JOURNAL OF MANAGEMENT, ACCOUNTING, GENERAL FINANCE AND INTERNATIONAL ECONOMIC ISSUES
(MARGINAL)

QUINTUPLE HELIX IN PUBLIC PRIVATE PARTNERSHIP (PPP) PROJECTS

(Case Study – PPP's Housing Project in Surabaya)

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Abstract

The demand for suitable and economical housing is on the rise due to the fast-paced growth of population and urban development. An innovative solution has been suggested to address this challenge, known as the Public Private Partnership (PPP) scheme. This research analyses the implementation of the Quintuple Helix concept in the Public Private Partnership (PPP) project of Vertical Housing in Surabaya. Using a qualitative methodology with a case study, this research identifies the key roles of the government, private sector, academia, community, and the environment in the success of the project. The results show that the Quintuple Helix approach is effective in optimising the implementation of PPP projects, but there are potential conflicts of interest between the helix, especially in terms of rental fees and quality standards. This research provides recommendations to improve communication, coordination, and collaboration between helixes, as well as strengthen the role of academia and community participation.

Keywords : *PPP, Vertical Housing, Surabaya, Quintuple Helix, Implementation Optimisation*

1. INTRODUCTION

The need for decent and affordable housing is increasing along with rapid population growth and urbanization. This phenomenon is particularly evident in big cities, where the increasingly limited availability of land and skyrocketing property prices have become major obstacles in meeting people's housing needs (Renata et al., 2020; Sueca, 2004; Susyanti & Pardiman, 2022). This is reinforced by Purwanto et al., (2016) research, which emphasises that the limited land in urban areas has become a contributing factor to the rising cost of housing, making it increasingly unaffordable for most people.

On the other hand, the government faces obstacles in providing adequate housing due to budget constraints. To overcome this challenge, the Public Private Partnership (PPP) scheme has been proposed as an innovative solution. This scheme allows the mobilisation of private resources for housing development and management, thereby reducing the burden on the government budget (Abdullah, 2020). However, the implementation of PPP in the housing sector has yet to show significant results. To date, no PPP project in the housing sector in Indonesia has successfully reached the transaction stage (PPP Dashboard, 2023).

To further understand the dynamics and challenges in implementing housing PPP projects, this research adopts the Quintuple Helix approach. This approach is a development of the Triple Helix concept introduced by Etzkowitz & Leydesdorff (1995). This concept initially focused on collaboration between academia, industry and government in driving innovation. However, along with the times, this concept has been

expanded into Quintuple Helix which involves four main actors, namely the community, government, academia, business entities with attention to environmental sustainability.

The Quintuple Helix approach was chosen because housing PPP projects are closely related to the relationship between the government and various other stakeholders. The PPP project aims to involve not only the government and business entities, but also neighbouring communities, academics, and the environment. Therefore, the Quintuple Helix approach is deemed suitable for analysing the complexity of relationships and interactions between various actors in housing PPP projects.

The application of the Helix approach in this research is supported by several previous studies. Zhou & Etzkowitz (2021) successfully applied the Triple Helix concept to drive sustainable development innovation in Ghana. Carayannis et al., (2022) developed the Quadruple Helix concept by adding media and cultural elements in empirical research. Damayanti et al., (2024) applied the helix approach in the context of Micro, Small and Medium Enterprises (MSMEs) and showed that integration between government, industry and educational institutions can increase innovation (Hartati, 2021; Hidayat, 2020).

In an effort to explore the application of the Quintuple Helix approach in the context of PPP in the housing sector, this research chose a case study of the Urban Vertical Housing PPP Project in Surabaya. This project is considered relevant because Surabaya is one of the major cities in Indonesia that faces significant challenges in providing decent and affordable housing. By analysing the role and contribution of each helix in this project, it is expected that a solution can be found to optimise the implementation of the vertical housing PPP project in Surabaya and provide maximum benefits for the community and the environment.

2. RESEARCH METHODS

This research uses a qualitative approach with a case study on the Surabaya Urban Vertical Housing PPP project. The qualitative approach was chosen (Sulistiyo, 2023) because it allows researchers to deeply understand the dynamics of collaboration between actors in PPP projects. The case study was chosen because the focus of this research is on one specific project, namely the Surabaya Urban Vertical Housing PPP project.

Data collection was conducted through in-depth interviews with representatives from various helixes involved in the Surabaya Urban Vertical Housing PPP project. These interviews were conducted using a pre-prepared semi-structured interview guide. This interview guide contains open-ended questions that allow informants to provide more in-depth and detailed answers. In addition to interviews, data was also collected through the study of related literature, such as project documents, research reports, and journal articles.

Data analysis was conducted using a thematic approach (Wali et al., 2023). The stages of data analysis included transcription of interview data, data reduction, and data interpretation (Bougie & Sekaran, 2020). After the data was analysed (Williams & Moser, 2019), data triangulation was conducted to ensure the validity and reliability of the research results (Creswell, 2015). Data triangulation was conducted by comparing data

obtained from various sources, such as interviews, literature studies, and observations (Yin, 2003).

This research involved several key informants representing various helixes in the Surabaya Urban Vertical Housing PPP project. These key informants were selected based on certain criteria, such as direct involvement in the project, knowledge of the project, and willingness to be interviewed.

3. RESULTS AND DISCUSSION

3.1. PPP Housing Project in Surabaya

The Tambak Wedi Public-Private Partnership (PPP) Housing Project is an initiative by the Surabaya City Government to provide decent and affordable housing for low-income communities (MBR). The project is located on a 21,155 m2 plot of land in Tambak Wedi, considered strategic due to its proximity to the toll road access to Madura Island and its high development potential as a trade and service center in North Surabaya. The land is already equipped with basic infrastructure networks such as drinking water and electricity and is supported by easily accessible health, education, and commercial facilities.

The project is planned to build flats with a large occupancy capacity and design flexibility. There are two alternative development options for flats on this land:

Alternative 1: Maximize the total floor area (GFA) by building four high-rise flats (two for MBR and two for commercial) and a parking building. The podium level can be used for supporting facilities and commercial areas.

Alternative 2: Develop buildings that are in harmony with the surrounding environment by building one low-rise and one mid-rise flat connected to two high-rise flats. Innovative housing concepts such as mezzanine or loft units can be applied to provide more diverse units and accommodate various housing needs.

Contextual considerations are also made in the development of this flat, especially to accommodate the needs of fishing communities around the location. Some of the facilities indicated that can be provided include storage space, places to sell or auction fish, and a marine culinary cente.

3.2. The respective roles of the Quintuple Helix

The Quintuple Helix concept is a development of the Triple Helix model introduced by Etzkowitz & Leydesdorff (1995). This model describes the collaboration and interaction between the four main elements in innovation with environmental principles (H Etzkowitz, 2008; Henry Etzkowitz, 2012). The environmental concept refers to the sustainability of the project, i.e. how the project can provide long-term benefits without damaging the environment and remain relevant to the future needs of society.

1. Government: The central and local governments play a guiding and facilitating role. The central government provides large-scale policies, regulations and funding, while local governments are responsible for implementation in accordance with local conditions and needs.

2. Community: Communities serve as a source of knowledge and real needs that can guide the direction and design of infrastructure. Community engagement ensures that infrastructure projects are not only technically adequate, but also socially sustainable and accepted by the communities they benefit.
3. Academia: Academia provides research and development support for innovation in housing development. They help identify the latest technological solutions and sustainable practices that can be applied in projects.
4. Business Entities: The business sector or enterprises play a crucial role as key players in infrastructure investment, design and construction. They bring innovation, operational efficiency, and project funding to the table.

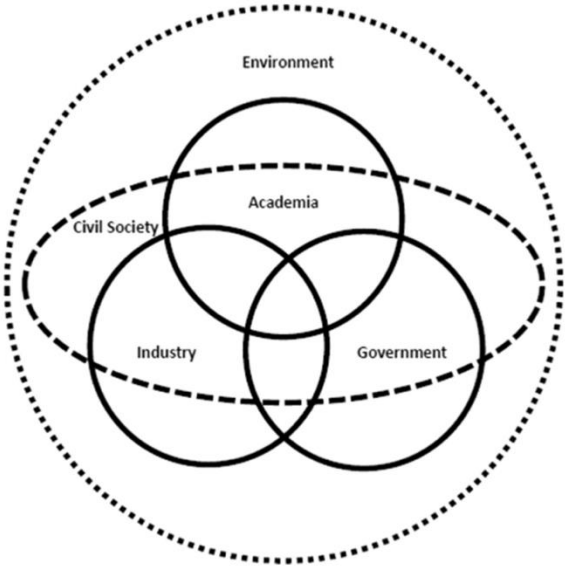

Figure 1. The five helixes of the quintuple helix
Source : Carayannis et al., (2012)

Each helix has its own responsibilities in maintaining project sustainability. The government is responsible for creating regulations and policies that encourage sustainable development practices. Private/business plays a role in implementing environmentally friendly technologies and innovations in project operations. Academia/universities provide research and knowledge to support the development of sustainable solutions, while communities provide input and participate in maintaining the project's environmental sustainability.

3.2.1. Helix Local Government as GCA

The Local Government as Government Contracting Agency (GCA) by the Mayor of Surabaya, represented by the Public Housing and Settlement Area and Land Office of Surabaya City plays a central role in this project. GCA of PPP projects must have strong motivation in project implementation. They realise the urgent need to meet the needs of decent and affordable housing for the community, especially in an effort to reduce the housing backlog in Surabaya. In addition, this project is also expected to be a solution to

overcome the problem of slum areas that are increasingly widespread in this city. With the Vertical Housing built through the PPP scheme, the Surabaya city government hopes to improve the quality of life of the community and create a better urban environment. Explanation from helix-GCA informants revealed:

> *"The Vertical Housing PPP project in Surabaya City was initiated by the Surabaya City Government's submission in dealing with slum areas. Due to the limited state budget, it was tried to use the PPP scheme. In essence, the Surabaya City Government will be committed to handling the slum area by building a housing project in the proposed location together with the Central Government. The main contribution prepared by GCA is to prepare clean and clear project land."*

3.2.2. Central Government Helix

The Ministry of Public Works & Housing (MPWH) has a crucial role as a companion in ensuring the success of the Surabaya Urban Vertical Housing PPP project. This support is realised through active involvement in facilitating the fulfilment of initial study needs at the project identification stage.

In the early stages of the project, MPWH provided comprehensive technical assistance to the Surabaya City Government as the GCA. This technical assistance includes the provision of experts and consultants who are experienced in the PPP field, as well as guidance in the preparation of project planning documents.

In addition to technical assistance, MPWH also provides financial support for the preparation of feasibility studies, environmental impact analyses, and preliminary project designs. The feasibility study aims to assess whether the project is technically, financially, economically, and socially feasible. An environmental impact analysis is conducted to identify potential negative impacts of the project on the environment and formulate appropriate mitigation measures. The preliminary design of the project provides an initial overview of the concept and layout of the Vertical Housing to be built.

> *"In accordance with the mandate provided by laws and regulations, we are responsible for conducting an initial identification of what is suitable for the construction of Vertical Housing, especially PPP schemes. This process involves a comprehensive assessment of various aspects, including the status of land ownership, the physical condition of the land, the financial capability of the GCA, the real needs of the community and what risks will occur."*

3.2.3. Academia Helix

The academic helix has a crucial role in the Surabaya Urban Vertical Housing PPP project, especially in providing scientific foundations and objective analyses to support informed decision-making. Their involvement began in the early stages of the project, by participating in public consultations. In this forum, academics act as a bridge between the community and the government, conveying the aspirations and needs of the community that may not be conveyed directly.

In addition, academics also provide a critical view of the real conditions of the project based on academic review. They analyse the potential risks that may arise, in terms of technical, financial, social and environmental aspects. Thus, the government and

related parties can anticipate and mitigate these risks as early as possible. They are also involved in the preparation of preliminary studies, project feasibility studies that take into account environmental aspects, Environmental Impact Analysis (EIA), and Traffic Impact Analysis (TIA).

One important aspect analysed by academics is the ability of the community to pay for the Vertical Housing to be built. This is shown by the Availability to Pay (ATP) and Willingness to Pay (WTP) figures. ATP measures people's financial ability to pay rent or instalments for Vertical Housing, while WTP measures their willingness to pay a certain price. By understanding ATP and WTP, the government and developers can determine the appropriate price and ensure that the Vertical Housing are affordable to the targeted communities.

> *"As academics involved in this project, we provide objective analyses and comprehensive studies on the project's feasibility, environmental impacts, and the community's ability to pay. We are also active in public consultations to convey the aspirations of the community and provide recommendations based on scientific evidence, so that this project can run optimally and provide benefits for all parties."*

3.2.4. Community Helix

Communities around the project have a role in expressing their aspirations, preferences, needs, and expectations for the provision of Vertical Housing. Active participation of the community in the decision-making process can ensure that the Vertical Housing project is built in accordance with their needs and desires.

In addition to the community around the project, the residents of the existing rental Vertical Housing managed by GCA also have an important role. They can provide valuable input on the management of the Vertical Housing, including rental fees, facilities, and services needed. This input can be used as a reference for the government and business entities in managing newly built Vertical Housing, so as to improve the satisfaction and welfare of residents.

Non-governmental organisations (NGOs) also act as representatives who fight for the aspirations of marginalised communities. They can help voice the needs and interests of underrepresented community groups, such as low-income communities, people with disabilities, and other vulnerable groups. In addition, NGOs also act as independent watchdogs that monitor the implementation of PPP projects, ensuring that projects run in accordance with the principles of transparency, accountability, and sustainability.

3.2.5. Business Entity Helix

Business entities act as investors and developers who are responsible for financing, building and operating the Vertical Housing. One of the factors that encourage business entities to participate in this project is the attractive return-on-investment schemes, such as long-term lease schemes and various fiscal incentives. Long-term rental schemes provide income certainty for business entities, while fiscal incentives, such as tax deductions or import duty exemptions, can increase project profits.

Business entities with experience in building operation and maintenance can provide valuable inputs on service standards that can be applied in the project. This input

can help improve the quality and efficiency of the Vertical Housing' operations, thereby providing greater benefits to the residents.

> *"We see the Surabaya Urban Vertical Housing PPP project as a very attractive investment opportunity. The return on investment scheme offered, especially the long-term lease scheme and fiscal incentives, gives us confidence in the potential for sustainable returns. In addition, the government's commitment to sustainable development is in line with our company's vision, so we are optimistic that we can make a positive contribution in providing decent and affordable housing for the people of Surabaya, while maintaining environmental sustainability."*

3.3. Relationship between Helixes

3.3.1. GCA and MPWH

GCA works closely with MPWH as the facilitator. GCA identifies housing needs and provides land, while the MPWH provides technical and financial assistance, as well as conducting feasibility studies and environmental impact assessments. communication between GCA and MPWH is very intensive, especially in terms of project planning, implementation, and supervision.

3.3.2. Government and Academia

GCA and MPWH collaborate with academics to obtain scientific studies and recommendations related to the technical, social and environmental aspects of the project. Academics also assist the government in understanding the needs and aspirations of the community. Communication between the government and academics occurs through public consultations, discussion forums, and direct meetings.

3.3.3. Government and Community

GCA actively involves neighbouring people and communities in the project planning and decision-making process. This is done through public consultations and other discussion forums. Communication between the government and the community is conducted through various channels, such as public consultation, project socialisation, and social media.

3.3.4. Government and Business Entities

GCA cooperates with business entities in financing, building and operating Vertical Housing. The government provides an attractive PPP scheme for the enterprise, while the enterprise contributes in the form of investment and technical expertise. Communication between the government and business entities is conducted formally through the tender process and contract negotiations. In addition, informal communication also occurs through meetings, discussions, and site visits.

3.3.5. Academia and Society/Community

Academics act as a bridge between the community and the government. They convey the aspirations and needs of the community to the government, as well as provide information and education to the community about PPP projects. Communication

between the government and the community is done through various channels, such as public consultation, project socialisation, and social media.

3.3.6. Academics and Business Enterprises

Academics can provide input and recommendations to business entities regarding the technical, social and environmental aspects of the project. Business entities can also utilise the results of academic studies to improve project quality and sustainability.

3.3.7. Communities and Business Entities

Business entities need to pay attention to the aspirations and needs of the community in the construction and management of Vertical Housing. The community can also provide input to business entities regarding the quality of services and facilities needed.

3.4. Conflict of Interest

Table 1. Conflict of Interest Helices

	Government	Academics	Community	Business Entity
Rental Fee	Affordable price for the community	In accordance with the study	Affordable price	Bidding high rents for higher profits
Project Development Quality Standards	High quality with offers from Business Entities	According to project needs	Quality at its best	Quality based on standards and bid price
Risk Assessment and Technical Solution	Viewing solutions from academia is an important cornerstone	Provide detailed recommendations and elaboration of adverse environmental impacts	Focus on minimising the negative impacts of the project on the surrounding environment.	Looking at technical solutions from academia as a reference in project planning and implementation. But still consider the financial and business aspects of the solution.

Source : Author's preparation (2024)

This table shows the potential conflict of interest between the helixes, especially in terms of rental fees and quality standards for project development. Governments and communities want affordable prices and high quality, while businesses want high profits. Academia acts as a mediator by providing recommendations based on scientific studies.

3.4.1. Rental Fee

Academics, considering the principle of project sustainability, may find that the ideal rental fee is relatively high to ensure the maintenance and operation of the Vertical Housing in the long run. However, the results of this study may conflict with the needs of local governments who want to provide affordable Vertical Housing for low-income communities. Local governments may find it difficult to set lower rental rates to make Vertical Housing accessible to people in need. MPWH has an interest in ensuring the sustainability of PPP projects. They may be more inclined to the academics' recommendations regarding higher rental fees to ensure the financial sustainability of the project. Informant from GCA, said :

> *"The results of the study do show that the rental price that is in accordance with the community's ability is below the capital price of the project. However, we remain committed to supporting the construction of these Vertical Housing in order to address the slum problem in Surabaya. We will discuss further with the Ministry of MPWH to find the best solution, perhaps by finding other sources of funding or developing more innovative financing schemes. In essence, we will continue to endeavour to keep this project running and provide benefits to the community."*

3.4.2. Project Development Quality Standards

The government helix has a very important role in determining the quality standards of the Surabaya Urban Vertical Housing PPP project. The government, in this case represented by the Ministry of MPWH, is responsible for setting quality standards that must be met by business entities in building Vertical Housing. These quality standards cover various aspects, ranging from the use of building materials, architectural design, to the facilities provided. This is the same as the statement of the informant from MPWH:

> *"In accordance with the mandate provided by laws and regulations, we are responsible for conducting an initial identification of what is suitable for the construction of Vertical Housing, especially PPP schemes. This process involves a comprehensive assessment of various aspects, including the status of land ownership, the physical condition of the land, the financial capability of the GCA, the real needs of the community and what risks will occur."*

The government wants high quality with bids from Business Entities. This high quality standard aims to ensure that the Vertical Housing built are not only livable, but also safe, comfortable and sustainable. Thus, the Vertical Housing can provide optimal benefits to the community and the environment in the long run.

3.4.3. Technical Solution

The academic helix has a very important role in the risk assessment of technical solutions in the Surabaya Urban Vertical Housing PPP project. They are responsible for conducting a comprehensive risk analysis, identifying potential negative impacts of the project on the environment, and providing recommendations for appropriate technical solutions to mitigate these risks.

> *"As academics involved in this project, we provide objective analyses and comprehensive studies on the project's feasibility, environmental impacts, and the community's ability to pay. We are also active in public consultations to convey the aspirations of the community and provide recommendations based on scientific evidence, so that this project can run optimally and provide benefits for all parties."*

Academics have in-depth knowledge and expertise in environmental, civil engineering, and social fields. Therefore, they can provide a comprehensive and objective view of the risks and technical solutions associated with the Surabaya Urban Vertical Housing PPP project. The recommendations provided by academics can serve as a reference for the government and business entities in making the right decisions to minimise risks and ensure project sustainability.

4. CONCLUSION

Quintuple Helix in the Public Private Partnership (PPP) project for Vertical Housing in Surabaya. This concept involves four main helixes, namely the government divided into MPWH and GCA, academics, communities, and business entities. Each helix has a different but interrelated role in the success of the project.

The local government as GCA of the cooperation project has a central role in identifying housing needs, providing land, and ensuring the project goes according to plan. MPWH provides the necessary technical, financial and regulatory support. Academics play a role in providing scientific studies, risk analyses, and recommendations for technical solutions. Communities provide input and aspirations related to housing needs, while business entities are responsible for funding, building and managing Vertical Housing.

The research also identified potential conflicts of interest between the helixes, particularly in relation to rental fees and development quality standards. The government and communities want affordable prices and high quality, while businesses want optimal profits. Academics act as mediators by providing recommendations based on scientific studies.

Based on the results of this study, several suggestions can be given to optimise the implementation of the Urban Vertical Housing PPP project in Surabaya, among others:

1. Improved Communication and Coordination: Better communication and more effective coordination between the government, private sector, academia, and communities is essential. This can be achieved through the establishment of regular communication forums, increased transparency of information, and better mechanisms for expressing aspirations.
2. Strengthening the Role of Academia: Academics should be given a greater role in providing scientific studies and policy recommendations. Academic studies can provide a strong foundation for informed and evidence-based decision-making.
3. More Active Community Engagement: Communities need to be more actively involved in all stages of the project, from planning to implementation to

monitoring. Community participation can ensure that PPP projects meet their needs and aspirations.

4. Capacity Building of Local Government: Local governments need to increase their capacity in managing PPP projects, including in terms of planning, procurement, and supervision. This capacity building can be done through training, technical guidance, and comparative studies.
5. Development of Innovative Financing Schemes: The government and business entities need to develop innovative financing schemes to ensure the financial sustainability of PPP projects. These financing schemes may include a combination of public and private funding sources, as well as the utilisation of innovative financial instruments.
6. Application of Sustainability Principles: Sustainability principles need to be applied in all aspects of PPP projects, from planning, design, construction, to operation. This is important to ensure that PPP projects not only provide economic benefits, but also social and environmental benefits.

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