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PRESERVING CULTURAL SACREDNESS IN RIVERSIDE TOURISM: PESTEL ANALYSIS OF AYUNG RIVER MANAGEMENT

**Tjokorda Istri Praganingrum^{1*}, Anak Agung Ratu Ritaka Wangsa²,
Ni Luh Made Ayu Mirayani Pradnyadari³, I Made Satya Graha⁴**

*^{1,2,3,4} Department of Civil Engineering, Faculty of Engineering,
UNIVERSITAS MAHASARASWATI DENPASAR*

Abstract

The Ayung River in Ubud, Gianyar, is the longest river in Bali, stretching from the northern mountains to the Badung Strait. The use of this watershed threatens environmental sustainability, especially due to waste pollution. This study aims to examine the pattern of sustainable management on the banks of the Ayung River to support the development of tourism potential. The research method involves problem identification, determination of tourism potential, and PESTEL analysis strategy based on *the concept of Tri Hita Karana*, especially the *Parahyangan element*. The results of the study show that there are weaknesses and opportunities in the arrangement of access to cultural facilities as well as rules that limit tourism development so as not to damage sustainable cultural conditions. The study concludes that cultural preservation efforts related to the Parahyangan element are essential for the preservation of the Ayung River environment.

Keywords: Riverside; Local Wisdom; Environment.

¹ Corresponding author. Email: praganingrum@unmas.ac.id

INTRODUCTION

The Ayung River is the longest river in Bali, flowing 68.5 km across the regencies of Bangli, Badung, Gianyar, and Denpasar City before reaching its estuary at the Badung Strait. Visually, the upper reaches of the Ayung River particularly in the Bongkasa Pertiwi and Kedewatan (Ubud) areas maintain a pristine natural landscape characterized by steep and deep river cliffs. These biophysical traits have established the Ayung River as a premier destination for river-based tourism, notably white-water rafting, which coexists with land uses such as rice fields, forests, and plantations.

However, the river's aesthetic appeal has triggered a surge in the construction of tourism accommodation facilities directly on the riverbanks. This phenomenon creates significant anthropogenic pressure on the river's ecosystem, including threats of waste and sewage pollution. From a regulatory perspective, any spatial utilization in these areas must strictly adhere to the Minister of Public Works Regulation No. 63/PRT/1993 concerning River Banks, River Benefit Areas, River Mastery Areas, and Former Rivers. This regulation dictates specific zoning boundaries to protect the river's ecological function; however, in practice, there is often a disconnect between formal spatial mandates and the rapid pace of tourism development on the ground.

The core planning problem addressed in this study is the degradation of cultural sacredness and the lack of spatial order resulting from ineffective control over river cliff utilization. While the Gianyar Regency Government has initiated Watershed Management Programs aligned with the national "Clean River Program", a more comprehensive approach is required to bridge the gap between technical-legal regulations and local values.

The scope of this study is focused on the river cliff areas of the Ayung River within the Ubud District, Gianyar Regency, a region uniquely positioned as a global hub for culture-based tourism. To formulate an effective preservation strategy, this research employs a PESTEL Analysis (Political, Economic, Social, Technological, Environmental, and Legal) as its primary framework. This analysis aims to link macro-variables such as regional political policies, tourism economic growth, and the legal constraints of the Minister of Public Works Regulation No. 63/1993 with local indigenous wisdom.

The data for this study are derived from primary sources, including field observations and interviews with customary leaders and tourism operators, as well as secondary sources, comprising spatial planning documents, tourism statistics, and environmental regulations. By integrating the *Tri Hita Karana* philosophy, this study seeks to produce a spatial control strategy that not only meets national technical standards but also preserves the sacredness of the river ecosystem as a vital part of Balinese cultural heritage.

LITERATURE REVIEW

Green Open Space

According to Law Number 26 of 2007 concerning Spatial Planning, what is meant by Green Open Space (GOS) is an elongated area or path or grouping whose use is more open, where plants grow, both naturally and intentionally planted (Sinaga et al., 2018).

The function of GOS is divided into (a) GOS as an ecological function, (b) GOS as a communal place, (c) GOS as an aesthetic function, (d) GOS as a barrier, (e) GOS fulfils an educational function, (f) GOS also has an economic function. Meanwhile, based on spatial structure, GOS can follow ecological patterns (grouping, elongated, scattered) and pathological patterns that follow the hierarchy and structure of urban spaces. Related to GOS, ownership is divided into public GOS and private GOS (Ernawati, 2016).

Protected Area Management

According to Presidential Decree No. 32 of 1990, protected area management is an effort to determine, preserve, and control the use of protected areas. Protected areas have several utilisation directions, some of which can be done and others that cannot (Peranginangin, 2014).

In managing protected areas related to the research location, things that must be considered are control of utilisation in watersheds, river banks, existing slope levels, and control in landslide-prone areas. The description of this control is further described in the following sections:

1. Watershed Utilization

The Directorate of Forestry and Water Resources Conservation in the Integrated Watershed Management Model Study stated that watershed ecosystems can be classified into upstream, middle, and downstream areas. The upstream watershed is characterised as a conservation area, the central watershed is a transitional area with characteristics as a distributor and regulator of water, and the downstream watershed is a utilisation area (Susetyaningsih, 2012).

2. Control of River Bank Utilization

Nationally, control of riverbank utilisation has been regulated in the Minister of Public Works Number: 63 / PRT / 1993 Regulation concerning River Bank Lines, River Benefit Areas, River Control Areas, and Former Rivers. Land use in riverside areas is limited (Haribulan et al., 2019).

Prohibited activities on the banks of rivers are (a) disposing of solid or liquid garbage waste and (b) erecting permanent buildings for residential and business premises. Such utilisation must obtain prior permission from the competent authority and meet predetermined requirements.

3. Land Use Control Along the Landslide-Prone Ayung River Bank

Land prone to landslides is related to the slope level and the type of land itself. The relationship is because the slope level and soil type affect the sensitivity of the land to erosion (Titisari et al., 2013).

Architectural Ecology Concept

The ecological concept is the concept of environmental management that utilises potential or natural resources and technology based on environmentally friendly ethical management. Another ecological approach in architecture, according to (Frick, 1998) is that eco-architecture includes harmony between humans and nature (Widiana, 2019).

(Saito, 2002) put forward the following principles of ecological design:

1. **Solution Grows from Place:** The solution to all design problems must come from the environment in which the architecture will be built. The principle is to use the environment's potential and resources to overcome every design problem. This principle emphasises the importance of understanding nature and local communities.
2. **Ecological Accounting Informs Design:** ecological calculations attempt to minimise adverse environmental impacts. Design decisions taken should have as little impact as possible on the environment.
3. **Design with Nature:** Architecture is part of nature. For this reason, every architectural design must ensure the survival of every ecosystem element without damaging the environment.
4. **Everyone is a Designer:** This involves every party involved in the design process. No one only acts as a user, participant, designer, or architect. Everyone is a participant-designer.
5. **Make Nature Visible:** natural processes are cyclical. The architecture should also be able to carry out the process so that the waste produced can be reduced to a minimum.

Tri Hita Karana

Tri Hita Karana is etymologically formed from the word tri, which means 'three', he means 'happiness', and karana, which means 'cause' or 'that which causes'. Thus, *Tri Hita Karana* can be interpreted as three harmonious relationships that cause happiness. *Tri Hita Karana* consists of *Parahyangan*, *Palemahan* and *Pawongan* (Suryatman et al., 2021). *Parahyangan* is a harmonious relationship between humans and Ida Sang Hyang Widhi Wasa, and *pawongan* is a harmonious relationship between humans and their neighbours. At the same time, *palemahan* is a harmonious relationship between humans and their environment.

RESEARCH METHODOLOGY

This research employs a descriptive qualitative approach, executed through a rigorous and systematic framework. The process begins with Spatial Delineation, specifically targeting the Ayung River segments within Bongkasa Pertiwi and Kedewatan. To ensure a focused analysis, the study area is restricted to a 100-meter buffer zone extending from the river's edge. Data collection is divided into two primary streams:

- **Primary Data:** Gathered through direct site observations and extensive documentation across 11 strategic locations (Points A–K).
- **Secondary Data:** Sourced from official spatial planning maps via Gistaru and relevant regional regulations to provide legal and geographical context.

Central to the methodology is the application of the PESTEL framework, which functions as a diagnostic tool rather than a static list. This framework evaluates the feasibility of "Ecological Design" by analyzing Political and Legal alignment with Minister of Public Work No. 63/1993, Environmental factors such as slope stability and waste management, and Social/Spiritual elements, including the mapping of Beji temples and sacred springs.

The final stage involves a Synthesis of these findings. By integrating PESTEL results with the five core principles of Ecological Design (Solution Grows from Place, Ecological Accounting, Design with Nature, Everyone is a Designer, and Make Nature Visible) the research provides a comprehensive evaluation of the site's ecological and developmental potential.

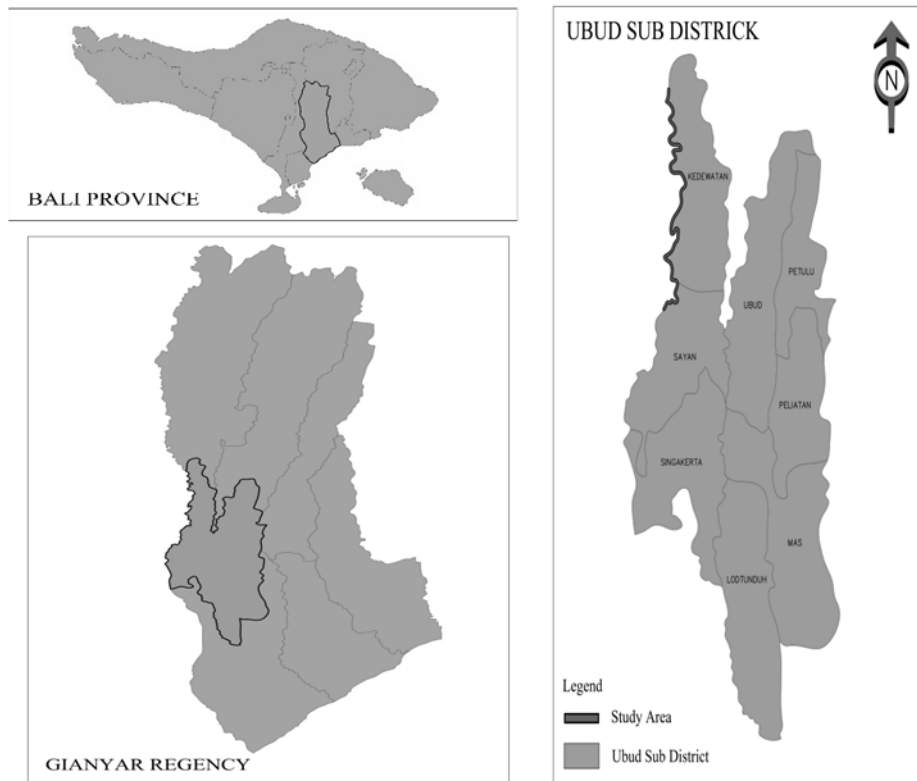


Figure 1: Location Delineation Map

Source: Geographic Information System Tata Ruang (gistaru.atrbpn.go.id) (2024)

ANALYSIS AND DISCUSSION

Field Ayung Riverside Land Use (ARLU)

ARLU was originally a land used by the surrounding community for wet agriculture (rice fields), dry agriculture (moorland), and cultural activities related to springs in the area, especially on the banks of the Ayung River. To date, ARLU is used for various functions, including ecological functions, Socio-Cultural Functions, and Economic Functions (Tourism Utilization) (Praganingrum, 2013).

The function of nature conservation can be seen from (a) wetland and dry-land agriculture and (b) grasslands also function as green open spaces. Socio-cultural functions include (a) sacred places and (b) water sources for community bathing and irrigation of rice fields. This economic function can be demonstrated

by (a) the existence of 4-star hotel accommodation facilities, b) recreational sports (rafting), and (c) wetland and dryland agriculture.

Socio-cultural aspects include religious ritual activities in rice fields, Bedugul Temple, Subak Temple, Pertiwi is the presence of Batu Mekong in Subak Temple, which can be used as a cultural symbol; in addition to Balinese architecture, there are traditional houses in the local community. The daily activities of farmers who work in rice fields, maintain harmonious family relations, make handicrafts, and conventional regional cuisine are socio-cultural attractions. Artificial attractions for recreation can be found at Bali Swing, Pinball Pinball and ATV attractions, and silver craft centres.

The utilisation of the cultural and social functions of the river in the environment on the banks of the Ayung River includes products of flexibility, life experience, and banks of the Ayung River. The social potential of residential areas on the banks of the Ayung River plays a vital role in connecting village community activities from one place to another, such as in Ubud Kedewatan Village and Bongkasa Pertiwi. In addition, the Ayung River is also considered to be a means of transportation that has no impact on air pollution. The Ayung riverside land use map can be seen in figure 2.

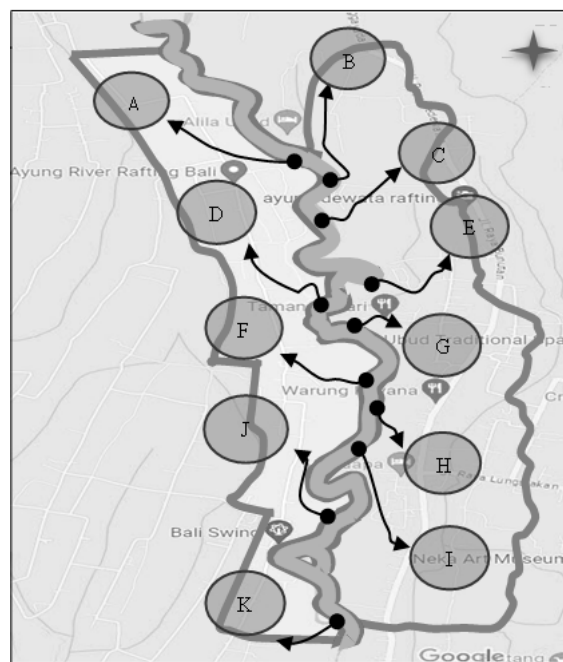


Figure 2: The Ayung Riverside Land Use Map

Source: Geographic Information System Tata Ruang (gistaru.atrbpn.go.id) (2024) with modification

The documentation description in Figure 2 can be seen in Figures A to K.



Figure A. Goa Temple



Figure B. Peliangan Temple, Wulandari Hotel

(Source Figure A, B: Anak Agung Ratu Ritaka Wangsa, 2023)



Figure C. Padma Sari Beji



Figure D. Karang Dalem Water Spring

(Source Figure C, D: Anak Agung Ratu Ritaka Wangsa, 2023)



Figure E. Pelinggih (temple)

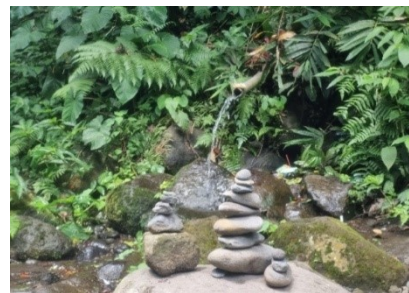


Figure F. Pancoran (water source)



Figure G. Royal Pitamaha Hotel Temple



Figure H. *Pelinggih* (Temple)

(Source Figure E, F, G, H: Ni Luh Made Ayu Mirayani Pradnyadari, 2023)



Figure I. Beji Temple Bongkasa



Figure J. *Pelinggih* (Temple)



Figure K. Bale Tudor Temple

(Source Figure I, J, K: I Made Satya Graha, 2023)

Ecological Design Concept for Ayung Riverbank Land Planning

Given the spatial pressures along the Ayung River, land arrangement must be guided by an ecological design concept that harmonizes anthropogenic activities

with natural constraints. According to (Prasetyo et al., 2018), ecology in environmental management involves the ethical use of natural resources and technology to achieve environmentally friendly architectural outcomes. In the context of Kedewatan and Bongkasa Pertiwi villages, this involves integrating the five core principles of ecological design *(a) Solution Grows from Place, (b) Ecological Accounting Informs Design, (c) Design with Nature, (d) Everyone is a Designer, and (e) Make Nature Visible*, into a robust framework for riverbank governance.

Strengthening Riverbank Control and Regulatory Compliance

A critical component of "Solution Grows from Place" is the strict enforcement of riverbank control measures. The ecological accounting of this design must align with the Minister of Public Works Regulation No. 63/PRT/1993. This regulation serves as a technical baseline for determining the setback lines, ensuring that permanent tourism structures do not infringe upon the river's benefit area. By integrating these legal setbacks into the ecological design, the development creates a buffer zone that prevents erosion and filters runoff before it enters the Ayung River, effectively operationalizing the "Design with Nature" principle. Sacred-Site Protection and the Tri Hita Karana Philosophy

The ecological design concept in this study intrinsically values local wisdom, specifically the Tri Hita Karana philosophy. The principle of Parahyangan dictates that riverbanks are not merely geographical features but sacred landscapes (*Palemahan Suci*). Many points along the Ayung River serve as sites for Melasti or Pengelukatan rituals. Therefore, ecological design must go beyond aesthetics to include "Sacred-Site Protection." This means establishing "no-build zones" around shrines and water springs (*Beji*), ensuring that tourism activities do not desecrate the spiritual atmosphere. This approach transforms the "Make Nature Visible" principle into a "Make the Sacred Visible" mandate, where architectural interventions act as a shield for cultural heritage.

Tourism Carrying Capacity and Environmental Resilience

To achieve long-term harmony (Pawongan and Palemahan), the ecological design must be governed by Tourism Carrying Capacity (TCC). The surge in accommodation along the Kedewatan cliffs necessitates a limit on the density of building footprints to prevent the "over-tourism" that leads to ecological collapse. By calculating the physical and social carrying capacity, planners can determine the maximum number of visitors and structures that the river cliff ecosystem can support without degrading its natural functions. Implementing TCC ensures that the "Ecological Accounting" informs the scale of development, preventing the Ayung River from becoming a victim of its own beauty. This balanced approach

ensures that tourism development supports the local economy without compromising the ecological and spiritual integrity of the river.

PESTEL Analysis

PESTEL analysis is a method for evaluating the external environment that affects a location or project, consisting of Political, Economic, Social, Technological, Environmental, and Legal aspect (Yüksel, 2012). In the context of the Ayung riverbank, we will see how each of these aspects interacts with the concepts of *Parahyangan* (harmony between humans and God, the spiritual realm) and *Tri Hita Karana* (harmony between humans, God, and nature).

1. Politics

- a. Government Policies: Local and national policies related to tourism management and cultural preservation greatly affect the development of the Ayung riverbank. Support from the government for sustainable development in accordance with the *Tri Hita Karana* principle can encourage investment in environmentally friendly infrastructure.
- b. Political Stability: The stable political situation in Bali can strengthen the confidence of tourists and investors in the development of tourism in the area.

2. Economics

- a. Tourism Value: The tourism potential in the culturally rich Ayung riverside area can boost the local economy if developed wisely. The concept of *Parahyangan* can prioritize environment-based tourism that supports the welfare of the community while protecting nature.
- b. Resource Investment: Increased investment in sustainable tourism infrastructure can create new jobs and improve the socio-economic lives of the surrounding communities.

3. Social

- a. Cultural Diversity: The banks of the Ayung river are known for their rich traditions and culture, which are in line with the values of *Parahyangan*. Maintaining social and cultural values is essential to maintain harmony in society as well as attract tourists who appreciate local culture.
- b. Community Participation: Involving local communities in tourism development allows for the creation of synergies that are in harmony with *Tri Hita Karana*, where the community, the environment, and their beliefs interact well with each other.

4. Technology

- a. Innovation in Environmental Management: Environmentally friendly technology can be applied in the development of tourism infrastructure, supporting the *Parahyangan* principle which emphasizes the need to maintain ecosystem balance.
- b. Digital Promotion: The use of information technology to promote local culture and tourism can expand the reach of tourists and enhance their experience, as well as provide in-depth information about the values of *Tri Hita Karana*.

5. Environmental

- a. Nature Conservation: A balance between tourism activities and environmental preservation is the key to achieving harmony in the *Parahyangan* concept. Pragmatism in natural resource management is important to avoid environmental damage due to tourism.
- b. Climate Change Impacts: Dealing with the impacts of climate change is a challenge that must be considered, including in the development of infrastructure that can last in the long term and do not disturb the balance of ecosystems.

6. Legal

- a. Compliance with Riverbank and Cultural Regulations: The integration of formal and customary law is essential for sustainable management. This includes strict compliance with the Minister of Public Works Regulation No. 63/1993, which establishes mandatory riverbank setbacks to protect the river's hydrological and ecological functions. These national standards are further strengthened by customary regulations (*Awig-awig and Pararem*), which designate specific riverside areas as sacred zones. This dual-layered legal framework ensures that the values of *Tri Hita Karana* are upheld, maintaining both the physical safety of the watershed and its spiritual integrity.
- b. Licensing in Tourism Development: Strict regulations on tourism-related development permits need to be implemented to ensure that all projects are in line with the basic principles of environmental and social sustainability. Licensing must not only verify technical engineering requirements but also require a "cultural impact assessment" to ensure that permanent structures do not infringe upon sacred sites or exceed the Tourism Carrying Capacity (TCC). By synchronizing government permits with customary approvals, the development process becomes a robust mechanism for preserving the Ayung River's cultural sacredness.

Table 1: PESTEL Analysis

PESTEL Elements	Scale of Impact	Description	Relevance to Parahyangan and Tri Hita Karana
Politics	5	Government Policies to support cultural and environmental preservation	Encouraging harmony through leadership that respects spiritual values of <i>Tri Hita Karana (Parahyangan)</i>
Economics	4	Tourism growth balanced with Tourism Carrying Capacity (TCC) and local investment.	Creating well-being while maintaining cultural traditions
Social	5	Cultural diversity, community participation, and preservation of sacred rituals.	Strengthening social cohesion and maintaining the sacredness of the river (Pawongan & Parahyangan).
Technology	3	Eco-friendly infrastructure and digital promotion of local wisdom.	Supporting environmental preservation and disseminating the values of <i>Tri Hita Karana</i> .
Environmental	4	Ecosystem protection, cliff stabilization, and watershed conservation.	Maintaining a balance between human activities and natural sustainability
Legal	4	Regulations to protect culture and tourism development licensing. (Minister of Public Works Regulation No. 63/1993 and Customary Laws)	Regulating the interaction between humans, nature, and spirituality. Providing a formal and spiritual legal basis for spatial control and sacred-site protection.

Source: Author's analysis 2024

Analysis of the table results:

1. The high level of political and social influence shows the importance of the involvement of the government and the community in maintaining the values of Parahyangan and Tri Hita Karana.
2. The environmental aspect is also very important in responding to current challenges.

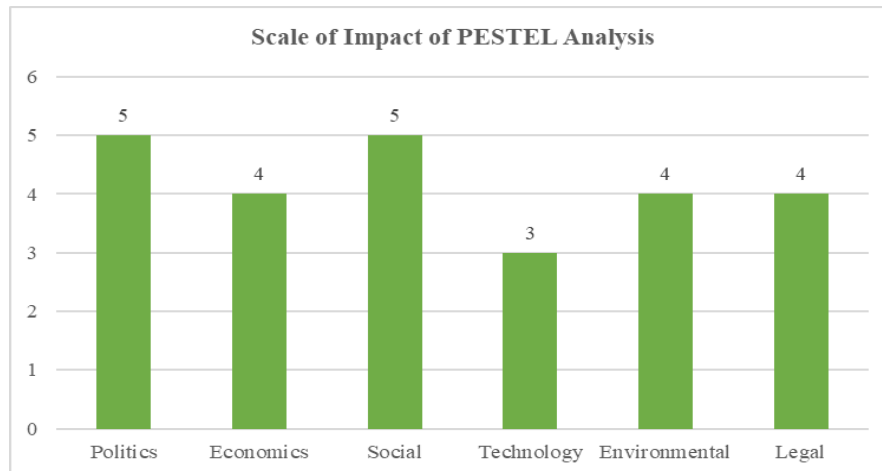


Figure 3. Graph Scale of Impact of PESTEL Analysis
 Source: Author's analysis 2024

Scale of impact description:

- 1 = Very Low
- 2 = Low
- 3 = Moderate
- 4 = High
- 5 = Very High

This PESTEL analysis shows that the development of the Ayung river bank must continue to adhere to the principles of *Parahyangan* and *Tri Hita Karana*. External factors such as government policies, economic conditions, and environmental preservation have a significant impact on the balance between tourism development and cultural and environmental protection. Thus, a holistic and integrated approach is needed to ensure that all elements support each other and maintain the desired harmony.

This research discusses the following essential things:

1. Integration of Local Wisdom: How local community values, knowledge, and traditional practices can be combined with modern design principles to create a sustainable waterfront environment harmonising with local culture.
2. Application of Ecological Design: How environmentally friendly design principles, such as the use of natural materials, water conservation, effective waste management, and the creation of green spaces, can be applied to maintain ecosystem balance and improve the quality of the waterfront environment.

3. Public Space Arrangement: How can the waterfront area be organised into an attractive, functional, and inclusive public space that can accommodate various social, economic, and recreational activities in the community?
4. Community Participation: How to actively involve the community in the planning, design, and management of waterfront areas so that they feel ownership and responsibility for the sustainability of the environment.

This research aims to develop a sustainable, inclusive, and based on local wisdom waterfront area planning model. This model can be an example for developing similar areas in other places.

CONCLUSION

This research concludes that the sustainable management of the Ayung Riverbank is fundamentally rooted in the synergy between strategic planning and Balinese local wisdom. The PESTEL analysis reveals that cultural values, particularly the *Parahyangan* element of *Tri Hita Karana*, function as a vital "non-physical" regulatory framework that effectively constrains uncontrolled land use. These spiritual and cultural norms do not merely maintain a metaphysical balance but act as practical guidelines for environmental preservation. By prioritizing the sacredness of the riverside environment, the community and stakeholders can ensure that tourism development remains within ecological limits, preventing the degradation of the watershed while maintaining its spiritual integrity.

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