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Research Paper

Urban geotourism development in the perspective of stakeholders

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Abstract

Geotourism is rapidly experiencing rapid growth in developing countries, such as Indonesia and it is a component of sustainable tourism. In addition, the country has many areas of geodiversity in cities or towns that potentially can become urban geotourism destinations, such as the Bandung Basin area. This region is characterized by geological features, including young volcanic rocks surrounding the mountains, alluvial fans, and lake deposits at lower elevations extending from Rancaekek to the base of Mount Lagadar in the western part of the area. Therefore, this research aims to analyze the respective roles of stakeholders in urban geotourism development. The study used literature review and interview methodology, where data is interpreted with stakeholder analysis, and complemented by descriptive analysis. The results showed that stakeholders were divided into primary (quadrant 1), key (quadrant 2), and secondary (quadrant 3) categories, each with distinct interests and degree of influence. As urban tourism expands, it presents ongoing opportunities to cultivate sustainable practices within these locales. The establishment of urban geotourism necessitates the identification and evaluation of engaged stakeholders. The subsequent planning and management initiatives for the Bandung Basin area can be enhanced through the active participation of stakeholders.

Keywords

Stakeholder analysis; Urban geotourism; Indonesia; Volcanoes

1. Introduction

Geotourism is associated with two main types of landscapes, namely natural and cultural. In the cultural context, industrial or post-industrial landscapes often serve as tourist attractions, featuring various mining relics such as open pits, landfills, and mines. (Świerkosz, Koźma, Reczyńska, & Halama, 2017). Others defined geotourism as a branch of sustainable tourism, that seeks to preserve all natural and human attributes (Ólafsdóttir & Tverijonaite, 2018). Geosites are an important component in urban geotourism, where urban geosites as the places representing geological or geomorphological values, formed as a result of geological processes or produced by man (Górska-Zabielska & Zabielski, 2017; Wolniewicz, 2019). Landforms and cultures, usually in industrial and post-industrial areas, are strongly and historically linked to geotourism (Chylińska & Kołodziejczyk, 2018). In Indonesia, particularly in the Bandung Basin area in the West Java region, geotourism holds significant potential. This region features diverse geological conditions, including young volcanic rocks surrounding the mountains, alluvial fan deposits, and lake sediments spreading from Rancaekek to the base of Mount Lagadar. The Late Pleistocene-Holocene geological composition is shaped by a complex system spanning from Mount Manglayang to Padalarang. This structure influences the distinctive slope, relief, and rock characteristics, warranting further exploration and research (Hadian, Suganda, Khadijah, & Anwar, 2021).

Despite urban landscapes not typically considered for geotourism development, there is a growing recognition of the potential in this research. Previous research explores the reasons behind this potential and implications such as Skibiński, Kultys, Baran-Zgłobicka, and Zgłobicki (2021) and Syaifudin and Hendarmawan (2022). This research explores the case of the Bandung Basin. Various geosites within urban areas offer distinctive attractions, enriching the inventory of geotourism. The evolution of urban geotourism in the Bandung Basin presents a dimension in tourism development paradigms, although tourism was present in the past but urban geotourism was not mentioned in studies of Bandung tourism. Consequently, there arises a necessity for stakeholder analysis concerning urban geotourism in the Bandung Basin and the vicinity. Stakeholders play a crucial role in planning, developing, and conserving geosites as geotourism destinations, recognizing the unique geoheritage value that warrants preservation.

The research was conducted on field survey and observations conducted across geosites in the Bandung Basin area. Subsequent to observations, a matrix is devised for listing urban geotourism sites and associated stakeholders. The research not only maps stakeholders but also examines the role and influence of each stakeholder in geotourism activities within the Bandung Basin area.

1.1. Urban geotourism

Geotourism comprised tourism activities that enhanced the geographical character of a place, including the environment, culture, aesthetics, heritage, and well-being of the inhabitants. In this context, the term “environment” was broadly understood to incorporate geology, although not explicitly stated. The main characteristic of geotourism was the ability to promote the conservation of geological resources through geoconservation. (Dowling & Newsome, 2018).

Geotourism correlated geology as a scientific discipline using objective criteria and scientific methods with tourism, which necessitated subjective requirements and aesthetic components (Garofano & Govoni, 2012). Urban geotourism evolved as a promising method for imparting earth

sciences to diverse audiences, given the clear relationship between human activities and the natural environment, both past and present (Melelli, 2019). Urban geotourism is based on geological landscape and resources on urban areas, it is a branch of tourism centered on exploring geological phenomena and offering aesthetic experiences.

Additionally, geotourism served as an economic activity by providing geoproducts, services, and infrastructure to promote earth sciences, thereby delivering tangible financial benefits to those engaged in the implementation. (Reynard & Panizza, 2005). Geoheritage, a form of geotourism, involves the study and preservation of geologically significant areas, often categorized as geosites or geo-morphosites, based on their unique scientific and cultural characteristics (Reynard, Fontana, Kozlik, & Scapozza, 2007; Pelfini, 2014; Reynard & Panizza, 2005). Although geosites were the best expression of geoheritage, the presence was not ubiquitous and the definition extended beyond objectivity. Therefore, it was crucial to identify geological elements in common features and everyday experiences to disseminate knowledge derived from earth sciences to a broader audience effectively. Urban geo-attractiveness is noticed in relation to some specific stone monuments of architecture (on condition that the interest of tourists is focused on stones and minerals more than the history and architecture of a building), common usage of rare building stones in urban environments (Chylińska & Kołodziejczyk, 2018). The urban geoattraction is part of urban geotourism in the city settings, such as in the Bandung Basin where many historical buildings reside, such as *Gedung Sate* building.

1.2. Stakeholders in urban geotourism

Substantial stakeholders are essential as forums for coordinating and communicating the development of tourism areas. Academics, Businesses, Community, Governments, and Media are stakeholders in urban geotourism. They have their roles according to their abilities. In this study, they are the key stakeholders. The coordination was crucial as it determined community participation in geopark management. Sustainable tourism development depended on informed engagement from all relevant stakeholders to ensure widespread participation. Stakeholders' empowerment served as a crucial element to support sustainable practices and enhance the community's ability to adapt to planned and unforeseen changes (Zuvara, Herdiansyah, & Asteria, 2022).

The preservation of nature could lead to the advancement of the community, contingent upon stakeholders recognizing that environmental quality formed the foundation of tourist attractions. The local community is an important stakeholder and collaborates with tourism destination organization. Stakeholders' engagement is essential for sustainable development and community progress in implementing tourism sector sustainability. Active participation in tourism activities by the community, governments, and management agencies was essential for the sustainable development of geoparks. Tourism flourished when planners ensured harmony with the local environment through effective planning and clear guidelines. However, challenges persisted in balancing resource distribution and tourism capacity through the simultaneous participation of all stakeholders (Zuvara et al., 2022).

Stakeholders' contribution to geopark management is essential for coordination and communication in tourism development. Complex challenges arose when communities were ill-prepared to

comprehend geoparks, leading to resistance toward tourism development within the areas. Geotourism held the potential to diversify local livelihoods and foster the economy. Stakeholders' engagement significantly influenced community participation in managing the tourism areas. Therefore, strong collaboration and communication between the community and local governments as policymakers were needed to achieve sustainable tourism in geoparks (Zuvara et al., 2022).

Collaborating with the local community alongside other stakeholders in heritage conservation was crucial, as it had the potential to transform values, practices, and behaviors toward sustainability. By actively engaging the community and stakeholders in heritage preservation efforts, emphasizing experiential learning could position geoparks as catalysts for sustainable regional development. Maintaining continuous engagement of the local community and stakeholders throughout the participatory process remained crucial for ensuring sustainable heritage conservation and effective geopark management. Fostering cooperation and participation of diverse stakeholders including public administrators, practitioners, academics, and NGOs were essential for successful geopark management.

Understanding the mechanics of participation within geoparks was crucial to ensure continuous improvement. Maintaining stakeholders' participation throughout the geopark development cycle, comprising planning, implementation, program monitoring, and communication was important. Conducting thorough needs assessments of the local community and stakeholders ensured the effectiveness of public education efforts and maximized the impacts of invested resources. These collaborative efforts served as fundamental elements in transforming the local community and stakeholders from a consumptive mindset to being appreciative of natural and cultural resources.

Balancing conservation and development in geoparks was crucial for fostering local community and stakeholders' appreciation of geoheritage, alongside promoting cultural, artistic, and economic regeneration. Sustainable efforts to raise awareness, knowledge, and understanding of heritage conservation within geoparks received serious attention from various stakeholders. Greater support and participation were facilitated by stakeholders, leading to the creation of win-win situations that promoted local economic growth while maintaining sustainable geopark development. Stakeholders' participation enhanced a sense of ownership over heritage values and sustainable conservation for the benefit of present as well as future generations (Halim & Ishak, 2017).

Institutional arrangements in integrated landscape methods were marked by multi-stakeholder collaboration and knowledge exchange, addressing evolving interests and challenges. These arrangements evolved and benefited from initiatives aimed at enhancing stakeholders' connectivity. Introducing relevant landscape concepts relevant to time, space, and stakeholder analysis fostered trust as well as reciprocity in long-term multi-stakeholder partnerships (Lee & Karimova, 2021).

The aspirations and efforts of the local community to achieve environmental conservation and economic development through urban geotourism were greatly influenced by collaboration with other stakeholders. Additionally, meeting natural resource conservation standards and conservation activity criteria was essential for enhancing the environment. Destinations devised distinctive strategies to preserve geoheritage through tourism based on local resources. The local community's strategy included setting common objectives to raise awareness of potential, socializing programs to

all stakeholders, building cooperation networks, innovating, expediting distribution processes, and conducting continuous evaluations (Suyanto, Haryono, & Baiquni, 2020).

In general, stakeholders are defined as any group or individual who can influence or be influenced by the achievement of organizational goals (Graci and Van Vliet, 2020; Manulang, 2017; Nyanjom et al., 2018; Vrontis, Christofi, Giacosa, & Serravalle, 2022). The types or categories of stakeholders in tourism development are based on the attributes of interests and power possessed by the stakeholders. Interest attributes relate to the rights, needs, hopes, desires, and aspirations of stakeholders. In the context of stakeholder relationships, interests influence feelings of like or dislike and determine the status of one's position as a positive stakeholder (friend) or negative stakeholder (opponent). Meanwhile, the power attribute refers to the extent to which the stakeholders have the ability to impose their will on an activity or development project (Manulang, 2017).

The coordination of geopark development was crucial with all stakeholders, including the local community, entrepreneurs, NGOs, and governments (Rosyidie et al., 2018). Sustainable tourism practices considered the conservation of natural and socio-cultural resources while ensuring equitable distribution of benefits among stakeholders and the community. It also represented a significant public agenda aimed at providing economic benefits through job opportunities, new educational prospects, and improved quality of life. Stakeholders typically comprehended the scope of social and economic affairs within the communities (villages) and Sub-district (Sagala, Rosyidie, Sasongko, & Syahbid, 2018).

2. Methodology

The method used is literature study, questionnaires and interviews in the geotourism study. The research design has four stages. The first stage is preparation for a field survey on geosites in the Bandung basin area, starting with compiling a list of geosites to be researched, then the researcher makes a list of questions/checklist for field observations, determines research respondents and processes research permit letters. After that, a matrix of geosites locations and their stakeholders was developed.

The data collected in this study is in the form of primary data and secondary data. The second stage is secondary data collection which is a literature study, where past documents (reports, maps, books, and articles) related to the general condition of the study area (urban geology) Bandung Basin, urban geotourism in Bandung Basin, and geotourism management and stakeholder. Secondary data were obtained from various relevant local institutions, such as the Geological Agency of Indonesia (Badan Geology) for geological data; Geospatial Information Agency (BIG) for topography, land use, socio-economic, and disaster history data from the Spatial Planning Office and Bandung City Tourism Office. After studying the documents, the researcher determined the geotourism attractions and developed a map of the urban geotourism location.

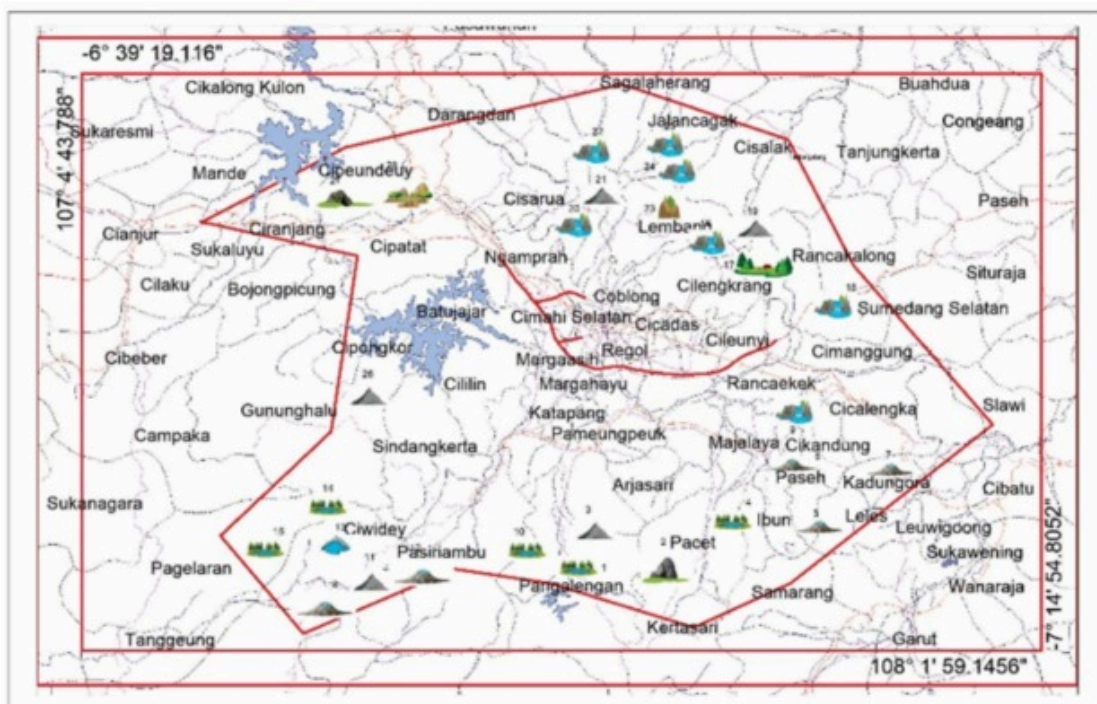
The third stage is collecting primary data, through field observations including descriptions and observations to understand geosite management. Primary data collection was carried out through questionnaires and in-depth interviews with 13 stakeholder respondents. Respondents were selected by looking at their capacity in answering questions. All respondents provide informed consent to participate in this study. Respondents represented each stakeholder element, namely

academics, business, community, government and media. Questions were asked regarding steps for developing urban geotourism which referred to a list of questions as a guide in the process. The list of questions created by researchers is adjusted to the role of the stakeholder, so that each stakeholder is given a different list of questions. The fourth stage is data processing, data analysis and report development. Data from interviews and questionnaires will be processed by making detailed descriptions, grouped according to the category of each stakeholder and then used for stakeholder analysis. Content analysis and stakeholder analysis were utilized, and also descriptive analysis. All stakeholders involved in the planning and decision-making process are accommodated by the stakeholder analysis approach. Central and local governments, geology and mining professionals (academics), tourism businesses, and community representatives are the stakeholders involved in decision-making (Table 1).

Table 1. Stakeholder for urban geotourism in Bandung Basin.

Stakeholder	Organization
Academics	<ul style="list-style-type: none"> University Research Group: University of Padjadjaran (UNPAD), Human Resources Agency of Energy and Mineral Resources, Ministry of Energy and Mineral Resources of Indonesia, Bandung
Business	<ul style="list-style-type: none"> Tour and Travel, Tourist Destination Organization, Tourism Support Facilities Business Sector Actors
Community	<ul style="list-style-type: none"> Local Community Group in Bandung Basin (Geobike, Bandung Heritage, MAGI, PERPIGI, Bandung Basin, Geourban)
Government	<ul style="list-style-type: none"> Development Planning, Research and Development Agency Bandung City Development Planning, Research and Development Agency Bandung Regency Development Planning, Research and Development Agency West Bandung Regency Department of Culture and Tourism of Bandung City Department of Culture and Tourism of Bandung Regency Department of Culture and Tourism of West Bandung Regency
Media	<ul style="list-style-type: none"> Promotional and communication media, digital media, and social media (Tribunnews).

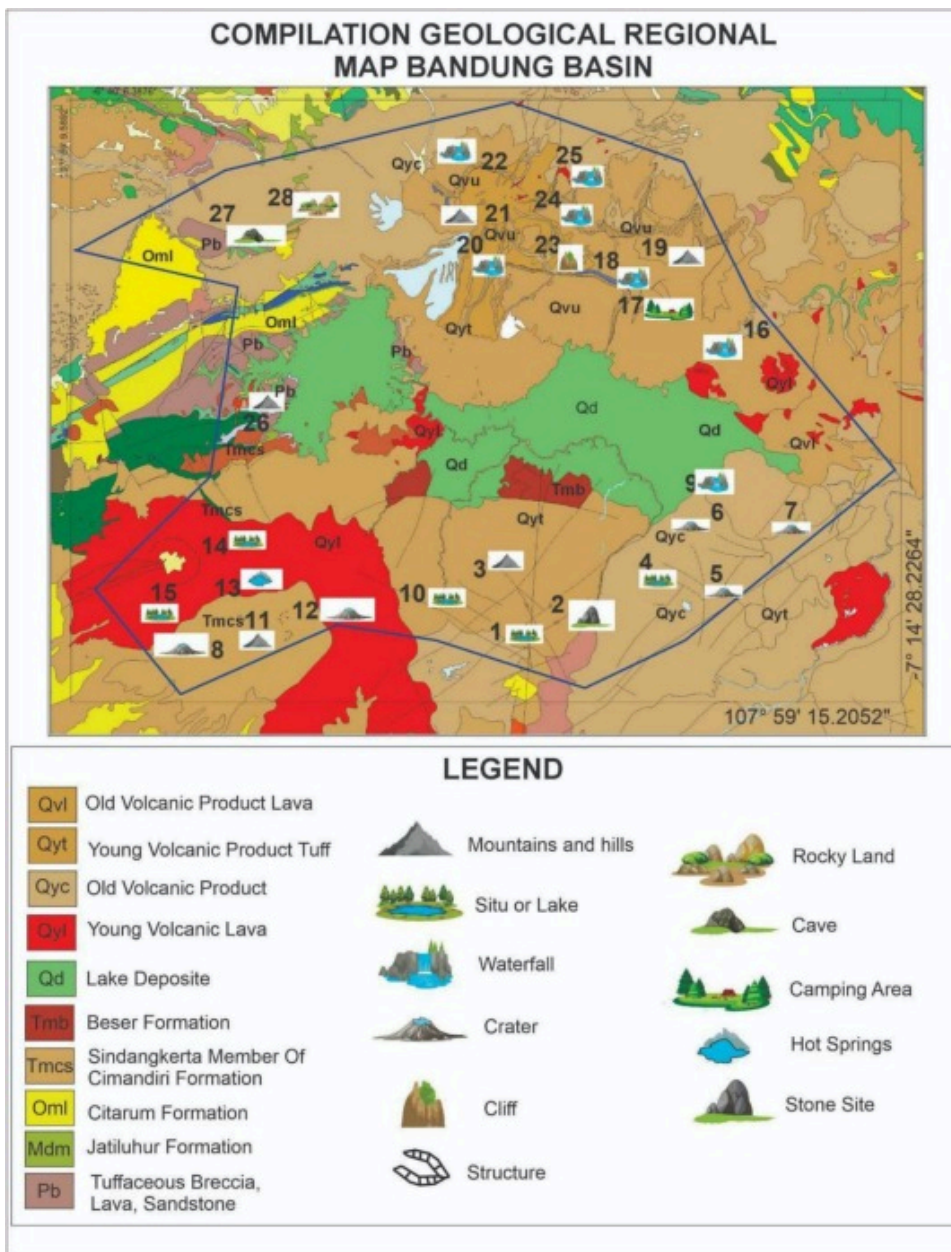
The study area is located at the Bandung Basin, the red line in Fig. 1 shows the borders of the urban geotourism area. The Bandung Basin area has many urban geological attractions, consisting of heritage buildings, geological sites, mountainous areas, volcanic lakes, and sedimentation basins that offer natural landscapes. Bandung Basin has 30 geosites, which are the following: 1. Situ Cisanti, 2. Situ Batu Nanceb, 3. Mount Malabar, 4. Situ Ciharus, 5. Sepur Crater, 6. Manuk Crater, 7. Hujan Crater, 8. Cibuni Crater, 9. Eti waterfall, 10. Situ Cileunca, 11. Mount Patuha (Ranca Canguang Campground), 12. Putih Crater, 13. Cimanggu hot spring, 14. Situ Patengan, 15. Ranca Upas, 16. Cinulang waterfall, 17. site Kuda Rock, 18. Cilengkrang Waterfall, 19. Mount Manglayang, 20. Taman Hutan Raya (Dago Waterfall and Pahoehoe Lava), 21. Batu Mountain, 22. Maribaya Waterfall, 23. Keraton Cliff, 24. Omas Waterfall, 25. Koleang Waterfall, 26. Mount Padang site, 27. Pawon Cave, 28. Stone Garden, 29. Geological Museum, 30. Gedung Sate Building. (See Fig. 2, Fig. 3, Fig. 4, Fig. 5.)



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Fig. 1. Map of study area in Bandung Basin.



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Fig. 2. Map of geological setting in Bandung Basin.



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Fig. 3. Geosite Batu Templek Sukamiskin–Cilengkrang.



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Fig. 4. Geological Museum in Bandung.



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Fig. 5. Stakeholder of Urban Geotourism.

For stakeholder analysis, samples were selected using the purposive sample method with several criteria set by the researcher based on the relevance of the study. In terms of the study area is the location of geotourism attraction in the Bandung Basin. Then the sample is the organizations involved in managing the geosites either directly or indirectly (city government, tourism community, private companies, geological agencies etc.).

The position of stakeholders in geotourism development is mapped in an interest and influence/power diagram. Analysis of stakeholder orientation in geotourism development was carried out using descriptive analysis. The study maps the role of various stakeholders into several categories, namely primary (quadrant 1), key (quadrant 2), and secondary (quadrant 3) stakeholders. Each quadrant has a different interest and influence/power, quadrant 2 (key stakeholders).

3. Results

3.1. Geological setting in Bandung Basin

The Bandung Basin is a topographic basin surrounded by volcanoes with heights ranging from 650 m to more than 2000 m. The Citarum River, which originates at Mount Wayang, Bandung Regency (1700 m above sea level), flows through the bottom of this basin to the Saguling Reservoir, which empties into the north coast of Java, precisely in Karawang Regency. Based on lithological characteristics, the Bandung Basin is divided into four parts based on its constituent rocks, namely Tertiary sedimentary deposits, old volcanic products, young volcanic products, and lake deposits (Narulita et al., 2008).

For the geology of Bandung Basin, its regional boundaries are the Bandung Plateau, the Upper Citarum River Basin, the Citarum-Rajamandala River Basin (Saguling Reservoir), and the Administrative Boundaries of the Western Bandung Regency. However, the boundaries of the Bandung Basin are based on the distribution of ancient Bandung lake sediments that form the Bandung Lake Plain and the surrounding area. This plain is a topographic basin that forms the

Citarum drainage area until it ends at the Citarum drainage point in the Rajamandala hill area. The Bandung Basin was identified as having several landscape units, including the Bandung Lake Plain unit, the Volcano Cone unit, the Homocline Embankment unit, and the Isolated Hill unit.

The Bandung Basin, characterized by its lithology primarily comprising volcanic rocks from the Oligocene to the Recent age, stands as a testament to the diverse geological formations and structural complexities within the West Java region. Its formation, attributed to a multitude of factors including intermountain basins, grabens, calderas, and volcano-tectonic calderas, has given rise to distinct geological features such as the Cibereum Formation, Kosambi Formation, and Cikapundung Formation. Moreover, the basin's tectonic setting, involving asymmetrical frontal subduction tectonics and the presence of fault structures like the Sukabumi-Padalarang Fault and the Lembang Fault, underscores its significance in the broader regional tectonics of the area.

The Bandung Basin's geological evolution, spanning millions of years, has been marked by the deposition of volcanic rocks and sediments, volcanic activities, and overlapping episodes of Tertiary and Quaternary volcanism. This intricate history, reflected in the basin's diverse geological formations and fault lineament patterns, offers valuable insights into the region's geodiversity and geotourism potential. Furthermore, the basin's complex structural geology, encompassing features like grabens and tectonic faults, not only shapes its landscape but also influences its hydrogeological characteristics, making it a compelling area for conservation and sustainable geotourism development in the context of urban geodiversity.

Volcanic disasters are a major concern in areas that are influenced by the geology of certain areas, especially with the eruption of Mount Tangkuban Parahu as a significant example. Eruptions, earthquakes, liquefaction which have the potential to cause damage to property and the environment, as well as endangering the lives of nearby residents. The rock formation characteristics have a significant impact on slope stability in the area. Rocks that are prone to erosion or brittleness can increase the risk of landslides, especially in heavy rain conditions that may occur as a result of climate change. Disaster planning and adaptation are crucial in facing disaster threats related to geology and climate change. Mapping risk zones, identifying evacuation routes and strengthening infrastructure are important steps in mitigation and adaptation efforts.

The distribution of rocks in the Bandung Basin and its surroundings can be divided into several groups, namely marine sedimentary rocks, volcanic rocks, rocks and land sediments. This is the basis for classifying regional development which has been made an integrated part of the development plan. This is related to policies to protect and improving the geological features of various conservation karst areas (shallow marine deposits), volcanic eruption products including those originating from the eruption of the Sundanese volcano with the characteristic tuff ignimbrite and being made into Dutch caves and Japanese caves and Tangkuban Perahu mountain deposits (basalt lava) and geomorphological and processes, and to promote understanding and satisfaction with them. As in the Tahura location (Great Forest Park) which is a buffer zone area from the Cikapundung River which flows into the center of Bandung city, it requires nature conservation and also as a drinking water reserve for city residents, apart from that it also has a geosite which is in the form of a very rare Pahoehoe Lava outcrop found in Indonesia, so good conservation is needed to protect it. The North Bandung Area, despite having a high level of geological disaster risk, is a main tourist destination.

The city government works with local communities, educational institutions and various stakeholders to increase awareness and understanding of geodiversity. For example, the inauguration of the geology museum in Bandung which displays the most complete collection in Indonesia, consisting of more than 250,000 geological specimens including fossils, rocks, minerals, geological maps and various other geological artifacts. The institution functions as an educational platform that offers an extraordinary learning experience, with a variety of exhibitions that provide insight into Indonesia's historical background and natural resources. The museum's fossil collection stands out as a major attraction, featuring fossils of the ancient human *Homo erectus*, the prehistoric elephant *Stegodon Trigocephalus*, and replicating fossils of the carnivorous dinosaur *Tyrannosaurus Rex*. In addition, the museum is equipped with 3D facilities, enhancing visual realism similar to a live encounter.

Ranca Cangkuang Campground represents vital recharge zones located in the Bandung Basin, with the former in the north and the latter in the south. The region is designated as a conservation zone that advocates sustainable development due to its significance in terms of biodiversity conservation and recharge area. They harbor rich biodiversity, serving as important genetic reservoirs for the surrounding ecosystem. Additionally, they fulfill important ecological functions by upholding natural balance, which includes maintaining water quality, reducing soil erosion, and maintaining nutrient cycles. Additionally, they serve as educational and research sites, supporting activities related to conservation, education, and research as part of Sustainable Development efforts. Conservation initiatives in the region are aligned with the Sustainable Development Goals (SDGs), which focus on preserving biodiversity and natural ecosystems. Community engagement plays an important role in upholding and advancing efforts to conserve natural resources and promote sustainable development. In terms of disaster management, the government and communities play a crucial role in implementing strategies to mitigate the risks associated with geological disasters. This involves educating tourists and local communities about potential hazards, implementing safety measures, and developing emergency response plans. These efforts contribute to disaster management by promoting sustainable practices that reduce environmental degradation and disaster risks.

3.2. Policies, program and studies on urban geotourism of Bandung Basin

3.2.1. Policies and program on urban geotourism of Bandung Basin

Based on the literature review of several documents including regulations, policies and government reports, it can be found the role of government and other stakeholders in urban geotourism development. Bandung is known for its diverse tourism potential, including nature, culture, heritage buildings, culinary experiences, and entertainment, with a focus on sustainable tourism development and stakeholder involvement (Permana, Susanti, & Wijaya, 2020). Strategies for tourism development in Bandung include short-term tourist attraction strategies, medium-term amenities and accessibility strategies, and long-term community involvement and ancillary strategies.

The West Java Regional Government has a direction for tourism development through the stipulation of Regional Regulation No. 50 of 2011 concerning the Master Plan for Regional Tourism Development for 2010–2025. These regulations are in accordance with the directions in the tourism

policy document, including Law Number 10 of 2009 concerning Tourism and Government Regulation Number 50 of 2011 concerning the National Tourism Development Master Plan for 2010–2025. Apart from that, Tourism Master Plan (Rippda) Bandung City also refers to policies other than the tourism sector, including Bandung City Regional Regulation Number 08 of 2008 concerning the Long Term Regional Development Plan for Bandung City for 2005–2025 and Bandung City Regional Regulation Number 18 of 2011 concerning City Regional Spatial Planning Bandung 2011–2031. These policy directions are the basis for tourism development of Urban Geotourism Bandung as a tourism attraction and destination.

Bandung Tourism Master Plan refers to policy directions regarding tourism, including Minister of Tourism Regulation Number 50 of 2011 concerning the National Tourism Development Master Plan. Based on the Minister of Tourism Regulation no. 14 of 2016 concerning Guidelines for Sustainable Tourism Destinations, the master plan is used as a pillar of tourism development, local governments involve stakeholders and the central government.

Policy on nature tourism is developed by the Bandung City Tourism and Culture Department. They design tourism marketing and promotion activities by embracing MSMEs. The city of Bandung has creative human resources so it is directed at developing tourism human resources. The government has directed Bandung City toward tourism that is strong with elements of traditional culture, so that the mindset of tourists who come to Bandung is about interesting arts and culture. This is also done with the cooperation of other parties, for example Angkung Udjo as an arts and culture center. Bandung City tourism promotion is also directed at promoting Bandung City SMEs' creative products. Bandung Regency Tourism and Culture Office has been developing strategic tourism areas in Bandung Regency to strengthen tourism competitiveness and answer strategic tourism issues in the form of strengthening Bandung Regency's natural and mountain cultural agro-tourism destinations, utilizing the Bandung City tourist market, and empowering Bandung Regency's tourism stakeholders in a sustainable manner.

They also develop the main tourism area of Bandung Regency to encourage regional and wider regional economic growth. The government develops creative and environmentally friendly natural and cultural attractions in the mountains. They cultivate the tourism industry culture in Bandung Regency supporting efforts to create an environmentally friendly tourism industry. The government uses an integrated tourism marketing approach, in accordance with the diversity of tourism product themes. They make a program with creative and effective marketing strategies and promotional techniques to capture a quality tourism market. Optimizing existing tourism organizations through improving organizational performance and human resources within it. They develop policies and regulations to increase environmental awareness of tourism actors and the community, improve the quality of formal and informal educational institutions in tourism, as well as a climate that is conducive to environmentally sound investment.

West Bandung Regency Tourism and Culture Office has the role to conduct: marketing and promotion policies for natural tourism in Bandung Regency cover the Bandung area and outside Bandung. They determined promotion through West Bandung Regency tourist exhibitions held outside Bandung. The shift in tourist behavior has encouraged the Department of Tourism and Culture to determine the right marketing strategy to promote tourism. They create promotional strategies in areas in West Bandung Regency that are not yet popular with tourists, for example in

the southern area which also has some geotourism, because in the northern area (for example Lembang) there is no need for a massive strategy because tourists are already familiar with the area.

Bandung City Research and Development Agency developed the Bandung city tourism policy. It is directed at mapping tourism potentials in the city center with high levels of crowds. Regional tourism development, including: policies for developing strategic areas and tourism mainstay areas, policies and strategies for developing the tourism industry, developing tourism destinations, developing tourism marketing, as well as developing human resources and tourism institutions. At the regency level, the Research and Development Agency (Bappelitbang) Bandung Regency ensures the concept of sustainable tourism development essentially rests on four pillars, namely: 1) Environmentally sustainable 2) Socially and culturally acceptable (socially and culturally acceptable); 3) Economically feasible; and 4) Utilize technology that is technologically appropriate.

Research and Development Agency (Bappelitbang) West Bandung Regency has the role to maximize tourism potential in the West Bandung Regency area, namely: Thematic Homestay Development (Agro Homestay), Tourism Area Development (KPP), Potential Tourism Destination Development Model, Tourist Destination Development Planning, Agro Tourism Potential Development. Meanwhile the geoheritage policies is under the Ministry of Mineral Resource and Energy of Indonesia, Article 1 number 2, 2020, where as the geoheritage is geodiversity which contain significance as a heritage due to the on-going or already completed geological record that happened on earth which is scientifically significant, rare, unique, and visually appealing that it has its own educational use.

3.2.2. Studies on urban geotourism of Bandung Basin

There are limited studies (seven articles found) published on the Bandung Basin and urban geotourism in the Scopus database 2024, which the author used. The studies were about: Tahura, Karst of Citatah (Pawon Cave and Stone Garden heritage site), human resources in the Citatah Mining area Bandung Basin, community participation in the tourism of Bandung Basin. At the Ir Djuanda Forest Park (Tahura), a number of geographical locations in the region, such as Sunda Ignimbrite at Goa Jepang and Sunda Ignimbrite at Goa Belanda, Lava Tube at Cikapundung River, Pahoehoe Lava at Cikapundung River, Ropy Lava at Curug Lalay, Columnar Joint Lava at Curug Omas, and Lembang Fault Scarp at Keraton Cliff, have been invested as potential geoheritage for geotourism. Geological characterisation and classification indicate that rocks, minerals, geological processes, and landforms/landscapes such fault scarps, grottos, waterfalls, and rivers dominate the geo-heritage potential in this area (Aini, Rahman, Wirakusumah, & Heryadi, 2021).

Another research on Bandung Basin is about Karst of Citatah. The research found a decline in support for the mining industry around many quarries in the area. The community prioritizes promoting sustainable geotourism by constructing historical sites of Guha Pawon Cave and the stunning Stone Garden in the study area. The community recognizes the importance of conserving resources for sustainable urban development above mining (Rohaendi et al., 2021a, Rohaendi et al., 2021b). A study on human resources in Citatah karst (Bandung Basin). have found that in the area people no longer have any interest in supporting the mining industry (Haerani, Muslim, Muslim, & Muslim, 2019). A study on Citarum river, found the area is ideal for intense tourism due to its favorable biophysical characteristics, including low slope, stable lithology, groundwater, and land availability. The Citarum river environment and protected woodland are major barriers to tourism

development. The river in this area is significant as it connects two major dams: Saguling and Cirata (Rohaendi et al., 2021a, Rohaendi et al., 2021b).

Another study was about the communities living in Bandung Basin, specifically on Cibeureum Village. It was traditionally an agrarian society, relying on agriculture, animals, and small traders for daily income. The study states Cibeureum Village was similar to other villages in that residents worked and lived together. However, as the tourism business was established, individuals began to transition from an agrarian to a tourism-focused town. The community begins to work with tourism managers to promote tourism. For example, many have begun to convert their yards into parking lots for tourists in order to improve their revenue. Tourism managers empower and include Cibeureum Village residents, particularly youth organizations (Hadian et al., 2021). Bandung Basin is also known as an area with geological disaster, such as earthquakes, volcanoes, landslides and flash floods. A recent study (Wulung & Abdullah, 2022) links geotourism trail with disaster. The geotourism trail in the Tangkuban Perahu Volcano is in the disaster prone area. It is a volcanic disaster-themed trail. This geotourism area is separated into two pathways that differ depending on the geological process. The Cimahi Geotourism Route features tourist sites from Ancient Sunda Mountain's eruption, such as Cimahi Waterfall, Tilu Leuwi Opat Waterfall, Aseupan Waterfall, Bubrug Waterfall, Layung Waterfall, and Layung Pine Forest.

3.3. Stakeholders perspective on urban geotourism

Urban geotourism is a type of sustainable and conservation tourism related to natural resources in urban areas. To support sustainable geotourism, it is necessary to have a synergistic education program between all geotourism stakeholders. In an interview conducted by the researcher, it was revealed that according to the Bandung Geoheritage community which in this case was represented by AT “geotourism is related to the historical value of geological formation including geoheritage, so that any information about geotourism is needed as educational material for the community. In geotourism objects, for example, there must be location maps and tourist information guides so that visitors can easily find out the natural / geological processes that occur.”

The geotourism education process certainly cannot be carried out by one party alone, but all related parties, including the community. MA from the geo urban community revealed that “The community can also play a role in supporting the sustainability of geotourism, for example by making geotourism objects remain natural without excessive modification, so that they can become a sustainable attraction. Geotourism objects are made as comfortable as possible by not changing the natural aesthetic value of the geotourism.”

From a governmental perspective, policy played a crucial role in guiding other tourism stakeholders. A tourism planner for the Greater Bandung area underscored the importance of research in developing geotourism potential. The planner emphasized the need to prioritize research to formulate effective strategies, focusing on assessing geoheritage and identifying potential geopark locations. Subsequently, a geopark master plan was formulated to guide development of geotourism programs in West Bandung Regency.

The process was associated with tourism promotion, where continuous geotourism promotion aimed to educate the community and promote preservation. “Of course, there were also other destinations to increase tourist visits to geotourism,” remarked EE, the Head of the Tourism

Promotion Section of the Tourism and Culture Office of West Bandung Regency. Geotourism held infinite potential due to its abundance of natural elements, promising enduring value both presently and in the future. Representing the MAGI community, HR showed that tourism offered educational opportunities for development leveraging unique natural elements as special attractions. This sentiment correlated with the notion of IS from the Geobike Community, who asserted that activities organized by the walking or cycling community gradually attracted public attention and spurred interest in joining similar activities.

Another interesting urban geotourism destination was the museum, featuring numerous collections of objects used as educational materials for tourists. SS, the head of the Geological Museum, emphasized the importance of regular updates on collections and services to prevent tourist saturation. Museums served as crucial icons for educating the community about geological processes, fossils, and other collections, igniting tourists' interest in geological phenomena, and fostering exploration of additional tourism sites.

Based on the research, the identification of tourism stakeholders in the activities of urban geotourism in Greater Bandung found educational activities were carried out by urban geotourism communities in Bandung Basin, focusing on preservation of geologically and culturally important areas. Community activities often feature walks and shares, conversations, and the involvement of academics and geologists to spread knowledge about the Bandung basin, Bandung urban geotourism, and Bandung geological and cultural history. The Indonesian Geotourism Assistant (PGWI) played a significant role in the efforts. Previously, a collaborative community research project in the mountains around Bandung gathered 300 mountain names and created geotrails. The community has walking activities with the geotourism community and geologists have become a joint activity in investigating Bandung's geotourism and geoheritage potential. This activity also usually involves geo-gastronomy. There is also geocamping, which is camping in areas affected by geotourism. The camping ground manager stated camping activities are promoted by the river working together with tourism communities in the Gambung Campground and Ranca Cangkang Campground.

The geological museum has a number of exhibition props for specific collections to attract visitors. "Si Cecep" is the geology museum's iconic figure created for branding. He is the guide for tourists to explore the museum. Situated in a historic building, the geological museum held considerable historical significance, which appealed to tourists. The creation of a museum information center has not included promotion materials and clear instructions so visitors can find out more about the contents of the museum. This museum collaborates with artist groups in Bandung, such as storyteller groups, whose job is to provide information and entertain visitors, usually children, through fairy tales. Top museum exhibits are collections presented attractively and equipped with information via holograms. The museum has a library and also special events where the guides, the community and visitors can share learning experiences.

Academic collaboration was found to be important in researching urban geotourism and heritage subjects, with activities aimed at socializing urban geotourism and geoheritage to the general public. Promotional efforts included writing for print media, social platforms, blogs, and publications, as well as reading books. Some members of urban geocommunity and the Bandung Basin actively contributed by writing and producing more works. Sharing sessions often took place during

community travels to destinations, fostering coordination with urban geotourism management. Additionally, sharing archaeological heritage with residents during geotourism-related trips was common. Larger communities sponsored and participated in virtual tourism, educating participants through community-led activities. Furthermore, a book report containing geotourism in Indonesia was written, and geology experts in 25 provinces were organized under established management to provide community education. Sharing sessions included seminars or discussions with officials from other areas and local governments, such as MAGI and PERPIGI.

In this study the urban geotourism stakeholders are grouped into 2 categories: key stakeholders and secondary stakeholders, the classification is part of the stakeholder analysis identification adopted from Nurfatriani et al. (2015). [Table 2](#) details stakeholders of this study.

Table 2. Geotourism Development Stakeholder Category.

No.	Category	Stakeholders	Role
1.	Key Stakeholders	Tourism Attraction Organization Ranca Cangkuang Campsite	- Providing the best service to tourists and providing the best facilities
		Tourism Attraction Organization Ir.Juanda Forest Park	- Assessing the potential of tourist attractions that can be developed - Innovating tour package offers - Providing geotourism education to visitors
		Tourism Attraction Organization (Geology Museum)	- Research updates to museum collections - Adapting the times to the museum collection - Educating visitors about geology and other potentials - Sharing with various stakeholders for museum development - Holding interesting events so that visitors are crowded
		Government (Bappelitbangda)	- Conducting research for tourism studies - Creating a tourism program - Determine tourism development policies and strategies

No.	Category	Stakeholders	Role
		Government (Department of Culture and Tourism)	<ul style="list-style-type: none"> - Conducting a study of tourism potential - Developing tourist destinations - Creating a tourism promotion strategy
2.	Secondary Stakeholders	Higher Education/Research Institute (University)	<ul style="list-style-type: none"> - Research tourism whose results can be taken into consideration for tourism policy-making - Carrying out continuous improvement of the novelty of tourism field
		Community	<ul style="list-style-type: none"> - Conducting tourism activities to promote geotourism - Providing education about tourism to community members and communities
		Business (Tour and Travel)	<ul style="list-style-type: none"> - Providing tourism packages that lead to urban geotourism - Promoting urban geotourism to tour and travel service users - Participating in developing the potential value of each destination visited - Obtaining input/opinions from users of travel services, so that it can be an evaluation material for tour managers

The main stakeholders in geotourism development include tourism destination organizations, government, and geology museums. Tourism attraction organizations are responsible for providing the best services to tourists and facilities, as well as identifying potential tourist attractions that can be further developed. They also play a role in innovating tour package offerings, providing geotourism education to visitors, and organizing events to increase the number of visitors. The government, through the Regional Research and Development Agency (*Bappelitbangda*) and the Culture and Tourism Service, is tasked with conducting research for tourism studies, creating tourism programs, and establishing tourism development policies and strategies. Meanwhile, the

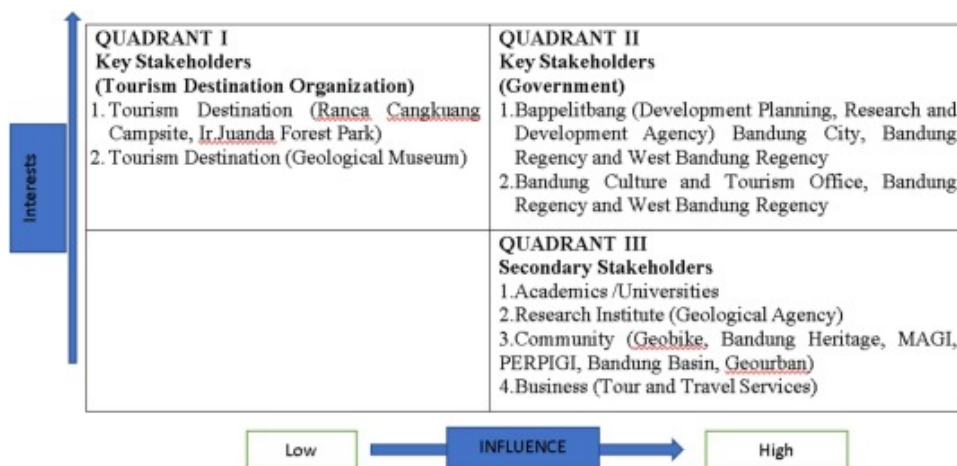
geology museum's role is to provide quality museum collections, educate visitors about geology and conservation, as well as share information with various stakeholders on geological phenomena, its history, and also about the relationship between the land and culture.

The secondary stakeholders include universities, the community and travel businesses. Universities and research institutes conduct research on urban geotourism, and the results can be in the form of publications: reference book, academic journal and also policy brief. University in the Bandung Basin area, such as Padjadjaran University is actively involved in developing urban geotourism through a number of strategic activities, not only research on geosites and urban geotourism, training the local community about geoconservation, but also student activities such as nature field trips. University students also participate in fieldwork (KKN) programs in various regions, where the lecturer and student support the development of geotourism destinations, such as dissemination of knowledge on the importance of environmental preservation for the sustainability of urban geotourism destinations, and developing geotourism products based on geo-attractions available. UNPAD provides consultation and technical support to local governments and communities in managing geoheritage and urban geosites that have geotourism potential. This support includes development of tourism infrastructure, development of cultural and nature-based tourism programs, as well as training to improve community skills and knowledge in managing urban geotourism destinations. The university plays an active role in the development of geotourism in various regions, while supporting the improvement of local community welfare and environmental conservation.

Meanwhile, the geological community or Masyarakat Geologi (MAGI) and the geotourism guide and interpreters (PERPIGI) plays a role in carrying out geotourism activities to promote geotourism and provide education about geotourism to a wider community. PERPIGI is involved in training of geoguides and certification process, ensuring the quality of geo-journey. Meanwhile, the tour and travel business provides tour packages aimed at urban geotourism, promotes urban geotourism to tourists, and participates in developing the potential value of each destination visited. Apart from that, tour and travel businesses also receive input from tourists, which is used as evaluation material for not only their tour manager, but also destination managers.

3.4. Stakeholder mapping

The study mapped the involvement of stakeholders in urban geotourism development, as well as the importance of collaboration between them to achieve common goals in advancing a sustainable tourism industry (see [Fig. 6](#)).



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Fig. 6. Urban Geotourism Stakeholder Roles Based on Interests and Influence/Power.

3.4.1. Quadrant I

In quadrant I there are four stakeholders consisting of tourism destination organizations, crucial in optimizing tourists' value. Tourism destination organization are the main stakeholders because they are the ones who determine the tourism product offering. They are stakeholders who have high interest in tourism, but low influence. Consequently, those included in Quadrant I needed to be empowered, engaged, and further supported in urban geotourism management.

3.4.2. Quadrant II

Stakeholders in quadrant II are referred to as key player stakeholders who have high importance and influence aspects in geotourism development. In this quadrant, here are three stakeholders involved. Stakeholders as key players have legal power in the management of the area, which here the government has a high interest and influence/power on the development of urban geotourism in the study area.

Development Planning, Research and Development Agency and the Culture and Tourism Office have a high interest in tourism management aspects such as planning, implementation, supervision, and evaluation. Stakeholders as key players have legal power in the management of the area. These stakeholders also have the authority to make tourism policies that were previously based on research studies that have been conducted. In addition, stakeholders in this quadrant create tourism programs for tourism promotion.

3.4.3. Quadrant III

Secondary stakeholders with interests in urban geotourism development included academics/universities and research institutions, contributing to tourism science research results applicable to tourism development. The next stakeholder was the community, comprising several groups, namely Geobike, Bandung Heritage, Indonesian Geotourism Community (MAGI), Indonesian Geotourism Guide and Interpreter Association (PERPIGI), Bandung Basin, and Geo Urban. These communities served as mobilizers for society's participation in geotourism development through

activities and educational initiatives about urban geotourism. Tourism support facilities, sector actors, and private stakeholders, including a tour as well as travel businesses, were engaged. These businesses served as an avenue for promoting tourism destinations by recommending the sites to service users. Through this process, the tour and travel acted as mediators in educating about geotourism programs. Narratives about the destinations visited were created, allowing tourists to gain information about the destinations.

4. Discussion

Urban geotourism has not yet become a discourse for tourism in the Bandung Basin although it has great potential. This is reflected in the results of interviews with stakeholders. This is related to stakeholders' understanding of geotourism which is still limited to geological phenomena that are closely related to natural tourism. In stakeholders' analysis, the role and function of each actor are obtained. Based on the previous explanation, the type of relationship that occurs between stakeholders in the development of tourism is observed.

The role carried out by academics is to conduct research on tourism whose results can be taken into consideration for tourism policy making and make continuous improvements to the novelty of tourism. From this role, it can be underlined that tourism needs proper development based on scientific, practical, community conditions and so on. These things can be solved through the results of research / studies conducted by academics, which can further map the right strategy in the development of urban geotourism.

The roles that must be carried out by the Government include designing, organizing and determining the direction, strategy, policies and regulations of tourism. Meanwhile businesses in the urban geotourism setting act as enablers. What is meant by enabler in this case is that business people become stakeholders who help in achieving the desired goals. In this case, tourism destination organizations can cooperate with the private sector, one of which is tour and travel. This can increase the number of visitors and increase the promotion of urban geotourism.

Community is a group of individuals who have the same hobbies and interests, so they will do the same thing related to the development of geotourism. The existence of this tourism community, such as MAGI and Geobikers encourages the process of education for the public on urban geotourism, because each community usually has activities or programs that can be followed by the general public. For example, walking or cycling activities to geotourism areas. Through this activity, the educational process indirectly runs media acts as an expander, namely as an outgoing informer. Digital Media such as online news media in this case is used as a medium of promotion and communication. Social media, through short videos and postings, is part of promotion in urban geotourism.

Overall, the relationship of stakeholders can be defined with the Penta Helix concept shows the significant roles of academics and communities in developing tourism areas, particularly in urban geotourism. Simultaneously, the necessity of the government's role in developing urban geotourism potential is underscored by its programs and policies. Businesses that support tourism promotion, such as tour and travel services and media, are perceived as already being empowered. The collaboration between all parties has foster strong development of urban geotourism in the area.

The findings of this study are somewhat similar with the previous studies conducted by Şadrî) and Briševac, Maričić, and Brkić (2021). Study in Papuk Nature Park showed the importance of combining various parties—mostly volunteers—as well as public institutions in the geotourism.(Briševac et al., 2021).

This study found the Bandung Basin area where the urban geotourism attraction is already developed and geosites are equipped with tourism facilities, and have many stakeholders. Each stakeholder plays a different role and works together to address issues raised by tourists such as lack of infrastructure, cleanliness of the geosites and few information boards, where historic geological information about the area is usually known only by scientists. There are opportunities to develop urban geotourism trails that fit the target market characteristics, extension of possible partners, and networking. Developing tourists' experience in the geo attractions and assessing the experience also geotourism management is what stakeholders can improve in the future. This is similar to past study conducted in Belgrade (Petrovic et al., 2017) about the preservation and maintenance of natural values, their planning and tourism-related interpretation, future research, monitoring and conservation, damage repair, landscape planning can be more effective by improving geotourism management. The success of the world-class tourist destination development program will be determined by the synergy of tourism stakeholders, namely tourists, agents, government, local communities, and non-government agencies. The basic principles of geotourism are tourism promotion, geological conservation efforts, community benefits, and stakeholder involvement (Nikū'ī Şadrî, 2020). Synergy must be able to have a positive impact on all parties, as well as adhere to the fulfillment of social and environmental responsibilities.

5. Conclusion

Urban geotourism has prospects to be developed in the Bandung Basin with a special interest tourism approach pattern that has a niche market for tourists who like geological themes in their tourism itineraries. Bandung Basin has 30 geosites as part of the urban geotourism trail, spreading across three regions: Bandung City, West Bandung Regency, and Bandung Regency. The stakeholders in this study are academics, business, community, government and media. They are classified into 2 groups, which are: key stakeholder and secondary stakeholder, based on their roles. Furthermore, they are mapped into 4 quadrants based on their interest and influence. It is found that key stakeholders are tourism destination organization is in quadrant 1, government is in quadrant 2. Secondary stakeholders are academics, community, tour and travel organizations and the media. By mapping them by their interest and influence, it can be inferred that there is a dynamic between organizations in developing urban geotourism. Collaboration between stakeholders is vital to ensure effectiveness of urban geotourism management.

Further study should be done in the management of geotourism attractions outside of the Bandung Basin, as this study is limited only to areas surrounding the Bandung Basin. The use of stakeholder analysis through the interest-power matrix in this study as the only analysis approach has several weaknesses. As a result, future studies are expected to apply different analytical methodologies more thoroughly. The current study's reliance on stakeholder analysis, specifically through the interest-power matrix, provides valuable insights into the dynamics of geotourism development in the region. However, it is essential to acknowledge the limitations and weaknesses inherent in this approach, as only a limited number of organizations was involved in the study. To comprehensively

understand and effectively manage urban geotourism in the Bandung Basin, future studies should adopt a diverse range of analytical methodologies, allowing for a more nuanced and holistic perspective. The study of urban geotourism in the Bandung Basin holds the promise of fostering sustainable tourism practices, while promoting geological conservation and education. Through continued research and collaboration among stakeholders, the region can unlock its full geotourism potential, offering enriching experiences for visitors while safeguarding its geological heritage for generations to come.

Ethical statement

Ethical approval for this study was obtained from Review Board of Universitas Padjadjaran Fakultas Teknik Geologi. Informed consent was obtained from all participants before the study.

CRedit authorship contribution statement

Mohamad Sapari Dwi Hadian: Conceptualization. **Mochmad Nursiyam Barkah:** Investigation. **Ute Lies Siti Khadidjah:** Data curation. **Ayu Krishna Yuliawati:** Resources, Project administration. **Asti Nur Aryanti:** Validation, Methodology. **Sani Suhardiman:** Writing – review & editing.

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Declaration of Competing Interest

None.

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