

APPLICABILITY OF PUBLIC-PRIVATE PARTNERSHIP TO OVERCOME THE CHALLENGES ENCOUNTERED BY PUBLIC SECTOR BUILDING PROJECTS IN SRI LANKA

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ABSTRACT

Public-Private Partnership (PPP) is a connection between public sector and private sector for a long duration with the aim of producing public services. PPP provides a mechanism for governments to bridge the supply-demand gap by developing new facilities in the construction industry. It is an extensive necessity for the Sri Lankan context due to the declining position in economic growth over the past years. Since PPP is already being practiced in Sri Lankan infrastructural projects, it is essential to investigate the ability of PPP to improve the public sector building projects (PSBP) in Sri Lanka (SL). An extensive literature synthesis was carried out to identify the PPP approaches and challenges encountered by PSBP. The challenges encountered by PSBP were validated and updated by conducting a semi-structured preliminary interview to comply with the Sri Lankan context. A questionnaire survey was conducted to identify the ability of PPP approaches to overcome the challenges in PSBP. Data analysis was done by conducting the Relative Important Index (RII) technique. The findings revealed that PPP has a high ability to overcome the challenges encountered by public sector building projects. Therefore PPP can be recommended as a procurement strategy for PSBP in SL.

Keywords: *Approaches; Building Projects; Challenges; Partnering; Procurement*

1. INTRODUCTION

According to the statistics of the Central Bank of Sri Lanka (2020), the country was in a position of declination in economic growth throughout the past three years. Additionally, Ramachandra, Rotimi and Rameezdeen (2013), stated that the construction industry and the economy of the nation have a considerable relationship. Therefore, it can be concluded that successful construction projects will have an effective impact on Sri Lanka's economy in an effective manner. However, according to Myers (2005), the construction industry is defined by its activities such as supplying building materials,

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manufacturing machinery, manufacturing building product components, operating sites, initiating new projects and assembling. That process of obtaining goods and services was known as procurement (Cartlidge, 2009).

According to Mathonsi (2012), the procurement system is a key factor that determines the success or failure of a project. Therefore, it would be best to apply the procurement method as a strategy to ensure the success of the project. However, a procurement method with transparency and competency will lead to effective project completion (Hardcastle, et al., 2005). The partnering of the public and private sectors for the purpose of designing and managing construction projects for a specified time period was known as PPP (Sharma, Bindal and Cantt, 2014). Additionally, in PPP, the private sector assists the public sector services by providing funds and providing leadership (Macdonald and Cheong, 2014). Patil (2017) reported PPP as an alternative option for public sector infrastructure development. Further, Patil (2017) stated that PPP provides a mechanism for governments to bridge the supply-demand gap by developing new facilities in the construction industry, which is currently the most important factor in the Sri Lankan context. Hence, the most of the resources were reported on improving infra-structure projects through public private partnership, it is important to investigate whether the application of same theory for Public sector building projects will increase the viability of projects. Due to the lack of researches on improving PSBP by applying public private partnership procurement, it is crucial to review ability of public private partnership to overcome the challenges encountered by PSBP prior to the implementation of PPP as a procurement strategy in building projects.

2. LITERATURE REVIEW

2.1 PUBLIC PRIVATE PARTNERSHIP (PPP)

Cartlidge (2009) defined PPP as a connection between the public and private sectors for a long duration with the aim of producing public services or infrastructure. Moreover, Allard and Trabant (2008) defined PPP as a "marriage" between public sector and private sector tasks for a long duration to optimize the use of public funds and enhance the quality of services generally provided by the public sector. In addition to that, according to Macdonald and Cheong (2014), PPP is a contractual arrangement between the private sector and the public sector where the private sector is obliged to deliver a public sector facility or service by funding or operating the project. Similarly, the PPP concept facilitates the public and private sectors' organizing of long-term alliances for producing goods and services (Kang, et al., 2019). The development of PPPs improved resource availability, sustainability, and efficiency in public services such as transportation, water, energy, health, and telecommunication (Babatunde, et al., 2014). Kang, et al. (2019) reported that most governments around the world have adopted PPP. In particular, developing countries such as Asian and African countries have started to believe in the PPP concept to develop infrastructure projects (Kang, et al., 2019). However, as noted by Babatunde, et al. (2014), the PPP projects were designed with attentive consideration within the project implementation.

2.2 CHARACTERISTICS OF PPP

Characteristics of PPP were identified from different sources as stated in Table 1.

Table 1: Characteristics of PPP

Characteristics	1	2	3	4	5	6	7	8	9	10
Private Sector Participation	√	√	√		√		√		√	
Value for Money (VFM)	√	√		√				√		
Certainty of outcomes	√	√					√			√
Innovation	√			√		√	√			√
Work Planning and Organizing		√							√	
Optimisation of life cycle cost				√					√	
Risk sharing		√	√	√	√	√	√		√	
Responsibility Sharing		√	√		√		√			√
Resources Sharing		√			√		√		√	√
Improve Level of delivering the Service	√		√							
Transparency		√	√		√		√			

1; (Akintoye, Liyanage and Renukappa, 2011), 2; (Akintoye, et al., 2003), 3; (Allard and Trabant, 2008), 4; (Boussabaine, 2007), 5; (Cheung, Chan and Kajewski, 2012), 6; (Chinyere and Lin, 2008), 7; (Kang, et al., 2019), 8; (Kurniawan, Mudjanarko and Ogunlana, 2015), 9; (Leiringer, 2006), 10; (Macdonald and Cheong, 2014)

2.2.1 Private Sector Participation

According to Allard and Trabant (2008), one of the main unique characteristics of PPP is the relationship between the private sector and the public sector, which was identified as a "marriage" between both sectors during the project lifetime.

2.2.2 Value for Money (VFM)

Hardcastle, et al. (2005), reported that one of the major aims of PPP is to achieve VFM. Leiringer (2006), stated that PPP motivates actions that facilitate the VFM during the project life cycle. United Nations Economic Commission for Europe - UNECE (2008), mentioned that PPP achieves VFM by delivering the projects at a lower cost, with a higher level of service, and reducing risk. Similarly, according to Leiringer (2006), there is a huge impact on VFM due to the risk transfer.

2.2.3 Certainty of Outcomes

Due to the strong encouragement for on-time and on-budget project completion, private sectors have mostly focused on the successful completion of the projects as soon as possible within the allocated budget (UNECE, 2008). Similarly, Asian Development Bank (2020), stated that PPP projects are highly motivated to achieve desired outcomes.

2.2.4 Innovation

UNECE (2008), explained that PPP has high potential for innovations due to the combination of skills and motivations of the public and private sectors. In particular, technological innovations can be adopted due to the long duration of the projects

(Leiringer, 2006). Moreover, Yuan, Skibniewski and Li (2008), reported that as a result of compatibility and consistency between two parties, it may lead to design innovations.

2.2.5 Work Planning and Organizing

The Public-Private Infrastructure Advisory Facility Organization - PPIAF (2009), argued that projects with long durations have the capability of adopting and maintaining proper planning and organizing procedures. According to Yuan, Skibniewski and Li (2008), proper planning in PPP projects results in improved outputs.

2.2.6 Optimisation of Life Cycle Cost

Due to the involvement of investment, maintenance, and operation tasks in PPP projects, there should be a well-balanced expenditure throughout the project (PPIAF, 2009). According to Hardcastle, et al. (2005), project costs, quality, management, and schedules are the main factors that affect the life cycle cost. Moreover, innovation concepts are mainly occurring to optimise the life cycle cost of projects (Javed, Lam and Chan, 2013).

2.2.7 Risk Sharing

According to the the World Bank (2014), risk should be transferred to the party that is capable of handling it at the highest level. Therefore, the main characteristic of PPP is appropriate risk allocation (Akintoye, et al., 2003). However, according to Kang, et al. (2019), the majority of the risk was allocated to the private sector. Anyhow, the risk allocation differed according to the form of PPP (Sharma, Bindal and Cantt, 2014).

2.2.8 Responsibility Sharing

Macdonald and Cheong (2014), identified that appropriate responsibility sharing in PPP projects may guide to successful project completion over a long period of time. According to Rocco and Plakhotnik (2009), and Irimia-Diéguez and Oliver-Alfonso (2012), the responsibility of design, management, financing, and maintenance varied with the degree of involvement in the public sector and private sector of different PPP models.

2.2.9 Resources Sharing

Akintoye, et al. (2003), argued that both resources and risks were shared among public and private sector parties. Similarly, Akintoye, et al. (2003), stated that within PPP project procedures, public sector and private sector resources were combined. According to Kang, et al. (2019), PPP projects achieve the best skills and human power through the sharing of private sector resources.

2.2.10 Improve Level of Delivering the Service

The PPP concept was improved for the delivery of public services (UNECE, 2008). According to the URT (2009), PPP is one of the main viable methods to deliver a good service to end users. In order to minimize the risks, the private sector leads to improving the services delivered through the public sector (Zhou, et al., 2013).

2.2.11 Transparency

According to Macdonald and Cheong (2014), PPP projects have transparency in the tasks of the partnership and in the roles of each partner. In addition to that, Miranda (as cited in Akintoye, Liyanage and Renukappa, 2011), reported that due to public sector involvement, there is considerable transparency in the PPP process.

2.3 CHALLENGES ENCOUNTERED BY PUBLIC SECTOR BUILDING PROJECTS

Challenges encountered by public sector building projects were identified in Table 2.

Table 2: Challenges encountered by public sector building projects

Root cause	Source
Financial Issues	(Ferdous, et al., 2019) (Riazi and Lamari, 2013) (Umar, 2018) (Silva, Rajakaruna and Bandara, 2008) (Kosala, Francis and Sirimewan, 2021)
Changes in Government Policies	(Silva, Rajakaruna and Bandara, 2008) (Yap and Cheah, 2020) (Riazi and Lamari, 2013) (Madanayake, 2015) (Staples and Dalrymple, 2007)
Lack of Technology usage	(Yap and Cheah, 2020) (Amusan, et al., 2018) (Sha'ar, et al., 2017)
Poor Management and Coordination	(Azis, et al., 2012) (Mbala, Aigbavboa and Aliu, 2019) (Umar, 2018)
Lack of Research and development	(Silva, Rajakaruna and Bandara, 2008) (Riazi and Lamari, 2013)
Resources shortage	(Tahir, et al., 2019) (Sha'ar, et al., 2017) (Issa, 2013 cited in Madanayake, 2015) (Silva, Warnakulasuriya and Arachchige, 2018)
Less Safety concerns	(Issa, 2013 cited in Madanayake, 2015) (Silva, Rajakaruna and Bandara, 2008)
Lack of Training and development	(Riazi and Lamari, 2013) (Ferdous, et al., 2019) (Tawalare and Laishram, 2020)
Social issues	(Riazi and Lamari, 2013) (Silva, Rajakaruna and Bandara, 2008)
Lack of skill levels	(Umar, 2018) (Silva, Warnakulasuriya and Arachchige, 2018)

Since the PPP characteristics and Challenges encountered by the building projects were listed in the Literature, it is essential to validate the challenges according to the Sri Lankan context and investigate the ability of each PPP characteristic to overcome the identified challenges.

3. METHODOLOGY

This research uses the questionnaire survey research strategy to achieve the research aim of reviewing the ability of PPP approaches to overcome the challenges encountered by public sector building projects in Sri Lanka. Thirty-one (31) professionals who had experience in PPP projects and building projects in SL responded to the questionnaire survey. They were reached through the snowball sampling method. In this dissertation, RII value analysis (refer Eq. 01) was mainly used to rank the PPP approaches under each challenge in PSBP in SL according to their contribution to overcoming the challenges.

$$RII = \frac{\sum W}{A(N)} \quad Eq. 01$$

Where, W = Weighting is given to each factor by the respondent; A = The highest weight in the research; and N = Total number of respondents.

Challenges encountered by public sector building projects were identified in the literature and validated by conducting a preliminary interview to validate the challenges to comply with Sri Lankan context. Four preliminary interviews were conducted with professional quantity surveyors who have experience in PSBP in Sri Lanka. Experts for preliminary interviews were selected only by representing industry practitioners. The Profile of the Interviewees is concluded in Table 3.

Table 3: Details of the interviewees

Interviewee ID	Designation	Experience	Qualifications
PI1	Quantity Surveyor	10 years	BSc (Hons) Construction Engineering
PI2	Quantity Surveyor	11 years	BSc (Hons) QS, MQSi
PI3	Quantity Surveyor	12 years	BSc (Hons) QS
PI4	Procurement executive	16 years	Chartered QS, BSc (Hons) QS, MSc (CPM) MRICS, MAIQS

4. FINDINGS AND DISCUSSION

4.1 CHALLENGES ENCOUNTERED BY PUBLIC SECTOR BUILDING PROJECTS IN SRI LANKA

In the literature synthesis, challenges to the PSBP were identified and they were grouped under their root causes. According to the literature synthesis, financial issues, poor management and coordination, skill shortage, resource shortage, government policies, social issues, lack of research and development, and safety issues were identified as challenges. Identified challenges were validated to comply with the Sri Lankan context using Preliminary Interview. Anyhow, PI1 stated that "*There is an adequate skilled human force in the Sri Lankan construction industry. Therefore, according to my view, there is no skill shortage.*" Therefore, a skills shortage cannot be considered as a significant challenge to PSBP. Further, PI2, PI3 and PI4 also confirmed that Sri Lanka has a strong human force which was skillful in the construction field. Therefore, challenges to the PSBP were concluded to financial issues, poor management and

coordination, resource shortages, changes in government policies, social issues, lack of research and development, Lack of Training and development, and safety issues.

4.2 ANALYSIS OF THE ABILITY OF PPP APPROACHES TO OVERCOME THE CHALLENGES IN PSBP IN SRI LANKA

The ability of each PPP approach to overcome the challenges had been assessed in the questionnaire survey. The level of ability to overcome the challenges was tested on the five-point Likert scale, which was indicated as 1 - "Very low," 2 - "Low," 3 - "Medium," 4 - "High," and 5 - "Very high". Since there are five scales, RII value interpretation was done by dividing the 0 - 1 in to five levels (refer Table 4).

Table 4: RII value interpretation

RII Value	Interpretation (level of ability)
0 – 0.200	Very Low
0.200 – 0.400	low
0.400 – 0.600	medium
0.600 – 0.800	High
0.800 – 1.000	Very high

According to the ratings, the RII value was calculated (refer Tables 5 and 6). RII values between 0.6 and 0.8 were interpreted as having high ability, while RII values between 0.8 and 1 were interpreted as having very high ability.

Table 5: Ability of PPP approaches to overcome the challenges encountered by public sector building projects in Sri Lanka (part 1)

PPP Approach	Private Sector Participation	Best Value for Money	Optimisation of LCC	Resource Sharing	Risk Sharing	Certainty of Outcomes
Challenges						
Financial Issues	0.8600	0.8533	0.8400	0.8400	0.7933	0.7800
Changes in Government Policies	0.7533	0.7466	0.7000	0.7533	0.8066	0.7666
Lack of Technology usage	0.7533	0.7600	0.7000	0.7733	0.7000	0.7666
Poor Management and Coordination	0.7000	0.6800	0.6800	0.7866	0.7633	0.6800
Lack of Research and development	0.7333	0.7800	0.6533	0.7333	0.6533	0.6800
Resources shortage	0.7600	0.7200	0.8133	0.9000	0.7200	0.6666
Less Safety concerns	0.6400	0.6733	0.7133	0.6600	0.8600	0.7133
Lack of Training and development	0.7600	0.7333	0.5800	0.6800	0.6600	0.6733
Social issues	0.5733	0.7000	0.7000	0.6800	0.6933	0.7666

Table 6: Ability of PPP approaches to overcome the challenges encountered by public sector building projects in Sri Lanka (part 2)

Challenges	PPP Approach				
	Improve Level of Delivery of the Service	Work Planning and Organisation	Responsibility Sharing	Innovation	Transparency
Financial Issues	0.7733	0.7533	0.7400	0.6800	0.6333
Changes in Government Policies	0.7866	0.8136	0.8066	0.7600	0.7000
Lack of Technology usage	0.7866	0.8133	0.7333	0.8066	0.7000
Poor Management and Coordination	0.7933	0.8933	0.8266	0.7466	0.8000
Lack of Research and development	0.8066	0.7333	0.7000	0.8400	0.5933
Resources shortage	0.7533	0.7800	0.7133	0.8066	0.6133
Less Safety concerns	0.7400	0.8600	0.7600	0.7666	0.6733
Lack of Training and development	0.7600	0.8000	0.7533	0.8133	0.6533
Social issues	0.8866	0.7066	0.7066	0.6933	0.8466

Financial issues in PSBP in SL can be overcome mainly by "private sector participation". According to the literature review, the PPP mechanism introduces private sector capital to the government sector, which helps to overcome the capital shortage faced by the Sri Lankan government in the construction industry. Secondly, the "best value for money" contributes to overcoming the financial issues. Value for money is a key factor in measuring the economic effectiveness of a project. Therefore, having the best VFM through PPP will enhance the economic effectiveness of a project. Thirdly, "optimisation of life cycle cost" and "resources sharing" are ranked as the PPP approaches to overcome the financial issues in PSBP in SL. Innovation and investment introduced with the PPP cause well-balanced expenditure on a project. Therefore, it helps optimize the LCC of a project. Furthermore, in the literature review, PPP was formed upon the concept of resources, risk, and reward sharing, which contributed to overcoming the financial issues occurring in a project.

As mentioned in Tables 5 and 6, "work planning and organisation," "risk sharing," and "responsibility sharing" are the three most contributing PPP approaches to overcome the government policy changes in PSBP in SL. According to the literature review, longer-duration projects, such as PPP projects, have a greater capacity for proper work planning and organization. In the event of a government change, the project can be continued according to plan without any interruption. The risk is transferred to the private party who is capable of bearing it. Even though government and policy changes have occurred, due to the risk-bearing of the private party, they can continue the project. Projects with long durations can be survived with responsibility-sharing among the parties. Because even if the government changes, a private party can continue the project by fulfilling their

responsibilities. So, the above three approaches have a very high ability to overcome the challenges occurring due to government policy changes. Among the eleven PPP approaches identified under Table 1, two main approaches have a very high ability to improve the usage of technology in PSBP in SL. Those two approaches are "work planning and organization" and "innovation." Work planning and organization are main factors in long-term duration projects, which encourage workers to use more technology to do proper work planning and organization. PPP enables the opportunity for new technological innovation in the project. Therefore, innovation is one of the most contributing approaches to enhancing the technology usage in PSBP.

According to Table 5, poor management and coordination can be overcome mainly by "work planning and organising," "responsibility sharing," and "transparency" provided by the PPP procurement method. Longer-duration projects have a greater capacity for proper planning and organization. With the PPP approach, a project can achieve best work planning and organizing with its long-term duration to overcome the existing poor management and coordination. Secondly, responsibility sharing contributes to overcoming poor management and coordination. It is because of the two parties' involvement that encourages us to improve the management and coordination within the project procedure. Thirdly, the transparency introduced with the PPP may help to improve the management and coordination. Because the transparency enhances the necessity of proper management and coordination between the parties involved in the project. Tables 5 and 6 demonstrated that "innovation" and "improving the level of delivery of the service" are the main contributing factors to overcoming the challenges that occurred due to a lack of research and development. Innovation leads to alternative options within the project process, which will be a main reason for implementing research and development. Improvement of the delivery process may be initiated along with the new research and development. Therefore, while improving the delivery of service, research and development will also be improved. Therefore, the above-mentioned PPP approaches have a high ability to improve research and development in PSBP.

According to Tables 5 and 6, "resource sharing," "optimisation of lifecycle cost," and "innovation" have a high ability to overcome the resource shortage in PSBP in SL. PPP facilitates the ability to share resources between the public and private sectors. When there is a resource shortage, there are two parties to resolve the shortage. Moreover, optimisation of LCC will be done by well-balanced investment, maintenance, and operations where the resource shortage can be identified at the prior stage and the necessary effort put into it to resolve it. As the third approach, innovation will initiate alternatives and new technological solutions to a resource shortage. Therefore, innovation is also one of the main approaches to overcome the resource shortage in PSBP in SL. According to Table 5, "work planning and organisation" and "risk-sharing" have a high ability to overcome the challenges that occur due to fewer safety concerns in a project. PPP is initiated along with work planning and organizing, where the lean principles are applied. Therefore, the planning and organizing have more potential to improve the safety concerns of a project. Furthermore, risk sharing will be another PPP approach to focus on safety concerns when the construction is going on. Because, PPP transfers the risk to the best possible party to bear it. Therefore, each party will be more concerned about safety issues. So that the planning, organizing, and risk sharing will contribute to improving the safety concerns within a PSBP in SL.

Further, "innovation" and "work planning and organisation" have a high ability to overcome a lack of training and development. PPP has an innovative approach where more training and development are needed. Moreover, proper work planning and organizing needed more training and development in relevant areas. Therefore, innovation and work planning and organizing encourage the training and development of a project". Improve the level of delivery of the service" and "Transparency" have a high ability to overcome social issues in PSBP in SL. PPP is one of the most viable methods to deliver a service to the end users. Therefore, it can reduce the social issues that arise against PSBP. Moreover, transparency provides more information about the project. So the transparency approach in PPP also helps to minimize the social issues in SBP in SL.

5. CONCLUSIONS

PPP is a procurement strategy where the public and private parties partner to complete a project with mutual objectives. In Sri Lanka, PPP is mostly used in public sector infrastructure projects to overcome the financial incapacities of the government. However, public sector building projects have different challenges which cause the abandonment of the buildings prior to completion or after completion. Therefore, the research identified the challenges faced by PSBP in SL and measured the ability to overcome them with the PPP approaches, which proved that PPP approaches have a high ability to improve the viability of the PSBP. So PPP has to be implemented in SL building projects as well. The preliminary interviews successfully verified the facts identified in the literature review. Nevertheless, all the respondents rejected the skill shortage in the Sri Lankan context. Therefore, it was removed from the list of challenges faced by PSBP in SL. The verified facts were added to the questionnaire survey for further processing. A sample of 30 experts who have experience in the Sri Lankan construction industry rated the ability of each approach to overcome the challenges encountered by building projects in the Sri Lankan context. Even though the report discusses the approaches with the highest ability, the RII value showed that all the approaches have a high ability to overcome the challenges faced by PSBP in SL (refer Table 05). Therefore, the PPP's ability to overcome the challenges encountered by PSBP in SL was ascertained in this paper.

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