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Challenge and Awareness for Implemented Integrated Project Delivery (IPD) in Indonesian Projects

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Challenge and Awareness for Implemented Integrated Project Delivery (IPD) in Indonesian Projects

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Abstract: Many projects in Indonesia have implemented new strategies in response to the COVID-19 outbreak. Many projects suffered unexpected losses during the COVID-19 pandemic, and conditions were unpredictable. This situation must be considered by all stakeholders participating in a project. Another problem in the implementation of construction is the fragmentation between project participants. Therefore, a strategy is needed in each phase of the project life cycle. In the absence of proper planning, the contractor is the party responsible for bearing the risk associated with this occurrence. Improved project performance is a shared responsibility among owners, contractors, designers, and subcontractors, all of whom need to tap into their own sources of creativity and innovation. The potential of partnering as a tool for achieving lean construction performance, it is still in its infancy as a means of enhancing project outcomes. In this study, we used qualitative methods and in-depth interviews enhanced by focus group discussions of 14 experts (owners, designers, contractors, and academics) using the Delphi method. The results illustrate the maturity of partnering in integrated project delivery (IPD); therefore, its guiding philosophy can be developed and implemented to improve the outcomes of construction projects in terms of cost, quality, schedule, health and safety, and environmental performance. The most important part of this research is related to the implementation of the 17th goal of the Sustainable Development Goals (SDGs), i.e., partnerships to achieve the goals. This research contributes to a deepening of partnering practices that can drive performance in project implementation.

Keywords: partnering; construction project; delivery system; project life cycle; integrated project delivery

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1. Introduction

A partnership project is characterized by the actors' desire to establish a relationship based on trust, commitment, and shared objectives. Partnering is defined as a long-term commitment between two or more organizations to achieve common project objectives by maximizing resource effectiveness. The key elements of partnering are trust, long-term commitment, and shared vision [1–3]. All stakeholders, including owners, contractors, consultants, and subcontractors, are involved in the implementation of partnering in construction projects [4]. The majority of partnering projects use a collaborative project delivery method based on early stakeholder engagement. The four levels of partnering maturity are competition, cooperation, collaboration, and coalescence. In practice, partnering is possible in all project delivery systems, including design–bid–build, design-and-build, and integrated project delivery (IPD) systems [5,6]. However, IPD is not yet well-known in Indonesia due to implementation obstacles, particularly in government projects in which collaboration is viewed as a violation of transparency. Although, in practice, a collaborative project delivery method during the concept development phase, the partnering method improves the project's ability to deal with uncertainty and respond to unforeseen events [5].

For the successful management of the complex and uncertain endeavors involved in interorganizational infrastructure, the need for the integration of multiple competencies and the collaboration of multiple stakeholders has become increasingly apparent in the context of projects. Collaboration between multiple stakeholders is crucial for minimizing disruptions and minimizing maintenance work and resource consumption; extensive collaboration is based on trust, open communication, and shared goals [6,7]. Furthermore, the emphasis on a long-term collaborative business arrangement may enhance our comprehension of a concept (partnering) that is paradoxically implemented in short-term investment projects despite being based on mutual trust and long-term collaboration [8–11].

The current contract phenomenon is very fragmented, and problems often occur because of competing contracts, resulting in the following phenomena [12–16]:

a. The construction industry is highly fragmented, and it is regrettable that it has been so hostile;
b. Construction owners avoid risk, and contractors interpret contract clauses differently and for their own benefit;
c. Productivity levels are low compared to other industries and have even fallen over time in some countries;
d. A culture of procurement design/bid/construction;
e. A price-based selection strategy attracts tenders to lower their bids to win contracts;
f. Reliance on subsequent claims to recover costs;
g. Contracting parties often cooperate in disjointed relationships, usually motivated by different goals and hidden agendas;
h. Swelling of time and costs, poor quality, customer dissatisfaction, disputes, and relationship breakdowns between contracting parties.

By dissecting the partnering interactions that occur at each stage of the project life cycle, the aforementioned issues can be resolved. Interaction determines the quality of collaboration within a project in order to improve performance.

1.1. Partnering

The four levels of partnering are competition, cooperation, collaboration, and coalescence [17–19]. Each interaction has a unique level of partnering, and each level of partnering can occur at any phase of the project life cycle. This partnering begins at a very superficial level and progresses to a profound level; partnering can mean participation only (competition), but it can also increase cooperation or result in the merging of organizations into new entities during project implementation, as shown in Table 1.

Table 1. Partnering levels of maturity.

Competition	Cooperation	Collaboration	Coalescence
There is free competition Maturity rate of 0-25%	Independent organizations cooperate ad hoc Maturity rate of 25–50%	There is no fusion but merging in an organization Maturity rate 50–75%	There is a fusion of consulting organizations and contractors from the constructability process, and buildability takes place in the design phase Maturity rate 75–100% [17,20]
Low	Intermediate	High	Highest

1.2. Partnering in Project Delivery Systems

Partnering in each project delivery system is undoubtedly diverse in terms of describing how each stakeholder interacts; various literature studies have documented the occurrence of partnering in each type of project delivery system, including design–bid–build (DBB), design and build (DB), and integrated project delivery (IPD) [21,22]. The occurrence of partnership in each project delivery system is depicted below.

1.2.1. Design–Bid–Build (DBB)

Design–bid–build is the process of implementing a project by separating the design and contractor functions into separate entities [8,22,23]. Two contracts are carried out by the owner: the first between the owner and the designer (AE) and the second between the owner and the construction manager/general contractor (CM/GC) so that partnering occurs at each stage of the DBB.

Figure 1 explains the partnering pattern in a design–bid–build (DBB) system. Due to the separation of the design and construction implementation functions, the level of partnership in DBB occurs at the level of competition and collaboration. The owner's partnerships can also involve competition in each phase of the project life cycle, including initiation, planning, and implementation. Contractors and subcontractors implement a plan–do–check–act (PDCA) framework to ensure that every activity carried out can be controlled. However, PDCA as a whole has not been carried out in an integrated manner [23–26].

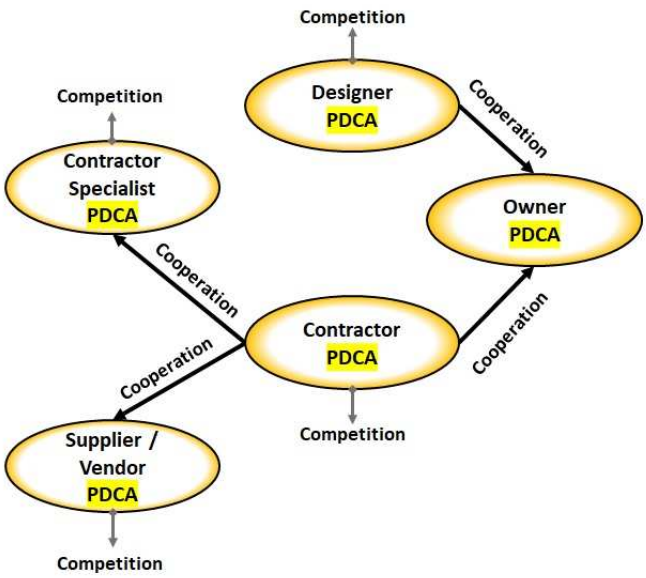

Figure 1. Design–bid–build (DBB) partnering.

1.2.2. Design and Build (DB)

Design and build (DB) occurs when the designer and contractor act as one entity, so the owner only contracts for the project with the GC. The implementation of GC construction can be a combination of cooperation between the architect engineer (AE) and GC, joint operation, or joint venture. For example, Refs. [8,22,23] present cases in which the owner only has a contract with the designer and builder. The designer and builder then contract with subcontractors. The combination of partnering between stakeholders in a DB system can be described as follows.

Figure 2 shows that the interaction in a DB system is shorter because the designer and builder are merged into a single entity. Consequently, the stages are simpler than in a DBB system; the level of partnership ranges across the levels of competition, cooperation, collaboration, and coalescence [17,27]. The merging of the designer and builder functions can achieved through cooperation, collaboration (joint operation), or coalescence (joint venture). Although the depth of partnering in a DB system is deeper, the partnering relationship with the owner can involve competition because two entities are facing each other. PDCA occurs at the owner and DB (general contractor) levels because these are entities with borders [22,28–30].

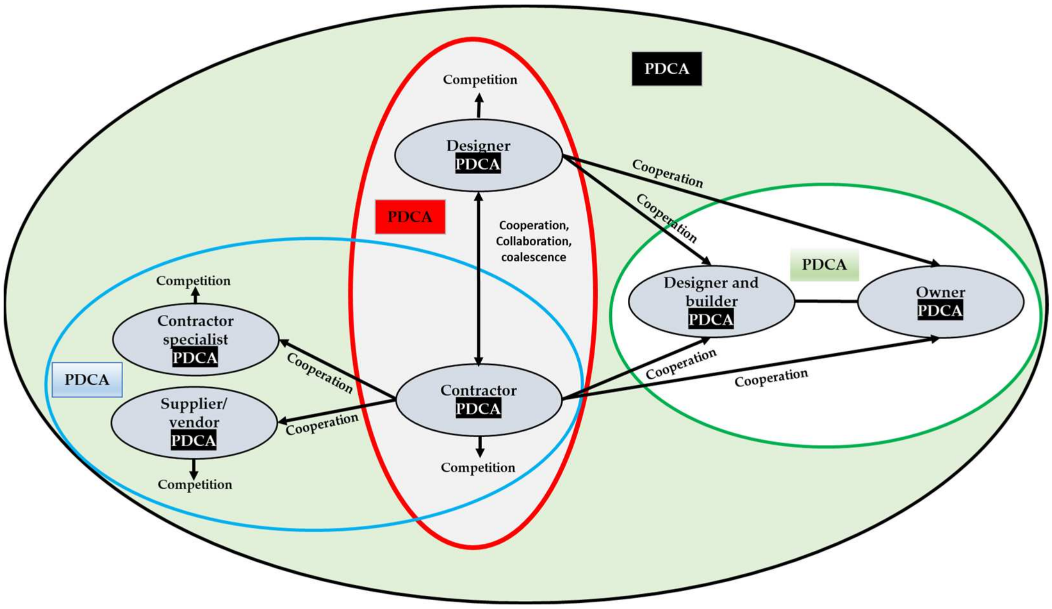

Figure 2. Design-and-build (DB) partnering.

1.2.3. Integrated Project Delivery (IPD)

The American Institute of Architects (AIA) defines IPD as "A project delivery approach that integrates people, systems, business structures, and practices in a process that collaboratively harnesses the talents and insights of all project participants to optimize project results, increase owner value, reduce waste, and maximize efficiency throughout all phases of design, fabrication, and construction" [22,28–34].

The AIA defines IPD as a multidisciplinary team of design and construction professionals assembled to complete a project bound together by alternative forms of agreement that require team members to share risks and rewards, contribute equally, and utilize alternative processes and technologies, all of which contribute to achieving cost and time reductions, as well as improved wastage metrics [22,23,26,35,36].

According to Patel (2011) [30], the rise of IPD can be explained by the convergence of three recent technical and organizational advances in the industry: building information modelling (BIM), lean construction and sustainability [10,34–40]. Moreover, Xia et al. (2015) argue that early contractor involvement is essential for achieving the sustainability objectives of the owner [35]. Patel (2011) and Vishal (2010) [30,36] state, "social actors know a great deal about what they are doing in the process of interaction, and yet there is a great deal that they do not know about the conditions and outcomes of their activities, which affects their course. The capacity of participants to adjust to new paradigms and work behaviors is essential to the success of the project" [41–47]. The most notable distinction between IPD and more traditional delivery techniques (e.g., lump-sum DBB (LS), design and build (DB), construction management as a contractor (CMC), and construction management as the agency (CMA)) is the use of a single multiparty agreement, whereby all significant project stakeholders execute the same agreement and share risks and possible profits [45–51]. Because the design is not yet complete (0%), this demonstrates that each stakeholder has collaborated from the outset, allowing them to generate creativity and innovation to optimize their unique resources for improved project performance, simplifying the illustration of the IPD partnership.

Figure 3 explains that in an IPD system, the stages of the project are shortened because the owner, contractor, designer, and subcontractor have been involved from the beginning and agreed to cooperate in the project, resulting in a very simple and efficient process. PDCA only occurs once during the project life cycle because all project stakeholders are involved in the initiation, design, implementation, and closing phases so that PDCA is comprehensive; all parties trust each other to develop cooperation in project implementation in order to achieve cost-effectiveness and innovation, generating value through the project [17,22–25,36–44,52,53].

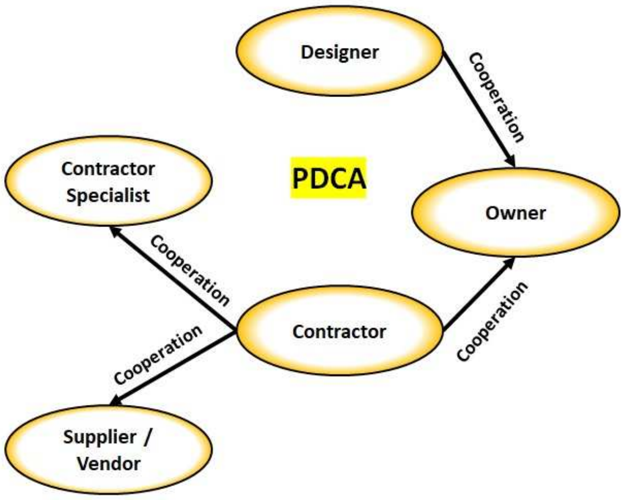

Figure 3. Integrated project delivery (IPD) partnering.

2. Materials and Methods

We employed a methodology to assess the level of collaboration within a given project delivery system. The proposed methodology is based on research findings; the input of expert owners, contractors, designers, and academics; and case studies of six construction industry projects [45–50]. In this article, we outline how the literature on partnership practices in DBB, DB, and IPD systems in the construction industry demonstrate the notion of partnering by focusing on its components. After performing a literature review, a case study was undertaken to determine the minimum requirements for a project to be labeled a partnership project by examining the presence of the elements in each case [53–57].

This study was designed in accordance with the recommendations and concepts outlined in [58,59], utilizing triangulation to reinforce the analysis. Based on the recommendation of the authors of [58], a literature review was performed to build a theoretical foundation for partnership. Various journal articles, books, and conference papers were used to gain a comprehensive understanding of the topic [60–66]. Initially, indicators were designed to assess the level of partnership during each phase of the project delivery system.

Then, metrics were devised to quantify the variable depth of partnering in construction, and a questionnaire survey was conducted to measure the characteristics of partnering depth based on the opinion of industry professionals, including owners, designers, contractors, and academics. Three rounds of data collection utilizing the Delphi approach led to an agreement regarding the level of partnership in each project delivery system. To establish the validity of the Delphi approach, test questionnaires were distributed to a subset of construction professionals for completion and response. Project owners, designers, construction contractors, and academics were identified as the target audience [3,4,8,11–14,22,59]. Details of the research methodology are presented in Figure 4, which describes the stages in the research consisting of six steps, starting with a literature study, compilation of indicators, and conducting a survey with in-depth interviews. Based on the results of the survey, a focus group discussion (FGD) was conducted twice using the Delphi method to form a consensus and draw conclusions.

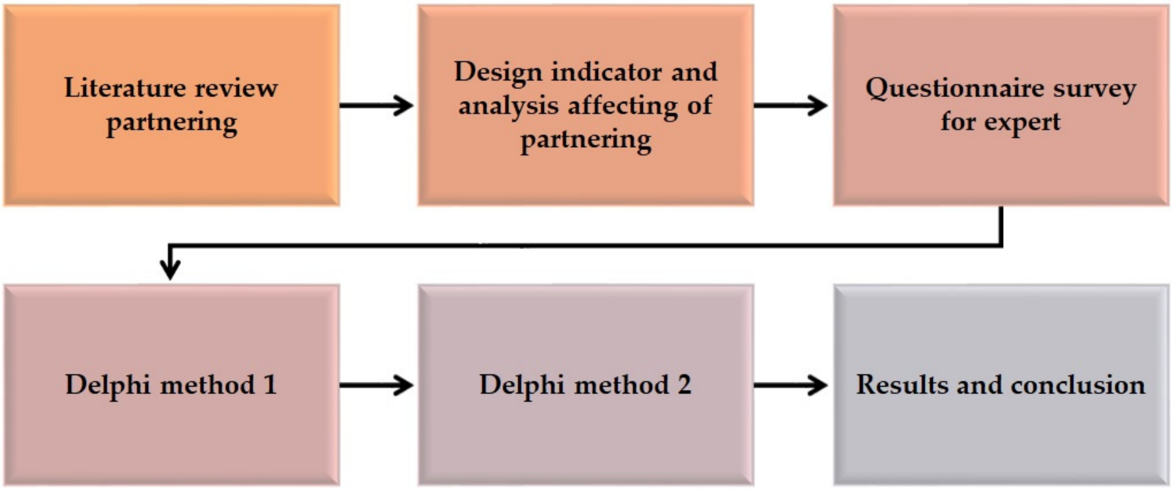

Figure 4. Research methodology.

2.1. Data Collection

The primary source of data examined in this study was semi-structured interviews, with respondents including project owners, designers, contractors, and academics, with the goal of gaining deep insights into various aspects of partnering depth. In their individual firms, respondents hold a variety of hierarchical positions, representing managers, directors, and CEOs. We visited the project office multiple times, where we conducted interviews, attended project meetings, and engaged in informal conversations with several project personnel. Observations from this visit were combined with secondary data in the form of presentations and documents gathered from both parties, and interesting material was clarified through interviews and informal talks. To ensure that data collection was as consistent and coherent as possible, an interview guide was established and used for all interviews. During interviews, respondents were encouraged to share thoughts outside the limits of official questions in order to collect richer data and record their interpretations and comments. All interviews were audio-recorded and transcribed verbatim to facilitate analysis [62–67].

The profiles of the experts in this study consist of owner (CEO), contractor (CEO, director, and project manager), designer (senior designer), and academic (associate professor and professor of construction management). Details about the experts are presented in Table 2.

Table 2. Profile of respondents.

Actor	Resp.	Position/Role
Owner	1	Chief Executive Officer
	2	Chief Executive Officer
Designer	3	Senior Designer
	4	Senior Designer
Contractor	5	Senior Manager
	6	Project Manager
	7	Operational Director
	8	Chief Executive Officer
	9	Director
	10	Project Manager
Academic	11	Professor of Construction Management
	12	Professor of Construction Management
	13	Assoc Prof of Construction Management
	14	Assoc Prof of Construction Management

The gathered data were analyzed using standard procedures for qualitative research: data reduction, data display, and verification of conclusions. We initially transferred the interview transcripts to organize the data. The first round was classified as data mining pertaining to perspectives (prerequisites, strengths and advantages, challenges, and obstacles) and the experience of each respondent in implementing projects, as well as the possibility of deeper collaboration up to IPD, which allowed for the positioning of events in a different time. As a subsequent step, we classified the data according to the four dimensions of partnership identified in the literature, namely competition, cooperation, collaboration, and coalescence. This provides a more in-depth understanding of the characteristics of partnership in a project delivery system. We also followed up with several key respondents to strengthen the validity of the analysis and draw conclusions [67–70].

2.1.1. Long-Term Collaboration

Transparency and long-term collaboration serve as the initial capital for stakeholder partnerships. Stakeholders view IPD as a new opportunity because the process is not lengthy and is believed to be capable of providing superior project performance, resulting in an increase in transparency and mutual trust [54,55,71–73].

2.1.2. Good Governance in the Construction Industry

Efforts to build good governance are desired by all stakeholders armed with honesty, trust, and transparency to jointly realize the success of the project.

Figure 5 explains that in order to achieve good governance, underlying values are needed, including honesty, integrity, dignity, and mutual trust, in order to foster positive partnering among all stakeholders. Likewise, the importance of transparency and accountability to good governance practices assures that equitable justice is obtained in the interactions that occur [31,44,62,66,72].

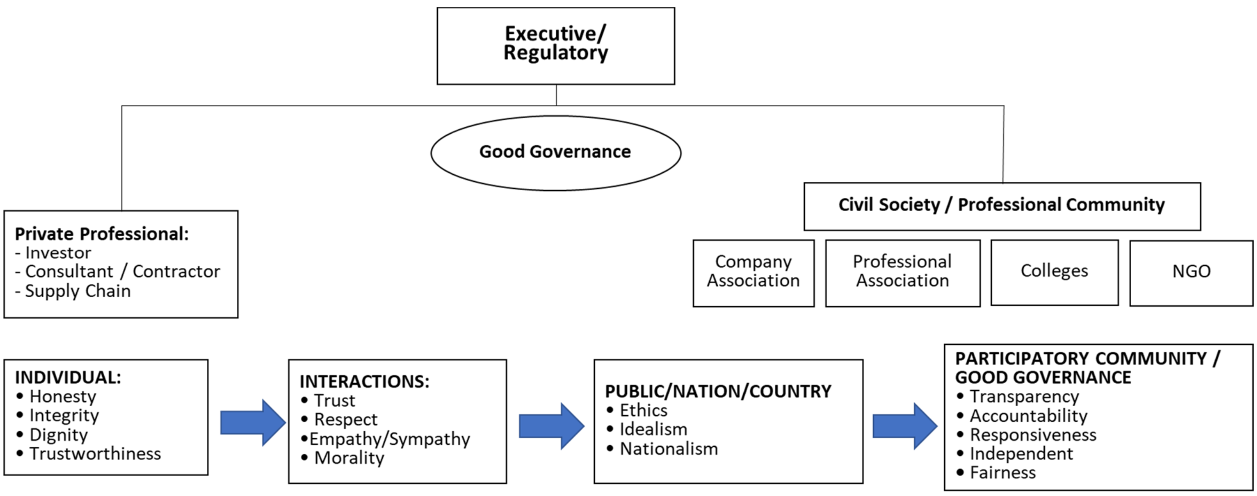

Figure 5. Schematic representation of the process of achieving good governance in construction projects.

Focus group discussion (FGD) results provide stakeholders with a viewpoint on how to implement good governance in building projects, including:

- Owner: There is openness and transparency in representing the owner's interests for the success and long-term benefits of the project. The owner desires a long-term partnership in order to concentrate on other projects. Because the owner lacks time to provide explicit directions, the contractor must carry out the required tasks. Therefore, integrity and high levels of trust are necessary for lasting partnerships. IPD makes it easier for owners to achieve faster and more efficient projects on time and on budget. Owners can strategically focus on other issues with high confidence in the management of their projects. A track record is needed for all stakeholders involved in the project. The owner believes there is no need for tenders in the project [22,30,32,44,66].

- Contractor: Cooperation is not only based on competition but also on investment because competition does not solve problems. Thus, for construction services to contribute to the project, they must interact positively and agree on payment methods. Supervisory functions must incorporate collaboration, cost performance, quality, and timeliness, as well as safety and the environment, all of which must be accomplished collectively. The owner desires not to hinder the performance of the project. The relationship between the owner and the contractor must be one of loyalty in order to achieve long-term performance. Construction services initially have contract rules, followed by construction, so future risks are occasionally unforeseen. If the margin is too narrow, it is preferable for the loss to be open to volume and price if the cooperation has an initial agreement. The contractor works on time; therefore, if the project is delayed, the service expires. The contractor is like a leaky ship that must reach its destination; leaks are typical [7,8,10,11,16,17]. IPD in Indonesia is very likely to be implemented in private projects because it provides a level of authority to terminate cooperation with various stakeholders from at the outset before a project starts. Competence and commitment are required from each party to achieve the desired results. Expectations for government projects can be implemented in urgent projects, disasters, and other special projects with the protection of applicable laws [7,8,10–12,37,38,41].
- Consultant (Designer): The commitment of the owner and contractor is required due to the intricacy of design and regulation typically encountered by the designer. If IPD is implemented in a project, the contractor is involved in the project from the beginning, and the contractor has assessed the design from the beginning. Still, there are likely regulatory aspects that cannot be negotiated by the contractor. A work order commitment is mutually agreed upon, and the key is to adhere to regulations [69,70,72].
- Academics: The development of project proposals is currently centered on engagement without considering input, process, risk, or output; instead, everything is integrated. Engagement is crucial because it involves the entire process. In Indonesia, the IPD phenomenon will represent a fresh approach to project development in a positive direction. It must be expanded to larger organizations. IPD is possible in private industries armed with projects implemented by owners, designers, and contractors [20,59–61].

3. Results

This paper contributes to the current literature on sustainable project management, particularly in enhancing the partnering process in the construction project sector to achieve the best project performance by demonstrating that high-level collaboration may play a crucial role in all aspects of sustainable project management. In addition, all components of collaboration (initiation, planning, execution, and closure) have an impact on all facets of sustainable project management. Hence, collaboration must be incorporated into any management practice meant to promote sustainability. This is consistent with the previous finding that proactive stakeholder participation is necessary for any viable project management strategy [22,64–66,72,73]. Furthermore, the effectiveness and creativity fostered by extensive project collaboration from the onset results in positive project life cycle performance according to the findings presented herein. Our results contribute to the contemporary construction management literature on the concept of cooperation.

Collaborative business arrangements that incorporate several stakeholders (both internal and external) promote sustainability, bolstering the beneficial correlation between collaboration and sustainability observed in prior research on alliance contracts in the context of infrastructure. Consequently, this study provides a reassuring illustration of how broad collaboration can be fostered and play a crucial role in sustainable project management techniques. For sustainable project management, a high level of teamwork is necessary [7,8,10–12,37,39,41].

Figure 6 shows the existence of partnering relationships at every stage of the project delivery systems. There are many borders in a DBB system, which are reduced in a DB system, whereas in IPD, there are no borders between the owner, designer, and contractor. The existence of a simpler PDCA in IPD is due to the involvement of all stakeholders from the beginning of the project. IPD represents a highly effective reference model to support the enhancement of the performance of various projects. In the United States, IPD has been established as a model for project delivery since 2007 [44,46,67,68]. Multiple research projects have been conducted on IPD [44,68,69]. By prioritizing the elements of trust, loyalty, accountability, transparency, honesty, and sound governance practices in construction implementation, the Delphi method and expert interviews reveal optimism with respect to the implementation of IPD [44,67,68].

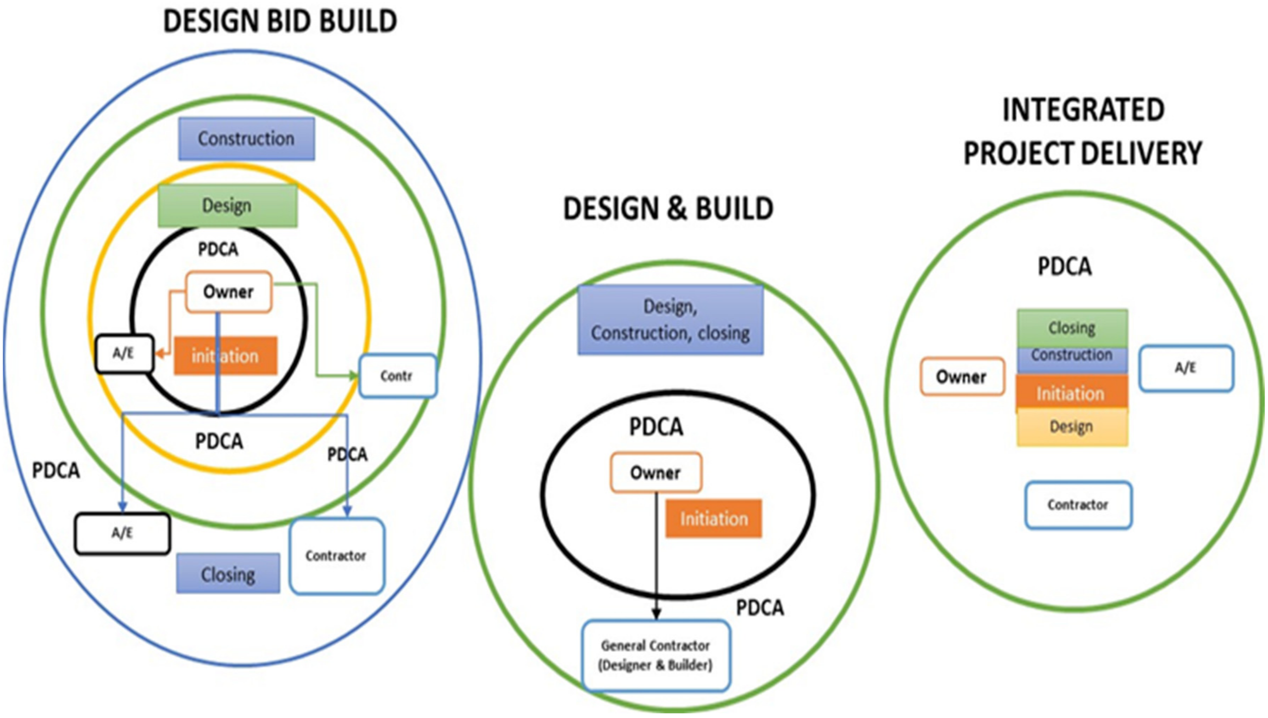

Figure 6. Schematic representation of partnering in project delivery systems.

4. Discussion

The results of interviews and FGDs conducted in this research show the importance of interaction from the beginning, resulting in improved performance of the project in terms of cost, quality, time, occupational health and safety, and the environment. This is in line with the results reported in [67] showing that integrated projects have quantitative value in terms of performance compared to non-integrated projects, and are characterized by the rapid handling of design problems during project implementation. Previous researchers suggested that interactions in integrated projects (DB) bring together design and building entities so that problems of design changes, specification changes, and contract problems do not occur, representing an in-depth partnering through cooperation, collaboration, and coalescence [68–70].

Azhar et al. (2008) [61] suggested that the value of IPD lies in the involvement of all actors in project implementation, which can improve project performance, as also highlighted in [41,67,68]. Interactions from the beginning include all phases in the project life cycle, namely initiation, planning, construction, and closing [71,72]. Integrated projects have better partnering depth than non-integrated projects [22,59,72]. In-depth interaction and partnering are entities of IPD. Although in Indonesia, IPD is not yet well-known, the practices of the construction industry, especially the private sector, involve many IPD components with the goal of achieving improved project performance [35,37,72]. There is hope for the implementation of IPD in Indonesia, especially in the project sector with private owners. Increased awareness of IPD and prerequisites for IPD implementation need to be ensured by the owner, consultant, contractor, and government entities [62,67,72].

5. Conclusions

This paper contributes to the ongoing discussion of sustainable project management, particularly in terms of improving project performance through partnering. The analysis and results of the focus group discussion illustrate the hope for adopting the values of IPD as a project delivery method in Indonesia. Although the concepts associated with IPD are not yet familiar in Indonesia, many practices that lead to IPD have been already carried out, especially in the private sector. IPD is a new concept associated with improved efficiency. However, there are prerequisites to implementing IPD, including underlying values of good governance, such as honesty, trust, dignity, fairness, accountability, and transparency. Another interesting context is that the IPD approach can be applied to various special and disaster-based government projects. This allows for fast project results and shortens long project cycles, especially tenders (bid) to hire designers and builders.

This idea offers new hope for improved project management and a deeper relationship between stakeholders so that from the onset of the project, stakeholders can collaborate and innovate freely to improve performance. It is quite probable that the incentive base of the IPD technique in Indonesia will be expanded through the development of new types of fairness rewards. Each stakeholder's conflicts of interest can be resolved by establishing a shared vision from the outset prior to the start of the project so that all parties can jointly produce project value.

During the COVID-19 pandemic, many projects in Indonesia experienced losses and delays. As a result, the IPD concept represents a new discourse for sharing risks in projects, such as COVID-19, as a joint solution among the owner, contractor, and subcontractors while still satisfying the requirements of good governance.

Author Contributions: E.M.S.: writing—original draft and investigation; A.P.I.: project administration and supervision; M.A.W.: writing—review and editing and formal analysis; J.P.S.: formal analysis and visualization; R.Z.T.: writing—review and editing and supervision; A.K.A.P.: data curation and visualization; M.P.D.: investigation and formal analysis. All authors have read and agreed to the published version of the manuscript.

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Data Availability Statement: Data are contained within the article.

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

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