buildings

MDPI

Article

A Study PPP in Indonesia Government Project : Solisated Model

Mustafa Nahdi [1], Naniek Widayati[2], Mochamad Agung Wibowo [3] , Endah Murtiana Sari [4]*, Rizal Zainuddin Tamin[5] and Antho Thohirin[6]

[1,6] Civil Engineering Doctoral Program, Faculty of Engineering, Universitas Tarumanagara, Jakarta Barat 11440, Indonesia; ade.328192005@stu.untar.ac.id
[2] Faculty of Engineering, Universitas Tarumanagara, Jakarta Barat 11440, Indonesia; dyahh@fti.untar.ac.id
[3] Department of Civil Engineering, Faculty of Engineering, Diponegoro University, Kota Semarang 50275, Indonesia; agung.wibowo@ft.undip.ac.id
[4] Department of Information System, Institut Manajemen Wiyata Indonesia, Sukabumi 43113, Indonesia
[5] Construction Engineering and Management Research Group, Faculty of Civil & Environmental Engineering, Institute Technology of Bandung, Bandung 40132, Indonesia
* Correspondence: endah.murtiana@imwi.ac.id

Abstract: Partnering will have a positive impact and increase value in construction projects in Indonesia. The Indonesian government through the Ministry of Finance is developing a partnering model for infrastructure projects in Indonesia in order to accelerate massive infrastructure development with Public Private Partnerships (PPP) Project Collaboration for any public infrastructure. The PPP project can overcome the funding gap experienced by the government to accelerate massive infrastructure development. This research aims to examine the Public Private Partnerships (PPP) model that occurs in Indonesia, especially the solisated model, Solised project is a PPP project initiated by the government based on the Government's long term development plan. The method used in this research is a qualitative method in the form of an in depth study at 3 (three) location solicited PPP project, using Soft System Methodology (SSM) followed by expert FGD using the Delphi method which aims to analyze the interaction and depth of partnering in the PPP Project. This output of the research is the positive impact of the solisated PPP model for Indonesian infrastructure development to overcome the gap in funding difficulties experienced by the government in accelerating infrastructure development. This research will bring new knowledge for all stakeholder and Academic in the development of PPP project in Indonesia, where currently massive development is needed to encourage the implementation of a solicited PPP model.

Keywords: government project, partnering, PPP, solisated project.

Citation:

Academic Editor(s): Name

Received: 2024
Revised: 2024
Accepted: 2024
Published: date

1. Introduction

Currently, there are 35 infrastructure projects in Indonesia carried out using the Public Private Partnerships (PPP) model, based on data from the website of the Ministry of Finance of the Republic of Indonesia. From the total 35 projects, they are divided into several infrastructure groups, these are included drinking water infrastructure (8), health (4), transportation (4), education (1), oil and gas (2), waste management (3), public housing (2) roads (8) and information technology (3). The needs for infrastructure in Indonesia is very large considering that population and economic growth is also rapid changes. The encouragement to carry out PPP is needed on a massive scale to realize equitable infrastructure development. Yun et.al. (2015) [1] differentiates the

management organization in PPP into 2 parts, namely solicited and unsolicited. Both have different characteristics in their management. Solisated is a project initiated by the government, usually a national priority project, while unsoliseted is a project whose initiative is submitted by a business entity to the government [1]. In developed countries such as the UK PPP has been widely implemented to build infrastructure such as roads, prisons, schools, health and several important infrastructure [2], [3]. PPP project service management can be in the form of Availability Payment (AP) [2] or User Charge [3]. AP is a periodic payment made by the Government to service providers during the PPP contract period, where if they meet predetermined standards usage, payments are released. Determining performance standards can be identified as part of the performance identified in the financial management contract [4]. Meanwhile, user charge is the direct charging of PPP services to users, such as toll roads in Indonesia [3].

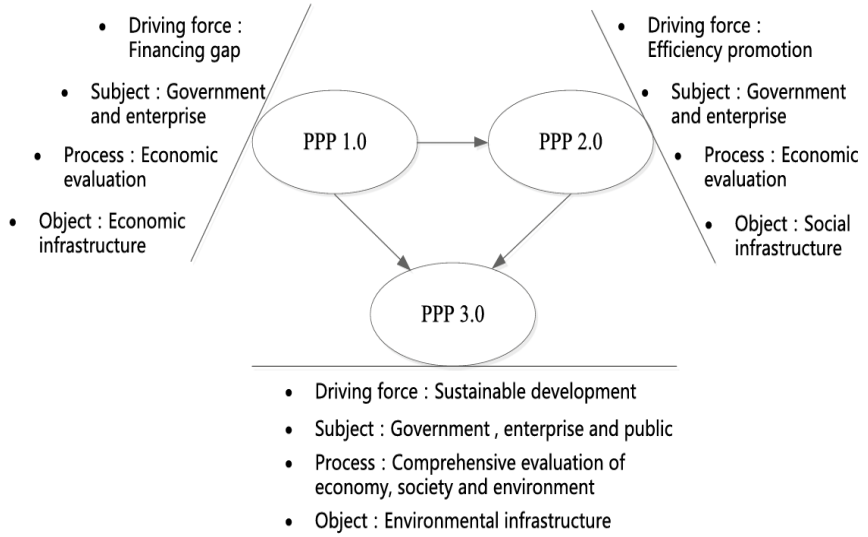


Figure 1. conceptual framework PPP[3]

Figure 1. Above illustrates the combination for assessing the feasibility of a PPP project. This division is important to address funding, increase efficiency and professionalism in implementing PPP projects [5]. Previous research on PPP has not discussed in detail the partnering model and the interaction between Owner (government) and investors in realizing PPP projects. Indonesia is a country with a large variety of Solicited PPPs, especially for toll road and local road construction with both AP and user charge service concepts, that the results of this research can become a reference for investors and the government to increase engagement in PPP projects in Indonesia.

1.1. Project PPP in Indonesia

Penerapan PPP di Indonesia didasarkan pada Peraturan Presiden Nomor 38 Tahun 2015 tentang Kerjasama Pemerintah dan Badan Usaha dalam Penyediaan Infrastruktur. Kemitraan dalam pembangunan infrastruktur harus didasarkan pada peraturan sektor yang berlaku. Inisiatif PPP dikategorikan menjadi Sollicited & Unsolicited dan kemitraannya ditetapkan melalui tender umum. Pemerintah dapat memberikan dukungan & jaminannya; untuk dicantumkan dalam dokumen pelelangan umum. Pemerintah dapat memberikan dukungan diantaranya adalah sebagai berikut :

- perizinan, penyediaan lahan, dukungan sebagian konstruksi; insentif pajak; kontribusi fiskal keuangan;
- penyediaan tanah diatur oleh PJPK sebelum proses pengadaan badan usaha;
- Kontribusi fiskal harus dituangkan dalam Anggaran Pendapatan dan Belanja Negara/Daerah (APBN/D).

Pemerintah juga harus memberikan jaminan terkait hal-hal sebagai berikut :

- Jaminan dapat diberikan atas kewajiban finansial CA (Contracting Agency);
- akibat kejadian risiko yang dialokasikan kepada CA;
- tercantum dalam perjanjian PPP; misalnya keterlambatan memperoleh ijin/lisensi, - perubahan regulasi, tidak adanya penyesuaian tarif, dan - kegagalan dalam mengintegrasikan jaringan/fasilitas;
- Disediakan melalui badan usaha yang khusus dibentuk oleh pemerintah untuk Penjaminan Infrastruktur .

Masing-masing penjelasan terkait dengan proyek solisated maupun unsolisated dijelaskan berdasarkan gambar dibawah ini :

The implementation of PPP in Indonesia is based on Presidential Regulation Number 38 of 2015 concerning Government and Business Entity Cooperation in Providing Infrastructure. Partnerships in infrastructure development must be based on applicable sector regulations. PPP initiatives are categorized into Sollicited & Unsolicited and the partnerships are determined through public tenders. The government can provide support & guarantees; to be included in the public tender documents. The government can provide support including the following:

- permits, land provision, partial construction support; tax incentives; financial fiscal contribution;
- Land provision is regulated by the GCA before the business entity procurement process;
- Fiscal contributions must be stated in the State/Regional Revenue and Expenditure Budget (APBN/D).

The government must also provide guarantees regarding the following matters:

- Guarantees can be provided for the financial obligations of the CA (Contracting Agency);
- due to risk events allocated to CA;
- stated in the PPP agreement; for example delays in obtaining permits/licenses, - changes in regulations, no tariff adjustments, and - failure to integrate networks/facilities;
- Provided through a business entity specifically formed by the government for Infrastructure Guarantee.

Each explanation related to solicited and unsolicited projects is explained based on the image below:

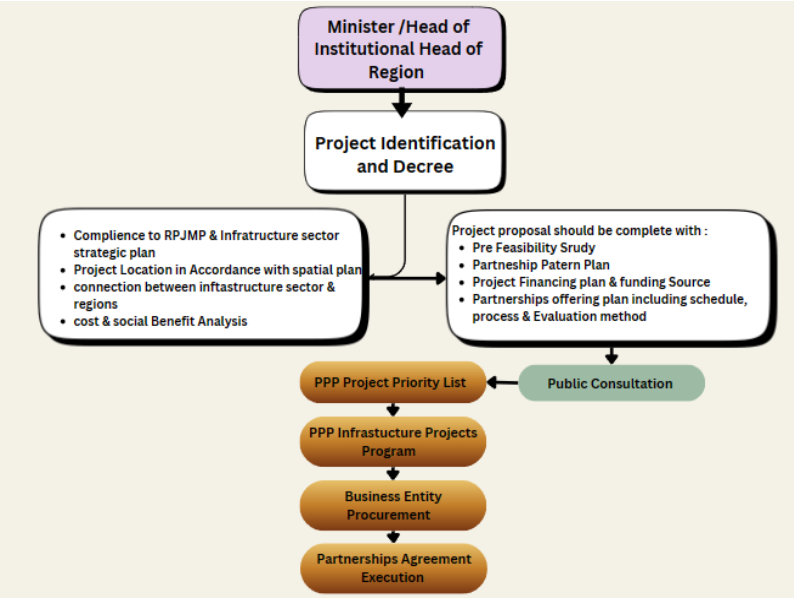


Figure 2. Solicited Project

Figure 2. above illustrates how solicited projects are designed based on Presidential Regulation Number 38 of 2015 starting from the Minister's policy that a study of spatial planning, costs and social benefits must be carried out. Next, a study is carried out by completing the proposal required in the finalized project. The next stage is to determine the infrastructure that will be collaborated through PPP, then a partnership agreement is executed.

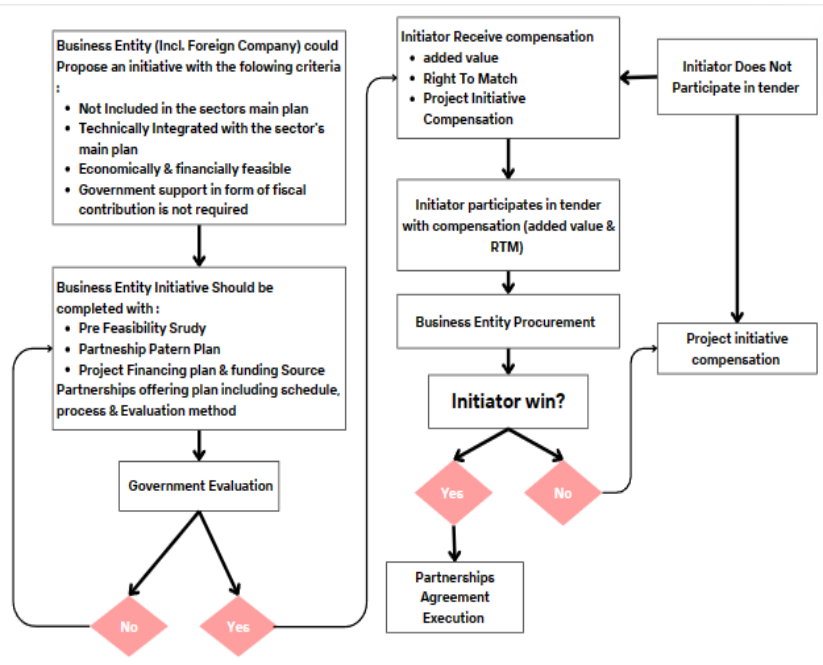


Figure 3. Unsolicited Project

Figure 3. above explains the unsolicited project, where as the initiator has various options to take the project or Right To Match (RTM) if the tender participant has a higher offer, while the option to get incentives can be chosen if the initiator does not want to take the project being offered. The PPP case in Indonesia is currently only being implemented,

because for the unsolicited scheme it has not yet been decided regarding the options offered to the initiator, so to avoid this, PPP has only implemented a solicited project scheme.

1.2. Partnering

PPP projects are long term partnering contracts between the government and private business entities [6]. PPP succeeded in overcoming market and government failures in managing the project. In the PPP partnering concept, it is indepth partnering at the collaboration level [7], [8] at the collaboration stage, all parties provide a sense of trust in carrying out PPP. The government has projects that must be financed and managed by private business entities [9], [10]. On a PPP project scale, partnering between investors/sponsors is often found to work on PPP projects together [3],[11]. PPP includes 5 aspects of definition, namely project, delivery method, policy, good governance and culture [12], this will not happen if in depth partnering is not carried out in the implementation of PPP [13], [14], [15]. Several factors that influence the depth of partnering include the principles of good governance which must be implemented in the form of TARIF (Trust, Accountable, Responsible, Independent and Fairness) [7][16], [17]. PPP is built on the concept of long term mutually beneficial partnerships [18], [19], [20], [21]. The increasing urbanization in Indonesia means that infrastructure development must be carried out quickly, several large countries' governments are experiencing financial deficits to build infrastructure. [22] Financing is a consideration in urban development in Indonesia, so it is necessary to attract local and foreign investors with PPP. [23]. The aim of this partnering is closing the gap in financing but can also attract active participation in encouraging globalization and attracting very large capital to a country [9] . PPP is one of the solutions in the future for government lack of funding of public infrastructure development. Basically, there are 2 types of PPP, user charge (payment collected from users) and Availability based payment (government allocate yearly payment to investors) with the fix values with the maximum contract 10-15 years[2], [3], [4], [5].

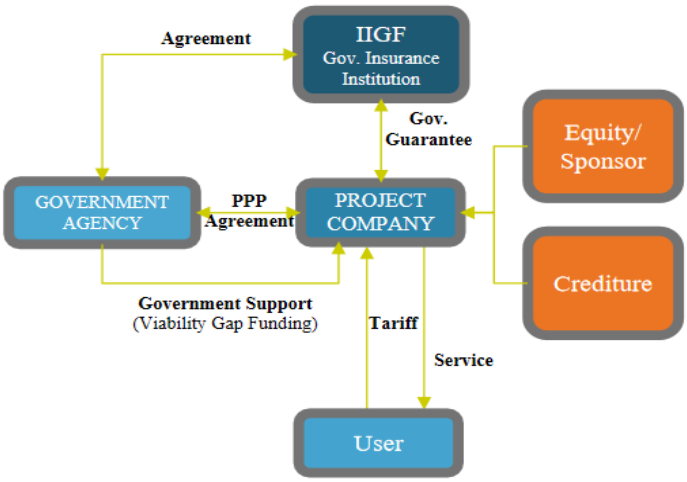


Figure 4. User Charge Model (Bappenas, 2022)

Figure 4 above illustrates how PPP project services are implemented with user charges [24]. The project is implemented by the project company, then when operating the user is charged a tariff to obtain services from the PPP project.

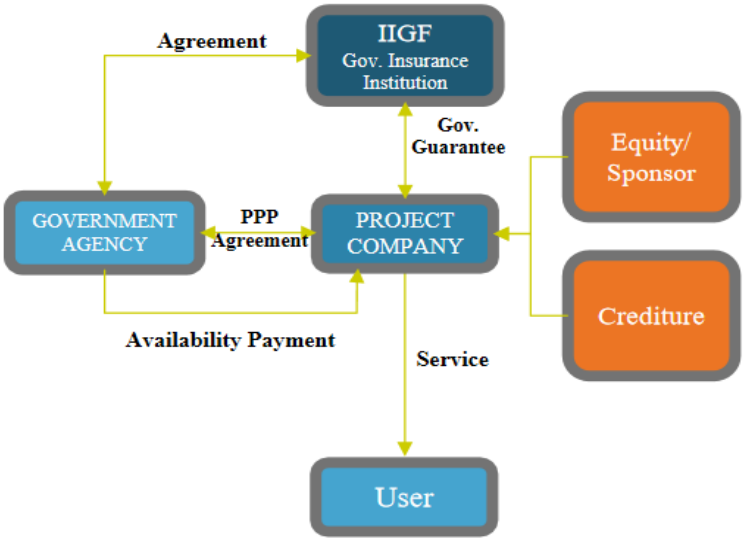


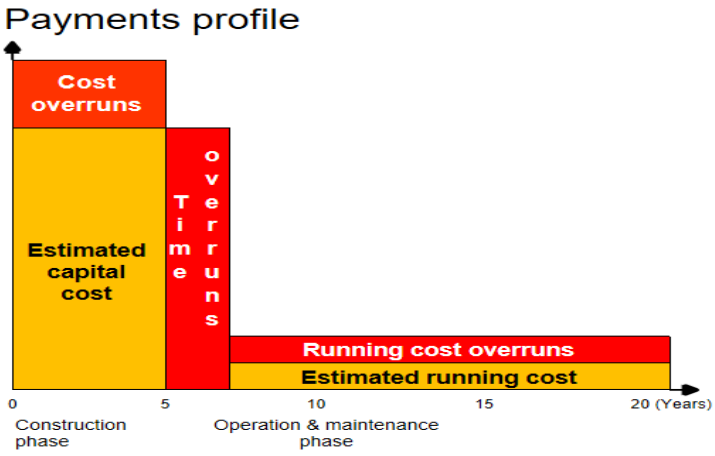
Figure 5. Availability Payment Model (Bappenass, 2022)

Figure 5. illustrate the PPP project services. After completion of construction, the project company will manage the services, then the government will provide availability payments [2], [4], [12], [18], [19] in accordance with the PPP agreement . Usually the term for AP services in Indonesia is a maximum of 15 years due to the fixed monthly tariff.

1.3. Traditional VS PPP Project

Pengelolaan traditional dan PPP project sangat berbeda, pada pengelolaan traditional project akan menghasilkan cost overruns yang tinggi[25], [26], [27], [28], [29] dan pembebanannya akan ditanggung sendiri oleh pemerintah, berbeda dengan PPP project biaya yang harus dikeluarkan oleh pemerintah berdasarkan penggunaan. Dibawah ini adalah figure yang menunjukkan perbedaan traditional dan PPP project.

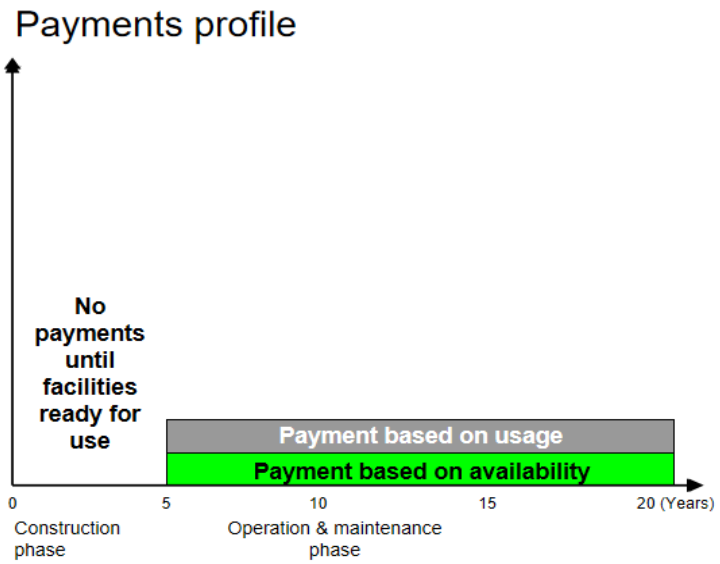
Traditional Project and PPP projects management is very different, traditional project management will result in high cost overruns [25], [26], [27], [28], [29] and the burden will be borne by the government itself, different from PPP project costs that must be paid by the government based on usage. Below is a figure that shows the difference between traditional and PPP projects.



Source: Price Water House Coopers (2003)

Figure 6. Traditional Project Management

In figure 6. above, it is illustrated how the estimated running costs are planned but the running cost overruns that occur are also high [30], [31], [32], [33], [34].



Source: Price Water House Coopers (2003)
Figure 7. PPP project Management

In figure 7. Above it is illustrated that the costs incurred in the form of payments depend on the use of both AP and User charges [2], [4], [12], [18]. Looking at the effectiveness of PPP projects, below is a comparison in table form between traditional and PPP projects management as follows:

Tabel 1. Comparation Traditional Vs PPP Project [3], [9], [10], [11], [23], [35]

No	Aspect	Traditional Project	PPP Project
1	Initiation Project	Proposed by the government	Can be proposed by the Government or its initiating business entities
2	Payment Method	No flexible, follows the cycle of disbursement of funds from the government so it is less flexible when used in sudden conditions	Very flexible because it is funded by the private sector, with investment disbursement of funds can be done whenever necessary according to project needs
3	Project Delay	There are work delays due to inflexible disbursement of funds	There are no work delays, work is always done early.
4	Project Maintenance	Project maintenance is poor	Project maintenance is very good because there is operational guarantee in maintenance of both user charges and Availability Payment (AP)
5	Potential Risk	Have risk	No Risk
6	Operational	Responsible by Government	Responsible by private sectors as operational and maintenance
7	Audit	By Government	Internal auditor maintence quality assurance

In table 1 above, it is illustrated that traditional projects with independent government financing will impact operational risks and project delays [26], [36], [37] compared to PPP projects [10], [35]. The PPP project guarantees maintenance performance because it affects the services provided and payments from the government based on service usage.

1.4. Soft System Methodology

Soft System Methodology (SSM) consists of 7 (seven) stages to analyze in unstructured problems into structured problems that can be solved through rich picture analysis [14], [38], SSM will released from the traps of traditional thinking [38] The stages in SSM consist of:

Steps 1 & 2: Consists of finding out the situation and problem then expressing it through a rich picture (rich picture) such as a type of diagram, more knowledge can be communicated visually.

Step 3: formulate a definition of the root of the problem. The root definition is a sentence that describes the system: its purpose, who will be in it? Who takes part in it? Who can be affected and who can influence it? The root definition and conceptual model can be formulated by considering the elements from CATWOE. The elements of CATWOE are Customers, Actors, Transformation Process, Weltanschauung, Owners, Environmental factors. CATWOE results vary depending on the stakeholder perspective for each case.

Step 4: Building a conceptual model is formed to identify activities from the main goal in the form of a series of logical actions implied by the definition of the root problem.

Step 5: compare with the real world. Does this happen in real situations? How does that carried out in real world situations? Based on what criteria is the assessment? Is this a concern in real world situations? In this way, discussions generate consensus among interested people about the proposed model as well as changes to it that can be implemented to improve the situation.

Step 6: involves identifying real changes that are systematically desired and culturally feasible in real-world systems. Feasibility is related to whether or not the potential for change that we have will make it worth pursuing. Cultural appropriateness is considered important especially in SSM, and culture is not considered static. Based on comparisons made in the previous stages.

Step 7: This stage involves implementing the changes identified in step 6.

2. Material and Method

This research will use case studies of 3 (three) PPP projects in the form of toll roads that use AP services and user charges. The model that will be developed is based on analysis of the three projects. Below is brief data from the project that will be analyzed in the case study as follows:

Table 2. List of Project Research.

No	Title	Service Payment	Location
1	PPP "A"	AP	South Sumatera
2	PPP "B"	User Charge	West Java
3	PPP "C"	User Charge	East Java

In table 2. Above the projects that will be used as case studies in this research, there are 3 (three) locations project that will be analyzed for the depth of partnering, interactions between stakeholders and factors that are considered to influence the success of the PPP project being carried out. The three project locations are available on the official website of the Ministry of Finance of the Republic of Indonesia.

The methodology used in this research consists of qualitative methods in the form of analysis and comparison using Soft System Methodology (SSM)[14], [39] to determine the importance of PPP implementation in accelerating infrastructure development in Indonesia, then indepth interviews were conducted[40], [41], [42] which will analyze the depth of partnering and interaction between project stakeholders. Next, the Delphi method is carried out [43], [44], [45], [46], [47], [48] with Focus Group Discussion (FGD) which will take a consensus on the level of depth of partnering and factors that influence the success of the PPP project in Indonesia. In detail the research methodology used in this research can be described as follows:

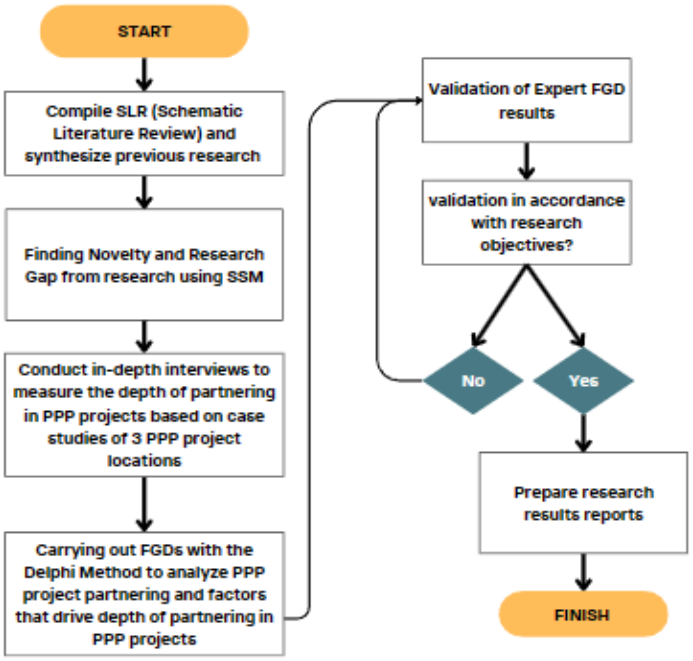


Figure 8. Steps of Research

Figure 8. is a step of research which can be explained as follows:

Step 1: conduct a Schematic Literature Review (SLR) to map the PPP Project problem with previous research so can described that research urgency.

Step 2: find research novelty using SSM.

Step 3: conduct in-depth interviews to measure the depth of partnering and stakeholder interactions based on case studies from the 3 project locations used as case studies

Step 4: conduct FGD to analyze the depth of PPP project partnering using the Delphi Method

Step 5: validate the results of the expert FGD. If the results of the expert FGD are deemed to have high validation, the next stage is to prepare a research report.

The profile for experts used in expert FGDs [44], [45], [48] consists of experts who have the following qualifications:

a. Practitioners from contractors who have broad experience in construction minimum 10 years in PPP projects as Project Manager.
b. Experts who understood construction management in government projects.
c. Experts who know about Partnering and Collaboration in Government projects with good governance standards.

Experts will provide opinions to analyze the depth of partnering and interactions in PPP projects and conclude the factors that influence the success of PPP projects in Indonesia.

3. Results

3.1. SSM for PPP Project

The PPP project plays an important role and massive socialization must be carried out so that the active role of investors becomes greater in overcoming government funding difficulties in building infrastructure. If a systems thinking approach is taken, steps 1 to step 7 can be described as follows:

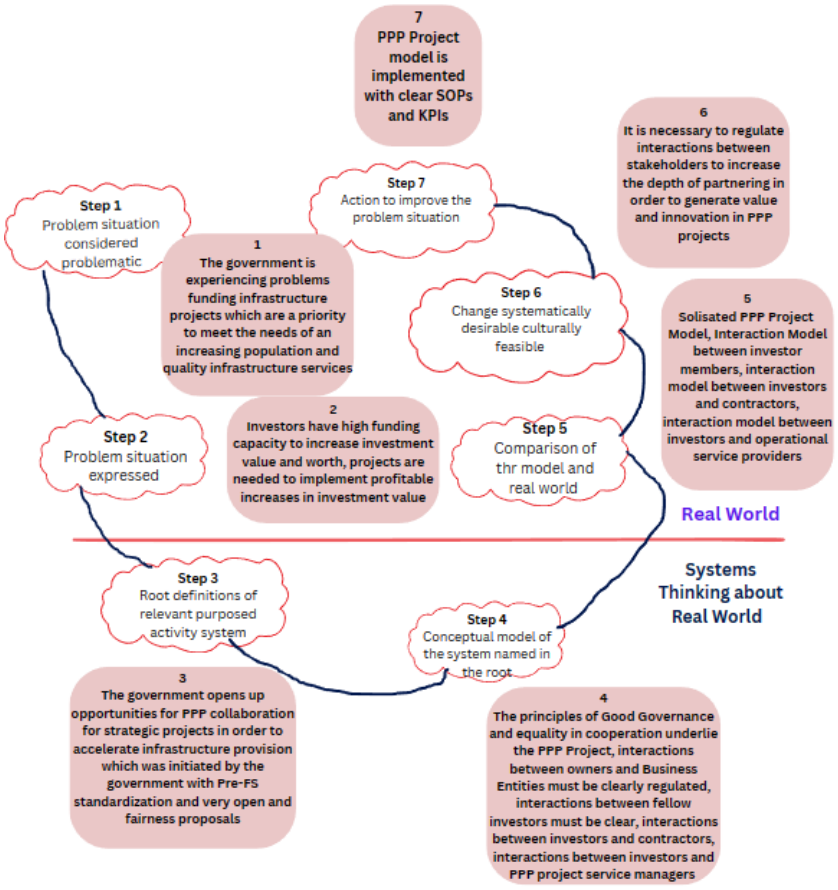


Figure 9. SSM model for PPP Project Identification

Figure 9. Above illustrates that in identifying potential collaboration through PPP projects, more detailed arrangements are needed for each interaction that occurs between the stakeholders involved in order to create value and increase innovation [7], [49], [50], [51]. The PPP project will be a solution to the government's financial difficulties if it is supported by clear SOPs and success indicators.

3.2. Studi Kasus PPP Project

a. South Sumatra East Cross Road Preservation Project in South Sumatra using the Avalaibility Payment service method

The South Sumatra Cross Road is managed by the Ministry of PUPR with the investor PT. JAA then investors appointed 2 contractors involved, namely PT. A and PT B, the operating contract period is 15 years with a fixed payment amount. The interaction process in the project can be described as follows:

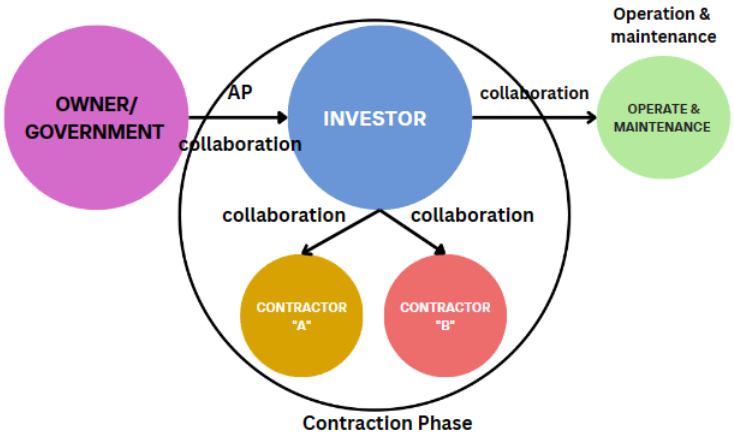


Figure 10. Interaction and partnering PPP model "A"

In Figure 10, it is illustrated that the government has an agreement with 1 investor to build a PPP project [2], [9], [10], [11], [23]. This interaction in partnering is called deeper interaction, namely collaboration [13] , [17], [52], Where owners and investors come together in one vision to build PPP projects with the principles of Good Government [53], [54]. In this case, investors and owners are called deep partnering because investors use their funds to finance government projects based on the results of the FS study and proposals made. The guarantee that investors will not experience losses depends on the risks they will face during operation and maintenance [54], [55], [56], [57]. A risk sharing article should be added[58] in the management of operations and maintenance. If a disaster or chaos occurs which causes damage to facilities exceeding 50%, a review of the service rates paid by the government to investors will be carried out.

b. Cileunyi, Sumedang, Dawuan Toll Road with User Charge service method.

The project owner is the Ministry of PUPR, in managing this PPP Project, a consortium was carried out between several contractors to form 1 parent company as an investor [7], [59], [60] to propose cooperation in this PPP project. The interaction description of the project is as follows:

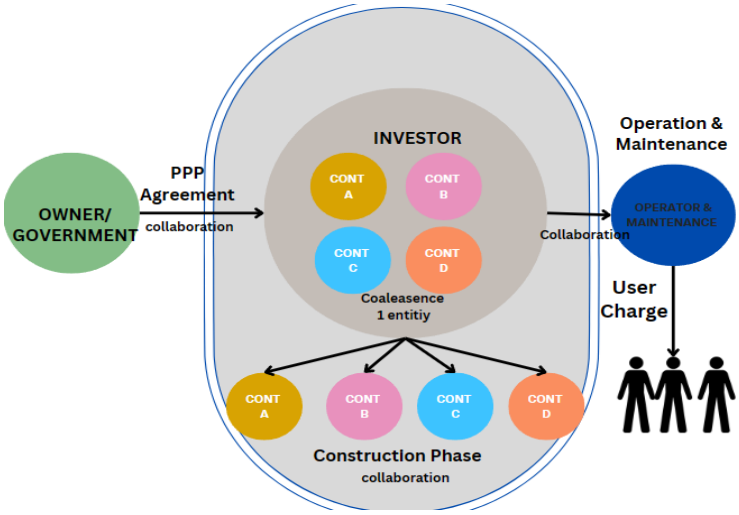


Figure 11. Model interaction and partnering PPP "B"

Figure 11. illusatrate the interaction and collaboration of PPP "B" where deep partnering occurs in the form of coalescence [13], [52], [61] which makes the contractor merge into 1 entity to form a Business Entity as an investor for the PPP project.

This is the highest level of partnering. Next, investors will collaborate [13], [52], [61] to work on the construction phase of the PPP project. After the project is completed, investors collaborate with the toll road management agency to provide facility services using a user charge model.

c. Probolinggo Bayuwangi dengan metode layanan User Charge.

The owner of this toll road project is the PUPR Ministry with investors who are a combination of contractors and several shareholders [13], [52], [61], then forming a new business entity as an investor. Furthermore, the investor consortium appointed several contractors to carry out the construction of the PPP project. After the construction phase is complete, a toll road manager with user charge services will be appointed. The Illustrated it can be described as follows:

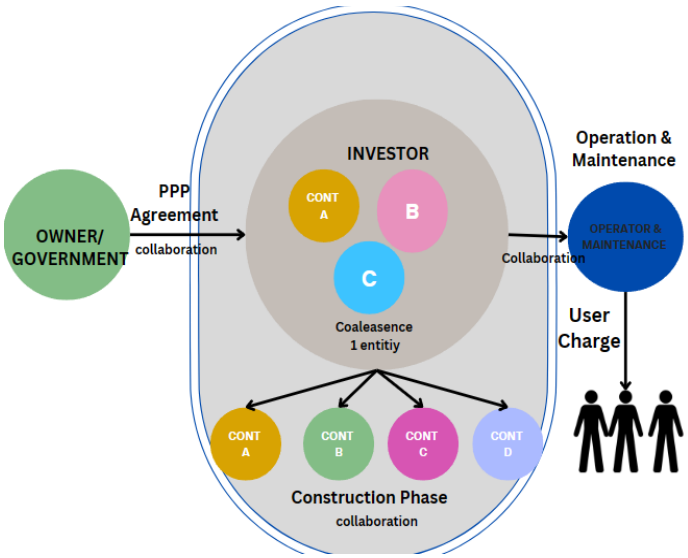


Figure 12. Model interaction and partnering PPP "B"

Figure 12 shows that there is in depth cooperation to form 1 entity [7], [51] as an investor, including contractors who carry out construction work, this model is similar to PPP"B" but in PPP"C" it is possible for contractors not to participate. investees are invited to collaborate to complete the construction phase[62], [63], [64].

3.3. Focus Group Discussion : Delphi Method

In order to obtain an Expert Judgment, this is done through a Focus Group Discussion (FGD) to evaluate and carry out a consensus regarding stakeholder interactions and determine the factors that influence the success of the PPP project.

Table 3. Factor affecting in PPP Project succeed

No	Factors	Descriptions	Reference
1	Technical/Construction	• Lack of clarity and misalignment of goals • Ambiguity in scope • Strict quality requirements • Ambiguity in technical methods • Conflicting norms and standards • Use of innovative technology • Lack of experience with technology	[65][66][67][15], [49], [68]

		• Defective design/quality problems • Engineering changes/design variations • Delays in design and regulatory approvals • Equipment shortage	
2	Organisational	• Lack of experience with parties involved Organisational • Multiple contracts • Poor labour productivity • Poor labour availability/shortage of skilled labour • Keterlambatan dalam mendapatkan kuantitas bahan baku yang dibutuhkan/Delays in obtaining required raw materials quantity • Kesalahan supllier dan subkon/ Supplier/subcontractors' default • Risiko huru hara	[65][66][67][68]
3	Environment	• Unwillingness to share information/lack of visibility • Escalation in raw material price • Misalignment of interests/conflicts with stakeholders • Contract disputes • Increase in labour cost • Occurrence of dispute • Environment damage • Accident related loss	[65][66][68], [69], [70]
4	Political	• Change of law • Land acquisition	[66], [71]
5	Economic	• Increase materials cost • Difficulty of financing • Interest rate	[10], [50], [66], [72], [73]
6	Social	• cultural barrier • Rigid bureaucracy • Lobby (legal/illegal) • Labor union	[66][10]
7	Weather	• Earthquake • Fire • Rainfall	[66][68]

From table 3, it is illustrated that there are 7 groups of factors that must be anticipated in a PPP project, which must be included in the contract regarding every influential interaction [74], [75], [76], [77]. For example, the weather factor must be a concern in the service and accuracy of the construction phase, if extreme weather occurs, will there be an extension of the maintenance and construction schedule.

4. Discussion

In collecting data from interviews conducted using in-depth in-interview [40], [41], [42] previously respondents were asked about their willingness to conduct inter-

views to collect data, then indepth interviews were carried out with various stakeholders to carry out validation related to the problems. man partnering and interaction between stakeholders in PPP projects. Below are the results of the data gathering which were then translated into conclusions as follows:

- **Government:** The implementation of PPP in Indonesia must be encouraged by good governance in interaction between the government and business entities including foreign investors [78], [79], [80], [81]. Good arrangements will be able to meet the gap in funding difficulties faced by the government, many investors play an active role in procuring infrastructure projects which in the end will result in mutually beneficial collaboration between the government and business entities [59], [60], [82] , [83].
- **Investors:** Investors must review the pre FS and proposals submitted for PPP projects [11], [23], it is better for investors not to stand alone but collaborate with several business entities (could be contractors) to grow their own-ships in implementing the project. The interaction process must be very clear and clear so as not to overlap the rights and obligations that will be exercised and obtained later [53], [54]. The appointment of a toll road management body must be a professional business entity that has previous experience in this industry. If the service is AP then speed is needed in improving the service if necessary because good service determines AP payments, AP payments are also sometimes based on user usage, so it is important that this provision pays attention to service excellence [2], [4].
- **Contractor:** PPP projects must have clarity in overcoming risks jointly between contractors and investors[84], a deep partnering pattern is needed to foster risk sharing and ownership between stakeholders. The contractor is not an object that must always be monitored and looked for mistakes, but also invests and feels ownership of the project so he wants to deliver the project as well as possible, because the quality of the project will affect the investment value of the contractor if he becomes an investor [7], [13].
- **Service Management Agency**: PPP project management with AP and user charges will be influenced by the level of service to users, the principle of collaboration with investors [84], [85], [86] for the readiness of funds during operation and maintenance will speed up repairs if required. There must be a sense of trust between managers and investors because this is a long-term collaboration in providing services. Especially for AP, user satisfaction must be a priority because it will affect the calculation of costs incurred.
- **Academics**: PPP Project is a solution for project management, improving work methods, good governance in construction management [87], [88]. The parties involved carry out partnering on the basis of ownership and trust so as to foster innovation and value for each stakeholder [49], [50], [61]. What must be the focus is how FS is carried out as best as possible, there is no risk of land acquisition when the project is implemented because investors have calculated the investment value offered. Because this is a long-term collaboration of more than 10 years, communication patterns must be regulated with transparent SOPs and success indicators.

6. Conclusions

From the research results above, the following can be concluded:

1. The PPP Project in Indonesia really needs massive socialization because this can be a solution to fulfill the funding gap faced by the Government. If this collaboration is successful, it means that it will encourage active community participation both through local and foreign investors, apart from that it can attract even more money into Indonesia.

2. PPP project interaction patterns are very diverse and this variation must be followed up with in-depth interaction through partnering. Interaction between stakeholders must be based on the values of good governance and ownership so that all stakeholders will make a major contribution to the implementation of the PPP project.
3. Factors that influence the success of PPP are needed to be a reference for stakeholders on how to anticipate and predict the implementation of PPP projects as well as prepare solutions and alternative solutions by sharing risks in contracts.
4. SOPs and success indicators are needed in every interaction between stakeholders in a PPP project to make everything transparent and foster a high sense of trust between stakeholders.

Author Contributions: M.N. and E.M.S.: Writing—Original draft, Investigation; M.N.: Project administration, Supervision; M.A.W. and R.Z.T: Writing—review and editing, Formal analysis; N.W.: Formal analysis, Visualization; E.M.S.: Writing—review and editing, Supervision; M.A.W. R.Z.T and N.W.: Data curation, Visualization; M.A.W. and E.M.S.: Investigation, Formal analysis. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by PT.Brantas Abipraya, with Grant-No: 008/BAP/2024.

Data Availability Statement: Data are contained in the article.

Acknowledgments: The authors are grateful to colleagues for optimal cooperation in providing the important data to accomplish the research.

Conflicts of Interest: The authors declare no conflict of interest.

References

[1] S. Yun, W. Jung, S. H. Han, and H. Park, "Critical organizational success factors for public private partnership projects - A comparison of solicited and unsolicited proposals," *Journal of Civil Engineering and Management*, vol. 21, no. 2, pp. 131–143, Jan. 2015, doi: 10.3846/13923730.2013.802715.

[2] L. Shi, W. Li, and Y. He, "An Incentive Analysis of Availability Payment Mechanism in PPP Projects," *IEEE Access*, vol. 8, pp. 106046–106058, 2020, doi: 10.1109/ACCESS.2020.2999932.

[3] Z. Cheng, H. Wang, W. Xiong, D. Zhu, and L. Cheng, "Public–private partnership as a driver of sustainable development: toward a conceptual framework of sustainability-oriented PPP," *Environ Dev Sustain*, vol. 23, no. 1, pp. 1043–1063, Jan. 2021, doi: 10.1007/s10668-019-00576-1.

[4] W. C. Lawther and L. Martin, "Availability payments and key performance indicators: Challenges for effective implementation of performance management systems in transportation public-private partnerships," *Public Works Management and Policy*, vol. 19, no. 3, pp. 219–234, Jul. 2014, doi: 10.1177/1087724X14528476.

[5] D. Zhu, "Research from global Sustainable Development Goals (SDGs) to sustainability science based on the object-subject-process framework," *Chinese Journal of Population Resources and Environment*, vol. 15, no. 1, pp. 8–20, Jan. 2017, doi: 10.1080/10042857.2017.1286147.

[6] T. Liu, Y. Wang, and S. Wilkinson, "Identifying critical factors affecting the effectiveness and efficiency of tendering processes in Public-Private Partnerships (PPPs): A comparative analysis of Australia and China," *International Journal of Project Management*, vol. 34, no. 4, pp. 701–716, May 2016, doi: 10.1016/j.ijproman.2016.01.004.

[7] E. M. Sari *et al.*, "Challenge and Awareness for Implemented Integrated Project Delivery (IPD) in Indonesian Projects," *Buildings*, vol. 13, no. 1, 2023, doi: 10.3390/buildings13010262.

[8] P. J. Thompson', S. R. Sanders, and A. Member, "PARINERING CONTINUUM," 1998.

[9] Y. Xu, A. P. C. Chan, and J. F. Y. Yeung, "Developing a Fuzzy Risk Allocation Model for PPP Projects in China," pp. 1–10, 2010, doi: 10.1061/ASCECO.1943-7862.0000189.

[10] P. X. W. Zou, S. Wang, and D. Fang, "A life-cycle risk management framework for PPP infrastructure projects," *Journal of Financial Management of Property and Construction*, vol. 13, no. 2, pp. 123–142, Aug. 2008, doi: 10.1108/13664380810898131.

[11] G. Castelblanco and J. Guevara, "Risk Allocation in PPP unsolicited and solicited proposals in Latin America : Pilot Study in Colombia," 2020.

[12] G. A. Hodge and C. Greve, "On Public–Private Partnership Performance: A Contemporary Review," *Public Works Management and Policy*, vol. 22, no. 1, pp. 55–78, Jan. 2017, doi: 10.1177/1087724X16657830.

[13] E. M. Sari, A. P. Irawan, M. A. Wibowo, J. P. Siregar, and A. K. A. Praja, "Project Delivery Systems: The Partnering Concept in Integrated and Non-Integrated Construction Projects," *Sustainability (Switzerland)*, vol. 15, no. 1, 2023, doi: 10.3390/su15010086.

[14] E. Murtiana Sari, A. Purna Irawan, M. Agung Wibowo, and O. Sinaga, "Applying Soft Systems Methodology To Identified Factors Of Partnerships Model In Construction Project-Palarch's," 2020.

[15] E. Murtiana Sari, A. Purna Irawan, M. Agung Wibowo, and A. Kusuma Among Praja, "Partnering Tools To Achieve Lean Construction Goals," 2021.

[16] L. E. Gadde and A. Dubois, "Partnering in the construction industry-Problems and opportunities," *Journal of Purchasing and Supply Management*, vol. 16, no. 4, pp. 254–263, Dec. 2010, doi: 10.1016/j.pursup.2010.09.002.

[17] T. G. Crane, J. P. Felder, P. J. Thompson, M. G. Thompson, S. R. Sanders, and A. Member, "PARTNERING MEASURES," 1997. doi: https://doi.org/10.1061/(ASCE)0742-597X(1999)15:2(37).

[18] Joop F.M. Koppenjan and BErt Enserink, "Public Private Partnerships in Urban Infrastructures: Reconciling Private Sector Participation and Sustainability," *Public Administration Review* , pp. 1–13, 2009.

[19] A. M. A. Aziz and M. Asce, "Successful Delivery of Public-Private Partnerships for Infrastructure Development," *Journal of Construction Engineering And Management* , pp. 918–931, 2007, doi: 10.1061/ASCE0733-93642007133:12918.

[20] L. Brogaard and O. H. Petersen, "Public-private partnerships (PPPs) in development policy: Exploring the concept and practice," *Development Policy Review*, vol. 36, pp. O729–O747, Sep. 2018, doi: 10.1111/dpr.12277.

[21] C. Knai *et al.*, "Title: The Public Health Responsibility Deal: Has a public-private partnership brought about action on alcohol reduction?," 2015. [Online]. Available: http://www.piru.ac.uk/

[22] F. Pan, F. Zhang, S. Zhu, and D. Wójcik, "Developing by borrowing? Inter-jurisdictional competition, land finance and local debt accumulation in China," *Urban Studies*, vol. 54, no. 4, pp. 897–916, Mar. 2017, doi: 10.1177/0042098015624838.

[23] Z. Cheng, H. Wang, W. Xiong, D. Zhu, and L. Cheng, "Public–private partnership as a driver of sustainable development: toward a conceptual framework of sustainability-oriented PPP," *Environ Dev Sustain*, vol. 23, no. 1, pp. 1043–1063, Jan. 2021, doi: 10.1007/s10668-019-00576-1.

[24] D. Zhu, "Research from global Sustainable Development Goals (SDGs) to sustainability science based on the object-subject-process framework," *Chinese Journal of Population Resources and Environment*, vol. 15, no. 1, pp. 8–20, Jan. 2017, doi: 10.1080/10042857.2017.1286147.

[25] M. S. Bajjou, A. Chafi, and A. En-Nadi, "A comparative study between lean construction and the traditional production system," *International Journal of Engineering Research in Africa*, vol. 29, pp. 118–132, 2017, doi: 10.4028/www.scientific.net/JERA.29.118.

[26] A. M. Odeh and H. T. Battaineh, "Causes of construction delay: traditional contracts," 2002. [Online]. Available: www.elsevier.com/locate/ijproman

[27] "Lean Management vs Traditional Management."

[28] K. P. Whyte, "On the role of traditional ecological knowledge as a collaborative concept: a philosophical study," 2013. [Online]. Available: http://www.ecologicalprocesses.com/content/2/1/7

[29] I. M. Katar, "Enhancing the Project Delivery Quality; Lean Construction Concepts of Design-Build & Design-Bid-Build Methods," *International Journal of Management*, vol. 10, no. 6, pp. 324–337, 2019, doi: DOI: 10.34218/IJM.10.6.2019.031.

[30] C. Ahbab, "An Investigation on Time and Cost Overrun in Construction Projects," 2012.

[31] A. Bin Seddeeq, S. Assaf, A. Abdallah, and M. A. Hassanain, "Time and cost overrun in the Saudi Arabian oil and gas construction industry," *Buildings*, vol. 9, no. 2, Feb. 2019, doi: 10.3390/buildings9020041.

[32] D. W. M. Chan and M. M. Kumaraswamy, "A comparative study of causes of time overruns in Hong Kong construction projects," 1997.

[33] P. F. Kaming, P. O. Olomolaiye, G. D. Holt, and F. C. Harris, "Factors influencing construction time and cost overruns on high-rise projects in Indonesia," *Construction Management and Economics*, vol. 15, no. 1, pp. 83–94, 1997, doi: 10.1080/014461997373132.

[34] H. Alinaitwe, R. Apolot, and D. Tindiwensi, "Investigation into the Causes of Delays and Cost Overruns in Uganda's Public Sector Construction Projects," 2013.

[35] B. Li, A. Akintoye, P. J. Edwards, and C. Hardcastle, "Perceptions of positive and negative factors influencing the attractiveness of PPP/PFI procurement for construction projects in the UK: Findings from a questionnaire survey," *Engineering, Construction and Architectural Management*, vol. 12, no. 2. pp. 125–148, 2005. doi: 10.1108/09699980510584485.

[36] S. M. Ahmed and S. Azhar, "Construction Delays in Florida: An Empirical Study," 2022. [Online]. Available: https://www.researchgate.net/publication/228584635

[37] D. Sushma Shridhar Asst Professor, "Delays in Construction Project and their preventions," 2016. [Online]. Available: http://www.mospi.nic.in

[38] M. Reynolds and S. Holwell, "Systems Approaches to Making Change: A Practical Guide," 2020.

[39] S. V. Shrivastava and U. Rathod, "A risk management framework for distributed agile projects," *Inf Softw Technol*, vol. 85, pp. 1–15, May 2017, doi: 10.1016/j.infsof.2016.12.005.

[40] C. R. Boddy, "Sample size for qualitative research," *Qualitative Market Research*, vol. 19, no. 4, pp. 426–432, 2016, doi: 10.1108/QMR-06-2016-0053.

[41] S. Guercini, "New qualitative research methodologies in management," *Management Decision*, vol. 52, no. 4, pp. 662–674, 2014, doi: 10.1108/MD-11-2013-0592.

[42] B. Njie and S. Asimiran, "Case Study as a Choice in Qualitative Methodology," 2014. [Online]. Available: www.iosrjournals.orgwww.iosrjournals.org

[43] S. Thangaratinam and C. W. Redman, "The Delphi technique," *The Obstetrician & Gynaecologist*, vol. 7, no. 2, pp. 120–125, Apr. 2005, doi: 10.1576/toag.7.2.120.27071.

[44] S. Humphrey-Murto, T. J. Wood, C. Gonsalves, K. Mascioli, and L. Varpio, "The Delphi Method," *Academic Medicine*, vol. 95, no. 1. Lippincott Williams and Wilkins, p. 168, 2020. doi: 10.1097/ACM.0000000000002887.

[45] T. J. Gordon and I. History, "THE DELPHI METHOD," 1994.

[46] bo Xia and A. P. c. Chan, "Measuring complexity for building projects: A Delphi study," *Engineering, Construction and Architectural Management*, vol. 19, no. 1, pp. 7–24, Jan. 2012, doi: 10.1108/09699981211192544.

[47] M. R. Hallowell and J. A. Gambatese, "Qualitative Research: Application of the Delphi Method to CEM Research," *Journal of Construction Engineering and Management* , pp. 1–10, 2010, doi: 10.1061/ASCECO.1943-7862.0000137.

[48] A. P. C. Chan, E. H. K. Yung, P. T. I. Lam, C. M. Tam, and S. O. Cheung, "Application of Delphi method in selection of procurement systems for construction projects," *Construction Management and Economics*, vol. 19, no. 7, pp. 699–718, 2001, doi: 10.1080/01446190110066128.

[49] A. Bigwanto, N. Widayati, M. A. Wibowo, and E. M. Sari, "Lean Construction: A Sustainability Operation for Government Projects," *Sustainability*, vol. 16, no. 8, p. 3386, Apr. 2024, doi: 10.3390/su16083386.

[50] E. Sari, A. Irawan, and M. Wibowo, "Design Partnering Framework to Reduce Financial Risk in Construction Projects," European Alliance for Innovation n.o., Sep. 2022. doi: 10.4108/eai.31-3-2022.2320722.

[51] E. M. Sari *et al.*, "Design bid build to integrated project delivery: Strategic formulation to increase partnering," *Journal of Infrastructure, Policy and Development*, vol. 8, no. 1, Dec. 2023, doi: 10.24294/jipd.v8i1.2242.

[52] P. J. Thompson', S. R. Sanders, and A. Member, "PARINERING CONTINUUM."

[53] A. Bakare, "Good Corporate Governance and Organisational Performance: An Empirical Analysis," 2014. [Online]. Available: www.ijhssnet.com

[54] M. P. Abednego and S. O. Ogunlana, "Good project governance for proper risk allocation in public-private partnerships in Indonesia," *International Journal of Project Management*, vol. 24, no. 7, pp. 622–634, Oct. 2006, doi: 10.1016/j.ijproman.2006.07.010.

[55] Andi, "The importance and allocation of risks in Indonesian construction projects," *Construction Management and Economics*, vol. 24, no. 1, pp. 69–80, Jan. 2006, doi: 10.1080/01446190500310338.

[56] T. Zhao and J. Li, "Decision Modeling Process of Risk Allocation in International Construction Projects," 2013.

[57] A. Peckiene, A. Komarovska, and L. Ustinovicius, "Overview of risk allocation between construction parties," in *Procedia Engineering*, Elsevier Ltd, 2013, pp. 889–894. doi: 10.1016/j.proeng.2013.04.113.

[58] M. El Asmar, M. Asce, A. S. Hanna, F. Asce, and W.-Y. Loh, "Quantifying Performance for the Integrated Project Delivery System as Compared to Established Delivery Systems," 2013, doi: doi:10.1061/(asce)co.1943-7862.0000744.

[59] R. Ghassemi and Gerber-Becerik, "Transitioning to IPD: Potential Barriers & Lessons Learned," 2011. [Online]. Available: www.leanconstructionjournal.org

[60] H. W. Ashcraft and H. Bridgett, "IPD Teams: Creation, Organization and Management," 2011.

[61] E. Murtiana Sari, A. Purna Irawan, and M. Agung Wibowo, "Role of Technical Education in Partnering Construction Project: A Geographical Study on Indonesia," *Review of International Geographical Education (RIGEO)*, vol. 11, no. 1, pp. 636–644, 2021, doi: 10.48047/rigeo.11.1.49.

[62] C. S. Dossick, R. Azari, Y.-W. Kim, and O. El-Anwar, "IPD IN PRACTICE: INNOVATION IN HEALTHCARE DESIGN AND CONSTRUCTION," 2013.

[63] F. Rached and F. Hamzeh, "Implementation of IPD in the Middle East and its Challenges," 2014, doi: 10.13140/RG.2.1.3348.6724/1.

[64] J. Guan, "Exploration on the Methods of Forming an IPD Project Team and the Responsibility of Team Members," 2018.

[65] A. Qazi, J. Quigley, A. Dickson, and K. Kirytopoulos, "Project Complexity and Risk Management (ProCRiM): Towards modelling project complexity driven risk paths in construction projects," *International Journal of Project Management*, vol. 34, no. 7, pp. 1183–1198, Oct. 2016, doi: 10.1016/j.ijproman.2016.05.008.

[66] Petr Rehacek, "risk management 2," *Journals of Engineering and Applied Sciences* , vol. 12, no. 20, pp. 5347–5352, 2017.

[67] B. A. K. S. Perera, R. Rameezdeen, N. Chileshe, and M. Reza Hosseini, "Enhancing the effectiveness of risk management practices in Sri Lankan road construction projects: A Delphi approach," *International Journal of Construction Management*, vol. 14, no. 1, pp. 1–14, 2014, doi: 10.1080/15623599.2013.875271.

[68] L. Lehtiranta, "Relational Risk Management in Construction Projects: Modeling the Complexity," 2011.

[69] Y. Joshi and Z. Rahman, "Factors Affecting Green Purchase Behaviour and Future Research Directions," *International Strategic Management Review*, vol. 3, no. 1–2, pp. 128–143, Jun. 2015, doi: 10.1016/j.ism.2015.04.001.

[70] M. A. Wibowo, N. U. Handayani, and A. Mustikasari, "Factors for implementing green supply chain management in the construction industry," *Journal of Industrial Engineering and Management*, vol. 11, no. 4, pp. 651–679, 2018, doi: 10.3926/jiem.2637.

[71] E. Hermanto, S. Soetomo, and M. Agung Wibowo, "Toward Partnership for Government Construction Project in Indonesia," *International Journal of Scientific and Research Publications (IJSRP)*, vol. 8, no. 10, Oct. 2018, doi: 10.29322/ijsrp.8.10.2018.p8286.

[72] Antonio J, "Financial risks in construction projects," *AFRICAN JOURNAL OF BUSINESS MANAGEMENT*, vol. 5, no. 31, Dec. 2011, doi: 10.5897/ajbm11.1463.

[73] P. Fulghieri, G. Strobl, and H. Xia, "The economics of solicited and unsolicited credit ratings," *Review of Financial Studies*, vol. 27, no. 2, pp. 484–518, Feb. 2014, doi: 10.1093/rfs/hht072.

[74] A. W. Cox and Ian. Thompson, *Contracting for business success*. T. Telford, 1998.

[75] I. El-adaway, I. Abotaleb, and S. Eteifa, "Framework for Multiparty Relational Contracting," *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*, vol. 9, no. 3, Aug. 2017, doi: 10.1061/(asce)la.1943-4170.0000238.

[76] T. Da, C. L. Alves, and N. Shah, "Analysis of Construction Contracts: Searching for Collaboration."

[77] P. J. O' Connor, "INTEGRATED PROJECT DELIVERY: COLLABORATION THROUGH NEW CONTRACT FORMS," 2009. [Online]. Available: www.aia.org.

[78] W. T. Chen, H. C. Merrett, S. T. Lu, and L. Mortis, "Analysis of key failure factors in construction partnering-A case study of Taiwan," *Sustainability (Switzerland)*, vol. 11, no. 14, 2019, doi: 10.3390/su11143994.

[79] J. Nyström, "Partnering; definition, theory and the procurement phase," 2005.

[80] T. O. Malvik and A. Engebø, "Experiences with Partnering: A Case Study on the Development Phase," *Procedia Comput Sci*, vol. 196, pp. 1044–1052, 2022, doi: 10.1016/j.procs.2021.12.108.

[81] P. Lahdenperä, "Making sense of the multi-party contractual arrangements of project partnering, project allianc-ing and integrated project delivery," *Construction Management and Economics*, vol. 30, no. 1, pp. 57–79, Jan. 2012, doi: 10.1080/01446193.2011.648947.

[82] R. Leicht and C. Harty, "Influence of Multiparty IPD Contracts on Construction Innovation," 2017.

[83] C. S. Dossick, R. Azari, Y.-W. Kim, and O. El-Anwar, "IPD IN PRACTICE: INNOVATION IN HEALTHCARE DESIGN AND CONSTRUCTION," 2013.

[84] P. Pishdad-Bozorgi and D. Srivastava, "Assessment of Integrated Project Delivery (IPD) Risk and Reward Sharing Strategies from the Standpoint of Collaboration: A Game Theory Approach."

[85] J. Larsson and L. Larsson, "Integration, application and importance of collaboration in sustainable project management," *Sustainability (Switzerland)*, vol. 12, no. 2, 2020, doi: 10.3390/su12020585.

[86] D. Zimina, G. Ballard, and C. Pasquire, "Target value design: using collaboration and a lean approach to reduce construction cost," *Construction Management and Economics*, vol. 30, no. 5, pp. 383–398, May 2012, doi: 10.1080/01446193.2012.676658.

[87] B. B. James Pocock, A. Member, C. T. Hyun, Z. Member, L. Y. Liu, and M. K. Kim, "RELATIONSIDP BETWEEN PROJECT INTERACTION AND PERFORMANCE INDICATORS," 1996.

[88] W. S. Alaloul, M. S. Liew, and N. A. W. A. Zawawi, "Identification of coordination factors affecting building projects performance," *Alexandria Engineering Journal*, vol. 55, no. 3, pp. 2689–2698, Sep. 2016, doi: 10.1016/j.aej.2016.06.010.