



## Strategic Collaboration of Zeni AD And Penta Helix In Accelerating Infrastructure Development: Case Study Of Trans Papua Road

Supriyanto, S.M<sup>1)</sup> Andria Sandiawan, S.Hub.Int<sup>2)</sup> Bayu Tri Wibowo<sup>3)</sup> Dr. Titin Rohayatin, S.I.P., M.Si.<sup>4)</sup>

<sup>1,2,3,4</sup>Sekolah Staf dan Komando TNI Angkatan Darat (SESKOAD), Indonesia

### Article Info

#### Article History

Submitted 2024-08-13

Revised 2024-10-08

Accepted 2024-10-27

#### Keywords

Collaborative  
Governance, Penta  
Helix.

### Abstrak

Pembangunan infrastruktur di daerah terpencil, seperti Papua, menghadapi tantangan yang signifikan, termasuk medan geografis yang sulit dan kompleksitas sosial-budaya. Untuk mengatasi tantangan ini, diperlukan pendekatan kolaboratif yang melibatkan berbagai pemangku kepentingan. Penelitian ini bertujuan untuk menganalisis penerapan model Collaborative Governance dan Penta Helix dalam percepatan pembangunan Jalan Trans Papua, dengan fokus pada kolaborasi antara Zeni Angkatan Darat (Zeni AD) dengan pemangku kepentingan lainnya seperti pemerintah, swasta, akademisi, masyarakat, dan media. Metode penelitian yang digunakan adalah pendekatan kualitatif dengan desain studi kasus, yang melibatkan wawancara mendalam, observasi partisipatif, dan analisis dokumen. Hasil penelitian menunjukkan bahwa kolaborasi melalui dialog tatap muka, pembangunan kepercayaan, komitmen terhadap proses, dan pencapaian hasil sementara dapat mempercepat penyelesaian proyek dan meningkatkan kemandirian daerah. Rekomendasi dari penelitian ini adalah memperkuat partisipasi aktif, pengembangan kapasitas lokal, transparansi, dan evaluasi berkala dalam pelaksanaan proyek-proyek infrastruktur di masa mendatang.

### Abstract

Pembangunan infrastruktur di daerah terpencil, seperti Papua, menghadapi tantangan yang signifikan, termasuk medan geografis yang sulit dan kompleksitas sosial-budaya. Untuk mengatasi tantangan ini, diperlukan pendekatan kolaboratif yang melibatkan berbagai pemangku kepentingan. Penelitian ini bertujuan untuk menganalisis penerapan model Collaborative Governance dan Penta Helix dalam percepatan pembangunan Jalan Trans Papua, dengan fokus pada kolaborasi antara Zeni Angkatan Darat (Zeni AD) dengan pemangku kepentingan lainnya seperti pemerintah, swasta, akademisi, masyarakat, dan media. Metode penelitian yang digunakan adalah pendekatan kualitatif dengan desain studi kasus, yang melibatkan wawancara mendalam, observasi partisipatif, dan analisis dokumen. Hasil penelitian menunjukkan bahwa kolaborasi melalui dialog tatap muka, pembangunan kepercayaan, komitmen terhadap proses, dan pencapaian hasil sementara dapat mempercepat penyelesaian proyek dan meningkatkan kemandirian daerah. Rekomendasi dari penelitian ini adalah memperkuat partisipasi aktif, pengembangan kapasitas lokal, transparansi, dan evaluasi berkala dalam pelaksanaan proyek-proyek infrastruktur di masa mendatang.

## INTRODUCTION

Infrastructure development in Indonesia, especially in the Papua region, is the government's main focus to increase accessibility, community welfare and independence in remote areas (Jatayu et al., 2024; Kambu et al., 2022c). Increasing regional self-sufficiency is an integral part of the national development project (Addie et al., 2020; Mahmood et al., 2020). Regional self-sufficiency refers to the ability of a region to manage and develop its resources effectively and sustainably to meet the needs and improve the welfare of its population without relying on external assistance (Barter, 2024). The concept of regional self-sufficiency covers various aspects, including economic, social, political and environmental. An independent region is able to meet the needs of local communities without the involvement of elements from outside the region (Gurney et al., 2014).

Road infrastructure development is very important to increase regional self-sufficiency by improving mobility and efficiency in the distribution of goods, services and people. Good infrastructure reduces transportation time and costs, speeds up trade, and makes it easier for people to access public services such as markets and jobs (Hadi et al., 2021; Ng et al., 2019). Road infrastructure supports holistic and sustainable regional growth, and plays a vital role in national development because the majority of goods distribution and passenger travel still depend on the road network (Gibbons et al., 2019; Wang et al., 2020).

It is hoped that the construction of the Trans Papua Road will open up the isolation of inland areas and accelerate development in various sectors such as the economy, education and health (Kambu et al., 2022c; Manalu et al., 2022). The Trans Papua project is the construction of a main route that stretches from Sorong City in West Papua Province to Merauke in Papua Province, with a total distance of 3,421 kilometers (Kambu et al., 2022b). This project is based on the awareness that the Papua region has large natural resources but inadequate road infrastructure. The Ministry of PUPR released statistics on road stability in the Papua region which shows that 40.67% of roads are categorized as unstable or unfit for use (Ministry of PUPR, 2024).

AD Engineers have technical and construction capabilities that can be used to build infrastructure that supports economic and social development in remote areas (Hidayat, 2019). The involvement of Army Engineers also brings technical expertise and manpower as well as the capacity to operate in difficult and dangerous conditions, maintaining the safety of project workers and the surrounding community from threats from OPM groups. Meanwhile, the Penta Helix approach, which involves five main elements—government, society, academics, business people and media—in the development process, is expected to be able to overcome various obstacles in a more inclusive and participatory way (Etzkowitz & Leydesdorff, 2000). This collaborative approach allows for synergy between various elements of society, so that development can run more efficiently, effectively and sustainably (Ansell & Gash, 2008; Mustoko et al., 2021).

The relevance of this topic in the industry today is very high, given the increasing recognition of collaborative approaches such as Penta Helix as an effective method in overcoming challenges in large projects, especially those involving multiple stakeholders. By implementing collaborative governance in the construction of the Trans Papua Road, it is hoped that development will not only prioritize physical aspects but also consider social, cultural and environmental aspects, so that the benefits can be felt directly by the local community. This research focuses on partnership collaboration, multi-stakeholder participation, the role of Army Engineers, contribution to regional self-sufficiency, and the application of the Penta helix Model in the Trans Papua road construction project to overcome infrastructure challenges in remote areas. The novelty of this research lies in an in-depth analysis of how Collaborative Governance and the Penta helix Model are applied in the challenging context of inland infrastructure development, as well as how this collaboration can increase project effectiveness and efficiency. This research is also expected to contribute to the development of non-war military strategies in developing inland areas through infrastructure development projects, which have not been widely explored in previous research.

*Collaborative Governance* is a framework that involves various stakeholders, including governments, non-state organizations (NGO), and the private sector, in the decision-making and policy implementation processes (Alamsyah et al., 2020; Ansell & Gash, 2008). This concept emerged as a response to the complexity of public issues that cannot be solved by one organization alone, so it requires collaboration across sectors and between institutions (Joo Chang, 2009). Collaborative Governance emphasizes the importance of voluntary cooperation and interdependence between participants to achieve common goals, by sharing information and setting goals collectively (Noor et al., 2022).

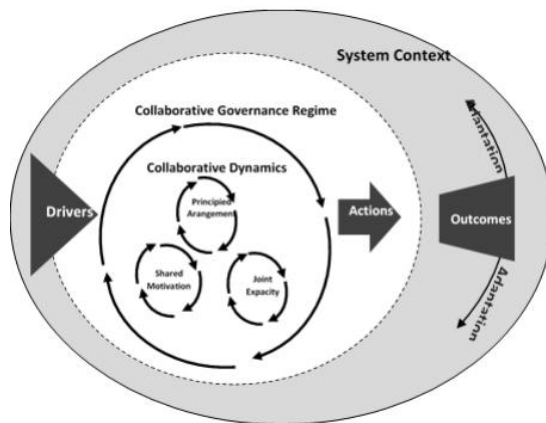
The emergence of Collaborative Governance was also driven by the limited capacity and resources of each institution, so that collaboration became an effective solution to overcome challenges in government administration (Emerson et al., 2012). This paradigm combines public and private stakeholders, including NGOs, business people and community leaders, in formulating policies that have a positive and objective impact (Bianchi et al., 2021). In the context of public administration, Collaborative Governance is considered as a method that allows long-term solutions to be achieved through active participation and good coordination between the various parties involved (Noor et al., 2022).

Collaborative Governance is a strategy in the public domain that invites various stakeholders from various sectors to jointly design and implement policies or programs (Vihma & Toikka, 2021). This model aims to overcome the problem of government capacity and legitimacy by involving non-government stakeholders in the decision-making process. Collaborative Governance changes the public's view from "customer" to "citizen," strengthens trust, and encourages cooperation between various stakeholders in creating public values (Noor et al., 2022). Collaborative Governance involves initiatives from public bodies, non-governmental stakeholders, direct involvement in policy design, formal forums, consensus-based decisions, and a focus on public policies or programs (Ansell & Gash, 2008; Ming'ate et al., 2019).

Ansell and Gash (2008) expand this concept by emphasizing the importance of achieving public goals through intensive collaboration involving governance arrangements and the involvement of various stakeholders, both government and non-government. Collaborative Governance aims to create public value that cannot be achieved by other means, building consensus, strengthening

trust, and sharing responsibility in implementing public policies. This collaboration process must be structured, formal, results-oriented, and focused on public policies or programs to ensure that the results are right on target and meet public expectations (Getha-Taylor et al., 2019).

According to Emerson et al., (2012), there are four initial components that are important in building collaborative governance, namely: a) trust, where each stakeholder must be trusted by other stakeholders; b) shared understanding, where each stakeholder must have the same understanding of a problem; c) joint commitment, where each stakeholder must be committed to the collaboration; and d) internal legitimacy, where each stakeholder must have credibility, so as to gain legitimacy from other stakeholders. This can be seen in Figure 1 below.



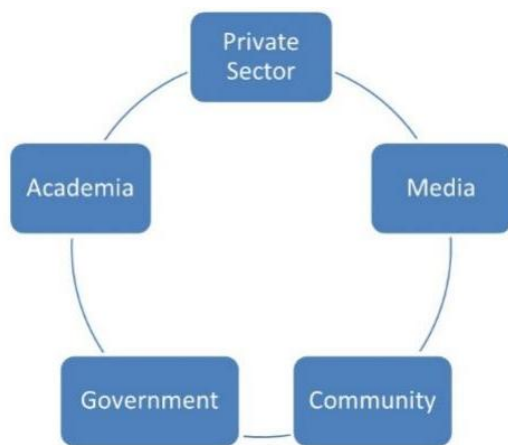
Source : Emerson et al., (2012)

**Figure 1.** Integrative Framework for *Collaborative Governance*

From Figure 1, it can be seen that collaborative dynamics and collaborative actions shape the overall quality and level so that collaborative governance regimes can be developed effectively. The outer circles in Figure 2 depict darker colors, indicating surrounding systems or environments that have political, legal, socioeconomic, environmental, and other influences that influence and are affected by the collaborative governance regime. This system context creates opportunities and constraints and influences collaboration dynamics from the start and continues to evolve over time. From this system context emerge drivers in the form of (1) leadership, (2) consequential incentives, (3) interdependence, and uncertainty that help initiate and direct collaborative governance regimes. In addition, George C. Edwards III uses four variables in analyzing public policy, namely: a) communication, b) resources, c) attitude (disposition or attitude), and d) bureaucratic

structure (Emerson et al., 2012).

The Penta Helix Collaborative Governance Model is a framework that emphasizes the active involvement of five key stakeholders in the preparation, implementation and evaluation of public policy (Moore, 1995). This model aims to create effective synergy between government, academics, businesspeople, society and the media, in an effort to achieve common goals that are more holistic and inclusive. The Penta Helix model encourages collaboration between these various sectors to create synergies in addressing complex challenges and creating more holistic and inclusive solutions (Noor et al., 2022). By involving various stakeholders, this model ensures that decisions and policies taken are more responsive to community needs and more effective in their implementation. This model is often applied in the context of sustainable development, technological innovation and economic development which requires multi-stakeholder involvement to achieve optimal results. The Penta helix model can be explained in the following picture:



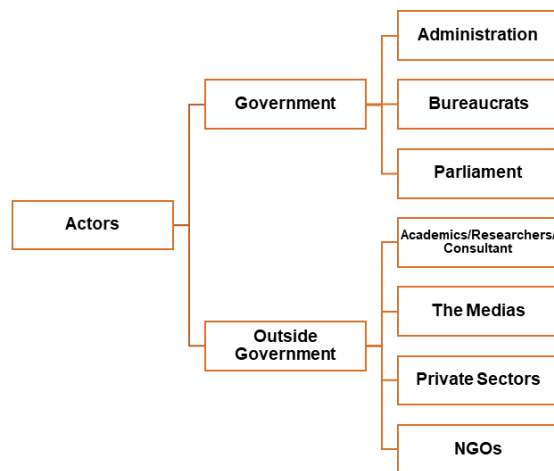
Source : Tonkovic et al., (2015)

**Figure 2.** Multi Collaboration Stakeholders Based on the Penta Helix Model

The government in the Penta helix model acts as the primary policy maker and facilitator, providing the regulatory framework and necessary resources. Academics contribute through research and scientific development, which supports decision making based on data and scientific evidence. Business people bring innovation, investment and operational efficiency that are important to drive economic and technological development. The community, as direct beneficiaries, provides feedback and active participation, ensuring that the policies and programs formulated are relevant and widely accepted. The media plays a

role as a disseminator of information, shaper of public opinion, and monitor of transparency, so that all parties remain informed and responsible (Noor et al., 2022).

The Penta Helix model of collaborative governance creates complex but harmonious dynamics, where each stakeholder plays an important role in realizing public policies that are effective, sustainable and in line with community needs (Tonkovic et al., 2015). The synergy between these five stakeholders enables the creation of more comprehensive and resilient solutions in facing various public challenges (Noor et al., 2022). Key Public Policy Stakeholders Based on the Collaborative Governance Model can be explained in the following picture:



Source : Noor et al., (2022)

**Figure 3.** Key Stakeholders in Public Policy Based on the Model Collaborative Governance

Figure 3 depicts the two main groups of stakeholders in public policy: government stakeholders and stakeholders outside the government. Government stakeholders include administration (such as the President and cabinet) who have great power and resources to formulate public policies at the macro level, bureaucrats who have an important role in implementing policies because of their expertise and knowledge, and parliament who have a political role in designing policies and maintaining values. -democratic values. Non government stakeholders include academics, researchers, and consultants who provide data and preferences for policy making; media which plays a role in shaping public opinion and encouraging public participation in the policy process; a private sector that can engage in public-private partnerships to help governments address resource constraints; and non-governmental organizations (NGOs) that

advocate to ensure public policies are more aspirational and oriented towards community needs (Noor et al., 2022).

## METHODS

This research uses a qualitative approach with a case study design to explore strategic collaboration between Zeni AD and the Penta Helix model in accelerating infrastructure development, especially on the Trans Papua Road project. This approach was chosen because it allows in-depth analysis of the roles and dynamics that occur between the various stakeholders involved. The research location is the Papua region, with a focus on the Trans Papua Road project which involves stakeholders such as Army Engineers, regional and central government, academics, the business sector, local communities and the media. The data used in this research consists of primary data obtained through in-depth interviews with the stakeholders involved, as well as secondary data from related documents such as project reports, government policies, scientific articles and media publications.

Data collection techniques used include in-depth interviews, participant observation, and document analysis. Interviews were conducted in a semi-structured manner to obtain views and experiences from the stakeholders regarding the collaboration that occurred, while direct observations in the field were carried out to understand the dynamics of collaboration and project implementation. The data obtained was then analyzed using the thematic analysis method, with steps such as data coding, theme categorization, and interpretation of results to answer research questions and relate the findings to collaborative governance theory and the Penta Helix model.

## RESULTS AND DISCUSSION

### 1. Stakeholder Mapping in the Construction of the Trans Papua Road

Stakeholders are an important and inseparable part of managing public policy, whose implementation requires the involvement of the general public or the private sector. Stakeholder involvement can increase the acceptability, sustainability and effectiveness of policies by taking into account diverse perspectives and needs (Noor et al., 2022). Stakeholder participation also encourages transparency, accountability and government responsiveness to community needs so that the public decision-making process can produce policies that are more relevant, sustainable and

successful in achieving the goals desired by all relevant parties (Bila & Saputra, 2019).

In the context of research regarding collaboration between the TNI AD (Zeni AD) and Penta helix in the construction of the Trans Papua Road Project, the role of stakeholders are very important and cannot be ignored. Active involvement of various stakeholders, such as society, the private sector, government, academics, and the media, is very important to increase the acceptability, sustainability, and effectiveness of policies and project implementation. The participation of various stakeholders not only encourages transparency and accountability, but also ensures that the policies taken are more responsive to local needs and able to achieve the desired goals (Noor et al., 2022; Bila & Saputra, 2019).

The results of interviews with the Papua Trans Project Coordination Committee and the Head of the Department of Public Works, Spatial Planning, Housing, and Settlement Areas revealed that stakeholder collaboration in the Trans Papua project began with stakeholder mapping. In this process, stakeholders were grouped based on their roles, such as the government, private sector, academia, local communities, and the media, to ensure synergy in the project's implementation.

In the concept of collaborative governance, stakeholders are considered a key element in the success of policy implementation, especially in projects involving the public and private sectors. This collaboration requires interaction and compromise between the government and other stakeholders, to create effective synergy in achieving common goals (Ansell & Gash, 2008). Therefore, stakeholder mapping in infrastructure development projects such as the Trans Papua Road is very important. This mapping aims to identify the roles and influences of the various parties involved, so that collaboration strategies can be developed more effectively and inclusively. Through this mapping, Zeni AD can work together with other Penta helix stakeholders to ensure that every stakeholder's interests and needs are taken into account, so that the project can run smoothly and achieve the expected success.

In research regarding Collaborative Governance in the implementation of the Trans Papua Project, stakeholder analysis using an interest and influence approach is very important. This approach involves identifying and mapping the various parties who have an interest and influence on the success of the project. This process includes an in-depth understanding of the role and impact of local

communities, regional and central governments, the private sector, NGOs, and other interest groups in project implementation (Mekuria et al., 2021).

The purpose of this analysis is to evaluate the level of interest and influence of each stakeholder on the success or failure of project implementation. Importance refers to how important the project is to stakeholders, while influence reflects the stakeholder's ability to influence the decision-making process or policy implementation (Bluffstone et al., 2018). Stakeholders with a high level of importance and influence are often considered key stakeholders in a project, as they have the capacity to significantly influence the direction and outcome of the project. In contrast, stakeholders with low importance and influence may have a more limited role (Foundjem-Tita et al., 2018; Garcia-Lopez & Antinori, 2018).

Based on the mapping described stakeholders in the Trans Papua road project are grouped into four main quadrant based on interest-influence analysis.

a. Quadrant 1 (High Importance, High Influence):

Stakeholders in this quadrant have a very big interest in the Trans Papua project and also have a significant influence in determining the success of the project. Zeni AD (TNI AD) play a key role in the technical implementation of the project and maintaining security, which is an important element for smooth development. The Central Government, through the Ministry of PUPR and the Ministry of Defense, has the main responsibility for directing national infrastructure and security policies, as well as allocating the necessary budget for this project. The Papua Regional Government plays a role in implementation at the local level, ensuring that the project runs in accordance with regional conditions and needs. Business and industrial stakeholders, especially infrastructure contrstakeholders, have high economic interests because they are responsible for implementing projects and benefiting from their success. Environmental and social-focused NGOs play a role in ensuring that projects do not damage the environment and take into account the rights of local communities, so they also have a significant influence in this process.

b. Quadrant 2 (Low Importance, High Influence):

Stakeholders in this quadrant may not have a large direct interest in the project, but they have considerable influence in the form of politics,

research, or the formation of public opinion. Academics, while perhaps not heavily involved in the day-to-day running of a project, provide research and data that support evidence-based decision making, which can influence project policy. Although not directly involved in the technical aspects of the project, regional leadership at the provincial level holds significant political influence in shaping opinion and policy, which can impact the overall success of the project. The media, both local and national, play an important role in shaping public opinion and monitoring project transparency, although their direct interests may be more limited than other stakeholders.

c. Quadrant 3 (High Importance, Low Influence):

Stakeholders in this quadrant have a great deal of interest in the project, primarily because of the direct impact the project has on their lives, but they have relatively limited influence in decision making. Local communities, who will be directly affected by the results of the project, have a major interest in ensuring that the project brings benefits to their daily lives. However, their influence in the decision-making process is more limited, often due to a lack of access to formal decision-making channels. Traditional and community leaders play an important role in gaining social approval from communities, but their influence outside the community is often limited. Village governments are also involved in these projects at the local level, but their influence on broader policies at the national or provincial level tends to be small.

d. Quadrant 4 (Low Importance, Low Influence):

Stakeholders in this quadrant have low interest and influence on the Trans Papua project. High school students and elementary school teachers in the surrounding areas of Papua, while part of the broader community that may experience indirect effects from the project, do not hold significant influence in its decision-making processes. Similarly, the national press, although capable of shaping public discourse, does not play a pivotal role in this specific project. People living outside the Papua region, including those in other parts of Indonesia, have even less interest and their influence on the project is minimal. Additionally, community organizations that are not actively engaged in local issues or directly involved with the project have a very low level of interest and influence, making their role nearly negligible in this context.



This mapping helps in formulating more effective communication and collaboration strategies, focusing on stakeholders in the quadrant with high interest and influence to ensure the success of the Trans Papua Road construction project.

**Table 1.** Identify Stakeholders

		Interest	
Influence		High	Low
		<ul style="list-style-type: none"> <li>- Indonesian Army Engineer</li> <li>- PUPR Ministry</li> <li>- Central government</li> <li>- Papua Regional Government</li> <li>- Infrastructure Contrstakeholder</li> </ul>	<ul style="list-style-type: none"> <li>- Local Universities</li> <li>- Governor of Papua</li> <li>- Local and National Media</li> </ul>
	High		
	Low	<ul style="list-style-type: none"> <li>- Local Community</li> <li>- Traditional and Community Leaders</li> <li>- Village Government</li> </ul>	<ul style="list-style-type: none"> <li>- School Students &amp; Teachers</li> <li>- National Press</li> <li>- General Public (Non-local)</li> <li>- Community Organizations</li> </ul>

## 2. The Role and Stakeholders of Penta Helix to Accelerate the Development of the Trans Papua Road

The Pentahelix Model is a collaborative approach that involves five key elements—government, academia, the business/industry sector, local communities, and the media—to address complex development goals. Based on interviews with the Papua Trans Project Coordination Committee and several key stakeholders, including the Head of the Department of Public Works, Spatial Planning, Housing, and Settlement Areas, it was revealed that the application of the Pentahelix Model in this project is crucial for overcoming challenges on the ground. The government, through policy-making and budget allocation, along with the Army Engineering Corps (TNI AD) as the primary technical executor, plays a central role in ensuring the smooth implementation of infrastructure development in difficult-to-reach areas. Furthermore, interviews with academics highlight that evidence-based research has supported decision-making processes related to construction methods tailored to Papua's geographical conditions. The business sector contributes by providing technology and materials through public-private partnerships, while the local communities are employed as laborers, fostering a sense of ownership over the project.

The interviews also emphasized the critical role of the media in monitoring transparency and disseminating information about the project to the public. The media plays a significant role in ensuring accountability at

every stage of the construction process. These interviews revealed that strong collaboration among stakeholders through the Pentahelix Model has proven effective in accelerating the development of the Trans Papua Road, despite ongoing challenges such as extreme terrain and complex social issues. Thus, the implementation

of this model not only facilitates the acceleration of infrastructure development but also enhances the engagement and capacity of local communities in Papua.

The following is a mapping of stakeholders and stakeholders involved in the Trans Papua Road project based on the Penta helix model, which includes stakeholders, roles and the impact of their involvement:

Table 2 maps the roles of each stakeholder involved in the Penta Helix model to support the development of the Trans Papua Project, as well as the impact of these roles on the success of the project.

**1. Government:** Central and regional governments are responsible for designing policies, allocating budgets, and supervising projects. This role is crucial because appropriate policies and financial support are essential for project success.

**2. Zeni AD (TNI AD):** Army Engineers act as technical implementers who overcome construction challenges in difficult terrain, while also being responsible for project security and logistics. Zeni AD's contribution ensures that infrastructure development runs smoothly and safely.

**3. Academics:** Academics provide research and data that are important for evidence-based decision making, as well as developing methods that are appropriate to Papua's geographic and social conditions. This helps in adapting building techniques to local needs.

**Table 2.** Mapping the Role of Penta Helix in the Development of the Trans Papua Project

Stakeholder	Role	Impact
<b>Government (Central &amp; Regional)</b>	a. Drafting policies and regulations. b. Budget and resource allocator. c. Project monitoring and evaluation.	a. Ensure policies and regulations that support project implementation. b. Providing funds and resources ensures the continuity of the project. c. Effective monitoring ensures the project goes according to plan.
<b>Army Engineer (TNI AD)</b>	a. Main technical implementer of road construction. b. Project security in vulnerable areas. c. Coordination of logistics and material distribution.	a. Completion of road construction in difficult terrain. b. Maintain project security from tampering. c. Timely and efficient distribution of materials.
<b>Academics</b>	a. Provider of research and data to support decision making. b. Development of development methods that suit local conditions.	a. Provides scientific considerations for decision-making and policy formulation related to the project. b. Support technical innovation that fits the local context.
<b>Business/Industrial Players</b>	a. Provider of building materials and technology. b. Partners in Public-Private Partnership (PPP). c. Investment in infrastructure.	a. Provide necessary resources for the project. b. Increasing efficiency through technological innovation and investment.
<b>Local Community</b>	a. Participation in the consultation process and project implementation. b. Local labor provider.	a. Increase project acceptance by the community. b. Increasing skills and employment opportunities for local communities.
<b>Media</b>	a. Disseminate information about the project to the public. b. Monitor project transparency and accountability.	a. Increase public awareness and support for the project. b. Ensure projects run transparently and accountably.

**4. Business/Industrial Players:** The business sector provides building materials, technology and investment through public-private partnership (PPP) schemes. This role increases efficiency and innovation in projects, as well as encouraging private sector participation in infrastructure development.

**5. Local Community:** Local communities are directly involved in the consultation and project implementation process, including providing labor. Their participation is important to increase project acceptability and provide direct benefits to local communities.

**6. Media:** The media plays a role in disseminating information about the project to the public and monitoring the progress of the project to ensure transparency and accountability. The role of the media is important to maintain public support and avoid misinformation

This mapping shows how each stakeholder in the Penta helix model has a specific role that complements each other and has a significant impact on the success of the Trans Papua Road construction project. It is hoped that the synergy between these stakeholders can overcome various existing challenges and ensure that the project runs in accordance with the stated objectives.

### 3. Collaboration Process Between Parties in Accelerating the Construction of the Trans Papua Road

The collaboration process is an essential strategic approach in achieving common goals, especially when involving various parties with different backgrounds and interests. In the context of infrastructure development, such as in the case study of the construction of the Trans Papua Road, collaboration is the main key to overcoming the complexity of existing challenges. This collaboration not only involves coordination between institutions but also builds synergy between the public, private, academic,



community, and media sectors, which is often referred to as the Penta Helix.

Interview results with the Papua Trans Project Coordination Committee and key stakeholders revealed that systematic and inclusive collaboration is critical. One respondent emphasized, "The success of this project lies in continuous face-to-face dialogue, where each party—government, private sector, and local communities—could openly discuss and resolve emerging challenges." Another interview with the Head of the Department of Public Works highlighted that "trust-building between stakeholders became a cornerstone of collaboration, ensuring that the long-term commitment of each stakeholder remained strong, even in the face of geographical and logistical difficulties."

Infrastructure development in remote areas such as Papua presents major challenges that require a multidimensional approach. To overcome these challenges, collaboration is needed between various stakeholders, which not only involves the government sector but also various other stakeholders who have a significant role in development. One model that can be implemented in this context is strategic collaboration between Zeni AD and Penta Helix stakeholders, consisting of government, private sector, community, academics and media.

The collaboration process between TNI AD Engineers and Penta Helix can be explained through the Collaborative Governance model which consists of several main components. The first stage is the Collaboration Process, which begins with Face to Face Dialogue or face-to-face dialogue, where all parties involved, including Zeni AD and Penta Helix stakeholders (government, business, community, academics and media), meet to discuss common goals and build open communication. This dialogue is followed by Trust Building, namely efforts to build trust through transparency and integrity in communication and actions. Once trust is established, each party shows Commitment to Process or commitment to the collaboration process with the allocation of necessary resources. Shared Understanding is then formed, where all parties have a common understanding of the goals and challenges faced. This process ends with an Intermediate Outcome, namely an initial achievement that shows that the collaboration is on the right track.

Furthermore, at the Initial Condition stage, collaboration is influenced by the history or previous cooperation experience (History/Previous Cooperation Experience) between Zeni AD and the Penta Helix

stakeholders. Imbalance of Resources and Knowledge is a challenge, but this can be overcome through incentives that encourage active participation from each stakeholder. Even though there is Fear of Conflict, this condition can be overcome with the right approach.

*Institutional Design* becomes the next important component in this collaboration. Institutional design includes active participation (Participation) from all stakeholders, establishing a limited forum (Limited Forum) for strategic discussions, establishing basic rules (Ground Rules), and maintaining transparency (Transparent) at every stage of decision making.

Facilitative leadership plays a key role in directing the course of collaboration. In this context, support for development and infrastructure programs is very important, as shown by TMMD budget support in several regions. Strong and visionary leadership, as shown by the Regent of Brebes in supporting the TMMD program, is an example of how effective leadership can accelerate infrastructure development, especially in rural areas.

The result (Outcomes) of this collaboration is expected to be the acceleration of infrastructure development in Papua, especially the construction of the Trans Papua Road. This success is not only an indicator of the effectiveness of the collaboration between Zeni AD and Penta Helix, but also has a significant positive impact on the local community. With this structured and comprehensive approach, collaboration can run effectively and efficiently, producing infrastructure that is beneficial to many parties.

#### **4. The Role of the Trans Papua Road in Accelerating Infrastructure Development and Transforming Remote Regions**

Infrastructure development plays a vital role in connecting remote regions, stimulating economic growth, and improving the welfare of communities. In Indonesia, the Trans Papua Road project, which spans more than 4,000 kilometers, serves as a key example of how infrastructure development can transform isolated and underdeveloped areas. The road links previously disconnected regions in Papua, making transportation, trade, and access to basic services more feasible, while also acting as a catalyst for regional development.

**Table 3.** Collaboration Process in Development of the Trans Papua Project

Collaborative Governance Model	Implementation	Strategic Steps
Collaboration Process	<i>Face to Face Dialogue</i>	Hold a face-to-face meeting between Zeni AD and Penta Helix stakeholders to discuss common goals.
	<i>Trust Building</i>	Build trust through transparency in communication and consistent actions.
	<i>Commitment to Process</i>	Establish joint commitments, resource allocation, and work schedules agreed upon by all parties.
	<i>Shared Understanding</i>	Create a shared understanding of the vision, mission and respective roles in this project.
	<i>Intermediate Outcomes</i>	Evaluating interim results, such as achieving milestones in development projects.
Initial Conditions	<i>History/Previous Experience</i>	Evaluate the history of previous collaborations to identify areas for improvement.
	<i>Imbalance of Resources and Knowledge</i>	Identify resource and knowledge imbalances, and seek solutions to resolve them.
	<i>Incentives (Advantages) to Participate</i>	Arrange attractive incentives for each stakeholder to participate in the collaboration.
	<i>Fear of Conflict</i>	Manage potential conflicts by establishing clear and mutually acceptable resolution mechanisms.
Institutional Design	<i>Participation</i>	Establish a participation mechanism that allows all stakeholders to be actively involved in the collaboration process.
	<i>Limited Forum</i>	Hold limited forums for strategic discussions and critical decision making.
	<i>Ground Rules</i>	Establish ground rules governing interaction and collaboration between stakeholders.
	<i>Transparent</i>	Maintain transparency in the decision-making process and project implementation.
Facilitative Leadership	<i>Development Program and Infrastructure</i>	Support development and infrastructure programs through appropriate budget allocations and policies.
	<i>Leadership Examples</i>	Providing examples of visionary leadership and supporting the implementation of TMMD and other programs.
Outcomes	<i>Accelerated Development</i>	Measuring success through accelerating infrastructure development, especially the Trans Papua Road.

Papua is known for its challenging geographical terrain, including mountainous regions and dense forests, which have long hindered infrastructure development. Before the construction of the Trans Papua Road, many remote communities could only be accessed by air or sea, making transportation difficult, expensive, and unreliable. The road project aims to address these challenges by creating land connectivity that links isolated regions with urban centers and other parts of Indonesia.

Bappenas (Indonesia's National Development Planning Agency) highlights that the road is expected to significantly reduce transportation costs, improve market access for local products, and facilitate the movement of goods and services (Bapenas, 2020). The construction of the Trans Papua Road is a monumental project that aims to integrate Papua's isolated areas with the rest of Indonesia. According to the Indonesian Ministry of Public

Works and Housing, the primary objective of this infrastructure project is to improve accessibility and foster regional development by providing direct road connections to areas that were once only reachable by air or sea. Before the construction of the Trans Papua Road, many regions in Papua, particularly the highland and interior regions, lacked sufficient infrastructure to support the movement of people and goods, which severely hindered economic development and access to essential services such as healthcare and education.

The development of the Trans Papua Road began under the leadership of President B.J. Habibie, and by February 2017, the total length of the road constructed had reached 3,851.93 kilometers. Significant progress was made during the administration of President Joko Widodo, with the government constructing 169 kilometers of new road in 2015, followed by an additional 231.27

kilometers in 2016. By 2017, the government aimed to complete another 143.35 kilometers, bringing the total length to 3,995.28 kilometers, leaving only 334.79 kilometers to be completed by 2019.

However, despite these efforts, progress was hindered by security issues. By March 2017, 3,850 kilometers of the road had been completed, but construction was delayed in late 2018 due to armed conflicts in certain areas of Papua. As of early 2022, 130 kilometers of the road remained unfinished, with 75 kilometers located in the Wamena-Jayapura stretch. Moreover, according to John Wempi Wetipo, Deputy Minister of Public Works and Housing, many completed sections of the Trans Papua Road were of substandard quality, requiring future improvements to ensure long-term usability.

Research conducted by Kambu et al., (2022a) reveals that one of the most significant impacts of the Trans Papua Road has been the reduction in transportation costs. With the construction of the road, the cost of transporting goods and services to remote areas has decreased by approximately 30%. The study further notes that the improvement in road connectivity has shortened travel times by up to 50%, which has boosted local economic activities, including agriculture and small businesses. Farmers, who previously faced difficulties transporting their products to market due to the lack of infrastructure, now benefit from reduced transport times and costs, allowing them to expand their markets beyond their local regions.

The improved accessibility provided by the Trans Papua Road has also contributed to better access to healthcare and education for remote communities. A study by Indonesia's National Development Planning Agency (Bappenas) shows that the road has enabled faster medical evacuations and more frequent visits from healthcare professionals to isolated villages, significantly improving health outcomes in the region. Moreover, students in remote areas now have greater access to schools and educational resources, which has contributed to increased school enrollment and literacy rates.

Despite these positive outcomes, the Trans Papua Road project has faced several challenges, particularly in its implementation phase. The difficult terrain and extreme weather conditions in Papua have slowed the construction process, resulting in delays and cost overruns. Furthermore, social and security issues have complicated the execution of the project. Kirksey & Bilsen (2002) point out that the ongoing conflicts in some regions of Papua have disrupted construction activities and created concerns over

the safety of workers. However, the Indonesian government remains committed to the completion of the project, recognizing its long-term benefits for the region.

The role of the Trans Papua Road in transforming remote regions extends beyond infrastructure development. It represents a strategic effort by the government to integrate Papua into the broader national economy, reduce inequality, and foster socio-economic development in one of the country's most underdeveloped areas. The road not only facilitates the movement of goods and services but also serves as a symbolic bridge to address the historical marginalization of Papua.

## CONCLUSION

This research shows that a collaborative approach through the Collaborative Governance and Penta Helix models is effective in accelerating the construction of the Trans Papua Road, overcoming complex geographic and social challenges. Collaboration between Zeni AD and various stakeholders, including government, private sector, academics, community and media, has been proven to increase project effectiveness and efficiency. It is recommended that active participation, local capacity development, transparency and regular evaluation be strengthened in similar projects in the future to ensure sustainability and broader benefits for local communities.

## REFERENCES

- Addie, J.-P. D., Glass, M. R., & Nelles, J. (2020). Regionalizing the infrastructure turn: a research agenda. *Regional Studies, Regional Science*, 7(1), 10–26. <https://doi.org/10.1080/21681376.2019.1701543>
- Alamsyah, D., Mustari, N., Hardi, R., & Mone, A. (2020). Collaborative Governance dalam Mengembangkan Wisata Edukasi di Desa Kamiri Kecamatan Masamba Kabupaten Luwu Utara. *FisiPublik : Jurnal Ilmu Sosial Dan Politik*, 4(2), 112–127. <https://doi.org/10.24903/fpb.v4i2.748>
- Ansell, C., & Gash, A. (2008). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory*, 18(4), 543–571. <https://doi.org/10.1093/jopart/mum032>
- Bapenas. (2020). *Peta Jalan SDGs Indonesia Menuju 2030*.
- Barter, S. (2024). Understanding Self-Government. *Journal of Autonomy and Security Studies*.

- <https://doi.org/10.61199/jass.142991>
- Bianchi, C., Nasi, G., & Rivenbark, W. C. (2021). Implementing collaborative governance: models, experiences, and challenges. *Public Management Review*, 23(11), 1581–1589. <https://doi.org/10.1080/14719037.2021.1878777>
- Bila, A., & Saputra, B. (2019). Strategi Collaborative Governance dalam Pemerintahan. *Jurnal Transformasi Administrasi*, 9(2), 196–210.
- Bluffstone, R. A., Somanathan, E., Jha, P., Luintel, H., Bista, R., Toman, M., Paudel, N., & Adhikari, B. (2018). Does Collective Action Sequester Carbon? Evidence from the Nepal Community Forestry Program. *World Development*, 101, 133–141. <https://doi.org/10.1016/j.worlddev.2017.07.030>
- Christawan, E., Perwita, A. A. B., Midhio, I. W., Hendra, A., & Sumertha, I. G. (2023). Papua as the Window of Indonesia's Spirit for the Melanesian Communities. *Journal of Social and Political Sciences*, 6(3). <https://doi.org/10.31014/aior.1991.06.03.426>
- Emerson, K., Nabatchi, T., & Balogh, S. (2012). An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research and Theory*, 22(1), 1–29. <https://doi.org/10.1093/jopart/mur011>
- Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: from National Systems and “Mode 2” to a Triple Helix of university–industry–government relations. *Research Policy*, 29(2), 109–123. [https://doi.org/10.1016/S0048-7333\(99\)00055-4](https://doi.org/10.1016/S0048-7333(99)00055-4)
- Foundjem-Tita, D., Duguma, L. A., Speelman, S., & Piabuo, S. M. (2018). Viability of community forests as social enterprises: A Cameroon case study. *Ecology and Society*, 23(4), art50. <https://doi.org/10.5751/ES-10651-230450>
- Garcia-Lopez, G., & Antinori, C. (2018). Between Grassroots Collective Action and State Mandates: The Hybridity of Multi-Level Forest Associations in Mexico. *Conservation and Society*, 16(2), 193. [https://doi.org/10.4103/cs.cs\\_16\\_115](https://doi.org/10.4103/cs.cs_16_115)
- Getha-Taylor, H., Grayer, M. J., Kempf, R. J., & O'Leary, R. (2019). Collaborating in the Absence of Trust? What Collaborative Governance Theory and Practice Can Learn From the Literatures of Conflict Resolution, Psychology, and Law. *The American Review of Public Administration*, 49(1), 51–64. <https://doi.org/10.1177/0275074018773089>
- Gibbons, S., Lyytikäinen, T., Overman, H. G., & Sanchis-Guarner, R. (2019). New road infrastructure: The effects on firms. *Journal of Urban Economics*, 110, 35–50. <https://doi.org/10.1016/j.jue.2019.01.002>
- Gurney, G. G., Cinner, J., Ban, N. C., Pressey, R. L., Pollnac, R., Campbell, S. J., Tasidjawa, S., & Setiawan, F. (2014). Poverty and protected areas: An evaluation of a marine integrated conservation and development project in Indonesia. *Global Environmental Change*, 26, 98–107. <https://doi.org/10.1016/j.gloenvcha.2014.04.003>
- Hadi, P. L., Wasanta, T., & Santosa, W. (2021). Pengaruh Indeks Infrastruktur Jalan Terhadap Indikator Ekonomi Di Indonesia. *Jurnal HPJI*, 7(2), 143–152. <https://doi.org/10.26593/jhpji.v7i2.5058>
- Hidayat, F. (2019). Kapabilitas Kompi Zeni Nubika TNI AD Dalam Menghadapi Ancaman Bencana Nubika. *Jurnal Manajemen Bencana (JMB)*, 5(2). <https://doi.org/10.33172/jmb.v5i2.464>
- Jatayu, A., Zahara, S., Syafitri, R. A. W. D., Dafadhilah, S., Roosyanindhita, D. R., Sidiq, M. I., & Priambodo, M. S. (2024). Measuring Levels of Infrastructure Development and its Impact on Regional Growth - Insights from Indonesia. *IOP Conference Series: Earth and Environmental Science*, 1353(1), 012011. <https://doi.org/10.1088/1755-1315/1353/1/012011>
- Joo Chang, H. (2009). Collaborative Governance in Welfare Service Delivery: Focusing on Local Welfare System in Korea. *International Review of Public Administration*, 13(sup1), 75–90. <https://doi.org/10.1080/12294659.2009.10805141>
- Kambu, Z., Jinca, M. Y., Pallu, M. S., & Ramli, M. I. (2022a). Perspectives of the Local Communities on the Development of Trans-Papua Road Infrastructure. *Civil Engineering Journal*, 8(5), 999–1010. <https://doi.org/10.28991/CEJ-2022-08-05-011>
- Kambu, Z., Jinca, M. Y., Pallu, M. S., & Ramli, M. I. (2022b). Persepsi Masyarakat Terhadap Keberlanjutan Pembangunan Infrastruktur Jalan Trans Papua, Indonesia: Studi Kasus Kabupaten Nduga. *KRESNA: Jurnal Riset Dan Pengabdian Masyarakat*, 2(1), 97–110. <https://doi.org/10.36080/jk.v2i1.22>

- Kambu, Z., Jinca, M. Y., Pallu, M. S., & Ramli, M. I. (2022c). Meta Synthesis of Community Participation Model on Trans-Papua Road Development. *Civil Engineering Journal*, 8(11), 2476–2489. <https://doi.org/10.28991/CEJ-2022-08-11-08>
- Kementrian PUPR. (2024). *Neraca Dataset - Kemantapan Jalan Provinsi*. Kementrian PUPR. <https://data.pu.go.id/visualisasi/neraca-dataset-kemantapan-jalan-provinsi>
- Kirksey, S. E., & Bilsen, K. (2002). A road to freedom: Mee articulations and the Trans-Papua Highway. *Bijdragen Tot de Taal, Land- En Volkenkunde / Journal of the Humanities and Social Sciences of Southeast Asia*, 158(4), 837–854. <https://doi.org/10.1163/22134379-90003769>
- Mahmood, S., Sabir, M., & Ali, G. (2020). Infrastructure projects and sustainable development: Discovering the stakeholders' perception in the case of the China–Pakistan Economic Corridor. *PLOS ONE*, 15(8), e0237385. <https://doi.org/10.1371/journal.pone.0237385>
- Manalu, E. F. L., Pane, E. T. S., Manalu, J. K., & Lubis, N. (2022). Socio-cultural analysis of the independent Papua Organization (OPM) and the narrative of Papua integration into Indonesia. *Jurnal Humanitas: Katalisator Perubahan Dan Inovator Pendidikan*, 9(1), 1–15. <https://doi.org/10.29408/jhm.v9i1.6258>
- Mekuria, W., Haileslassie, A., Tengberg, A., & Zazu, C. (2021). Stakeholders interest and influence and their interactions in managing natural resources in Lake Hawassa catchment, Ethiopia. *Ecosystems and People*, 17(1), 87–107. <https://doi.org/10.1080/26395916.2021.1894238>
- Ming'ate, F. L. M., Letema, S., & Obiero, K. (2019). Designing Institutional Arrangements for Collaborative Governance of Forests in Kenya Using a Delphi Process. *Journal of Scientific Research and Reports*, 1–11. <https://doi.org/10.9734/jsrr/2019/v25i430191>
- Moore, M. (1995). *Creating public value: Strategic management in government*. Harvard University Press.
- Mustoko, H., Samad, S., & Sailan, M. (2021). Implementation of Collaborative Governance Program TNI Manunggal Building Villages in the Brebes Region , Indonesia. *IOSR Journal of Humanities And Social Science*, 26(7), 1–8. <https://doi.org/10.9790/0837-2607080108>
- Ng, C. P., Law, T. H., Jakarni, F. M., & Kulanthayan, S. (2019). Road infrastructure development and economic growth. *IOP Conference Series: Materials Science and Engineering*, 512, 012045. <https://doi.org/10.1088/1757-899X/512/1/012045>
- Noor, M., Suaedi, F., & Mardiyanta, A. (2022). *Collaborative Governance: Suatu Tinjauan Teoritis dan Praktik*. Bildung.
- Tonkovic, A. M., Veckie, E., & Veckie, V. W. (2015). Applications of Penta Helix Model in Economic Development. *Economy of Eastern Croatia Yesterday, Today, Tomorrow*, 4, 385–393. <https://econpapers.repec.org/RePEc:osi:ecyvt:v:4:y:2015:p:385-393>
- Vihma, P., & Toikka, A. (2021). The limits of collaborative governance: The role of inter-group learning and trust in the case of the Estonian “Forest War.” *Environmental Policy and Governance*, 31(5), 403–416. <https://doi.org/10.1002/eet.1952>
- Wang, C., Lim, M. K., Zhang, X., Zhao, L., & Lee, P. T.-W. (2020). Railway and road infrastructure in the Belt and Road Initiative countries: Estimating the impact of transport infrastructure on economic growth. *Transportation Research Part A: Policy and Practice*, 134, 288–307. <https://doi.org/10.1016/j.tra.2020.02.009>