Factors
	(Dulaimi et al., 2010)	complexity, political stability and support, existing alliances, organizational resources, community support, feasibility, credit rating of investors, teamwork, consortium structure, delivery of assets, investment growth and project identification.
Nigeria	An overview of CSF of PPP in the delivery of urban infrastructure (Muhammad et al., 2016)	Availability of a PPP frame work, perception of the private financial objectives, risk allocation consequences, perception of value for money objectives. PPP process transparency, standardization of procedure
United Kingdom	CSF for UK construction industry. (Hardcastle et al., 2002)	Transparent procurement process, competitive procurement process, good governance, well organized and committed public agency. Social support, shared authority between the public and private sector through and realistic cost/benefit assessment, project technical feasibility, appropriate risk allocation and risk sharing, commitment/responsibility of public /private sector, strong and good private consortium, favorable legal framework, government involvement by providing guarantees, multi benefits objectives, political support, stable macro-economic conditions, sound economic policy and available financial market.
China	CSF for PPP in infrastructure development. (X. Zhang, 2005a)	Favourable investment environment, economic viability, reliable concessionaire consortium with strong technical strength, sound financial package and appropriate risk allocation via a reliable arrangement. contractual
United Arabic emirate	Execution of PPP in the UAE	Approval process, negotiation, client brief/outcomes, bid features, business diversification, viability,

Country	Research Project	Critical Factors
	(Dulaimi et al., 2010)	competition, environmental impact, innovation and complexity, political stability and support, existing alliances, organizational resources, community support, feasibility, credit rating of investors, teamwork, consortium structure, delivery of assets, investment growth and project identification.
Nigeria	An overview of CSF of PPP in the delivery of urban infrastructure (Muhammad et al., 2016)	Availability of a PPP frame work, perception of the private financial objectives, risk allocation consequences, perception of value for money objectives. PPP process transparency, standardization of procedure
Malaysia	CSF of PPP implementation of Malaysia (Ismail, 2013)	Unifying specific vision, commitment upon communication and trust, willingness to compromise/collaborate respect, community outreach, political support, expert advice and review, risk awareness and clear role and responsibilities.
China	PPP application in infrastructure development in china: institutional analysis and implication(S. Zhang et al., 2015)	Stable micro economic environment, shared responsibility between public and private sectors, transparent and efficient procurement process, stable political and social environment and judicious government control
Developing countries	Engineering construction and architectural management barrier to PPP in	Project profitability, asset quality, fair risk allocation, competitive tendering, internal coordination within government, employment of professional advises, corporate governance.

Country	Research Project	Critical Factors
	developing countries (Jefferies, 2002)	
Singapore	Public private partnership projects in Singapore: Factors, critical risks and preferred risk allocation from the perspective of contractors (Hwang et al., 2013)	Well organized public agency, appropriate risk allocation and sharing, strong private consortium, transparency in procurement process, clear defined responsibilities and roles. Clarification of contract documents, favorable legal frame work, shared authority between public and the private party.
Hong Kong	Factors influencing the success of PPP at feasibility stage - A tripartite comparison study in Hong Kong (Ng et al., 2012)	Technical support and innovation, stable and favorable social environment, supportive political and legal framework, supportive project team and management actions.

2.7.2 Critical factors that affect the application of PPP model in Sri Lanka

According to the literature review, there were few research studies carried out to identify the critical factors that affect the application of the PPP procurement model in the Sri Lankan context. The identified critical factors with concerning different studies were tabulated 2.9 shown below.

Table 2-9: Critical factors that affect the success of PPP in Sri Lanka

Author	Research Project	Critical Factors
(Indika & Lanka, 2018)	development of multi-model transport terminals in Sri Lanka	availability of a well-established framework for the application of the PPP model
(Thoradeniya, 2017)	Application of PPP model for Colombo port city development project,	Environment issues, political issues, governance issues favorable legal framework directing in depth studies through adequate EIA, the capacity of regulating establishments act freely and attention of demand placed by the project on existing infrastructure
(Perera, 2011)	Private public partnership for infrastructure development in Sri Lanka	Lack of project development funds, a requirement of the establishment of project development funds, lack of understanding of PPPs among officials in the public-sector, impediment of policy framework and lack of viability gap funding.
(Fernando, 2019)	Regulating Public Private Partnership in Sri Lanka	Lack of well-established legal and regulatory framework.
(Herath H.M.L.C, Moratuwa, 2009)	The success of PPP in Transportation in Sri Lanka	The competent private sector, measurable output/outcome, specifications, regulatory, fiscal and economic frame work, credibility and transparency, selecting right project

3 RESEARCH METHODOLOGY

3.1 Introduction

This chapter described detailed methodology about in what way the research is conducted and the conclusion and recommendation are made, this study utilized both qualitative and quantitative methods to gather data and the analysis of the study. Accordingly, the literature is reviewed and synthesized on existing PPP models around the world with special emphasis on the application of PPP to countries in the Asian region to outline their structure and functions. Critical factors for the successful delivery of public-private partnership models in the international concept were compared with the Sri Lankan situation. Since the PPP procurement model is not familiar in the Sri Lankan construction industry, the knowledge and expertise of PPP are limited. However, the study is approached by industrial experts who are aware of the initiation and implementation of PPP projects.

3.2 Selection of study plan and the proposal

When designing a suitable research method, depends on the scope of the study and the research gap required to be fulfilled during the study. Based on the above concern, a triangulation research study combining literature review, interview and empirical questionnaire survey is adopted for this research.

Design of the every research study is divided into three different perspectives. Such as the number of contracts within the study population, the reference period of the study and the nature of the research.

Selecting of proper concept to find an answer for the research question and the research gap is the first step of the study plan. Then the precise definition of the concept is required and how it going to be measured. As explained by (Kumaraswamy & Zhang, 2001) there is more than one way to measure a particular concept to find answers to the research questions.

Therefore, ideas about to this research study are shown below for clearness and improved direction of the next step of the research.

- Explore and study the critical factors identified in previous research for the successful delivery of PPP projects internationally.
- Identify CSF that affects the successful delivery of the PPP model for infrastructure development in Sri Lanka.

- Propose, areas to be addressed the identified issues for successful implementation of the PPP model in Sri Lanka by consolidating the above objectives 1 & 2.

3.3 Method of data collection

The collecting and gathering of data for research studies were done through two major approaches called Primary data collection and secondary data collection. The collection of primary data is done by observation, conducting a questionnaire survey and interview while the secondary data will be gathered through the information of other countries and the resources such as journal articles, earlier research papers, personnel records, and Mass media etc.

Accordingly, this research study started with a broad assessment of relevant existing materials from journal articles, conference papers, research papers and search information from the internet to capture related knowledge of the public private partnership procurement method and the critical factors of successful delivery of PPP to develop infrastructure in Sri Lanka. Overall background for the research study and the appropriate template for both interview and the feedback forms have been done after reviewing the literature.

Details and the data related to the public-private partnership procurement model and the application of the PPP model for the development of infrastructures in other countries were recognized through literature. Various of problems encountered during the implementation of the PPP project and the critical factor that affect the successful delivery of PPP projects in the world were studied through the literature.

The countries such as China, Singapore, Malaysia, Thailand, India, Australia, the USA, Nigeria, the UK and Vietnam have been identified as the critical factors that impact the success or failure of the application of the PPP model as an alternative procurement method to develop their infrastructure in the countries.

From the literature, it was revealed that most of the research done by the various countries in the world to identify the critical factors that affected the application of the PPP model to develop infrastructure has been categorized into five major classes as given below.

Favourable investment environment

Economic Viability

Reliable concessionaire consortium with adequate technical strength

Sound financial package

Appropriate risk allocation via reliable contractual arrangements

However, the application of public private partnerships to develop infrastructure projects in Sri Lanka is not much popular. Therefore, no's of PPP project carried out during the last decade is very limited and the experience in the implementation of the PPP model is also limited to the few construction experts in the country. Therefore the desktop study has been conducted to identify critical factors that affect the successful delivery of PPP in Sri Lanka.

After that draft questionnaire survey was developed and used as a tool for the collection of data. Then the pilot questionnaire survey was carried out by circulating among selected industrial experts to validate the critical success factors identified by the literature review in the international framework to check the relevance of those factors to the local practice. Afterwards using responses received from the selected expert and following the Delphi technique rearrangement of the questionnaire survey is finalized.

The population for the research was various professionals such as project directors, project managers, chartered Engineers, senior managers, middle managers and officers representing public sector ministries, authorities, corporations, construction companies, consulting firms and investment companies.

It was important to recognize the career background of each respondent as only the responses of competent professionals were required to consider as satisfactory. Therefore, the minimum criteria for selection of respondents have been established as both 5years of experience in

Development project and the minimum academic qualification as degree holders related to the construction industry. Based on the above criteria a questionnaire was prepared to consist of four sections. The first section was planned to collect respondent's data such as experience, academic qualification and present working places etc. second section was designed to collect data on general experience on the public private partnership of the respondents. The next section is designed to gather respondent's ideas about the effectiveness of the PPP and the final section was designed to get an idea about the effect of legal and policy framework on the success of PPP in Sri Lanka. The sample of the questionnaire was attached as Appendix A.

The purpose of dividing the questionnaire into four sections was to identify the critical factors of the relevant section and that will support to identifying the most critical factors to the successful delivery of the PPP model to develop infrastructure in Sri Lanka.

Hundred (100) questionnaires were distributed among professionals in the construction field as well as other professionals who have experience in the application of PPP or working on PPP related projects via Emails, as well as a face to face meeting with some personnel's. Out of 100 administered questionnaires, 54 completed questionnaires were collected from respondents representing a response rate of 54%.

In addition to the questionnaire survey, the study approached senior advisors who are either familiar with the implementation of PPP. Interviews were conducted as an appropriate data collection technique as the study requires to identifying critical factors that lead to the successful delivery of the PPP project. Accordingly, ten senior construction related professionals of government, construction organizations, consulting firms and private sector investors were selected as appropriate to interview and out of them, six interviewees were from government organizations while four of them were from public sector organizations.

3.4 Method of data analysis

Exploring and studying the critical factors identified in previous research for the successful delivery of PPP projects internationally is the one of the objectives of this study. To fulfil this objective critical factors identified in different countries through the literature survey was tabulated as shown in table 2.7 of chapter two of this study. These factors were then further analyzed and the frequency of occurrence of identified critical success factors in different research studies was calculated to rank the most critical success factors of the PPP procurement model in international concept.

As explained by (Hsu & Sandford, 2007) the Delphi technique can be used as a method for compromising the responses obtained by using a series of questionnaires to collect data for a panel of specific topics. The Delphi method employs multiple iterations designed to the information developed by previous iterations.

Further numerical analysis can confirm that thoughts and views collected by each specific area are represented in the final round of the Delphi study. Whereas an important spread in individual opinions can be expected even at the end of the exercise.

Therefore, in the analysis process of the study, the Delphi technique is used to collect compromise of ideas from the respondents, by assisting several iterations to the respondent. While doing the questionnaire survey it is always collect different ideas from the respondent and those ideas revalidate after discussing with the selected expert in the industry

Thus, the knowledge and experience of the same set of experts are being utilized in this survey multiple times, in respect of short-listing the most critical factors. Further, there is no restriction for data analysis stipulated and any appropriate data analysis technique can be used to interpret the responses of the Delphi participants.

Normally, the Delphi survey can be planned in various rounds as possible, in view of meeting to an accurate set of expert opinions. However, in this case, only 2 rounds of the Delphi survey were preferred. However, mainly due to the limitations of having industry experts' valuable time in re-joining to this survey and the restrictions to meet them due to present global COVID -19 pandemic situation had impacted on limiting the frequency of Delphi rounds, as most of them cooperated amidst the tight schedules of their professional careers.

Therefore, interviewees for the semi-structured interview which is part of the study were selected based on their experience in Public private partnership procurement process in Sri Lanka as well as in the world.

The Likert scale has been used for analyzing figures which are collected by conducting a questionnaire survey. This scale is developed using the assumption that each statement on the questionnaire scale has equal attitudinal value.

In this process, the first step was creating a statement and it should be expressed to show both positive and negative views of the responses towards the statement of the problem.

Responses from the questionnaire survey were analyzed by assigning weight (Numerical value) to each and every response received from the questionnaire survey. When assigning the numerical values as a weightage to the responses, different value has been used based on the negativity and the positive of the preferences. As an example, the response representing the most satisfactory preference will be given the highest weightage. The weightages given to the statement in the questionnaire survey is shown in table 3.1.

Table 3-1 : Weightages for Likert scale of the questionnaire survey

Likert Scale	Strongly agree	agree	uncertain	Disagree	Strongly disagree
Weightage	5	4	3	2	1
Likert Scale	Most satisfied	More satisfy	satisfied	Less satisfied	Unsatisfied
Weightage	5	4	3	2	1
Likert Scale	Major impact	Minor impact	Positive impact	Negative impact	No impact
Weightage	5	4	3	2	1
Likert Scale	Always	often	Moderate	rarely	Never
Weightage	5	4	3	2	1

Finally, the preferences score of the respondents was calculated by adding the numerical value assigned to the statement using the Average Rank Ranking method.

The Average Ranking Method is a simple method which is commonly used for the comparisons of preferences obtained from the surveys carried out for any research work. (Fidalgo et al., 2018).in this method, numerical values for responses obtained through the survey were given using a numerical scale of 1-5 where

Number 1 factor (most favourable preference to the statement) has a weights of – 5)

Number 2 ranking factor has a weight of -4

Number 3 ranking factor weights of -3

Number 4 ranking factor weights of -2

Number 5 ranking factor weights of -1

If the weightage of the rank is W_i and the number of responses is n , the average ranking was calculated for each statement using the following equation

$$\text{Average Ranking} = \sum W_i / n$$

According to the average ranking factor analysis, responses of the respondents were tabulated and ranked as the critical factors of the PPP in terms of weightage. Accordingly, ten critical factors were identified by scrutinizing the responses received via a questionnaire survey. Then the above critical factors were validated by interviewing selected professionals.

The third objective of the study was to propose areas to be addressed the identified issues for successful implementation of the PPP model in Sri Lanka by consolidating the above objectives 1 & 2. This task has been fulfilled by considering the issues and the critical factors identified through the literature review, questionnaire and interview with industrial experts and it have been further validated by discussing with the industrial experts who are involved as interviewees of this study. Finally, it identified and draw out the issues, critical factors and areas to be addressed for the successful application of the PPP model to future development projects in Sri Lanka and presented those factors in chapter four as an extensive discussion.

4 DATA COLLECTION AND ANALYSIS

As explained in chapter 01(introduction) and chapter 03 data collection and the analysis part of this research study were carried out to identify the most critical factors that affect to successiveness of the PPP procurement model in developed infrastructures in Sri Lanka. Accordingly knowledge of the critical factors that affect to successfully delivery of the PPP model in international concept and thereby, the Sri Lankan concept were gathered through the literature survey. Finally, fifteen critical factors were recognized as the most critical factors to develop the questionnaire survey. The questionnaire survey was delivered to selected professionals in the construction industry and 54 respondents were received out of 100 questionnaires.

4.1 Literature review

One of the main objectives of this study was to explore and study the critical factors identified in previous research for the successful delivery of PPP projects internationally. To accomplish this objective comprehensive literature was carried out and identified the critical factors of the public private partnership from the ten studies carried out in the different regions of the world. By the literature, there is thirty eight number of critical factors that affects the successiveness of the PPP model were identified and these critical factors were ranked considering the frequency of occurrence in the ten studies carried out to identify the critical factors that affect the successful delivery of public infrastructure project through public private partnership procurement model. Accordingly, the most common critical factors which affect to the success of the PPP model in the international framework were identified and the frequency of occurrence of each factor in different studies was tabulated in the table attached in Appendix B and the most common ten critical factors are shown in table 4.1 for further studies.

Table 4-1: Most common critical factors for the successful delivery of infrastructure through PPP in the international context.

	Critical Factor	Frequency of Occurrence	Rank
1	Effective negotiation between parties	8	1
2	Numerous regulations are involved and the approval process	7	2
3	Sufficiently module PPP guidelines	7	3

4	Collective authority between the public and private sector through and realistic cost/benefit assessment	7	4
5	Appropriate risk allocation and risk sharing	7	5
6	Political support	7	6
7	Reliable concessionaire consortium with strong technical strength	7	7
8	Transparent procurement process	6	8
9	Favorable legal framework,	6	9
10	Public satisfaction on the project delivered	6	10

There are thirty eight critical factors identified through the literature review of this study that affected the successful delivery of infrastructure projects by adopting the PPP procurement model. Out of thirty eight factors, ten critical factors were selected as the most critical factors by using the frequency of occurrence for further study. As the next step of this research study, a questionnaire survey is developed based on the above critical factors and expert experience.

4.2 Questionnaire survey

To fulfil the main objective of the study a questionnaire survey was carried out and the purpose of the questionnaire survey was to identify the critical factors that affect the successful delivery of the PPP model for an infrastructure development project in Sri Lanka.

Before conducting the questionnaire survey, the appropriateness of the questions needs to be verified before circulating among a large population. Therefore a pilot survey was conducted with the selected expertise of the industry to minimize the incompatible results of the questionnaire survey and ensure the effectiveness of the study.

After that, the finalized questionnaire was circulated to professionals in the industry through Emails. There are 100 emails were sent to the professionals in the industry and 53 responses were received out of 100 administered mails. According to the literature survey, around fifteen critical factors that affect to successiveness of the public private partnership of the Sri Lankan context was identified and those factors were incorporated

in to the questionnaire survey under four sections. Finally, it is expected for respondents to rank the criticality of the identified factors.

4.2.1 Outcomes of the different sections of the questionnaire survey

The questionnaire survey consisted of five sections, the first section is planned to collect the respondent's personal information such as profession, educational qualification and experience. The data collected through this section will support verifying the reliability of the responses received from each respondent. The second part of the questionnaire covered the general experience of the respondents and collected their views on the application of Public private partnership model to develop infrastructure in Sri Lanka. In the next section, it was planned to collect respondent's views on the effectiveness of the PPP model compared to the traditional procurement method and identification of critical factors when this procurement model apply to develop infrastructure in Sri Lanka. The data collected through the final section of the questionnaire was planned to gather information and the outlook of the respondents on the effect of the existing legal and policy framework of the country to apply the PPP procurement model to develop infrastructure.

Responses of the individual respondent for general information as well as for the each and every statement of the questionnaire survey were discussed below.

Table 4-2: Practicing the discipline of the respondents

Profession	No of Respondents	Percentage%
Chartered Engineer	17	32.2
Engineer	21	39.6
Quantity Surveyor	2	3.7
Chartered Architect/Architect	0	0
Financial Advisor/Procurement Specialist	1	1.88
Project manager/site manager/senior Manager	5	9.4
Manager above	4	7.54
Any other	2	5.66
Total	53	100.0



Figure 6: Cross section of the respondent's (Profession wise)

4.2.2 Respondent's Academic qualifications

According to the data collected through the survey, all of the respondents were qualified degree holders and out of the above participant's around 50% participants were master's degree holders.

Table 4.3 shows the academic qualification of the respondents. Out of the total of 53 respondents, 27 respondents (50.9%) possess a Master's Degree and the above, mainly in Engineering. Furthermore, 26 respondents possess Bachelor's degrees in Engineering, economics and law. Based on the above qualifications it is understood that most of the respondents would be able to understand the questionnaire and will be safe to expect favorable responses to the questionnaire

Table 4-3: Education qualification of the respondents

Academic qualification	No of respondents	Percentage %
Master Degree and above	27.0	50.9
Bachelor Degree	26.0	49.1
Diploma, certificate	-	-
Other	-	-
Total	53	100.0

4.2.3 Primary role of the respondents

Table 4.3 and figure 8 shows the primary role of each and every respondent respective to their qualification, out of 53 respondent 30 respondents represented 56.6% working in the public sector and 16 respondents represented 30.2% working in the private sector while the 6 respondents 11.3% working in donor funded project. One respondent representing 1.9% is self-employed.

Table 4-4: Practicing the discipline of the respondents (Sector wise)

Working institute	No of respondents	Percentage %
Public sector	30.0	56.6
Private sector	16.0	30.2
Joint venture/partnership	0	0
Government/donor funded project	6.0	11.3
Self employed	1.0	1.9
Total	53	100.0

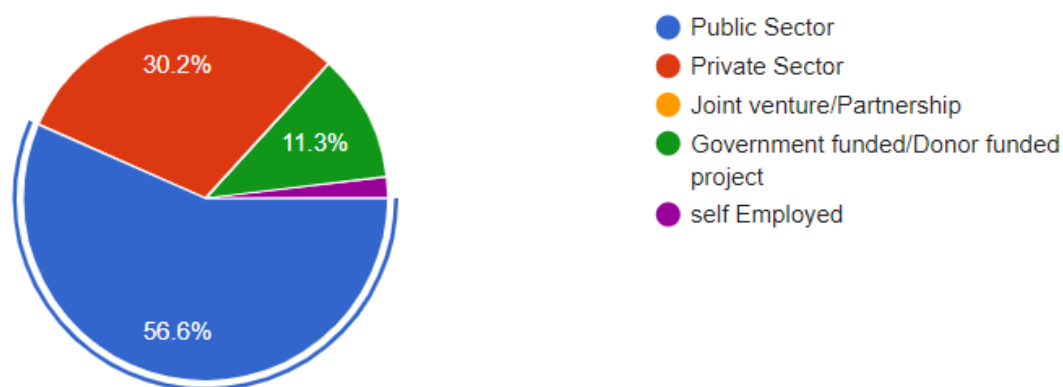


Figure 7: Cross section of the respondent's primary role

4.2.4 Respondents general experience in the PPP procurement model

There are only forty-nine (49) respondents responded to this statement out of 49 five respondents were very familiar with the application of the PPP model to develop infrastructure and 18 no's indicated 36.7% were familiar with the application of PPP and 12 respondents indicate 24.5% response rate was not familiar and but they have

some knowledge about the application of PPP. However, four respondents indicating 8.2% response percentage has not any experience with PPP.

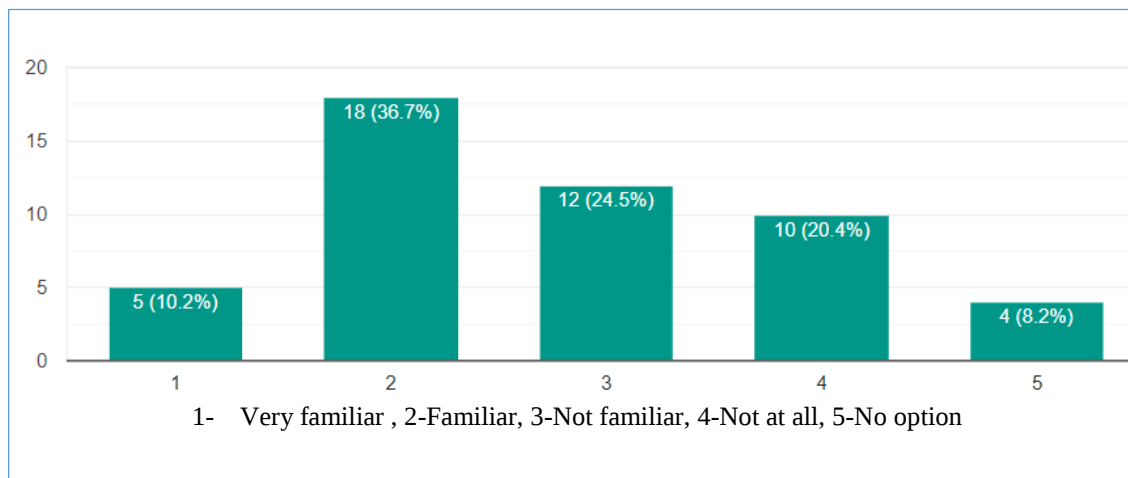


Figure 8: Respondent's awareness on public private partnership procurement model

4.2.5 Respondents competency on PPP

Figure 10 indicates that 26.4% of respondents have experience in implementing PPP projects. 2.8% of respondents have experience only in the initial stage activities such as preparation of bid documents and feasibility studies but they have an overall idea about the concept of the PPP procurement model. 6% of the respondents have experience in the initiation stage to the final stage of the PPP project. While 17% of the respondents had attended short courses on PPP and they also have an overall idea of this procurement model. However, 37.7% of the participant didn't have any experience and according to them, they are interested in the application of the PPP model and they are in reweaving literature on the application of PPP in international concepts.

According to the above data, it was revealed that out of 53 respondents who participated in the questionnaire survey, 62.3% of the participants have at least one competency related to the application of the public-private partnership model as a substitute model to develop infrastructure in the country. These competencies are an indication that most respondents were adequately knowledgeable for the successful completion of the questionnaire.

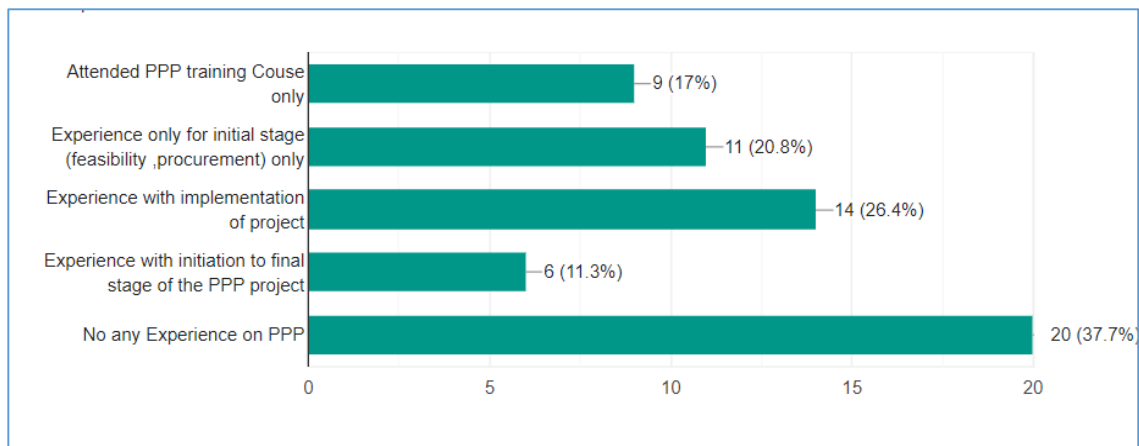


Figure 9: Respondent's competency in the PPP Model

In addition to the respondent competencies shown in figure 10, most of the respondents were involved with different kinds of development projects. Such as health sector development projects, transport development projects, water and sanitary, power energy, housing, telecommunication and school and education development project. Out of the above type of projects, experience in transport sector development projects was the highest and indicates 34% involvement of the respondents. These experiences of the respondents further enhanced the adequacy of knowledge to complete the questionnaire successfully.

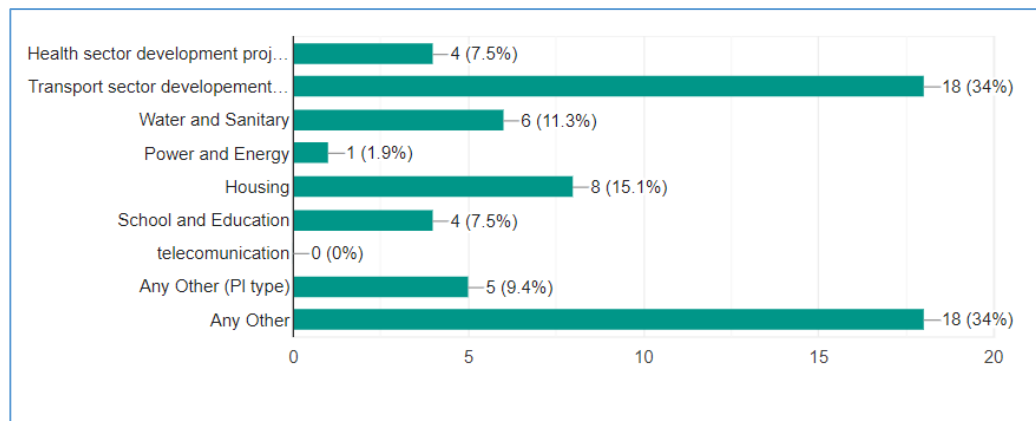


Figure 10: Respondent's experience in project wise

According to the finding of the literature survey and the pilot survey carried out among the industrial expert's final questionnaire was prepared with the twenty identified most critical factors that affect the successful delivery of the public-private partnership procurement model. It was delivered to 100 professionals in the industry via emails from the period of June 2020 to May 2021 and 53 responses were received out of 100 questionnaires. The list of critical factors that affect to the successful delivery of PPP

model which are included in deferent sections of the questionnaire survey is tabulated in the table 4.5 shown below.

Table 4-5: Critical factors for successful delivery of PPP model in Sri Lanka

Item	Critical factor of PPP model
1	Sufficiently modeled PPP guidelines
2	Overwhelming with government legislations /(Numerous regulation involved)
3	Unavailability of sufficient qualified private companies
4	Sound economic condition/ Viability
5	Value For Money Achieved
6	Public satisfaction/social support
7	Public consultation
8	Appropriate risk allocation between and risk sharing.
9	Effective negotiation between parties
10	Competitive/transparent procurement process
11	Well prepared contract document
12	Political support
13	Availability of financial market/viability funding
14	Good governance
15	Project feasibility
16	Shared authority between private and public parties
17	Satisfactory investor promotion
18	Sound financial package
19	Long concession period
20	Current legal background of the country

Afterwards as explained in chapter3 section 3.4 Likert scale has been used to analyze the data by assigning weightage to each and every response given to identify the critical factors listed above. Responses for the questionnaire sections three and four were

collected separately and scrutinized. Table 4.4 indicates the way respondents rank the criticality of the identified critical factors from point of their view. As mentioned in section 3.4 of the methodology chapter, there is no restriction for data analysis stipulated for the application of the Delphi method, Average Ranking (AR) method was used in this study for analysis of the responses received from the participants for the questionnaire.

According to the results obtained from the Average ranking method, the ten highest average values were selected as the critical factors for the successful delivery of infrastructure projects through the PPP procurement model and it was found that the other ten factors listed below had been identified as affecting lesser impact to the application of public private partnership model to the successful delivery of infrastructure development project in Sri Lanka.

Therefore these 10 Critical factors were marked as the least averaged critical factors for the successful delivery of the PPP project in Sri Lanka and hence these factors were excluded from further analysis of this study.

1. Satisfactory investor promotion
2. Sufficiently modelled PPP Guidelines
3. The current legal background of the country
4. Public Consultation
5. Long Concession Period
6. Overwhelming with government legislations /(Numerous regulations involve)
7. Unavailability of sufficient qualified private companies
8. Public satisfaction/social support
9. Shared Authority between public and private parties
10. Value for money Achieved

Table 4-6: Ranking of criticality for identified critical factors

Item No	Critical Factor	Respondents																											Total Σ(wi)	Avg. Weight [Σ(wi)/ Σ(xi)]	Rank
		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			
		Weight (Wi)																													
1	Sufficiently modeled PPP guidelines	1	2	4	2	4	4	2	4	3	4	2	2	4	4	4	2	4	3	1	2	3	2	5	4	2	2	4	80	1.509	
2	Overwhelming with government legislations /(Numerous regulation involved)	3	4	2	3	2	3	4	4	4	4	2	4	4	3	3	4	4	4	5	4	3	2	4	3	1	5	3	91	1.717	
3	Unavailability of sufficient qualified private companies	4	4	4	4	4	4	3	3	3	4	5	4	3	4	4	3	4	4	3	3	2	4	5	5	3	5	4	102	1.925	
4	Sound economic condition/ economic Viability	4	5	5	5	3	5	2	5	4	5	5	4	5	2	2	4	5	5	4	5	2	4	5	3	2	5	3	108	2.038	
5	Value For Money Achieved	5	5	5	5	5	5	4	5	4	3	3	5	4	4	4	3	4	3	5	4	2	3	5	5	3	5	2	110	2.075	
6	Public satisfaction/social support	3	4	3	3	5	3	4	5	3	4	5	4	4	4	4	4	4	3	4	4	2	3	5	4	4	4	3	102	1.925	
7	Public consultation	2	4	2	5	4	3	3	5	3	4	3	4	3	4	4	5	5	3	4	3	2	4	4	4	5	4	3	99	1.868	
8	Appropriate risk allocation risk sharing. between public and private party	4	3	2	3	1	2	3	5	2	4	4	5	4	4	4	4	5	3	4	5	2	4	4	5	5	5	3	99	1.868	
9	Effective negotiation between parties	3	4	5	5	5	3	4	5	3	4	5	5	4	3	3	5	5	4	4	5	2	4	5	4	4	5	3	111	2.094	
10	Competitive/transparent procurement process	3	4	3	1	1	2	4	5	4	4	3	4	5	4	4	5	5	4	5	5	2	4	5	5	4	5	3	103	1.943	
11	Well prepared contract document	4	4	3	1	1	3	3	5	3	4	4	5	5	4	4	5	5	4	4	5	2	4	5	5	4	5	3	104	1.962	
12	Political Support	5	5	3	4	5	4	3	4	2	4	3	5	4	3	5	3	5	4	5	3	3	3	4	5	4	5	3	106	2.000	
13	Availability of financial market/viability funding	5	5	5	5	5	5	3	5	4	5	5	4	5	3	3	5	5	5	4	5	2	4	5	4	4	4	3	117	2.208	
14	Good governance	5	5	5	5	5	5	4	5	5	4	5	5	4	3	3	4	5	5	4	5	2	4	5	5	4	5	2	118	2.226	
15	Project feasibility	4	5	5	5	5	5	2	5	5	4	5	5	5	4	4	5	5	4	5	5	2	4	5	5	4	5	3	120	2.264	
16	Shared authority between private and public parties	4	5	4	4	5	4	4	3	5	3	4	5	4	4	4	5	4	4	4	3	2	4	5	5	4	4	2	108	2.038	
17	Satisfactory investor promotion	0	0	0	0	0	0	3	4	4	4	1	2	3	5	5	3	3	2	2	2	2	2	3	2	3	4	3	62	1.170	
18	Sound financial package	5	5	5	4	4	5	3	5	4	5	5	4	5	4	4	4	5	4	5	5	2	4	5	5	3	4	3	116	2.189	
19	Long concession period	4	3	5	3	4	4	3	5	4	4	3	4	4	3	3	3	3	2	3	2	3	4	4	5	3	2	3	93	1.755	
20	Current legal background of the country	5	3	4	5	4	4	2	4	3	3	3	2	4	4	4	2	4	3	2	2	2	2	3	4	3	3	3	87	1.642	

Table 4-7; Ranking of criticality for identified critical factors (Cont.)

Item No	Critical Factor	Respondents																												Total Σ(wi)	Avg. Weight [Σ(wi)/ Σ(xi)]	Rank
		28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53					
		Weight (Wi)																														
1	Sufficiently modeled PPP guidelines	3	3	3	4	4	1	2	3	1	1	3	2	4	4	4	4	2	5	3	3	4	2	4	3	3	3		158	2.981	19	
2	Overwhelming with government legislations /(Numerous regulation involved)	3	3	3	4	4	5	5	2	5	5	5	5	4	3	3	3	5	5	3	4	5	4	5	3	3	2		192	3.623	15	
3	Unavailability of sufficient qualified private companies	5	3	1	4	4	2	3	4	5	4	3	3	5	4	5	3	4	4	3	4	4	3	4	3	2	2		193	3.642	14	
4	Sound economic condition/ economic Viability	2	5	4	5	4	4	5	4	5	5	5	5	4	4	4	3	5	5	3	4	5	5	5	3	2	4		217	4.094	9	
5	Value For Money Achieved	2	4	5	4	4	5	3	4	4	4	5	4	4	3	5	5	5	4	5	3	5	4	3	4	4	1		213	4.019	11	
6	Public satisfaction/social support	4	5	5	5	4	4	3	4	5	3	5	3	3	3	4	3	3	5	3	4	5	4	4	5	3	2		203	3.830	13	
7	Public consultation	2	2	3	3	2	2	3	4	3	1	3	1	2	4	4	3	3	4	3	4	1	3	1	4	3	2		169	3.189	17	
8	Appropriate risk allocation risk sharing. between public and private party	5	4	5	5	5	4	5	5	5	5	4	4	5	5	4	5	3	4	3	4	5	4	5	5	5	4		216	4.075	10	
9	Effective negotiation between parties	5	4	5	5	4	5	4	5	5	5	4	4	5	5	3	5	2	4	3	4	5	4	5	5	4	4		224	4.226	5	
10	Competitive/transparent procurement process	5	5	5	5	5	4	5	4	5	5	5	5	5	5	4	5	3	4	3	4	5	4	3	5	5	4		220	4.151	8	
11	Well prepared contract document	5	5	5	4	5	5	5	5	5	5	5	5	5	5	4	5	3	5	3	4	5	4	3	5	5	2		221	4.170	7	
12	Political Support	4	5	5	5	4	5	5	5	4	5	5	5	4	3	5	4	5	5	3	4	5	4	5	4	4	5		223	4.208	6	
13	Availability of financial market/viability funding	5	5	5	5	5	4	5	4	5	4	5	5	4	5	4	4	4	4	3	3	4	5	4	3	4	5		230	4.340	3	
14	Good governance	5	4	5	4	4	5	5	4	5	5	5	4	4	4	5	5	4	3	3	3	5	5	5	5	5	4		233	4.396	2	
15	Project feasibility	5	5	5	5	3	5	5	4	5	5	5	5	5	5	4	5	4	4	3	4	5	5	5	4	5	5		240	4.528	1	
16	Shared authority between private and public parties	5	4	5	3	4	5	3	5	5	3	4	3	4	3	4	3	4	3	3	3	5	4	5	4	4	5		211	3.981	12	
17	Satisfactory investor promotion	1	2	1	1	3	4	2	4	1	1	3	2	2	2	3	2	2	2	3	4	5	2	3	2	2	1		122	2.302	20	
18	Sound financial package	5	5	5	5	3	4	5	4	5	5	5	5	5	4	4	4	4	3	3	5	4	4	5	4	5	3		229	4.321	4	
19	Long concession period	4	2	3	1	3	2	3	3	3	4	4	4	4	3	4	2	4	4	3	4	5	4	4	5	3	4		182	3.434	16	
20	Current legal background of the country	2	3	3	4	4	4	3	4	2	1	3	3	1	2	4	3	3	2	3	4	5	3	2	2	3	3		163	3.075	18	

According to the results obtained through the Average ranking method following ten (10) Critical factors have been identified as the most critical factors that affect the successful delivery of infrastructure projects in Sri Lanka through the PPP procurement model.

1. Project technical feasibility
2. Good governance
3. Availability of financial market/viability funding
4. Sound financial package
5. Effective negotiation between parties
6. Political Support
7. Well prepared contract document
8. Competitive/transparent procurement process
9. Sound economic condition/ economic Viability
10. Appropriate risk allocation and risk sharing. Between a public and private party

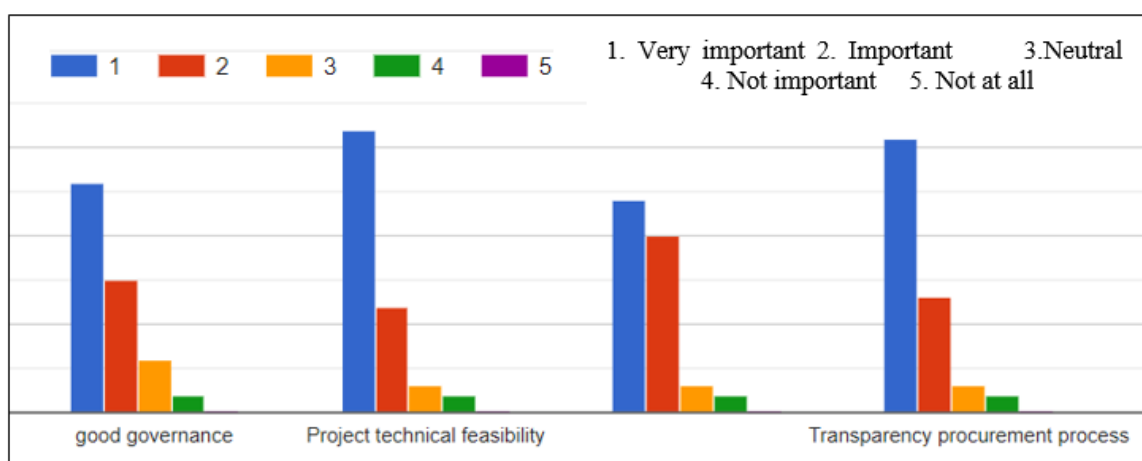


Figure 11: frequency distribution of the responses (project technical feasibility, good governance, shared authority)

The frequency distribution of the responses received related to the statement of the most critical factors for the successful delivery of PPP projects in Sri Lanka are shown in figures 12, 13, 14 and 15. It shows that 32 respondents or 60.3% of the total 53 respondents selected the project feasibility report as more important in the ranking of the questionnaire statement concerning drivers for the successful delivery of PPP model to develop infrastructure in Sri Lanka.

As per the average ranking method practicing good governance was selected as 2nd ranking critical factor affecting the successful delivery of the PPP model to develop infrastructure. it shows 17 respondents or 32% of respondents out of 53 considered the practice of good governance as a most essential part of the application of a successful PPP model.

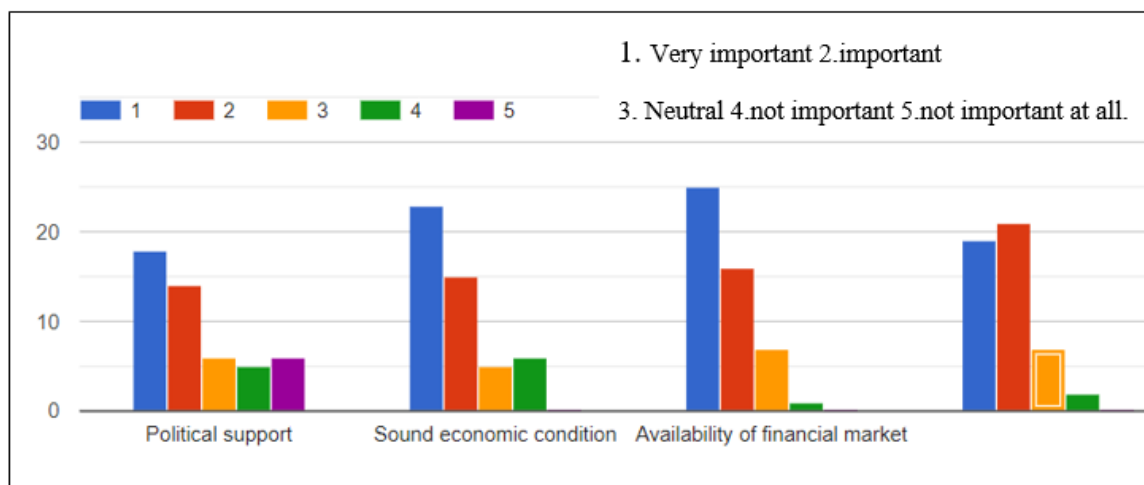


Figure 12: Frequency distribution (political support, sound economic condition, availability of financial market)

As shown in figure 13 there are 25 respondents out of 49 responses which are 51% of the response rate marking the availability of the financial market as a very important critical factor to the success of the PPP procurement model to deliver infrastructure in Sri Lanka. This critical factor was identified as 3rd Ranking factor of the average ranking method of this study.

The sound financial package was identified as 4th ranking Critical factor in the study and there are 24 respondents out of 53 (i.e. 45.2% of the respondents) marked this factor as a more important critical factor for the application of the PPP model to develop infrastructure Sri Lanka. The frequency distribution of the responses concerning sound financial support package is shown in figure 14 below.

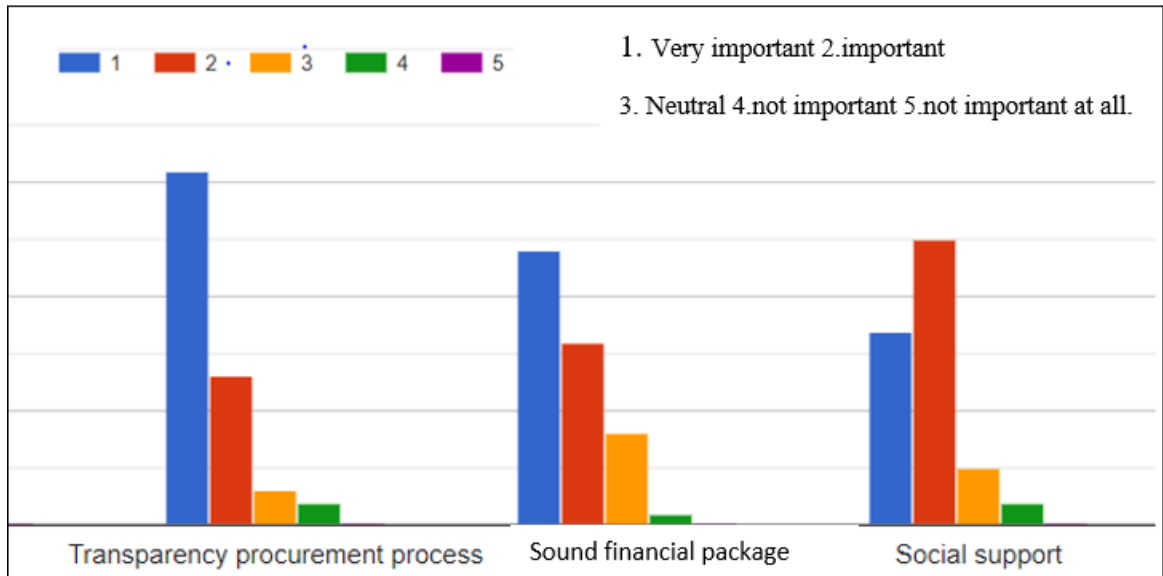


Figure 13: Frequency distribution (transparency, social financial package, social support)

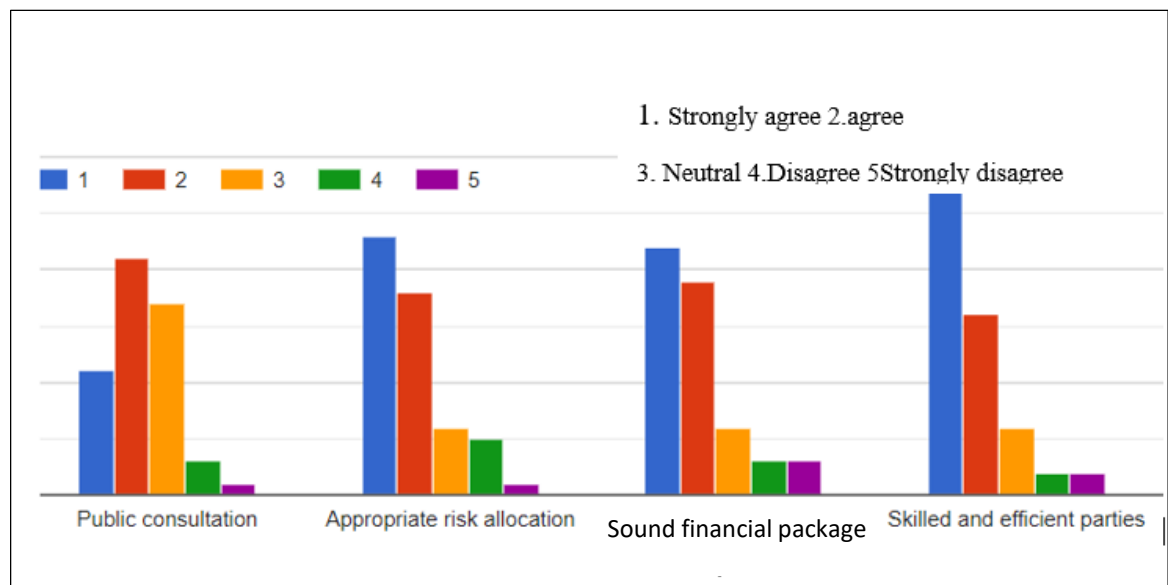


Figure 14: frequency distribution (effective negotiation between parties)

According to the average ranking of the study effective negotiation between parties was ranked as the 5th Critical factor. 22 respondents out of 53 participants of the questionnaire survey that is 77.3% strongly agreed with the statement of the questionnaire and 19 respondents i.e., 35.8% agreed with the statement of the questionnaire and altogether 79.2% of the respondent agreed and strongly agreed with the statement. Therefore it is evident that effective negotiation between both public and the private party will Leads to the successful delivery of PPP in Sri Lanka.6th critical

factor of the ranking method was political support. it was identified as a very important critical factor by the 18 respondents while 14 respondents marks the response as important. Totally 60.3% percent out of the 53 respondents agreed with the statement given in the questionnaire survey.

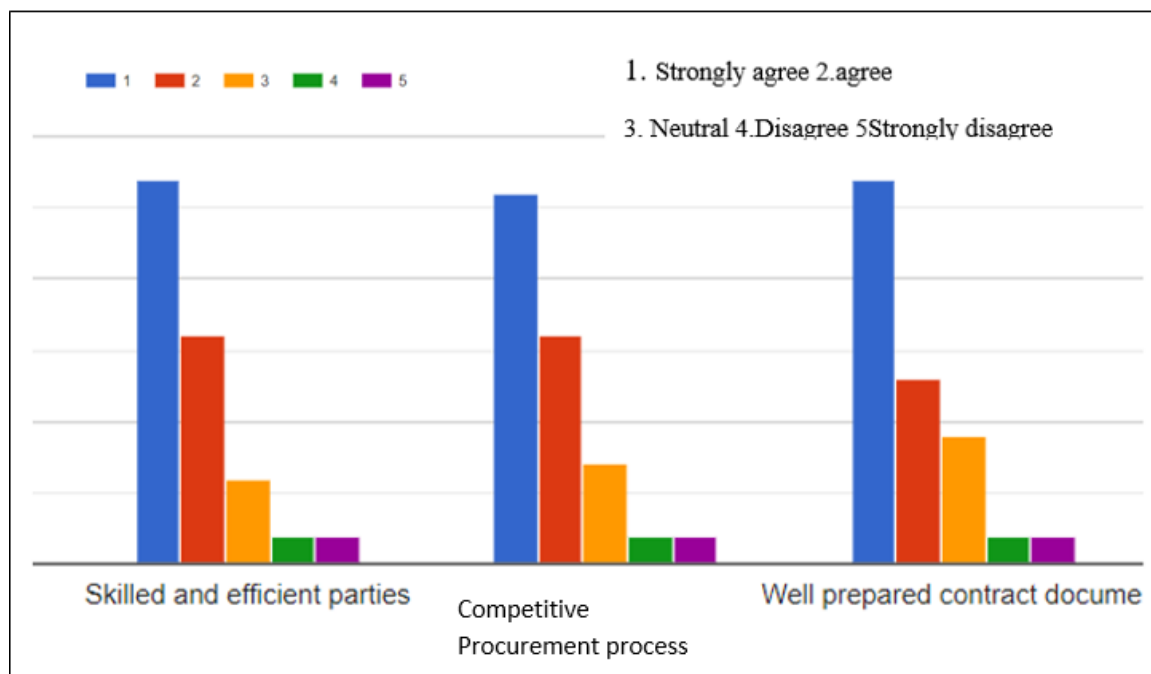


Figure 15: Frequency distribution (skilled efficient parties, well prepared contract document)

All the respondents have concerned about the well-prepared contract documents and the competitive transparent procurement system which were handled at the initial stage of the project as the most important Critical factor for the application of the PPP model to develop infrastructure in Sri Lanka. The rate of response for the well-prepared documents was 75.4% and it was ranked as the 7th factor the competitive procurement process was ranked as the 8th factor and the percentage of response was 60.3%.

Sound economic condition and the appropriate risk allocation and risk-sharing between the public and the private sector were ranked as 9th and the 10th critical factor of the average ranking method the rate of response concerning as very important and important for these two factors was marked as 77.5% and 77.3%.

Afterwards, the identified most critical factors by using the average ranking method were validated by conducting the semi-structured interview with the 10 experts selected from the beginning of the study. The details of their views, concerns and agreement on the identified critical factors that affect the application of the Public private partnership

procurement model to develop public infrastructure in Sri Lanka was presented in the next chapter as a recommendation.

4.3 Discussion on Results

According to the literature review even though many developed countries have used the concept of PPP to develop infrastructure long ago but many developing countries have been concerned about the PPP in the recent past. As a result, Sri Lanka practiced Public-private partnership concept in various infrastructure development projects during the 1990s and the outcomes were far from the desired goals. Total investment over the last fifteen years on the PPP projects was US \$ 1652 million. However, when compared with the other countries in the Asian region Sri Lanka places behind them in terms of investment and the number of projects implemented.

As per the central bank Annual report 2018 (CBSL, 2018), the bank has emphasized on requirement and importance of private sector involvement and investments to develop and manage public infrastructure in Sri Lanka to overcome the budget deficit to develop public infrastructure. As a result. Several attempts have been taken to proper implementation of PPP projects by different governments in the country from time to time however still there is a number of challenges that have to be overcome to achieve the core objectives of the PPP project in Sri Lanka. Therefore, the main objective of this study was to identify critical factors that affect the application of Public-private partnership model to develop public infrastructure in Sri Lanka.

As per the results indicated in section 4.2 criticality of identified critical factors were ranked using the average ranking method. Accordingly, project technical feasibility was identified as the most critical factor in terms of the successful application of the PPP model to develop infrastructure in Sri Lanka. However with compared to the global concept “project technical feasibility” was not considered the most critical factor as most of the countries that applied the PPP model to develop their infrastructures used only for the potential project and their usual practices on the selection of development project is only after considering the proper project feasibility. According to the findings of the interview with an expert experienced professionals in the industry, it is found the importance of doing a proper project feasibility study to identify the potential projects to develop infrastructure by using the PPP procurement model .also it was further emphasized, the responsibility of the government institutes to prepare a proper project feasibility report for selection of projects for economic growth of the country. Further,

before deciding to adopt the PPP procurement model to develop infrastructure, the government needs to confirm the ability of the private sector to develop projects under acceptable risk and gain a reasonable return from the project. to fulfil the above requirement proper feasibility studies have to be carried out by the government incorporating engineering feasibility, financial analysis, environment & social impact assessment and legal framework of the country.

Most importantly, the good governance practice of the country is directly affected by the success of any event of the economic growth of the country. As usually in the application process of the PPP model to develop infrastructure in Sri Lanka also considered good governance practice is a critical factor. According to the average ranking method of this study, experts in the industry have marked this critical factor as 2nd most critical factor for the successful application of the PPP model to the Sri Lankan context. as per the results of the interview carried out with the ten experts in the industry, it was emphasized that the importance of the good governance practice and highlighted to conduct stakeholder mapping before initiation of any project that should be taken to address the requirement of stakeholders who can influence the project in a positive or a negative way. Further high expectancy and getting off the project by the general public in the country with the support of the government local Authorities and the department was highlighted to consider as good governance practice for the success of any PPP project in Sri Lanka. Most of the investors who came to the country for investment in past decades were discouraged due to the Overwhelming government legislation, numerous regulation involved in the approval process of the PPP model and the political instability of the country. Therefore findings of this study further emphasized considering these issues as more critical to applying the PPP model to Sri Lankan Context.

The third ranked critical factor of the study is the availability of financial market/viability funding. Even though this critical factor was identified as a less critical activity for the success of PPP projects in international concept, it was considered a more critical factor for the application of PPP mode to a development project in Sri Lanka. According to the study availability of the financial market will be fluctuated with the country's economic condition due to the instability of the political system in Sri Lanka. The outcome of the study shows unavailability of the financial market also discourages private investors and it will lead to the failure of the PPP project in Sri

Lanka. to overcome this issue it is proposed to provide a guarantee for the return of the investment to attract external financing and availability of a well-established financial market with an opportunity to share the financial risk and viability funding which is very attractive to the private contractor for the successful delivery of PPP project in Sri Lanka. the results of both the questionnaire survey and the findings through the interview show un developed financial market limit the availability of financing and it was considered as a major issue for investors attraction to infrastructure development projects.

The sound financial package was identified as a fourth critical factor from the analysis of responses in the questionnaire and the interviews of this study. it has to be considered the most critical factor for the attraction of investors to invest in the PPP project. The sound financial package usually has more influence on a PPP project than the design or construction cost. As explained by (Hardcastle et al., 2002) the government has to idea about the cost and benefit of the project to prepare output-based specifications to ensure the achievement of value for money and make decisions to implement the project under the PPP model. It is found that a longer concession period benefited the private party whereas the government made a loss. Therefore, the selection of an appropriate financial package is more critical in the successive applications of PPP model for infrastructure development projects in Sri Lanka.

Effective negotiation between parties is identified as the fifth most critical factor for the successful application of the PPP model to the Sri Lankan context. Effective negotiation between the public and private sector was beneficial for considerate private parties and the public sector organization necessities and needs to avoid the probable issues and thereby it will be reduced the duration of the tendering process. According to the study, effective negotiation of the government party with the private parties (tenderers) to achieve the best deal for the public sector to develop infrastructure is a major requirement for the successful application of the PPP model. The study further highlighted, that the negotiation process is made up of ensuring the competition at the tendering stage and it will support a selection of reliable investors for the successive application of the PPP model to the Sri Lankan concept.

Stable political support is identified as a highly important factor and ranked as the sixth critical factor from the average ranking method of the study. Stable political support is related significantly to the economic and technological elements. Further, the Political

stability of the government would be a necessary forerunner to the private sector lending money for the PPP project. Therefore stable political system in the country makes the implementation PPP model easier. The study reveals that instability of the political system or frequent changes in public policies and strategies hinder the application of the PPP model to develop infrastructure in Sri Lanka. Therefore a sound political system is necessary for the country to apply alternative procurement models like PPP to reduce the budget deficit for infrastructure development in Sri Lanka.

The seventh critical factor that affected to Application of public-private partnership cited in this research study was a well-prepared contract document to select a competitive bidder for investment. Even though a well-prepared contract document was not considered as an uppermost critical factor for the development of infrastructure globally, it was considered by the respondents of this study as the most important critical factor for the successive application of the PPP model to develop infrastructure in Sri Lanka. As per the finding from this research study, a lot of delays in the selection process of the investors or bidders can happen due to shortcomings of the bid document and that will leads to the failure of the projects. In this context, a properly defined concession agreement was identified as the most critical part of the bid document and mistakes in the agreement will create disputes between the government and the public party during the implementation finally which can lead to the downfall of the PPP projects.

As mentioned in the above paragraph after preparations of the proper contract document the competitive and transparent procurement process was the next stage of the investor's selection process for the PPP procurement Model. In these circumstances, the comparative and transparent process has been ranked under this study as the 8th critical factor for the successive application of the PPP model to develop infrastructure in Sri Lanka. The study further highlighted the importance of accountability and transparency issues in the procurement process due to pursued records of corruption in the Sri Lankan Construction Industry. Therefore, most of the respondents of the study were concerned about the transparency which affects the application of the PPP model to develop infrastructure in the country, because the general public is so worried about the corruption issues in the development project which was used by taxpayers money.

According to the Average ranking method of the study carried out to identify the most critical success factors of the PPP model sound economic condition and the economic

viability was ranked as the 9th factor by the respondents of the questionnaire survey. However, according to the literature, this critical factor was not considered the most critical success factor in the ten studies selected to identify the international concept. The reasons behind that were discussed with the interview participant to validate the above statement accordingly, most developed countries, as well as developing countries in the Asian region, exist sound economic conditions whereas not in Sri Lanka due to instability political regimes. Therefore the responsibility of the government to maintain a stable growing economic environment is essential to initiate PPP projects by giving confidence and positive results to attract investors for successive applications of the PPP model to our country.

The tenth critical factor identified in this research study was appropriate risk allocation and risk-sharing between the public and the private sector. In the feasibility studies, it is essential to identify the possible risks of each and every stage of the project. The study done by (Xenidis & Angelides, 2005) has identified nine key risk areas such as political risk, financial risk, revenue risk, market risk, procurement risk promoting risk, development risk, construction completion risk and operating risk which will affect the application of the PPP model to develop infrastructures. Further apart from the above risk factors, there will be other possible risks such as environmental risk, social risk and economic risk that affect different stages of individual PPP projects in the Sri Lankan context that were identified under this study. Therefore it is important to proper risk allocation between the public and private parties of the PPP project to maintain win-win situations for both private and public parties.

Apart from the above-identified ten critical factors, the general view of the respondents on the application of PPP to develop infrastructure in Sri Lanka has been checked through the questionnaire survey. 40 respondents out of 53 participants i.e. representing 75.4% agreed to the statement “PPP will be a better approach to ascertain private investment to develop infrastructure in Sri Lanka” and they expected the transfer of expert knowledge of the private party to the government via this approach.

Further to the above-identified Critical factors, the study revealed that improvement of the current legal system, investor promotion, and arrangement of viability funding will encourage the PPP model as an alternative procurement method to develop infrastructure in Sri Lanka.

4.4 Comparison of the research findings with the critical factors identified through the literature

Ranking the criticality of the identified CF through the research study, project technical feasibility has been ranked as a more critical factor in the Sri Lankan context whereas effective negotiation between parties has been identified as more critical in the international context. With compared to the global concept “project technical feasibility” was not considered the most critical factor as most of the countries that applied the PPP model to develop their infrastructures used only for the potential project and their usual practices in the selection of development project is only after considering the proper project feasibility and it is used as a standard for their practice of infrastructure development.

However effective negotiation between parties involving the PPP project is one of the critical factors identified through the research for the successful application of PPP model to the Sri Lankan concept and it is further strengthened by the literature as this factor was selected as more critical to the global concept for the successful delivery of PPP projects

According to the research findings, good governance practice is identified as a second critical factor for the successful implementation of the PPP since most of the investors who came to the country for investment were discouraged due to the overwhelming government legislation and numerous regulation involved in the approval process. It was further strengthened by the findings of the literature. Because numerous regulations of the approval process of the PPP application in the international concept were marked as the second CF of the international context.

As per the findings of the literature, the availability of the financial market and the viability gap funding have not been considered as the CF in the previous studies done in various regions of the world for the application of the PPP model to the international concept. However, it has been challenged by the findings of this research study since the availability of a well-established financial market with an opportunity to share the financial risk and viability funding which is very attractive to the private investor for the successful delivery of the PPP projects in Sri Lanka.

The other Critical factors identified from the research study, like a stable political system, transparent procurement process, appropriate risk allocation and risk-sharing

between the public and private sectors also marked as the CF in the global context which has been identified through the literature review of this study. Therefore those factors identified in the literature further support the research findings. However, according to the literature review sound economic conditions and economic viability, well-prepared contract document and sound financial packages were found not to be critical for the successful application of PPP in the international context and it criticizes the above CF identified for successful application of PPP model in Sri Lanka under this research study.

Further table 2.9 of chapter 02 of this report shows that previous studies carried out in Sri Lanka related to the research topic that has identified the different critical factors that affect the success of PPP in Sri Lanka and most of them were similar to the factors identified under this research. Therefore those factors further confirmed here from this research finding and the above-identified ten critical factors can be validated as critical factors that affect the successful application of the PPP model to develop infrastructure in Sri Lanka.

5 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The government of Sri Lanka will require to look into alternative routes for funding to fulfil the limitation of fiscal deficit to develop infrastructure projects such as the Public-Private Partnership financial model. However, the application of a centralized procurement model such as public-private partnership to develop infrastructure in Sri Lanka, tends to create financial implications attitudinal problems in government officers, control issues and difficulties in the management of contracts at the execution stage of the development project which needs to be fully agreed by public sector organization including policymakers and private partners. Therefore, the main intention of this study was to recognize the above consequences, barriers and critical success factors that influence for application of the PPP model to develop infrastructure in Sri Lanka.

To accomplish the above goals, the following objectives were fixed under this research. Explore and study the critical factors identified in previous research for the successful delivery of PPP projects internationally, Identify CSF that affects successful delivery of PPP model for infrastructure development in Sri Lanka. Propose, areas to be addressed the identified issues for the successful implementation of the PPP model in Sri Lanka by consolidating the above objectives 1 & 2.

As discussed in chapter 02 of the study extensive literature review was carried out and found 37 no's of major critical factors that affected the successful delivery of PPP projects in the international framework. The ranking of identified critical factors was done by using the frequency of occurrence for the outcomes obtained by ten research studies done on the same topic. Out of 37 critical factors, 10 factors were identified as the most critical factors and used some of these factors as variables for the questionnaire survey.

The data gathered through the questionnaire survey and the semi-structured interview conducted among ten professionals in the industry were analyzed using the Delphi method and the average ranking method to rank the Critical success factors that affect the successful delivery of the PPP model to develop infrastructure projects in Sri Lanka.

Accordingly, the ten most critical factors were identified by using the average ranking method and the same critical factors were validated by the semi-structured interview carried out with the professionals in the construction industry in Sri Lanka.

Project technical feasibility, Good governance, Availability of financial market/viability funding, Sound financial package and Effective negotiation between parties were identified as the most critical five factors and Political Support, Well prepared contract document Competitive/transparent procurement process, Sound economic condition/economic Viability, risk allocation risk sharing between public and private parties were ranked as the least important factors for the successful delivery of Public-Private Partnerships to develop infrastructure in Sri Lanka.

Section 4.3 of this study identified the critical factors that affected the successful application of the PPP model and those factors were a bit deference from the critical factors identified in the global concept, concerning the other developed and developing countries in the same region in the world due to uncertainty economic condition, availability of financial market and unstable political regime. Therefore, it is useful to understand the identified critical factors under this study that need to be considered both in planning aspects and policy formation about the successive applications of public-private partnerships to develop infrastructure in Sri Lanka.

5.2 Recommendations

Based on the findings of this study, the followings are recommended to face future challenges in the application of the Public private partnership model for the successful delivery of infrastructure in Sri Lanka.

One of the most critical factors that leads to the failure of the application of the PPP model in the Sri Lankan concept was the lack of project prioritization and identification of PPP potential projects. The reason behind this failure was that most of the projects were not being properly assessed while preparing the project feasibility reports. to overcome these issues it is recommended to have a proper framework in the National Agency for PPP that can help public sector line ministries to identify the most prioritized project and to identify PPP potential projects in Sri Lankan concept. Further, it is proposed to amend clause no 227(preliminary Screening) of the existing guild line of the PPP by elaborating the identification process of how the relevant ministries of the government should select PPP potential projects.

Lack of knowledge of PPP practices and attitude issues of the government officers was one of the major issues that affect the successful delivery of the PPP project. Therefore the attitude of the officers in the government sector should be changed from the role of developer/operator to the facilitator. Also, it is recommended to improve the contact model for different sectors by enhancing the knowledge of government officers on the PPP procurement system.

The findings of the study show good governance practice was the critical factor for the success of the PPP model. However multiple government organizations with repeated functions and unclear defining of scope with responsibilities of the various government agencies engaged in promoting PPPs will result in pursuing PPP projects by different agencies independently. Also, the absence of a solid framework to manage the responsibilities as per the institutional regulations in the inter-agency decision-making process has created an environment of uncertainty and confusion which leads to disappointment in the PPP projects. The creation of the National Agency for public-private partnership in 2017 was intended to address the above issues. However, restructuring the organizational structure of the NAPPP and outlining the scope including organizational responsibilities for PPP has been again frustrated by a lack of recent operational experience in the PPP process.

To overcome the above uncertainties and confusion regarding the application of the PPP in Sri Lanka it is recommended to establish an institutional framework consisting of inter-ministerial or cabinet-level subcommittees with higher-level representatives from key sectors. That institution would have the directives to review all proposed investments and assess whether the proposed development will be PPP potential project or not. In these circumstances, clause no 231(formal approval process for the project) of the existing PPP guideline needs to be restructured by giving whole authority to NAPPP for the project approval process without delegating the power to the different committees and that will minimize the time taken to the selection of potential investors for the identified projects.

The arrangement of a sound financial package was one of the most critical factors to navigate investors for investment in PPP projects in any country. In this context, it is recommended to introduce a long concession period, arrangement of tax relief and incentives, duty-free material importation and viability gap funding by the government as an encouraging package for the successful application of the PPP to full fill future

needs of infrastructure in Sri Lanka. Those provisions and concessions should be clearly defined in the existing guideline as a new chapter before chapter xvi (procedure for issuing RFP assisting bidders) to attract more investors for the projects as it will support investors to submit economically and financially feasible reports to the government.

Based on the involvement in other countries in the world, authorities have to be given to the existing national agency for the PPP for the identification, preparation, evaluation and negotiation for the selection of investors to develop infrastructure under the PPP model.

In addition to the above improvement, it is recommended to change the national legal system to manage long term contracts and dispute resolution which were usually practiced in the PPP model.

Further, the existing public procurement guideline for PPP has to be re-scrutinized and do the revision, particularly concerning managing competitive tendering. It has to be done by amending the sub-clauses of chapter XVI (procedures for issuing RFP and assisting bidder), chapter XVII (preliminary evaluation of proposal) and the chapter XVIII (Evaluation criteria).specially when evaluation of proposal under clause 268 indexation risk it should be transparent and one method needs to be applied for the whole bidders as the indexation risk will vary from one proposal to another due to different proposal submitted by the investors. Further, it is essential to pre-mention the factors that will be taken into account while assessing price negotiation under clause 269 of the guideline as it will be fair for the whole bidder who participates in the project. Negotiation between both parties has been identified as CF for successive applications of PPP. Therefore the composition of the cabinet-approved negotiation committee (CANC) needs to be mentioned in the contract document and the procedure of selection of the CANC has to be mentioned in the guild line under clause 274 of the negotiation and the authority to select suitable investors shall be delegated to the CANC.

Building PPP capacity and awareness of PPP should be done to ensure understanding of PPP among the various line ministries and government agencies. For that, it is recommended to conduct awareness programs and training and use PPP guide books.

This study highlighted the importance of reducing challenges arising from the identified critical factors which were effective to the successful application of the PPP model for

future infrastructure development in Sri Lanka. Therefore following areas to be addressed for the successful implementation of the PPP model in Sri Lanka.

- Create a clear and reliable PPP policy
- Existing PPP procurement Guidelines need to be reviewed and updated regularly
- To support the procurement process of the PPP model, a separate institutional structure needs to be established.
- Formulate a PPP communication strategy
- Build PPP capacity and understanding within the public sector
- To enhance the quality of project feasibility studies, transaction advisors should be hired whenever necessary to improve the PPP model with options analysis.

Finally, it can be proposed to further study and analyzed what are the sub-critical factors that influence the identified main CF under this research study. Through in-depth studies and analysis of those sub-critical factors, permanent solutions for the application of the PPP procurement model can be found to develop infrastructure in our country. Also, it is necessary to have further research to identify specific governance structures that could be supported the successful application of the PPP model to the Sri Lankan context.

6 REFERENCES

- Akintoye, A., Beck, M., & Kumaraswamy, M. (2015). An overview of public private partnerships. *Public Private Partnerships: A Global Review*, 1–18. <https://doi.org/10.4324/9781315686516>
- Bank, C. (2014). Central bank anual report (chapter 05). In *anual report*.
- CBSL. (2018). Anual Report 2017 - Central Bank of Sri Lanka. *Central Bank*. https://www.cbsl.gov.lk/sites/default/files/cbslweb_documents/publications/annual_report/2017/en/5_Chapter_01.pdf
- Chan, A. P. C., & Cheung, E. (2013). *Public Private Partnerships in International Construction : Learning from case studies*. <https://library.oapen.org/bitstream/20.500.12657/40065/1/9780415529754.pdf>
- Chan, A. P. C., Lam, P. T. I., Chan, D. W. M., Cheung, E., & Ke, Y. (2010). Potential Obstacles to Successful Implementation of Public-Private Partnerships in Beijing and the Hong Kong Special Administrative Region. *Journal of Management in Engineering*, 26(1), 30–40. [https://doi.org/10.1061/\(asce\)0742-597x\(2010\)26:1\(30\)](https://doi.org/10.1061/(asce)0742-597x(2010)26:1(30))
- Dulaimi, M. F., Alhashemi, M., Ling, F. Y. Y., & Kumaraswamy, M. (2010). The execution of public-private partnership projects in the UAE. *Construction Management and Economics*, 28(4), 393–402. <https://doi.org/10.1080/01446191003702492>
- federal transit administration. (n.d.). *national council of public private partnership workshops*. <http://www.ncppp.org>
- Fernando, G. . (2019). *Regulating PPP in Sri Lanka*.
- Fidalgo, J., Pinho, D., Lima, R., & Oliveira, M. S. N. (2018). VipIMAGE 2017. *Impact of Feature Selection on Average Ranking Method via Metalearning Salisu*, 27. <https://doi.org/10.1007/978-3-319-68195-5>

- Hardcastle, C., Edwards, P. J., Akintoye, A., & Li, B. (2002). Critical Success Factors for PPP / PFI Projects in the UK Construction Industry: A Factor Analysis Approach. *The School of the Built and Natural Environment, Glasgow, 2002*, 1–9.
- Herath H.M.L.C, Moratuwa, R. I. L. (2009). The Success of PPP in Transportation. *Library University of Moratuwa*.
- 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. *International Journal of Project Management*, 31(3), 424–433. <https://doi.org/10.1016/j.ijproman.2012.08.003>
- Indika, W. S. N., & Lanka, S. (2018). *Development of Appropriate Investment Models for Multimodal Transport Terminals in Sri Lanka. February*.
- 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>
- Jefferies, M. (2002). *Engineering , Construction and Architectural Management Article information : To cite this document : Users who downloaded this article also downloaded : About Emerald www.emeraldinsight.com Critical success factors of the BOOT procurement system : reflec.*
- Ke, Y., Wang, S., Chan, A. P. C., & Cheung, E. (2011). Understanding the risks in China's PPP projects: Ranking of their probability and consequence. *Engineering, Construction and Architectural Management*, 18(5), 481–496. <https://doi.org/10.1108/09699981111165176>
- Kwak, Y. H., Chih, Y., & Ibbs, C. W. (2009). Towards a comprehensive understanding of public private partnerships for infrastructure development. *California Management Review*, 51(2), 51–78. <https://doi.org/10.2307/41166480>
- Mel, D. De, & Rathbone, M. (2018). *work shop on Streamlining the implementation of PPP. April*.

- Muhammad, Z., Sik, K. K., Johar, F., & Sabri, S. (2016). An overview of critical success factors of publicprivate partnership in the delivery of urban infrastructure and services. *Planning Malaysia*, 4(Special Issue 4), 147–162. <https://doi.org/10.21837/pmjournal.v14.i4.155>
- Ng, S. T., Wong, Y. M. W., & Wong, J. M. W. (2012). Factors influencing the success of PPP at feasibility stage - A tripartite comparison study in Hong Kong. *Habitat International*, 36(4), 423–432. <https://doi.org/10.1016/j.habitatint.2012.02.002>
- Perera, W. S. L. (2011). *Public -private partnerships for infrastructure development in sri lanka*. December, 1–85.
- Pessoa, A. (2006). Public-Private Sector Partnerships in Developing Countries: Prospects and Drawbacks. *FEP Working Papers*, May, 1–26. <https://www.researchgate.net/publication/24111613>
- Singh, A., & Prakash, G. (2010). Public-private partnerships in health services delivery: A network organizations perspective. *Public Management Review*, 12(6), 829–856. <https://doi.org/10.1080/14719037.2010.488860>
- Solomon, N., Babatunde, O., Olusegun, A. O., & Akinsiku, E. (2012). Critical Success Factors in PPP on infrastructure delivery in Nigeria. *Journal of Facilities Management*, 10(5), 212–225. <http://dx.doi.org/10.1108/14725961211246018%0Ahttp://%0Ahttp://dx.doi.org/10.1108/13664380680001086%0Ahttp://dx.doi.org/10.1108/09513550410546598%0Ahttp://dx.doi.org/10.1108/14725961211246018%0Ahttp://%0Ahttp://dx.doi.org/10.1108/13664380680001086%0Ahttp://>
- The World Bank. (2012). World Bank Group Support to Public-Private Partnerships. In *World Bank Group Support to Public-Private Partnerships: LESSONS FROM EXPERIENCE IN CLIENT COUNTRIES, FY02–1202–12* (Vol. 1).
- Thoradeniya, D. (2017). *Public-Private Partnerships the Case Study of the Colombo Port City*. December. <http://dl.lib.mrt.ac.lk/handle/123/12784>
- World bank group, P. (2018). Benchmarking Public-Private Partnerships Procurement 2017. In *Benchmarking Public-Private Partnerships Procurement 2017*. <https://doi.org/10.1596/32501>

- Xenidis, Y., & Angelides, D. (2005). The financial risks in build-operate-transfer projects. *Construction Management and Economics*, 23(4), 431–441. <https://doi.org/10.1080/01446190500041552>
- Zhang, S., Gao, Y., Feng, Z., & Sun, W. (2015). PPP application in infrastructure development in China: Institutional analysis and implications. *International Journal of Project Management*, 33(3), 497–509. <https://doi.org/10.1016/j.ijproman.2014.06.006>
- Zhang, X. (2005a). Critical Success Factors for Public–Private Partnerships in Infrastructure Development. *Journal of Construction Engineering and Management*, 131(1), 3–14. [https://doi.org/10.1061/\(asce\)0733-9364\(2005\)131:1\(3\)](https://doi.org/10.1061/(asce)0733-9364(2005)131:1(3))
- Zhang, X. (2005b). Paving the Way for Public–Private Partnerships in Infrastructure Development. *Journal of Construction Engineering and Management*, 131(1), 71–80. [https://doi.org/10.1061/\(asce\)0733-9364\(2005\)131:1\(71\)](https://doi.org/10.1061/(asce)0733-9364(2005)131:1(71))

APPENDICES

APPENDIX A

Sample of the questionnaire

Section 1 of 5

Application of Public Private Partnership(PPP)
and effect on public infrastructure development
project in Sri Lanka

×

⋮

Dear Respondent

I am a student of the University of Moratuwa Sri Lanka and following a Master of Science in Construction Project Management. I am carrying out research on the topic of "Application of Public-Private Partnerships (PPP) and effect on the public infrastructure development project Sri Lanka". this voluntary questionnaire is part of a study which is being conducted to identify critical success factors that affect to application of Public Private partnership (PPP) for infrastructure development project in Sri Lanka. the purpose of this study is to find the best practices, perceptions and effectiveness about the use of PPP as an alternative procurement method for infrastructure development projects in Sri Lanka.

Section 2 of 5

01) Personal information

×

⋮

The responses collected will be kept confidentially by me to the maximum extent and will not be passed on to any other party

What is your Current position *

☐ Chartered Engineer

☐ Engineer

☐ Quantity Surveyor

☐ Chartered Architect/Architect

☐ Financial advisor/Procurement Specialist

☐ Project manager/Site Manager/Senior Manager

☐ Manager and above

Your highest Academic Qualification *

- ☐ Master Degree and above
- ☐ Bachelor Degree
- ☐ Diploma, Certificate
- ☐ Other (PI type)

Your highest Academic Qualification *

- ☐ Master Degree and above
- ☐ Bachelor Degree
- ☐ Diploma, Certificate
- ☐ Other (PI type)

Which Sector do you work last five years. *

- ☐ Public Sector
- ☐ Private Sector
- ☐ Joint venture/Partnership
- ☐ Government funded/Donor funded project
- ☐ self Employed

02)General Experience with PPP



Description (optional)

Are you familiar with the application of PPP model as a alternative procurement model to develop infrastructure SL(Rate 1-very familiar,2-familiar,3-not familiar,4- not at all,5-No option) *

	1	2	3	4	5	
Very familiar	☐	☐	☐	☐	☐	No option

What is your Competency on application of PPP? *

- ☐ Attended PPP training Course only
- ☐ Experience only for initial stage (feasibility ,procurement) only
- ☐ Experience with implementation of project
- ☐ Experience with initiation to final stage of the PPP project
- ☐ No any Experience on PPP

Which of the following PPP projects have you been involved *

- ☐ Health sector development project
- ☐ Transport sector developement Project
- ☐ Water and Sanitary
- ☐ Power and Energy
- ☐ Housing
- ☐ School and Education
- ☐ telecommunication
- ☐ Any Other (PI type)

Do you think PPP is/will be a better approach to ascertain private investment to develop infrastructure SL . *

(Rate 1-Strongly agree,2- agree, 3-uncertain, 4-Disagree, 5-strongly disagree)

	1	2	3	4	5	
Strongly Agree	☐	☐	☐	☐	☐	Strongly Disagree

Do you think Knowledge and expertise will transfer to the country and government Via application of PPP model to develop infrastructure SL.(Rate as 1-Strongly agree,2- agree, 3-uncertain, 4-Disagree, 5-strongly disagree) *

	1	2	3	4	5	
Strongly Agree	☐	☐	☐	☐	☐	Strongly Disagree

un availability of sufficient qualified private companies (investor's) will affect to success of application of the PPP model in Sri Lanka?(Rate as 1-Strongly agree,2- agree, 3-uncertain, 4-Disagree, 5-strongly disagree) *

	1	2	3	4	5	
Strongly Agree	☐	☐	☐	☐	☐	Strongly Disagree

Which of the following PPP procurement methods are you familiar with *

- ☐ Build-Operate Transfer (BOT)
- ☐ Design-Build-Finance-Operate (DBFO)
- ☐ Build-Own-Operate (BOO)
- ☐ Build-Own-Operate and Transfer (BOOT)

What reasons will make you select PPP for infrastructure development project SL *

- ☐ Private sector efficiency
- ☐ Transfer of risk
- ☐ Value for money
- ☐ Expertise of other partners involved
- ☐ Overwhelming with Government legislations/Law

As your belief which types of projects are best suited for PPP to develop infrastructure in SL(Rate 1-5 with 1 as most suitable and 5 as Not suitable) *

	1	2	3	4	5
Economically vi...	☐	☐	☐	☐	☐
Value for money	☐	☐	☐	☐	☐
High scope of i...	☐	☐	☐	☐	☐
High risk projec...	☐	☐	☐	☐	☐
Mutual benefits...	☐	☐	☐	☐	☐
Any project	☐	☐	☐	☐	☐

o3)Effectiveness of Public Private Partnership



Description (optional)

How would you compare PPP with traditional procurement methods(Rate a-Strongly agree, b-Agree, c-Neutral, d- Disagree, e-Strongly Disagree) *

	a	b	c	d	e
Tendering and ...	☐	☐	☐	☐	☐
PPP considers ...	☐	☐	☐	☐	☐
Difference in ris...	☐	☐	☐	☐	☐
PPP projects ar...	☐	☐	☐	☐	☐
PPP projects ut...	☐	☐	☐	☐	☐

what is your agreement on the following key indicators of a successful PPP project? ((Rate a-Strongly agree, b-Agree, c-Neutral, d- Disagree, e-Strongly Disagree) *

	a	b	c	d	e
Resources saved	☐	☐	☐	☐	☐
Public satisfact...	☐	☐	☐	☐	☐
Value for mone...	☐	☐	☐	☐	☐
Risk managem...	☐	☐	☐	☐	☐
Traditional KPI'...	☐	☐	☐	☐	☐

What do you think about the following general factors that lead to a successful PPP? (Rate 1-Strongly agree, 2-Agree, 3-Neutral, 4- Disagree, 5-Strongly Disagree) *

	1	2	3	4	5
Public consulta...	☐	☐	☐	☐	☐
Appropriate ris...	☐	☐	☐	☐	☐
Effective negoti...	☐	☐	☐	☐	☐
Skilled and effi...	☐	☐	☐	☐	☐
Competitive pr...	☐	☐	☐	☐	☐
Well prepared c...	☐	☐	☐	☐	☐

how you rate impact of the following factors for effectiveness of the application of PPP model to develop infrastructure SL?(Rate from 1-5, with 1 as the Major impact 2-minor impact,3-positive impact,4-negative impact,5- No impact) *

	1	2	3	4	5
Government int...	☐	☐	☐	☐	☐
Public complai...	☐	☐	☐	☐	☐
Numerous regu...	☐	☐	☐	☐	☐
Long tendering ...	☐	☐	☐	☐	☐

what are the most critical factors for successful delivery of PPP project in Sri Lanka.(Rate 1 as very important,2-impotent,3-Neutral,4-not important,5-Not important at all) *

	1	2	3	4	5
Political support	☐	☐	☐	☐	☐
Sound economi...	☐	☐	☐	☐	☐
Availability of fi...	☐	☐	☐	☐	☐
Appropriate ris...	☐	☐	☐	☐	☐
good governance	☐	☐	☐	☐	☐
Project technic...	☐	☐	☐	☐	☐
Shared Authorit...	☐	☐	☐	☐	☐
Transparency p...	☐	☐	☐	☐	☐
Sound financial...	☐	☐	☐	☐	☐
Social support	☐	☐	☐	☐	☐

Section 5 of 5

4)Effect of legal and policy frame wok to success PPP in SL

Description (optional)

Do you think current legal background is in satisfactory level to encourage PPP model as a alternative procurement method to develop infrastructure SL?(Rate 1as Always, 2-offen, 3- Moderate,4-rarely, 5- never) *

	1	2	3	4	5	
Always	☐	☐	☐	☐	☐	Never

⋮

Do you think model of concession Agreement of the PPP need to be develop with type of the infrastructure(water supply, housing port, power etc.) (Rate 1as Always, 2-offen, 3- Moderate,4-rarely, 5- never) *

	1	2	3	4	5	
Always	☐	☐	☐	☐	☐	Never

Do you think current investor's promotion are in satisfactory level for success Application of PPP to our country(Rate as 1-most satisfied,2- more satisfied, 3-satisfied, 4-Less satisfied, 5-Unsatified) *

	1	2	3	4	5	
Most satisfied	☐	☐	☐	☐	☐	Unsatisfied

⋮

Availability of viability funding (extended support of government into the project in the form of equity share subsidies, grant)will make PPP into successive.((Rate 1-Strongly agree, 2-Agree, 3-Neutral, 4- Disagree, 5- Strongly Disagree) *

	1	2	3	4	5	
Strongly agree	☐	☐	☐	☐	☐	Strongly Disagree

long concession period is positively effect to the success of infrastructure development using PPP model(Rate 1-Strongly agree, 2-Agree, 3-Neutral, 4- Disagree, 5-Strongly Disagree) *

	1	2	3	4	5	
Strongly agree	☐	☐	☐	☐	☐	Strongly Disagree

What are the most common risks associated with PPP? (Rate from 1-5, with 1 as the least and 5 as highest) *

	1	2	3	4	5
Political risks	☐	☐	☐	☐	☐
Financial risks	☐	☐	☐	☐	☐
Operating risks	☐	☐	☐	☐	☐
Environment ris...	☐	☐	☐	☐	☐

Do you have anything to say about application of PPP for development of infrastructure and critical factors that affect to success of PPP in SL please write below

Long answer text

APPENDIX B

Frequency of occurrence of identified critical factors in the world

item No	Critical Fators	Research Studies done by											
		(Hardcastle et al., 2002)	(X. Zhang, 2005a)	(Dulaimi et al., 2010)	(Muhammad et al., 2016)	Malaysia (Ismail, 2013)	Zhang et al., 2015)	(Jefferies, 2002)	(Hwang et al., 2013)	(Ng et al., 2012)	(Tang & Shen, 2013)	frequency of occurrence	Rank
1	Transparent procurement process,	1		1	1		1		1		1	6	3
2	good governance	1		1		1		1				4	5
3	well organized and committed public agency	1				1			1			3	6
4	stable and favorable social environment(social support)	1		1		1	1			1	1	6	3
5	shared authority between the public and private sector through and realistic cost/benefit assessment	1	1	1			1	1	1		1	7	2
6	project feasibility	1		1								2	7
7	appropriate risk allocation and risk sharing	1		1	1	1		1	1		1	7	2
8	commitment/responsibility of public /private sector	1				1	1					3	6
9	favorable legal framework,	1	1		1		1		1	1		6	3
10	government involvement by providing guarantees	1		1		1		1			1	5	4
11	multi benefits objectives	1										1	8
12	political support	1	1	1	1	1				1	1	7	2
13	sound economic condition	1			1		1		1			4	5
14	Favorable investment environment		1									1	8
15	reliable concessionaire consortium with strong technical strength	1	1	1		1		1	1	1		7	2
16	Sound financial package and appropriate risk allocation via reliable contractual arrangement.		1									1	8
17	effective negotiation between parties	1		1	1	1	1	1		1	1	8	1
18	Availability of viability funding	1		1			1			1		4	4
19	Numerous regulations involved and the approval process	1	1		1	1	1		1		1	7	2

item No	Critical Fators	Research Studies done by											
		(Hardcastle et al., 2002)	(X. Zhang, 2005a)	(Dulaimi et al., 2010)	(Muhammad et al., 2016)	Malaysia (Ismail, 2013)	Zhang et al., 2015)	(Jefferies, 2002)	(Hwang et al., 2013)	(Ng et al., 2012)	(Tang & Shen, 2013)	frequency of occurrence	Rank
20	perception of the private financial objectives,	1			1			1				3	6
21	standardization of procedure								1			1	8
22	well prepared contract document			1		1	1			1	1	5	4
23	Unavailability of sufficient investors in the countries	1		1	1			1			1	5	4
24	reliable concessionaire consortium with strong technical strength		1									1	8
25	long concession period	1		1				1		1	1	5	4
26	sufficiently module PPP guide lines		1	1		1		1	1	1	1	7	2
27	public satisfaction on the project delivered	1			1		1	1		1	1	6	3
28	credit rating of investors			1								1	8
29	perception of the private financial objectives				1		1					2	7
30	stable political and social environment and judicious government control					1						1	8
31	Project profitability							1				1	8
32	internal coordination within government,		1		1	1		1		1		5	4
33	Employment of professional advises, corporate governance.						1					1	8
34	Existing alliances			1								1	8
35	willingness to compromise/collaborate respect					1						1	8
36	Unifying specific vision					1						1	8
37	Competitive procurement process	1		1		1		1		1	1	6	4
38	Supportive project team and management actions.			1			1			1		3	6

APPENDIX C

Details of the participant of the interview

No	Name	Designation	Name of the present project	Education Qualification	Experience
1	Eng K.Disanayake	Deputy project director	Western province light rail transit project	CEng, MSc in transportation	15 Yrs
2	Eng Saumya Senadeera	Procurement Engineer	Sri Lanka port Authority	CEng, Msc	8Yrs
3	Eng Senarath Perera	Consultant Engineer	Accelerated programme for middle income housing and infrastructure development.	CEng, Msc(Con Management)	10yrs
4	Eng S.M.P Sooriya bandara	Deputy project Director	Elevated highway project (New Kelani Bridge to Athurugiriya)	CEng, MSc (Transportation)	20Yrs
5	Eng Chandrani Jayaweera	Deputy project Director	Tec City development project	CEng, MSc (Transportation)	15Yrs
6	Eng Shanika Hemachandra	Senior Engineer	Western province light rail transit project	CEng, MSc (Struc.)	10Yrs
7	Eng Nadeesha Apsara	Project director	Sisili Hanaro Encare Expansion Project(Ministry of Health)	BTec, MSc (Env.)	11Yrs

No	Name	Designation	Name of the present project	Education Qualification	Experience
8	Eng D.Dhushyananth	Procurement Engineer	Metro Colombo Urban Development Project	CEng, MSc(Project Management)	10Yrs
9	Mr. Niroshan Nanayakkara	Manager Research development	Sisili Hanaro Encare Expansion Project(Ministry of Health)	Bsc, MSc(Agriculture)	10Yrs
10	Mr. Yasantha Gunarathne	General Manager	Sisili Hanaro Encare Expansion Project (Ministry of Health)	Bsc,Msc (Bio mass Eng)	10Yrs