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Program management: The role of stakeholder communication in the development of megaprojects in the new Indonesia capital city

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Abstract

Megaprojects involving numerous stakeholders necessitate structured communication mechanisms and close collaboration to prevent conflicts and imbalances in decision-making. The existing management structure is often unable to deal with the dynamic complexity of megaprojects in the New Indonesia Capital City (IKN). Good communication and coordination between stakeholders will reduce risks and cost overruns, enabling project performance to be achieved. This study aims to produce an effective communication model between stakeholders as part of the management program and project in the IKN megaproject. Using a mixed-methodology approach (qualitative and quantitative), this study will develop an effective communication model between stakeholders in the development of megaprojects in IKN. The qualitative method will be employed through surveys with 200 respondents and analysis with SEM-PLS to explore the perceptions of respondents and identify the factors considered important in producing performance in the IKN megaproject. Subsequently, the qualitative method will be carried out through a Focus Group Discussion (FGD) with 11 experts to validate the results of SEM-PLS analysis and map various stakeholder interests, ensuring effective communication. The role of these stakeholders is crucial to the success of megaprojects in IKN. This model can be applied to other projects in the development of National Strategic Projects in Indonesia.

Keywords: Communication, IKN, Megaproject, Project management, Project performance.

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1. Introduction

The development of the New Indonesia Capital City (IKN), as one of the most ambitious mega projects in Southeast Asia, aims not only to relocate the center of government but also to create a sustainable, smart, and inclusive city. The challenge faced by the IKN mega project is managing all programs and projects involved. The complexity of this project necessitates an innovative program management approach to oversee various interconnected projects effectively. Based on analysis by Wang et al. [1], the success of a mega project such as the IKN depends on the ability to create a management mechanism that is structured, coordinated, and adaptive to field dynamics.

Effective coordination among various parties in a construction project is essential to reduce the risk of delays and cost overruns Dokras [2], Jardine et al. [3] and Rehacek [4]. The involvement of all stakeholders in the coordination process is key to achieving success in large-scale projects. The coordination model applied in a project can influence the final results, including completion time and costs incurred. Clear and regular communication between the involved entities ensures that all parties share a common understanding of the project's goals and progress [4]. Various studies have been conducted to understand the main challenges in megaprojects, such as risk management, cost control, and time efficiency [5, 6]. Despite the growing research on project management, a significant gap remains in terms of a holistic approach focused on program management for megaprojects of the scale and complexity of IKN. Megaprojects such as IKN involve multiple stakeholders with diverse backgrounds, interests, and objectives. The absence of an effective coordination mechanism can lead to conflict, overlapping roles, and waste of resources, ultimately hindering the achievement of the project's strategic objectives [7]. Megaprojects face significant risks, including policy changes, economic uncertainty, and environmental impacts. However, no model effectively integrates risk management with time and cost control within a program management framework [8, 9]. The principle of sustainability guides the development of the IKN; however, no program management framework explicitly integrates sustainability aspects (environmental, social, and economic) into the management of the mega project [1].

This study examines how a program management approach can facilitate adherence to established schedules and budgets. This includes analysis of decision-making mechanisms, resource allocation, and mitigation of risks associated with delays and cost overruns [4]. Program management is expected to explore aspects of sustainability, including the use of green technology, energy efficiency, and the management of social impacts [10, 11]. The success of this research is a program management model that can be adapted to address complex bureaucratic challenges, regulatory compliance, and the need for cross-sector and inter-agency coordination, as found in development projects managed by the Ministry of Public Works and Housing, especially in the context of the IKN mega project [12-14].

2. Theoretical Literature Review

2.1. Program Management

Artto et al. [15] and Artto et al. [16] program management is an organized approach to managing a set of interrelated projects to achieve larger strategic outcomes. Program management is essential to ensure effective coordination between entities, thereby reducing delays (time overruns) and cost overruns [6, 17, 18]. The Project Management Institute (PMI) [20] defines program management as the coordination, monitoring, and control of multiple projects simultaneously, with a focus on achieving benefits that cannot be attained through individual project management. In the context of mega projects such as the development of the IKN, program management plays a vital role in ensuring that all project components work synergistically to achieve the final goal efficiently in terms of time, cost, and quality. Additionally, program management in public organizations must accommodate a complex and dynamic institutional framework, as explained by Geraldi [19] regarding the importance of adaptation within the framework of project studies.

According to previous research, the theories of program management, as presented by Pais et al. [20] and Schuman and Brent [21], emphasize the importance of flexibility in program management, particularly in projects with high uncertainty and numerous stakeholders. In megaprojects, this flexibility is necessary to respond to changes in the external environment and manage the risks associated with the project's large scale.

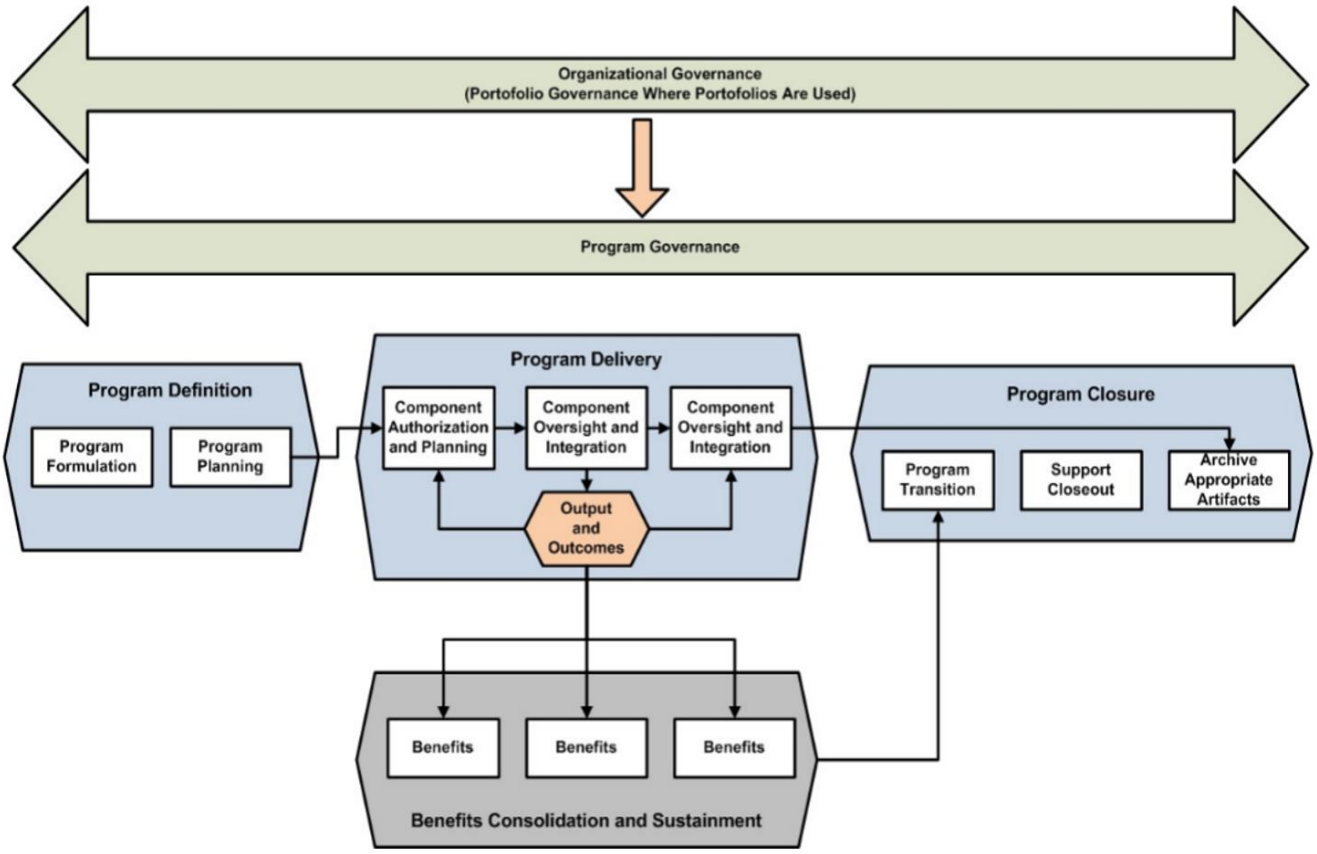

Figure 1.
Program life cycle.

Figure 1 illustrates the program life cycle during the project's duration. The project life cycle begins with the government defining the program in program formulation and planning. Then, it will enter the project delivery phase, which will produce project output in the form of infrastructure. The project delivery system can be in the form of DBB (Design-Bid-Build), DB (Design and Build), EPC (Engineering, Procurement, and Construction), or other methods based on the contract [22-25] so that the final phase of the project life cycle is project closure, handover to the owner, and operation and maintenance are carried out in the use of the infrastructure produced. The cycle above illustrates the parties involved during the project [23]. Coordination between entities is a crucial component in large projects, particularly when numerous stakeholders with diverse objectives are involved. Flyvbjerg [5] notes that one of the leading causes of megaproject failure is the lack of coordination between the parties involved. Castelblanco [26] emphasizes that in the context of mega projects, the coordination structure must be capable of managing multi-party interaction networks in layers, thereby systematically minimizing the risk of conflicts between entities. Good coordination requires a clear and transparent decision-making structure, Chandragiri [27]. An effective coordination mechanism involves a clear division of roles and responsibilities, as well as open channels of communication between the various levels of project management.

2.2. Communication in Projects

Effective communication is a primary prerequisite for building synergy between entities. According to Kania et al. [28], a lack of clear and structured communication is one of the leading causes of failure in mega projects. Poor communication can lead to misinterpretation of goals, incorrect judgments, and slow decision-making. Based on research by Manata et al. [29], the four communication behaviors identified as critical to the functioning of Integrated Project Delivery (IPD) teams are monitoring, managing, challenging, and negotiating. In general, monitoring involves tracking and discussing events that affect the project. At the same time, management refers to negotiating interpersonal relationships and team boundaries, typically through the use of a project coordinator or facilitator. Challenging involves open consideration and discussion of opposing viewpoints, and negotiating relates to problem-solving interactions and discussing issues in a collaborative, give-and-take manner. Manata et al. [29] identified four ways to achieve good integration and depth of communication, consisting of monitoring, managing, challenging, and negotiating.

The IKN megaproject has a main stakeholder called the IKN Infrastructure Development Task Force, which is responsible for overall accountability for the program. In this case, the lead for all programs and projects is the responsibility of the IKN Infrastructure Development Task Force. Below are the stakeholders and roles in the IKN megaproject.

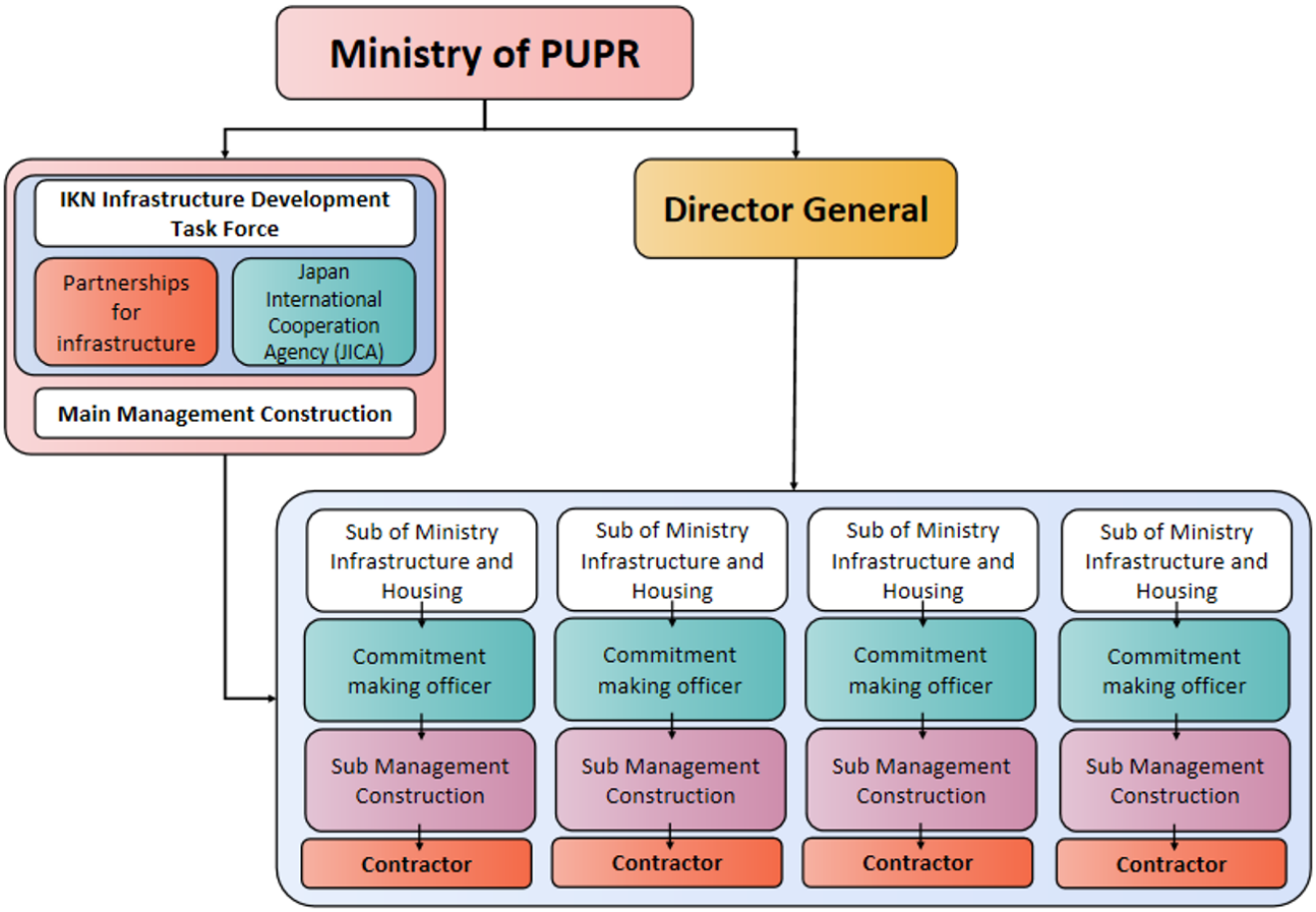

Figure 2.
Stakeholder in IKN Megaproject.

Figure 2 above illustrates that the coordinator of the entire program is the Ministry of Infrastructure and Housing, which includes related stakeholders representing both the owner (government) and construction management, contractors, and third parties involved in assurance.

Table 1.
Stakeholder and role in the IKN Megaproject.

Stakeholder	**Role**
IKN Infrastructure Development Task Force	Overall accountability for the programme
Partnerships for infrastructure	PMO Governance and Assurance
Japan International Cooperation Agency (JICA)	Construction Technical Assurance
Main Management Construction	Package Management Consultant Lead
Sub of the Ministry of Infrastructure and Housing	Program management for a package within an area
Commitment-making officer	Project manager for the project (representative owner)
Sub Management Construction	Management Construction for the package
Contractor	Implementation of the Project

Table 1, above, describes stakeholders that are visible in programs and projects in IKN. Various stakeholder backgrounds certainly have different interests and perceptions. Program management is needed that can see from a broad perspective in order to formulate appropriate program management and communication patterns for each stakeholder, who has different perceptions. Several communication channels need to be built to bridge the interests of different stakeholders in the IKN mega project.

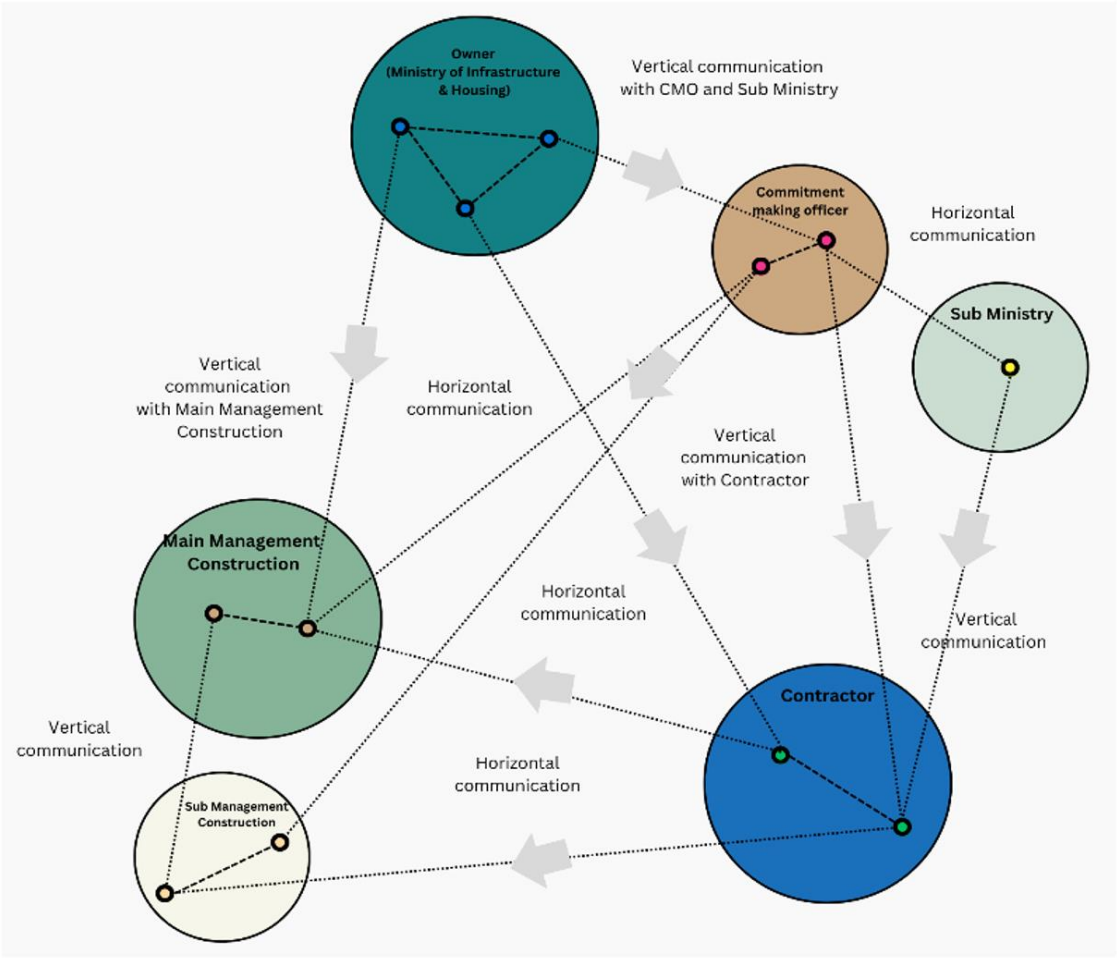

Figure 3.
Model Communication in the IKN Mega Project.

Safapour et al. [30] stated that in managing communication in a project, it is necessary to identify stakeholders and the communication patterns that occur. Figure 3, above, illustrates the type of communication, both vertical and horizontal, between stakeholders in the IKN megaproject.

2.3. Stakeholder Integration in Megaproject

The major decision to launch an iconic infrastructure megaproject and the subsequent strategy to realize it are often driven by: (1) socio-economic factors, such as creating jobs, boosting tourism, and opening up new industries and regions for economic growth; (2) political drivers, such as for national, regional, or personal prestige, e.g., hosting the World Cup or a prestigious international summit; (3) a distinct cultural identity and/or spectacular aesthetics; (4) projecting technological excellence and innovation Kumaraswamy et al. [31]. Megaprojects typically attract public attention due to their significant socio-economic impacts, technological breakthroughs, and/or perceived or publicized iconic status. Megaprojects, in general, and purpose-built infrastructure megaprojects, in particular, are also expected to have at least some significant impacts on end-users. These impacts will span the entire project life cycle, from the design and development phase to potential disruptions during the construction period, thereby creating a sense of ownership during the use and operation phases after the project is successfully handed over, resulting in increased value and quality of life for the community.

3. Materials and Methods

This study uses a mixed-method approach, namely a combination of quantitative and qualitative methods [32-34]. This method is necessary to explore the perceptions of actors involved in the IKN mega project regarding the importance of communication in defining their respective roles in programs and projects within IKN [35-37]. Furthermore, model validation is carried out with qualitative analysis to ensure that these perceptions are understood and can be implemented in the IKN project or as lessons learned for future mega projects [36, 38, 39].

This study uses a quantitative method, distributing questionnaires to 200 respondents, Schutt [40] and Briskorn and Dienstknecht [41], where 200 respondents represent megaproject actors in IKN. Furthermore, descriptive statistical tests were conducted on the questionnaire results to determine the means, standard deviations, and variance coefficients, thereby assessing the level of homogeneity in the data. Furthermore, a qualitative analysis was conducted using Focus Group Discussion (FGD) involving 13 experts with the following expert characteristics:

Table 2.
List of experts.

Respondent	Actors	Position/role
1	Owner	Government/PUPR
2		Government/PUPR
3		Government/PUPR
4		Government/PUPR
5		Government/PUPR
6	Contractors	Project Manager
7		Senior Project Manager
8		Operational Manager
9		Chief Operations Manager
10	Academic	Professor of Project Management
11		PhD in Project Management
12		PhD in Project Management
13		PhD in Project Management

The results of the qualitative analysis aim to validate the model developed in the questionnaire, assess its suitability, and provide recommendations that can be applied in megaprojects such as IKN. The details of the steps in this study are as described in the following chart:

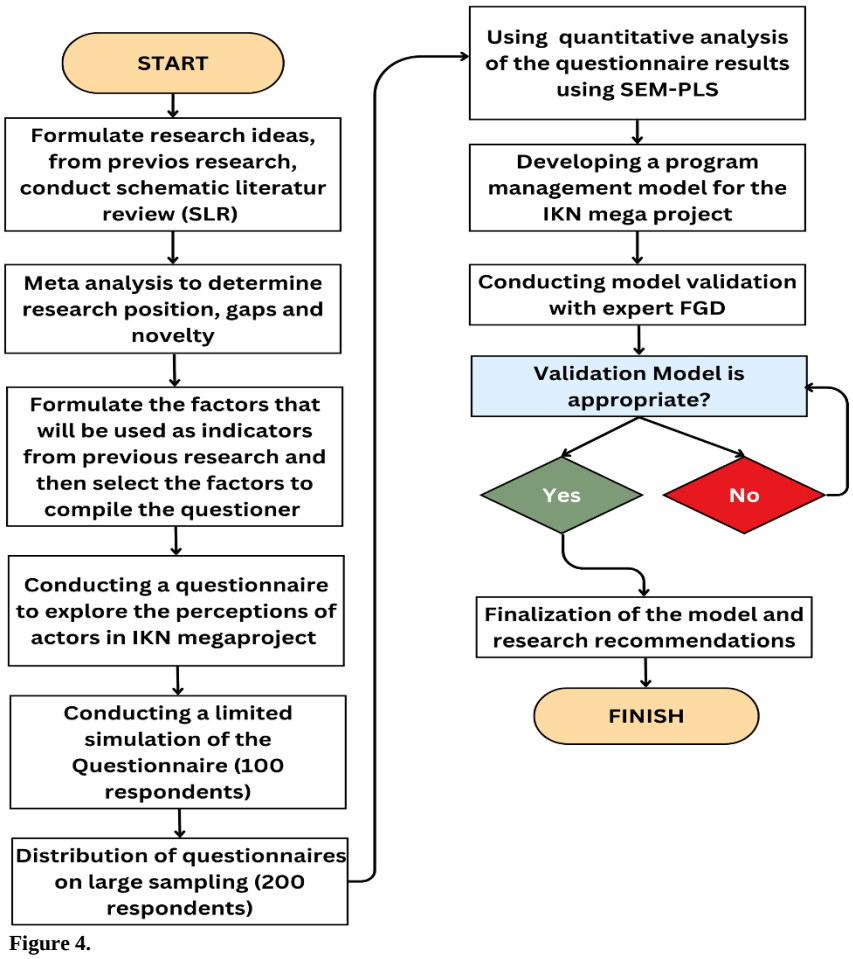

Figure 4.
Research Methodology.

Figure 4, above, illustrates the research methodology employed in this study, which involved a preliminary questionnaire test conducted on the first 100 respondents, followed by a larger-scale test on a sample of 200 respondents. The analysis was conducted using a mixed-methods approach (qualitative and quantitative) to produce an appropriate model that can be recommended for policymaking related to program management in mega projects. The profile of respondents in this study is as follows:

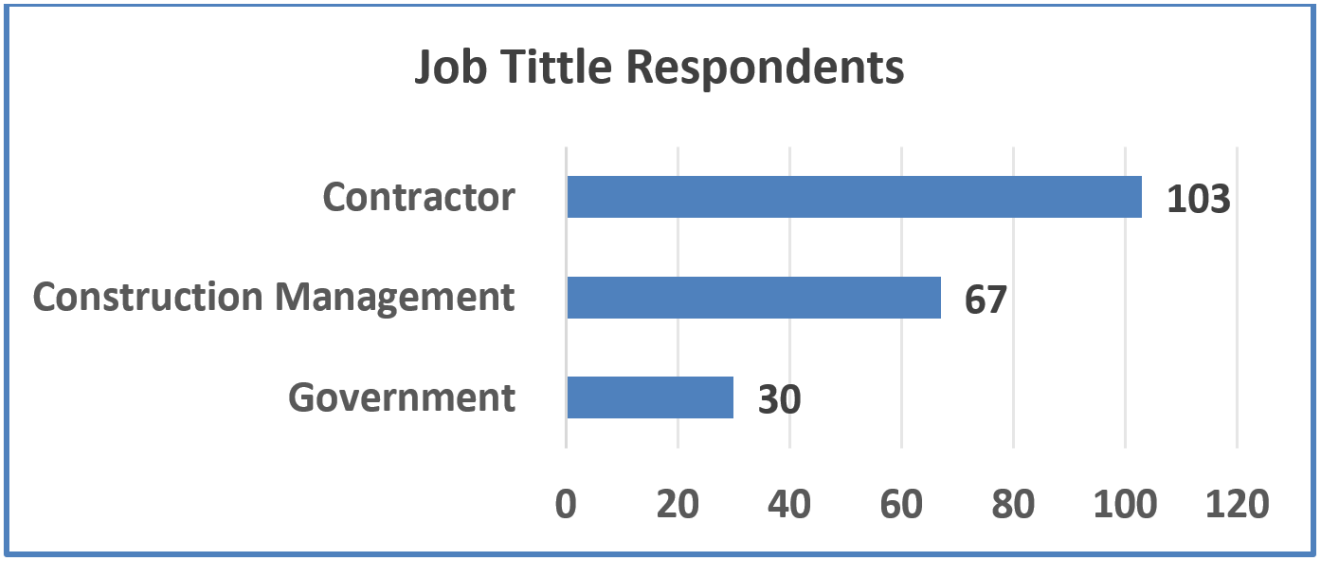

Figure 5.
Distribution of job title respondents.

Figure 5 above shows that respondents came from three sources: contractors (51.5%), construction management (33.5%), and government (15.0%).

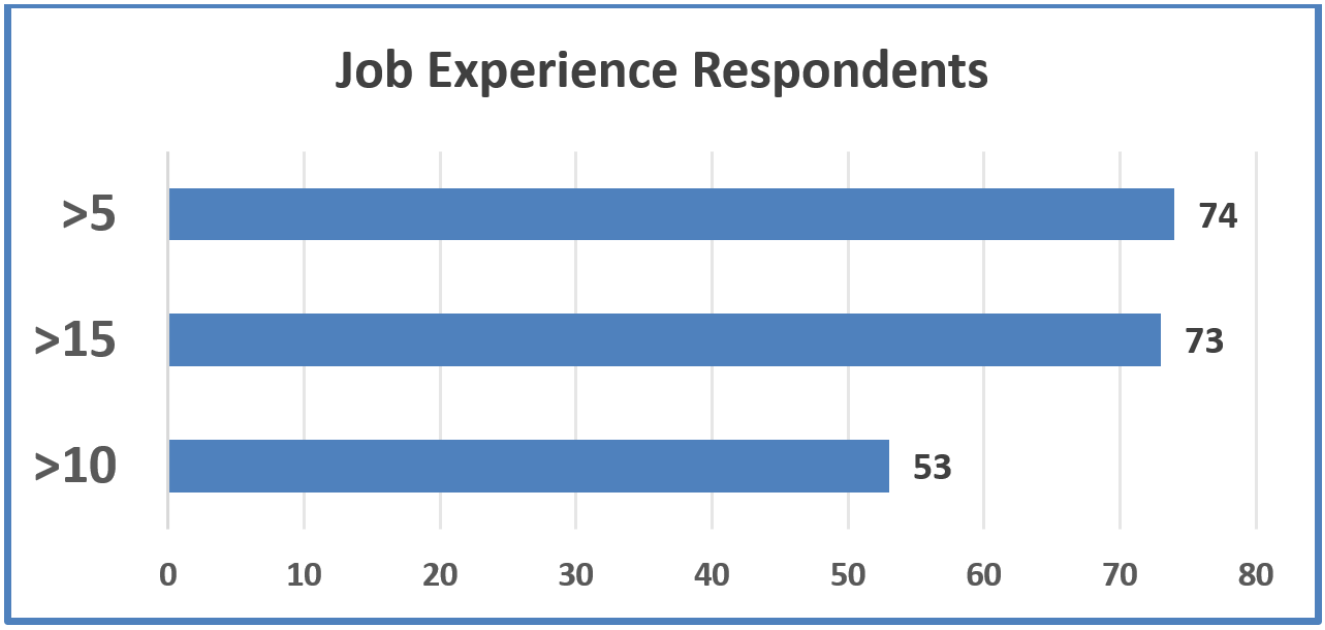

Figure 6.
Distribution of job experience respondents.

Figure 6, the above illustrates the distribution of work experience among respondents, where respondents with more than 5 years of work experience account for 37%.

4. Results

4.1. Quantitative Analysis

This study involves four independent variables (X), with project management acting as the moderating variable, and the dependent variable (Y) being project performance. Data were collected from 200 respondents through questionnaires, and the findings are described as follows:

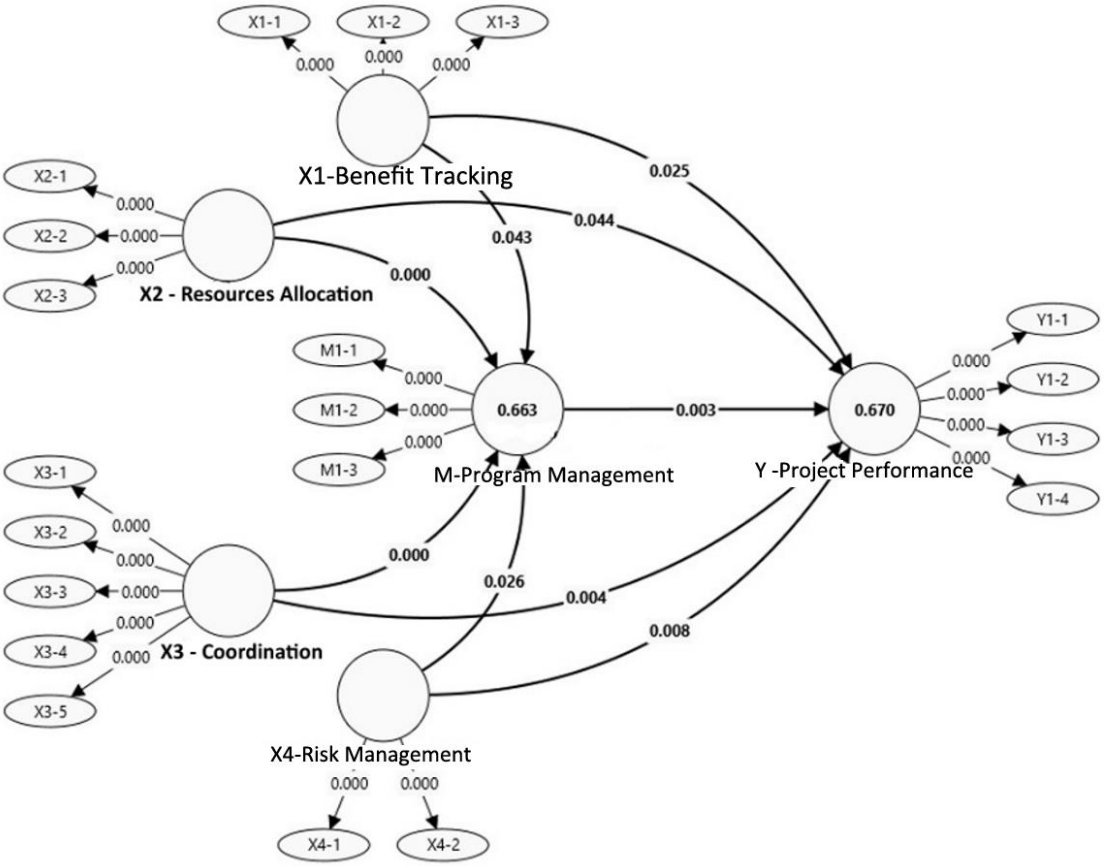

Figure 7.
Relationship between variables.

From Figure 7 above, it is explained that each has an indicator in each dimension, with a p-value. All paths show a p-value < 0.05, indicating statistical significance at a 95% confidence level. This confirms that all exogenous variables, either directly or indirectly, contribute to achieving project performance, both through the program management mediation path and directly.

The coordination variable (X3) has the most significant influence on program management (β = 0.419), indicating that the effectiveness of inter-entity coordination plays an important role in cross-project management.

The Resource Allocation (X2) and Risk Management (X4) variables also have a significant influence on project performance, both directly and through program management.

The existence of a direct path from X1–X4 to Y, as well as an indirect path through M, indicates the presence of a partial mediation effect, which requires further analysis in the following subsection.

Thus, the structural model of this study is proven to be statistically feasible and valid in explaining the relationship between constructs in the context of the IKN mega project, and it supports the theoretical validity of the program management model based on a cross-variable, programmatic approach.

Table 3.
Results of the loading factor.

Variable	M-Program Management	X1-Benefit Tracking	X2-Resources Allocation	X3-Coordination	X4-Risk Management	Y -Project Performance
M1-1	0.876					
M1-2	0.929					
M1-3	0.848					
X1-1		0.822				
X1-2		0.833				
X1-3		0.819				
X2-1			0.851			
X2-2			0.837			
X2-3			0.899			
X3-1				0.852		
X3-2				0.810		
X3-3				0.775		
X3-4				0.757		
X3-5				0.795		
X4-1					0.930	
X4-2					0.880	
Y1-1						0.786
Y1-2						0.867
Y1-3						0.772
Y1-4						0.804

The results of the loading factor test also show that all variables have a loading factor above 0.7, which indicates that all variables are considered to have a significance value above the minimum threshold. Therefore, there is no need to reduce the variables.

4.2. Qualitative Analysis

Qualitative analysis was conducted through an expert FGD involving 11 experts. In this FGD, the Delphi method was used for consensus [42, 43], which was conducted in 2 stages, there are:

- Stage 1: Each expert is given time to provide feedback on the resulting model, which consists of four dimensions and one moderating variable. Each expert can agree with or reduce variables in each dimension, as well as moderate variables or add them if necessary, to expand the discussion.
- Stage 2: Experts provide weighting and consensus on the selected factors and offer a brief discussion as needed.
- From the qualitative analysis through FGD, several conclusions were produced as follows:
- Government: Project performance is significantly influenced by coordination and risk management through integration program management and benefit tracking, which serve as the primary pathways to improving project performance. The path of coordination → program management → project performance is very dominant, demonstrating strategic capabilities in managing multi-party projects. Increasing project value is crucial through effective communication and coordination among stakeholders.
- Contractor: High focus on operational coordination because the contractor has duties and responsibilities in project implementation; however, benefit tracking has not been a primary concern because the contractor does not focus on the entire process. Resource allocation is crucial and should be carried out from the initiation phase by coordinating with the owner (the government). The contractor focuses on project performance in terms of cost, quality, time, safety, and environment.
- Academic: A shared vision is important for generating benefits and increasing value in mega projects. Coordination and communication within the project are key to implementing the strategic capabilities of each stakeholder. The project is not only oriented towards achieving results but also towards anticipating long-term risks and learning from experience in future projects. Project performance is not only based on cost, time, and quality but also on safety and the environment.

5. Discussion

Hair et al. [44] state that the p-value is an important factor in determining the suitability of a model in statistics, indicating that a model is considered fit and usable. Additionally, the factor loading must meet the minimum threshold, namely 0.7 [44, 45], so that the relationship between variables is significant and can be used. The program management model developed in this study demonstrates that the two prerequisites have been met, making it suitable for validation purposes. In conducting validation, expert justification was employed with 11 experts in a heterogeneous group [36, 38, 39, 46]. The consensus among experts is that the five dimensions proposed by researchers, tracking benefits, allocating resources, coordination, risk management, and project management, are considered to address important aspects of the IKN mega project. Delphi Decision-Making [43, 46-48] can further explain that aspects of program management require a

shared vision and increased value in tandem. Theoretically, these results suggest that program management functions as a strategic mediator, connecting coordination, resource allocation, benefit tracking, and risk management to project success. This aligns with the findings of Evans et al. [49], who suggest that partnering in megaprojects can enhance communication and mitigate conflict during the project, ultimately creating value [25, 50]. Collaborative work practices in mega projects make tracking interests crucial, ensuring a shared goal to achieve project success.

In the FGD results, contractors held differing opinions from other experts, emphasizing operational aspects and direct involvement in the field, but lacking in tracking benefits and programs. This aligns with Katar [51] statement that contractors, in both Design-Bid-Build (DBB) and Design-Build (DB) delivery systems, emphasise the operational aspects of project implementation. In contrast, Sari et al. [25] and Sari et al. [25] and conveyed that contractors involved since the initiation phase will understand the value and vision of the project to be implemented; therefore, in the case of mega projects, integration is needed from the beginning of the project before it starts, which is facilitated by the government or IKN Infrastructure Development Task Force with the principle of good governance [25].

In order to ensure a shared perception among stakeholders, it is necessary to design the appropriate type of communication and communication channels so that a common vision and mission can be established, enabling the successful realization of program management objectives [1, 30].

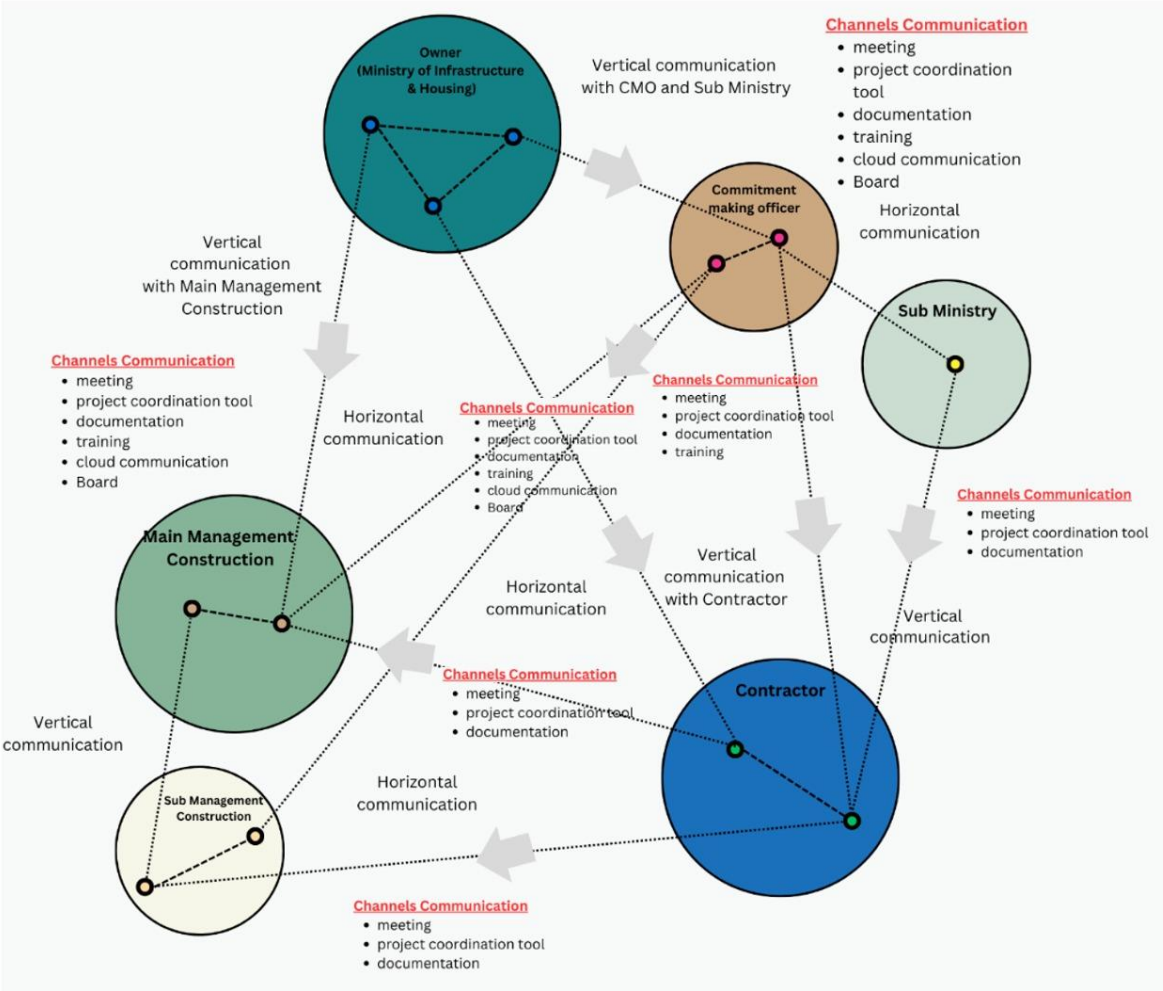

Figure 8.
Channels communication in the IKN megaproject.

Figure 8, above, illustrates the communication design of each stakeholder in the IKN megaproject. The channels include meetings, project coordination tools, documentation, training, cloud communication, and boards. These channels are used according to the type of communication, both vertical and horizontal, in the IKN megaproject. The use of communication channels in a project is adjusted to the needs of the stakeholders involved and the hierarchy of the project.

6. Conclusions

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

1. In building performance for a mega project, five important factors are necessary that must be accepted by every stakeholder in the project, namely equal benefits, coordination, resource allocation, risk management, and project management. This shared vision is crucial for overseeing the project to achieve good performance in terms of cost, quality, time, safety, and environmental impact.
2. Differences in views among contractors regarding the entire project need to be addressed through partnering, as the project is currently in the initiation phase, so that contractors share the same perspective on tracking benefits as other stakeholders. The contractor's operational perspective must be broadened to encompass a broader context within the framework of a complex megaproject. This communication must be facilitated by the owner (the government) throughout the implementation of the megaproject, from the initiation phase.
3. An effective communication model must be designed along with appropriate channels to accommodate all stakeholders so that they share the same perception in making the project a success. Several communication channels designed in this study can help serve as a bridge for each stakeholder in the IKN mega project.

References

[1] Y. Wang, D. Graziotin, S. Kriso, and S. Wagner, "Communication channels in safety analysis: An industrial exploratory case study," *Journal of Systems and Software,* vol. 153, pp. 135-151, 2019.

[2] U. Dokras, "Mitigating project risk management-role of human resources," 2017. https://www.aon.com/2017-global-risk-management-survey/pdfs/2017-Aon-Global-Risk-Management-Survey-Full-Report-062617.pdf

[3] C. Jardine *et al.*, "Risk management frameworks for human health and environmental risks," *Journal of Toxicology and Environmental Health part B: Critical Reviews,* vol. 6, no. 6, pp. 569-718, 2003.

[4] P. Rehacek, "Risk management in construction projects," *Journal of Engineering and Applied Sciences,* vol. 12, no. 20, pp. 5347-5352, 2017.

[5] B. Flyvbjerg, *How big things get done*. New York: Oxford University Press, 2022.

[6] J. Odeck, "Cost overruns in road construction—what are their sizes and determinants?," *Transport Policy,* vol. 11, no. 1, pp. 43-53, 2004.

[7] Ruuska I et al, "Stakeholder integration in megaprojects," *International Journal of Managing Projects in Business,* 2011.

[8] Irimia-Diéguez A. et al, "Adaptive control in megaprojects," *Journal of Engineering and Technology Management,* 2014.

[9] Irimia-Diéguez IA et al, "Project governance in developing countries," *Project Management Review,* 2014.

[10] Y. Yenita and R. Soegiarso, "Green urban planning," *Journal of Sustainable Cities,* 2024.

[11] Y. Yenita and R. Soegiarso, "The implementation of green construction in IKN development by integrating sustainable triangle concept into sustainable development goals," *Frontiers in Political Science,* vol. 6, p. 1489034, 2024.

[12] E. G. Too and P. Weaver, "The management of project management: A conceptual framework for project governance," *International Journal of Project Management,* vol. 32, no. 8, pp. 1382-1394, 2014. https://doi.org/10.1016/j.ijproman.2013.07.006

[13] J. R. X. X. Turner, "Project duration and uncertainty," *Project Management Journal,* 2018.

[14] J. Turner and R. Müller, "The project manager's leadership style as a success factor on projects: A literature review," *Project Management Journal,* vol. 36, no. 2, pp. 49–61, 2005.

[15] K. Artto, H. Kulmala, and P. Dietrich, "Program management framework," *Project Management Journal,* vol. 40, no. 1, pp. 32–45, 2009.

[16] K. Artto, M. Martinsuo, H. G. Gemünden, and J. Murtoaro, "Foundations of program management: A bibliometric view," *International Journal of Project Management,* vol. 27, no. 1, pp. 1-18, 2009. https://doi.org/10.1016/j.ijproman.2007.10.007

[17] H.-P. Yuan and J.-Y. Wang, "Major cost-overrun risks in construction projects in China," *International Journal of Project Organisation and Management,* vol. 3, no. 3-4, pp. 227-242, 2011.

[18] R. Aziz, "Delays and cost overruns in government projects," *Alexandria Engineering Journal,* vol. 59, no. 1, pp. 341–352, 2020.

[19] S. Geraldi, "Project studies in transition," *International Journal of Project Management,* vol. 36, no. 9, pp. 1684–1695, 2018.

[20] E. Pais, J. Farinha, A. Cardoso, and H. Raposo, "Optimizing the life cycle of physical assets—A review," *World Scientific and Engineering Academy and Society,* vol. 15, pp. 417-430, 2020.

[21] C. A. Schuman and A. C. Brent, "Asset life cycle management: Towards improving physical asset performance in the process industry," *International Journal of Operations & Production Management,* vol. 25, no. 6, pp. 566-579, 2005. https://doi.org/10.1108/01443570510599728

[22] M. Kantola and A. Saari, "Project delivery systems for nZEB projects," *Facilities,* vol. 34, no. 1/2, pp. 85-100, 2016.

[23] M. El Asmar, A. S. Hanna, and W.-Y. Loh, "Quantifying performance for the integrated project delivery system as compared to established delivery systems," *Journal of Construction Engineering and Management,* vol. 139, no. 11, p. 04013012, 2013.

[24] Y. Q. Chen, J. Y. Liu, B. Li, and B. Lin, "Project delivery system selection of construction projects in China," *Expert Systems with Applications,* vol. 38, no. 5, pp. 5456-5462, 2011.

[25] E. M. Sari *et al.*, "Challenge and awareness for implemented integrated project delivery (IPD) in Indonesian projects," *Buildings,* vol. 13, no. 1, p. 262, 2023.

[26] S. Castelblanco, "Stakeholder-risk management," *Project Management Journal,* vol. 54, no. 2, pp. 200–212, 2024.

[27] S. Chandragiri, "Communication in construction projects," *Construction Management and Economics,* vol. 39, no. 10, pp. 987–1002, 2021.

[28] E. Kania, E. Radziszewska-Zielina, and G. Śladowski, "Communication and information flow in polish construction projects," *Sustainability,* vol. 12, no. 21, p. 9182, 2020.

[29] B. Manata, V. Miller, S. Mollaoglu, and A. J. Garcia, "Measuring key communication behaviors in integrated project delivery teams," *Journal of Management in Engineering,* vol. 34, no. 4, p. 06018001, 2018.

[30] E. Safapour, S. Kermanshachi, S. Kamalirad, and D. Tran, "Identifying effective project-based communication indicators within primary and secondary stakeholders in construction projects," 2019.
[31] M. Kumaraswamy, K. K. W. Wong, and J. Chung, "Focusing megaproject strategies on sustainable best value of stakeholders," *Built Environment Project and Asset Management,* vol. 7, no. 4, pp. 441-455, 2017.
[32] R. B. Johnson, A. J. Onwuegbuzie, and L. A. Turner, "Toward a definition of mixed methods research," *Journal of Mixed Methods Research,* vol. 1, no. 2, pp. 112-133, 2007.
[33] A. J. Onwuegbuzie and N. L. Leech, "Linking research questions to mixed methods data analysis procedures," *The Qualitative Report,* vol. 11, no. 3, pp. 474-498, 2006.
[34] H. L. Siow and H. P. Fung, "Relationship between team satisfaction and project performance as perceived by project managers in Malaysia–A mixed methods study," *Open Journal of Social Science Research,* vol. 1, no. 9, pp. 238-249, 2013.
[35] E. W. Cheng and H. Li, "Exploring quantitative methods for project location selection," *Building and Environment,* vol. 39, no. 12, pp. 1467-1476, 2004.
[36] I. Plag, "Qualitative and quantitative aspects of productivity. In: Aarts B, McMahon AMS," *English Language and Linguistics: Handbooks and Manuals*, pp. 4051–1382, 2020.
[37] M. El Asmar, W. Lotfallah, G. Whited, and A. S. Hanna, "Quantitative methods for design-build team selection," *Journal of Construction Engineering and Management,* vol. 136, no. 8, pp. 904-912, 2010.
[38] S. Guercini, "New qualitative research methodologies in management," *Management Decision,* vol. 52, no. 4, pp. 662-674, 2014.
[39] C. R. Boddy, "Sample size for qualitative research," *Qualitative Market Research: An International Journal,* vol. 19, no. 4, pp. 426-432, 2016.
[40] R. Schutt, *Quantitative methods*. Hoboken, NJ: John Wiley & Sons Ltd, 2020.
[41] D. Briskorn and M. Dienstknecht, "Survey of quantitative methods in construction," *Computers & Operations Research,* vol. 92, pp. 194-207, 2018.
[42] S. Thangaratinam and C. W. Redman, "The delphi technique," *The Obstetrician & Gynaecologist,* vol. 7, no. 2, pp. 120-125, 2005.
[43] B. Xia and A. P. Chan, "Measuring complexity for building projects: a Delphi study," *Engineering, Construction and Architectural Management,* vol. 19, no. 1, pp. 7-24, 2012.
[44] J. F. Hair, G. Tomas, M. Hult, C. M. Ringle, and M. Sarstedt, "A primer on partial least squares structural equation modeling (PLS-SEM)," 202. https://www.researchgate.net/publication/354331182
[45] J. Risher and J. Hair, "The robustness of PLS across disciplines," University of South Alabama, 2017.
[46] M. R. Hallowell and J. A. Gambatese, "Qualitative research: Application of the Delphi method to CEM research," *Journal of Construction Engineering and Management,* vol. 136, no. 1, pp. 99-107, 2010.
[47] K. A. Alomari, J. A. Gambatese, and N. Tymvios, "Risk perception comparison among construction safety professionals: Delphi perspective," *Journal of Construction Engineering and Management,* vol. 144, no. 12, p. 04018107, 2018.
[48] E. E. Ameyaw, Y. Hu, M. Shan, A. P. Chan, and Y. Le, "Application of Delphi method in construction engineering and management research: A quantitative perspective," *Journal of Civil Engineering and Management,* vol. 22, no. 8, pp. 991-1000, 2016.
[49] M. Evans, P. Farrell, and A. Mashali, "Influence of partnering on stakeholder's behaviour in construction mega-projects," *The Journal of Modern Project Management,* vol. 8, no. 1, 2020.
[50] M. Nahdi, N. Widayati, M. A. Wibowo, E. M. Sari, R. Z. Tamin, and A. Thohirin, "Examining Solicited Projects of Public–Private Partnerships (PPP) in the Initiative of Indonesian Government," *Buildings,* vol. 14, no. 6, p. 1870, 2024.
[51] 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.