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THE PENTA-HELIX SYNERGY FOR SUSTAINABLE TOURISM DEVELOPMENT IN WEST BANDUNG REGENCY IN THE POST-PANDEMIC ERA

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Abstract:

Background: The tourism sector plays a crucial role in regional economic development, employment creation, and local income generation. However, the COVID-19 pandemic severely disrupted tourism activities, particularly in regional destinations such as West Bandung Regency, Indonesia. Mobility restrictions, declining tourist arrivals, and prolonged health-related concerns significantly weakened local tourism ecosystems and reduced community-based economic activities. These conditions highlighted structural vulnerabilities in tourism governance and emphasized the urgent need for effective stakeholder collaboration to support post-pandemic recovery and long-term sustainability.
Purpose: This study aims to analyze the role and synergy of Penta-Helix stakeholders government, business, community, academia, and media in supporting sustainable tourism development in West Bandung Regency during the post-pandemic period.
Design/methodology/approach: This research adopts a qualitative descriptive approach. Data were collected through semi-structured interviews, field observations, and document analysis involving key tourism stakeholders. The collected data were analyzed using thematic analysis to identify patterns of collaboration, governance mechanisms, and stakeholder roles in tourism recovery.
Findings/Result: The findings reveal that the government plays a dominant coordinating role through a top-down policy approach to manage public health risks and regulate social mobility while facilitating tourism recovery. Business actors contribute through service innovation and the implementation of CHSE standards, local communities support operational compliance at the destination level, academic institutions provide knowledge-based support, and media actors strengthen destination branding and public trust.
Conclusion: The study concludes that effective Penta-Helix collaboration, supported by strong governmental coordination, is essential for rebuilding a resilient and sustainable tourism ecosystem in the post-pandemic era.
Originality/value: This research contributes to sustainable tourism literature by providing a regency-level perspective on post-pandemic tourism governance using the Penta-Helix framework and by highlighting the relevance of top-down coordination as an effective strategy in crisis recovery contexts.

Keywords: penta-helix, post-pandemic, sustainable tourism development, tourism, west bandung regency

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INTRODUCTION

Tourism is one of the largest industries in the world and has demonstrated one of the fastest economic growth rates, encompassing multidimensional and multifaceted activities supported by strong social elements (Ikhtiagung & Radyanto, 2020; Shcherbachenko et al. 2021). In conjunction with related sectors, tourism contributed approximately 10.3% of global Gross Domestic Product (GDP) and 10.4% of total employment worldwide, with a direct contribution of 3.2% of GDP and 3.8% of global employment in 2019 (Hosseini et al. 2021). Through both direct and indirect mechanisms, tourism significantly influences economic development (Ali, 2018; León-Gómez et al. 2021), community growth (Strydom et al. 2019), income generation (Gabriel-Campos et al. 2021), and inequality reduction (Yasir et al. 2021). The growth of global tourism increased substantially from 25 million international arrivals in the 1950s to approximately 1.5 billion arrivals in 2019, indicating the strategic importance of the sector for inclusive economic growth (Deb & Nafi, 2021).

However, this growth trajectory was abruptly disrupted following the outbreak of Coronavirus Disease 2019 (COVID-19). On January 31, 2020, the World Health Organization (WHO) declared COVID-19 a Public Health Emergency (Ying et al. 2021). Originating in Wuhan, China, in December 2019 (Chang et al. 2020; Roman et al. 2020), the rapid global spread of the virus was closely linked to international mobility and tourism activities (Vinerean et al. 2021). The pandemic severely affected socio-economic activities, product demand and supply, and the global labor market, posing a serious threat to the sustainability of multiple sectors, particularly tourism (Esquivias et al. 2020). Mobility restriction policies implemented by many countries including China, the United States, Italy, and Indonesia were necessary to control virus transmission but simultaneously produced significant negative impacts on tourism and other people-intensive industries (Wassler & Fan, 2021). These restrictions also altered tourist decision-making processes and destination loyalty (Aldrianto et al. 2021).

In Indonesia, tourism has long been positioned as a strategic sector to support economic diversification amid declining oil and gas contributions. Nevertheless, the pandemic caused a sharp decline in foreign tourist arrivals, with a reduction of 470,898 visitors in March 2020, representing a 64.11% decrease compared to the same period in the previous year (Fadilah, 2020). This contraction significantly reduced tourism's contribution to GDP and foreign exchange earnings, which reached USD 17.6 billion in 2019. The multiplier effects of this decline were strongly felt at the regional level, including in West Bandung Regency, a newly established district in West Java Province with substantial tourism potential. During the pandemic, local revenue in West Bandung Regency declined by approximately 50%, falling to IDR 28.401 billion, compared to IDR 48.946 billion in 2019, with significant reductions across hotel, restaurant, and entertainment sectors (Venus et al. 2020). Given that tourism constitutes a major development pillar in West Bandung Regency, addressing the impacts of the pandemic requires coordinated and sustainable governance approaches.

Previous studies have extensively examined sustainable tourism development through stakeholder collaboration frameworks, particularly the Penta-Helix model, which emphasizes synergy among academics, business actors, communities, government, and media. Empirical research has applied the Penta-Helix framework across various tourism contexts, including tourism village development (Chamidah et al. 2020; Yasir et al. 2021), digital tourism innovation (Lagarense et al. 2018), urban tourism, sports tourism, and geotourism development (Raharjo et al. 2020). The conceptual roots of the Penta-Helix model originate from the Triple-Helix theory (Leydesdorff & Etzkowitz, 1998), later expanded into the Quadruple-Helix (Leydesdorff, 2012; Carayannis et al. 2017), and eventually the Penta-Helix to incorporate broader societal and media dimensions (Muhyi & Chan, 2017; Sudiana et al. 2020a; Sudiana et al. 2020b).

Despite these advances, existing literature largely focuses on tourism development under relatively stable conditions. Limited attention has been given to the role of Penta-Helix collaboration in post-pandemic tourism recovery, particularly at the regional or regency level, where policy implementation and stakeholder coordination directly influence recovery outcomes. Moreover, while the Indonesian Ministry of Tourism Regulation No. 14 of 2016 explicitly institutionalizes the Penta-Helix framework for sustainable tourism destinations, empirical evidence on how this framework operates during crisis recovery remains scarce. This gap is especially critical given that post-pandemic recovery requires balancing public health, economic resilience, social mobility, and environmental sustainability.

Accordingly, this study contributes novelty by examining post-pandemic sustainable tourism development through a Penta-Helix perspective in West Bandung Regency, highlighting the role of government-led coordination and multi-actor collaboration in managing crisis-induced challenges.

To address the complex challenges arising from post-pandemic tourism recovery, this study adopts the Penta-Helix collaboration model as its primary analytical framework. The model enables an integrated examination of stakeholder roles and interactions in tourism governance, emphasizing the importance of coordination among government, business actors, local communities, academic institutions, and media organizations. In the context of West Bandung Regency, stakeholder collaboration aligns with the broader development vision of West Java Province, namely "Terwujudnya Jawa Barat Juara lahir batin dengan inovasi dan kolaborasi," which underscores innovation and collaboration as key development principles.

A qualitative descriptive approach is employed to capture contextual realities, policy responses, and collaborative mechanisms shaping tourism recovery. This approach is particularly suitable for understanding governance dynamics under crisis conditions, where formal regulations, informal coordination, and stakeholder adaptation intersect. By applying the Penta-Helix framework, this study seeks to explain how collaborative governance can mitigate economic shocks, manage public health risks, and support sustainable tourism development in the post-pandemic era.

This study aims to analyze the synergy among Penta-Helix stakeholders in supporting sustainable tourism development in West Bandung Regency during the post-pandemic period. Specifically, it seeks to examine how government-led coordination and multi-stakeholder collaboration contribute to tourism recovery while addressing economic, public health, and social mobility challenges.

METHODS

This research employed a qualitative descriptive method to create a systematic, factual, and accurate description of the characteristics of the research object, namely post-COVID-19 tourism development in West Bandung Regency. This approach was selected because it allows the researcher to capture real conditions, stakeholder perspectives, and observable phenomena without manipulating variables. The qualitative descriptive method provides flexibility in understanding complex social interactions and governance processes within the tourism sector. In this study, the research object reflects the dynamics of tourism recovery and stakeholder collaboration during the post-pandemic period. By applying this approach, the study aims to generate findings that are contextually grounded and empirically relevant (Miles et al. 2014).

The data used in this study consisted of primary and secondary data. Primary data were obtained from key informants representing the Penta-Helix model, including business actors, government institutions, communities, academic institutions, and media organizations involved in tourism development in West Bandung Regency. These informants were selected based on their relevance, roles, and involvement in tourism governance and post-pandemic recovery efforts. Secondary data were collected from official government documents, tourism development reports, regulations, and statistical records. In addition, relevant academic literature was reviewed to support the interpretation and contextualization of the primary data.

A total of six key informants representing government, business, academia, community, and media stakeholders participated in this study. The number of informants was considered sufficient because data saturation was achieved during the interview process. The informants representing the Penta-Helix stakeholders were purposively selected based on their direct involvement in tourism governance, policy implementation, destination management, and tourism recovery initiatives in West Bandung Regency.

Data collection was conducted primarily through in-depth interviews with selected informants representing the Penta-Helix actors. Interviews were used to obtain detailed information regarding stakeholder roles, experiences, and perceptions related to sustainable tourism development in the post-pandemic context. The interview process allowed respondents to elaborate on challenges, coordination mechanisms, and collaborative practices within the tourism ecosystem. Informants involved in this study included representatives from the West Bandung Regency Tourism and Culture Office,

the Indonesian Hotel and Restaurant Association (PHRI), Universitas Padjadjaran, Tourism Awareness Groups (POKDARWIS), the West Bandung Tourism Promotion Board, and the Indonesian Tour Guide Association (HPI) of West Bandung Regency. These institutions were selected because they play strategic roles in tourism planning, implementation, and promotion.

In addition to interviews, document analysis was conducted to complement the primary data. Relevant policy documents, strategic plans, official reports, and regulatory frameworks related to tourism development were examined. This technique enabled the researcher to understand the institutional and policy context of tourism governance in West Bandung Regency. Document analysis also helped verify and triangulate information obtained from interviews. Through this combination of techniques, data collection was conducted in a comprehensive and systematic manner.

Semi-structured interviews were conducted in January 2024 during the post-pandemic tourism recovery period, and each interview lasted approximately 45–90 minutes. Interview questions focused on stakeholder roles, collaboration mechanisms, recovery strategies, and sustainable tourism initiatives to support sustainable tourism development in West Bandung Regency.

Data analysis was conducted by organizing the collected data into a systematic structure to facilitate interpretation. The analysis process involved sorting the data into manageable units, synthesizing information, and identifying recurring patterns related to stakeholder collaboration and tourism governance. This stage enabled the researcher to distinguish essential findings from supporting information. Furthermore, the analysis focused on discovering meaningful relationships among themes that emerged from the data. These procedures followed qualitative data analysis techniques that emphasize data reduction, data display, and conclusion drawing (Miles et al. 2014).

To ensure the credibility and validity of the findings, triangulation was applied by comparing data from different sources. Interview data were cross-checked with documentary evidence and relevant literature. This process reduced potential bias and strengthened the reliability of the interpretations. The analytical procedures allowed the researcher to develop conclusions that are grounded in empirical evidence. As a result, the findings provide a comprehensive understanding of the Penta-Helix synergy in supporting sustainable tourism development.

Thematic analysis was employed to analyze the interview data. The analytical process involved data reduction, open coding, category development, theme identification, and interpretation. Emerging themes were subsequently compared across stakeholder groups to identify patterns of collaboration and governance practices.

The framework of thought in this study is illustrated through a conceptual model based on the Penta-Helix approach. The framework depicts the interaction among government, business actors, communities, academic institutions, and media in supporting sustainable tourism development. It explains how stakeholder synergy, coordinated policies, and collaborative mechanisms contribute to tourism recovery in the post-pandemic context. The framework also highlights the role of government-led coordination in aligning stakeholder interests and actions. Through this conceptual model, the study provides a structured understanding of how multi-actor collaboration influences sustainable tourism outcomes in West Bandung Regency.

RESULTS

West Bandung Regency is part of West Java Province, which is definitively a Level II Region, based on Law Number 12 of 2007 concerning the Establishment of West Bandung Regency in West Java Province (State Gazette of the Republic of Indonesia of 2007 Number 12, Supplement to the State Gazette of the Republic of Indonesia Number 4688). West Bandung Regency has an area of 1,305.77 km^2, which constitutes 37.5% of West Java Province, and is divided into 16 sub-districts and 165 villages. Gununghalu is the largest sub-district, with an area of 160.64 km^2 or 12.30% of West Bandung Regency, while Batujajar occupies the smallest area of 32.04 km^2 or 2.45% (Mulyadi et al. 2018) The most common use of land is for agricultural cultivation, involving 66,500,294 ha. Meanwhile, about 50,150,928 ha are protected areas, non-agricultural cultivation covers 12,159,151 ha, while 1,768,654 ha are used for other activities. The protected areas in the regency area are related to the North Bandung issue. Judging from the physical condition of the geographical position of West Bandung Regency that supports the emergence

of tourism objects, the area is considered to have profitable potential that supports tourism development.

Table 1 summarizes the primary roles and contributions of each Penta-Helix stakeholder identified during the interview process. The findings indicate that government institutions played the most dominant coordinating role, while the remaining actors supported implementation, communication, and knowledge transfer activities.

West Bandung Regency Tourism Post-COVID-19

The COVID-19 pandemic affected all provinces in Indonesia and led the government to declare it a national disaster, as millions of people were infected and thousands of deaths were recorded (Purnomo et al. 2021). The implementation of Large-Scale Social Restrictions (PSBB) that followed the pandemic led to the cessation of all tourism activities in West Bandung Regency, causing economic losses in the tourism sector. Generally, West Bandung is known for its many natural tourism potentials. It is one of the leading regencies in West Java, resulting in its representation as a tourism image for the province. The regency has many tourist objects that attract local and foreign visitors. Although natural resources are mostly used, artificial tourism, agrotourism, geo-tourism, eco-tourism, culinary, and local cultural tourism are also included in the area's attractions (Zakaria et al. 2019).

One of the rules of PSBB in West Bandung, was the prohibition of tourism activities in order to reduce the massive spread of COVID-19. However, this resulted in a multiplier effect, as shown in Figure 1. At least five aspects of the tourism sector were affected by COVID-19. These included, first, the economy, as many businesses experienced losses due to the cessation of tourism activities, which automatically halted income from related services. These economic losses had implications for other aspects, as businesses did not receive revenue from tourism services but continued their managerial activities, such as facility maintenance, financing water and electricity fees, as well as the remuneration of existent and dismissed employees. This led to an imbalance between income and expenditure for business actors, leading to significant losses and the burden of returning to tourism activities (Sobaih et al. 2021). Second, the tax revenue generated by the tourism sector in West Bandung Regency, denoted by its Original Regional Revenue, fell by 50% to only around IDR 28.401 billion (Venus et al. 2020). Third, the implementation of PSBB policy resulted in three aspects of employment. Some workers in the tourism sector were protected from being laid off, several were dismissed but still received salaries as stipulated by government regulations, while a few were unsure about being re-employed post-COVID-19 (Chen et al. 2021). Fourth, a good brand image in tourism is a critical aspect of its sustainability, as it creates a positive impression and increases the desire of tourists to visit (Chan et al. 2021). Fifth, tourism sustainability was extensively questioned during the COVID-19 outbreak, which spread massively and changed individual patterns significantly. The tourism sector is entering a new normal era, with new protocol paradigms to welcome the changed conditions. The new normal era has introduced new roles, paths, and expectations. Therefore, the tourism sector must adapt to these new conditions through the rapid development and adjustment of digitalization and technology by re-implementing business model strategies to survive in the new normal era (Idris et al. 2021).

Table 1. Summary of penta-helix stakeholder roles in post-pandemic tourism recovery in West Bandung

Stakeholder	Main Role	Key Contribution
Government	Coordinator and regulator	CHSE implementation, vaccination programs, mobility regulation
Business	Service provider and innovator	Tourism service adaptation, business continuity, destination readiness
Community	Facilitator and supporter	Destination maintenance, protocol compliance, tourism awareness
Academia	Knowledge provider	Research, training, capacity building, policy recommendations
Media	Communicator and promoter	Public awareness, destination branding, tourism promotion

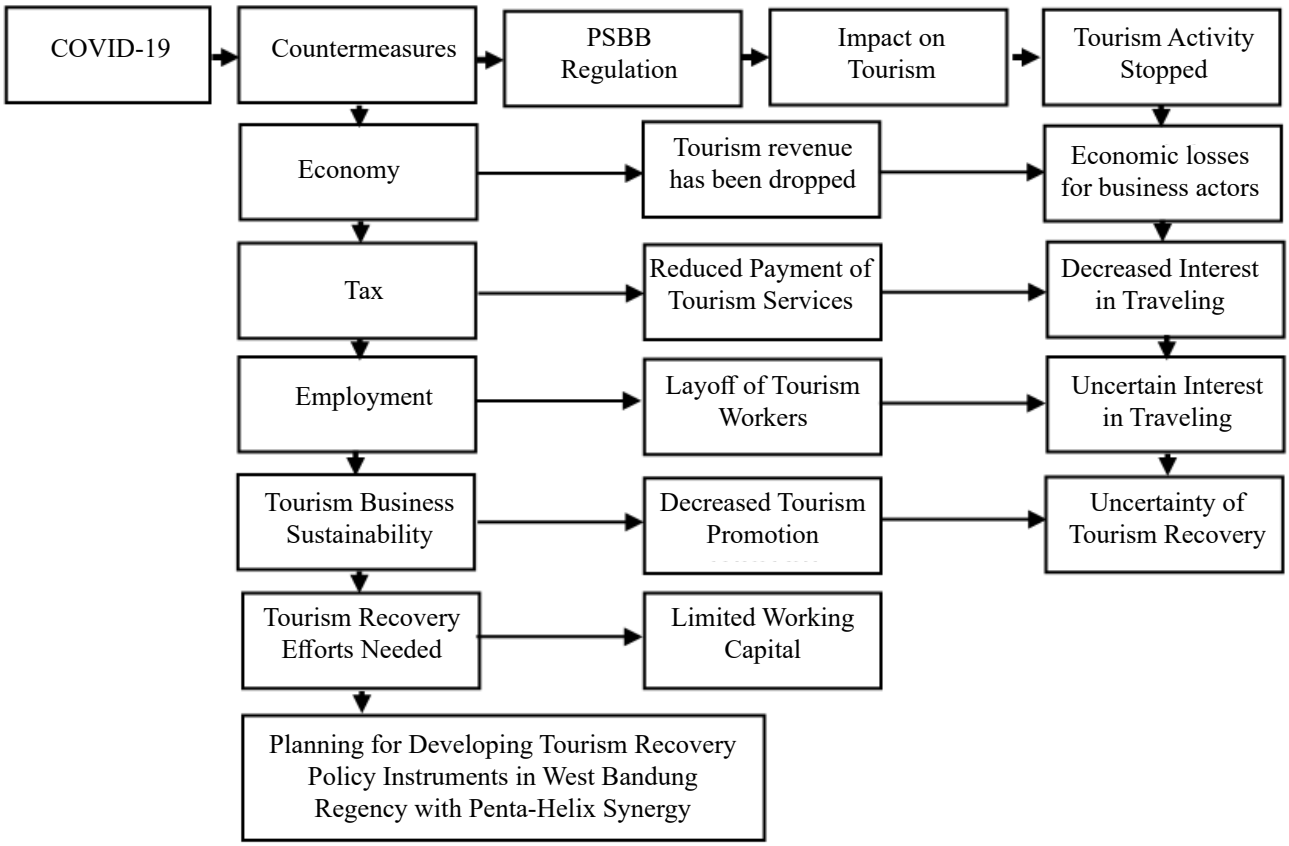


Figure 1. Multiplier effect in West Bandung Regency tourism post-COVID-19

This transition influenced tourism trends, as alternative vacations that attract fewer people, were introduced, such as solo travel tours, virtual tourism, and staycations, where health, cleanliness, and safety problems were the key factors that determined the decision to visit a location. Therefore, stakeholders in the creative economy were required to plan in advance and refrain from rushing to open tourist locations in order to ensure no more imported cases could negatively impact the sector's image. The media also exerts an important influence in creating societal paradigms, particularly during times of crisis such as the COVID-19 outbreak. It is one of the primary sources of information on the growth of the tourist sector, and should be seen as a source of optimism for the community's survival and readiness to embark on the new normal, which will include specific procedures in the tourism sector. Post-COVID-19 birthed new conditions or trends in travel, namely the new normal, where tourists pay more attention to travel protocols, specifically those related to health, security, comfort, sustainable and responsible tourism, authentic digital ecosystem, etc (Gössling et al. 2020; Vărzaru et al. 2021; Wassler & Fan, 2021). This is congruent with the guidelines on the implementation of sustainable tourism issued by the Global Sustainable Tourism Council. The government compiled guidelines for implementing sustainable tourism through the Minister of Tourism Regulation Number 14 of 2016 concerning policies for sustainable tourism destinations. The ministry and the creative economy also prepared a framework, action plan, and certification in collaboration with stakeholders in the tourism ecosystem. These efforts were expected to raise awareness of the importance of sustainable tourism development in the post-COVID-19 era in various regions, particularly in providing added value and economic development.

The Role of the Penta-Helix in West Bandung Regency Post-COVID-19

Sustainable Development is a comprehensive implementation concept that must be included in every development strategy and plan (Asmelash & Kumar, 2019; León-Gómez et al. 2021; Streimikiene et al. 2021). This development is expected to increase the involvement of tourists in publicizing destinations in

the future. It is also a principle and a marketing tool for promoting tourism. Its purposes are to provide visitors with enjoyable travel activities and attract foreign tourists. Sustainable tourism is a development philosophy that may positively influence the promotion of tourism locally and globally to boost visitor numbers to a destination (Chan et al. 2021). This philosophy can be achieved through positive development, paying attention to sustainability, and ensuring visitors are comfortable in their stay, thereby resulting in satisfaction with visits and guaranteeing constant returns.

Sustainable tourism should not be sectoral but comprehensive, involving the community, government, academics, etc, in a strategy called the Penta-Helix. Various disciplines must improve approaches to increase the competitiveness and sustainability of tourism activities. Sustainable tourism is a tremendous opportunity in the future, specifically after the pandemic, because it is a tourist need from an investment perspective and is not very burdensome (Battaglia et al. 2012; Ruhanen, 2013). The necessity of tourism revival, as mentioned above, necessitates the development of a well-structured strategy that will allow recovery to proceed following established objectives. As an official agency with authority to design and decide tourism recovery plan policies, the government plays a critical role in the recovery of the tourism sector. However, there must be participation from a wide range of interested parties, as the sustainability of tourism recovery is dependent on multi-actor engagement, which necessitates close coordination and synergy between all stakeholders.

The involvement of Penta-Helix actors in the development of sustainability in the tourism sector has had a positive impact on West Bandung Regency and on the national economic growth (Muhyi & Chan, 2017). However, the authorities were unable to limit the negative effects of the COVID-19 pandemic on the tourism sector. Severe damaging impacts were noted on elements considered vital, such as processing activities, trade, community mobility, the tourism sector, and other related sectors. Consequently, the Penta-Helix model, which may play a role in maintaining sustainable development and ensuring the return of the tourism sector to West Bandung Regency.

Based on Figure 2, the Penta-Helix model in the tourism sector in West Bandung Regency first involves the role of the government as an actor with full power to make policy regulations to facilitate the return of the tourism sector after the impact of the COVID-19 pandemic (Khan et al. 2021; Lee et al. 2020). The policy regulations issued by the West Bandung Regency government are more focused on controlling the massive impact of the pandemic and fully supporting tourism activities to ensure continued operations in the hope of adapting to the new normal era. Second, the business/private sector plays an important role in implementing sustainable tourism development by contributing to the regional economy and opening up opportunities for community members to become entrepreneurs. In addition, it offers increased investment through the provision of quality innovations and important supporting facilities (Almukhamedova, 2020). Business products that can be developed include the provision of services to consumers, such as tourism objects as the main products offered, transportation, tour & travel, tour guides, accommodation, lodging, culinary businesses, and services or products designed to customer needs and wishes. Third is the role of the community, which comprises planning, implementing, and maintaining tourism facilities (Purnomo et al. 2021; Yasir et al. 2021). The community in the tourism ecosystem of West Bandung Regency is formed through interests or hobbies that aim to explore or promote regional tourism. They also actively play a role in providing ideas and input to potential sectors that can act as drivers of other sectors. Fourth, academics produce various sources of information for novel thoughts and theories about tourism development through scientific studies and research, which increase the quality and quantity of the sector. The role of academics in sustainable tourism development is to enhance the capacity of human resource experts as well as increase the certification and standardization of products in the tourism sector. Fifth, media is an expander in the Penta-Helix model, and its functions include supporting publications and developing a brand image, which may help boost the competitiveness and credibility of tourists through websites alongside online and offline media (Chamidah et al. 2020; Lagarense et al. 2018). The role of the media is more focused on the means of conveying a positive impression of tourism destinations and increasing its marketing in West Bandung Regency.

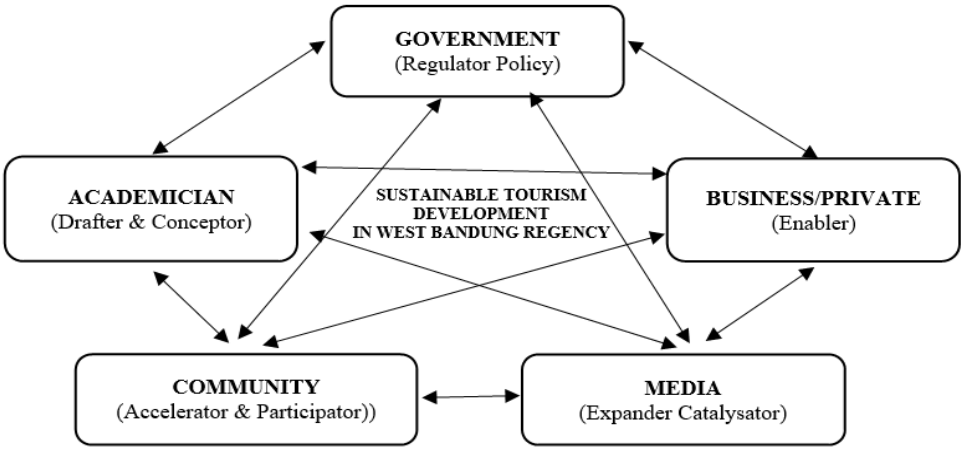


Figure 2. Penta-Helix Model tourism sector in West Bandung Regency

The post-pandemic recovery process requires the role and contribution of these actors, mainly for economic recovery, society, health, mobility, and the environment in West Bandung Regency. This is because the tourism industry is one of the leading sectors that can increase regional income. However, the impacts of the COVID-19 pandemic continue to influence tourism performance and have contributed to a significant contraction of the national economy.

Figure 3 is presented as supporting literature to contextualize the broader impacts of the COVID-19 pandemic on tourism activities and to compare these impacts with the findings observed in West Bandung Regency. Figure 3 shows the significant influence and impact on tourism activities caused by the COVID-19 pandemic (Yeh, 2021). Some affected industries are represented, namely F&B, hotels, employment, shopping, customers, manufacturers, exhibits, travel, transportation, etc. This figure may be used to illustrate that COVID-19 has significantly impacted all tourism-related activities. The effect of the pandemic has been enormous and necessitates a collaborative effort by all stakeholders, particularly the Penta-Helix actors, to sustain and gradually enhance tourism sustainability in West Bandung Regency. In order to explain the data findings, the unique functions of the five Penta-Helix actors in the tourist industry in West Bandung Regency were examined. Several aspects connected to indicators that influence and are directly related to sustainable tourism development in the regency post-COVID-19 were evaluated, namely economic crisis (Ozili &Arun, 2020), workplace (Olivia et al. 2020), public health policies (Lee et al. 2020), and social mobility (Bonaccorsi et al. 2020).

The first indicator was the economy and employment of West Bandung Regency tourism sector. The effect of the pandemic on the economy and employment generated by tourism as the leading sector in the regency cannot be denied. Therefore, several strategic innovation steps can be taken by the government, particularly the local government, such as the implementation of policies from the central government to slowly revive the sector. Hotels, restaurants, and company owners directly involved can receive grants in the form of subsidies, which will enable a gradual restart of economic operations.

Second, the role of business or private actors is very sensitive. In addition to the decrease in income caused by the temporary cessation of tourism activities, this group was laden with the burden of employee operational costs, as they were expected to continue paying employees who were laid off during the pandemic. However, some hoteliers attempted to adapt by providing online catering and food services for customers. This involved the ability to place orders through social media, the application of attractive promos for staycation activities, and the beauty of the natural panorama offered by targeting local tourists who wanted to work in a hotel atmosphere. The next role is the community, as the financial assistance provided by the local government can be used to maintain facilities and tourism infrastructure and accelerate the technical distribution of assistance in door to door settings and the within the community. This is because West Bandung Regency occupies a large area geographically that requires the assistance of tourism awareness groups to assist technically and reduce the presence of crowds. Furthermore, the role of academics in

improving the economy and employment involves the provision of innovative solutions, standardization, and understanding related to the empowerment of small and medium enterprises to adapt to new habits or the new normal. This is important because technological literacy and knowledge for small businesses affected by the multiplier effect of the tourism sphere can contribute to the economy and create new jobs in the COVID-19 era. According to Carayannis and Campbell (2010), the final element of the Penta-Helix concept is media support by providing news related to government assistance and shaping the image of West Bandung Regency to illustrate its ability to handle the COVID-19 pandemic (Gössling et al. 2021). This will motivate foreigners to visit tourist destinations in West Bandung Regency, specifically in local areas. Therefore, the media can provide information assistance and support to the government through promotions that can increase the regency's income.

Public health policies and social mobility in tourism activity in West Bandung Regency are also important indicators. The response to mobility activities and health policies by actors involved in the tourism industry, particularly after the effect of COVID-19 transmission on movement, is critical to the development of sustainable tourism. In this case, the government has been very influential by providing the Ministry of Tourism's program, namely Cleanliness, Health, Safety, and Environmental Sustainability or abbreviated (CHSE) following the Circular of the Minister of Tourism and Creative Economy/Head of the Tourism and Economics Office Creative Number 2 of 2020. It also provided free vaccination programs for the community, particularly tourism stakeholders in West Bandung Regency, to increase immunity against COVID-19 and reduce the risk of virus transmission and mutation. Furthermore, the implementation of Community Activity Restrictions was intended to reduce the spread of COVID-19 by limiting mobility. The Department of Tourism and Culture of West Bandung Regency implemented digital innovations through the *PeduliLindungi* application, which was introduced by the central government as part of its Information and Communication Technology strategy. Businesses or the private sector also play a role in integrating health protocols into business activities during the COVID-19 pandemic. This involves efforts to support government health policies, such as vaccination, to create a safe environment and reduce the risk of COVID-19 transmission. Tour guides offered booster vaccines to provide additional immunity and minimize the risk of COVID-19 transmission. Also, business actors displayed creativity and innovation by conducting vaccine tourism to provide free vaccination services and programs in tourist areas to attract the public, particularly local tourists. The *"pedulilindungi"* application was also an innovation that positively impacted natural tourism destinations. Besides providing additional assurance regarding public health and visitor safety, this application can track destination visitors and help prevent overcrowding, thereby supporting sustainable tourism management, which may negatively impact sustainable tourism development indirectly, specifically environmental sustainability.

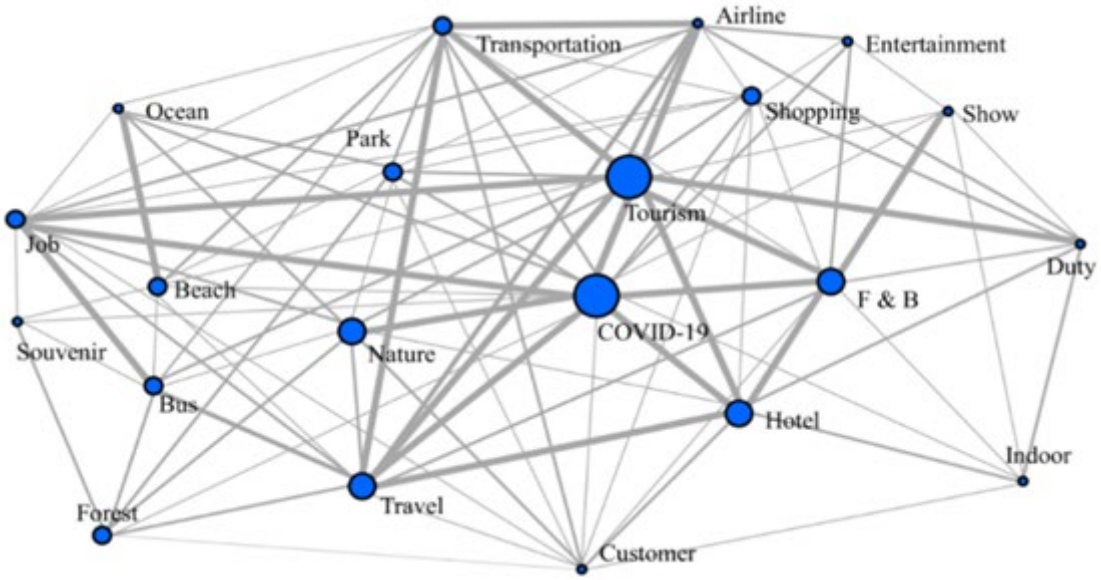


Figure 3. Impact of COVID-19 on Tourism (Yeh, 2021)

The role of local communities and tourism awareness groups in West Bandung Regency is to support government health protocols and promote responsible tourism behavior. These groups actively participated in preventing the spread of COVID-19 through public awareness campaigns, vaccination promotion, and community-based monitoring initiatives. In addition, academics support health policies by providing ideas and knowledge to small-scale tourism industry players about the importance of maintaining the sustainability of the CHSE program. Finally, the media actively participate in information delivery concerning the importance of vaccination for public safety, specifically in the tourism sector of West Bandung Regency. The role of the media is crucial in enhancing the image of tourism destinations and providing information that can raise awareness of the importance of the role of information communication technology.

Theoretical Implications

This study contributes to the sustainable tourism and collaborative governance literature by extending the application of the Penta-Helix framework to a post-pandemic recovery context. While previous studies have primarily examined stakeholder collaboration under relatively stable tourism conditions, this research demonstrates how crisis situations alter stakeholder dynamics and increase the importance of government-led coordination.

The findings confirm the relevance of the Penta-Helix model as a mechanism for achieving sustainable tourism outcomes through multi-stakeholder collaboration. However, the study also suggests that the relative influence of each stakeholder may vary depending on contextual conditions. In the case of West Bandung Regency, government actors assumed a more dominant role due to the need for rapid policy intervention, public health protection, and social mobility regulation during the recovery process.

The findings also suggest that crisis contexts may alter the relative dominance of Penta-Helix actors, positioning government institutions as temporary lead actors during recovery periods. This extends existing Penta-Helix literature, which generally assumes a more balanced distribution of stakeholder influence.

Managerial Implications

Implications for Government

The findings of this study imply that the government plays a central and strategic role in coordinating post-pandemic tourism recovery through effective policy formulation and implementation. Government institutions are required to provide clear regulatory frameworks that balance public health protection, economic recovery, and sustainable tourism development. Strong government leadership is essential to align the interests and actions of multiple stakeholders involved in the tourism sector. In addition, government agencies should strengthen inter-agency coordination to ensure consistency between tourism policies and public health regulations. By acting as the main coordinator within the Penta-Helix framework, the government can create a conducive environment for collaborative governance and long-term tourism sustainability.

Implications for Business and Industry

For tourism business actors, the study highlights the importance of adaptive strategies in responding to post-pandemic challenges. Tourism enterprises are encouraged to innovate in service delivery, implement health and safety standards, and adjust operational models to changing tourist preferences. Collaboration with government institutions and local communities is crucial to ensure compliance with regulations and to rebuild tourist confidence. Business actors also play a key role in supporting destination competitiveness through quality improvement and responsible tourism practices. Through active participation in the Penta-Helix collaboration, tourism businesses can enhance resilience and contribute to sustainable economic recovery.

Implications for Local Communities

The results indicate that local communities have a significant role in supporting sustainable tourism development at the destination level. Community involvement is essential for ensuring the implementation of health protocols, maintaining destination cleanliness, and preserving local cultural values. Active participation of community-based organizations, such as Tourism Awareness Groups (POKDARWIS), can strengthen the operational aspects of tourism recovery.

Moreover, community engagement fosters a sense of ownership and responsibility toward tourism resources. By empowering local communities within the Penta-Helix framework, tourism development can generate inclusive benefits and enhance social sustainability.

Implications for Academic Institutions

The study suggests that academic institutions contribute to sustainable tourism development through research, knowledge dissemination, and capacity building. Academics can provide evidence-based recommendations to support policy formulation and tourism planning. Collaboration between universities and other stakeholders enables the transfer of knowledge and best practices related to tourism governance and sustainability. Academic involvement also supports the development of human resources through training and education programs for tourism practitioners. Therefore, strengthening the role of academic institutions within the Penta-Helix model can enhance the quality and effectiveness of tourism development strategies.

Implications for Media

Media organizations play an important role in shaping public perception and rebuilding trust in tourism destinations during the post-pandemic period. Effective communication through media channels can disseminate accurate information regarding health protocols, destination readiness, and tourism policies. Media coverage also supports destination branding and promotion, which are essential for attracting visitors in the recovery phase. Furthermore, media can act as a bridge between stakeholders by facilitating information exchange and public engagement. By actively participating in the Penta-Helix collaboration, media organizations can contribute to transparency, awareness, and sustainable tourism development.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study concludes that tourism development in West Bandung Regency possesses substantial potential for recovery and sustainability in the post-COVID-19 era, particularly given the strategic role of tourism in regional economic development. The findings demonstrate that effective stakeholder collaboration is essential to address the complex challenges faced by the tourism sector following the pandemic. The Penta-Helix collaboration model provides a relevant framework for understanding how government, business actors, local communities, academic institutions, and media interact in supporting sustainable tourism development. In this context, government-led coordination plays a dominant role in regulating public health measures, managing social mobility, and aligning stakeholder actions. Consequently, well-organized collaboration among Penta-Helix actors contributes significantly to rebuilding a resilient and sustainable tourism ecosystem in West Bandung Regency.

Furthermore, the study reveals that post-pandemic tourism recovery requires integrated efforts that consider economic, social, and public health dimensions simultaneously. The implementation of adaptive tourism programs, such as health and safety initiatives, destination readiness, and the utilization of information and communication technology, supports tourism sustainability in the new normal era. The involvement of all Penta-Helix actors enhances policy effectiveness and operational implementation at the destination level. The findings also indicate that collaborative governance can mitigate the negative impacts of crises by fostering innovation, shared responsibility, and collective action. Overall, the Penta-Helix synergy serves as a strategic approach to promoting sustainable tourism development in the post-pandemic context.

This study is limited to a single-regency case study and relies primarily on qualitative data collected from a limited number of stakeholders. Therefore, the findings may not be fully generalizable to other tourism destinations. Future studies may employ comparative or mixed-method approaches to provide broader empirical evidence.

Recommendations

Based on the findings, this study recommends that the government strengthen its coordinating role by ensuring policy consistency and fostering collaboration among tourism stakeholders. Clear regulatory frameworks and integrated planning are necessary to balance public health protection with economic recovery objectives. Continuous evaluation of tourism policies and programs is also recommended to enhance adaptability in future crisis situations. Strengthening

inter-agency coordination can further support effective tourism governance at the regional level. These efforts will contribute to long-term tourism sustainability and resilience.

In addition, tourism business actors are encouraged to continue adopting innovative and responsible practices that align with sustainability principles. Local communities should be empowered to actively participate in tourism development through capacity building and community-based tourism initiatives. Academic institutions are recommended to enhance research collaboration and knowledge transfer to support evidence-based tourism planning. Media organizations should maintain their role in disseminating accurate information and promoting positive destination images. Finally, future research is recommended to explore comparative studies across regions and to apply mixed-method approaches to deepen the understanding of collaborative governance in sustainable tourism development.

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