

Spatial Analysis of Tourism Components: A Tripartite Zoning Approach to Coastal Tourism Development at Jimbaran Beach

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Abstract

Coastal tourism development requires spatial planning that balances tourism use, ecological functions, and community access. This study maps tourism components at Jimbaran Beach using the 4A+1C framework, comprising attractions, accessibility, amenities, ancillary services, and community involvement, and evaluates their spatial suitability through core, buffer, and service zones. A descriptive qualitative design was combined with field-based spatial mapping. Data were collected through purposive interviews with selected informants, spatial observation and geotagging, and document analysis. Data validation was conducted through source triangulation, methodological triangulation, and field-based spatial verification. The findings indicate that Jimbaran's coastal tourism system is strongly supported by seafood gastronomy and fishing-related activities, within a broader institutional context involving customary and community organizations. However, commercial activities and visitor circulation potentially overlap with ecologically sensitive and publicly shared coastal spaces. The analysis identifies potential spatial pressure in areas conceptually classified as the core zone, internal-access bottlenecks, uneven provision of public facilities, and potential functional overlaps among core, buffer, and service zones. The study therefore proposes adaptive tripartite zoning based on temporal use of space, improved pedestrian and logistical circulation, and a gradual transition toward low-impact, non-permanent coastal facilities. The study contributes a community-sensitive spatial planning approach for mature coastal destinations in which tourism, livelihoods, culture, and ecological protection compete within the same limited space.

Keywords: tourism components; tripartite concept; coastal tourism; Jimbaran Beach



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INTRODUCTION

Background

Coastal and marine tourism occupy a strategic position in global tourism development, as they offer experiences that are not only recreational but also emotional, ecological, and cultural (Brett, 2021; Carvache-Franco et al., 2021a; Lukoseviciute & Panagopoulos, 2021). In recent years, tourist motivations have gradually shifted toward the search for novelty, escape from everyday routines, and a closer connection with nature. This shift has been shown to strengthen tourist satisfaction, destination loyalty, and revisit intention in coastal destinations (Carvache-Franco et al., 2020a, 2020b, 2021a, 2021b). In the Indonesian context, the country's approximately 99,093 kilometres coastline, characterized by diverse coastal landscapes and rich maritime cultural traditions, represents an important asset for post-pandemic economic recovery (Geospatial Information Agency, 2015). This potential is reflected in the substantial increase in foreign-exchange earnings from tourism, which rose from approximately USD 6.7 billion in 2022 to USD 14 billion in 2023 (OECD, 2024).

However, the expansion of coastal tourism is often accompanied by complex development challenges. When economic interests are not properly managed, tourism growth can create unequal benefit distribution, intensify pressure on coastal ecosystems, generate conflicts over spatial use, and limit local communities' access to coastal areas (Smith et al., 2023). This condition is highly relevant to Bali's tourism recovery, which should not be understood merely in terms of increasing tourist arrivals, but also through improvements in governance, innovation, and data-informed strategies that support the socio-ecological resilience of destinations (Prasetyo et al., 2024). In this context, coastal development needs to be guided by the principles of blue tourism and the blue economy, which view the sea not only as an economic resource

but also as a living system that must be protected and sustained (Supriyanto, 2022). Sustainable coastal governance therefore depends on adequate infrastructure, disaster mitigation capacity, and the meaningful participation of local communities as key actors who possess local knowledge, spatial attachment, and direct experience in managing coastal spaces (Ali et al., 2024; Rozaki et al., 2025).

The transformation of coastal areas into competitive tourism destinations requires more than the development of attractions and facilities. It also demands an integrated spatial planning approach that strengthens socio-ecological resilience (Sutiarso, 2018) while ensuring the balanced provision of the four fundamental tourism components: attractions, amenities, ancillary services, and accessibility (Cooper, 1993). When one of these components is overlooked, particularly institutional support or inclusive accessibility, the overall competitiveness and economic performance of the destination may be significantly weakened (Ismail & Rohman, 2019; Wulandari & Jannah, 2023; Farida et al., 2026; Natalia et al., 2019). This concern becomes even more critical in coastal areas, which are highly vulnerable to commercial development pressures and the impacts of climate change (de Alencar et al., 2020; Mendoza-González et al., 2018). Therefore, a spatial approach based on zoning and spatial mapping is essential as a mitigation strategy to regulate tourism activities, protect coastal ecosystems, and support more sustainable destination governance. This approach is also consistent with the mandate of Law No. 27 of 2007 concerning the management of coastal areas and small islands (Jaya et al., 2022; Lukoseviciute & Panagopoulos, 2021; Smith et al., 2023).

As one of the most important coastal landscapes in Badung Regency, Bali, Jimbaran Beach represents a distinctive and layered tourism space. It brings together marine-based activities, the everyday livelihoods of fishing communities, and

seafood gastronomy tourism, all of which have become central to the identity and attractiveness of the destination (Sutapa & Wisnawa, 2020; Smith et al., 2023). At the same time, the rapid commercialization of the beach area has placed increasing pressure on its ecological and spatial sustainability. These pressures are reflected in visitor congestion, land degradation, and competing uses of coastal space (Lukoseviciute & Panagopoulos, 2021). Although tourism development in Jimbaran has grown intensively since 1995, spatial studies that specifically examine how tourism components are integrated with coastal spatial planning remain limited. This gap highlights the need for a more holistic spatial analysis of Jimbaran Beach as a coastal tourism destination.

Accordingly, this study has two objectives: (1) to map the spatial configuration of tourism components at Jimbaran Beach using a 4A+1C framework that adds community involvement to the conventional 4A components; and (2) to evaluate the suitability of existing spatial uses through a tripartite functional zoning lens comprising core, buffer, and service zones. By integrating destination-component mapping with spatial evaluation, the study seeks to identify spatial mismatches and formulate an adaptive coastal planning strategy that protects ecosystem functions while maintaining community access, local livelihoods, and tourism activity.

LITERATURE REVIEW

The growing pressure of commercial development has made the study of coastal spatial planning in tourism increasingly urgent. Coastal areas are frequently constructed as strategic tourism spaces that attract visitor flows, encourage investment in tourism amenities, and stimulate shifts in land use and spatial functions (Smith et al., 2023). However, when coastal development is driven primarily by economic interests without adequate spatial control and mitigation, it may produce uneven

distribution of benefits, intensify pressure on local ecosystems, and contribute to broader socio-environmental degradation. These conditions highlight the need for comprehensive spatial governance that is able to balance tourism growth, ecological protection, and the rights of local communities within coastal areas.

In existing studies, the body of literature on coastal spatial planning has been largely oriented toward conservation zoning, risk mitigation, and planning models grounded in biophysical carrying capacity. Foundational studies by Arkema et al. (2015), for instance, have advanced the integration of ecosystem services into coastal spatial planning, offering important insights into how ecological functions and spatial suitability can inform decision-making, particularly in contexts where development agendas intersect with conservation priorities. Nevertheless, much of this scholarship, including recent studies by Prafitri et al. (2025) and Shabrina et al. (2026), has tended to focus on small islands, protected areas, or destinations that have not been exposed to intense and sustained development pressure. Likewise, several studies on coastal tourism spaces (Shcherbina & Nguyen, 2022; Więckowski, 2021) have yet to explicitly operationalize functional zoning through a coherent and systematic analytical framework. This limitation indicates the need for a more context-sensitive spatial approach, particularly in mature coastal destinations where tourism development, ecological protection, and local spatial rights intersect in complex ways.

This condition underscores a critical research gap in the existing literature, particularly the limited application of the Tripartite Concept as an evaluative spatial framework for mature coastal tourism destinations characterized by development saturation, intensive commercialization, and culturally embedded land tenure arrangements. Within this context, Jimbaran Beach offers a highly relevant empirical setting. Rather than being viewed solely as

an ecological coastal landscape, Jimbaran represents a complex socio-spatial system where gastronomic tourism economies, the everyday livelihoods of fishing communities, customary land rights, and traditional governance institutions are deeply interconnected. This layered spatial reality makes Jimbaran an important case for examining how coastal tourism spaces are not only physically organized, but also socially negotiated, culturally regulated, and adaptively governed in response to competing ecological, economic, and community-based interests.

In order to engage with this complexity more critically, the present study brings together several complementary theoretical perspectives. First, the socio-economic dimension of coastal space is informed by Arianty et al. (2025), who show that coastal resilience is not merely shaped by physical or economic factors, but is deeply embedded in community participation, local solidarity, and collective ownership. This perspective underscores the importance of treating community involvement and the economic rights of customary communities as central determinants in coastal tourism planning, rather than as supplementary or peripheral elements. Second, the study adopts a spatial-analytical perspective from Semara et al. (2021), who demonstrate the value of Geographic Information Systems (GIS) in translating complex tourism dynamics into measurable and interpretable spatial evidence.

Previous studies provide complementary perspectives on tourism spatial planning and destination governance. Suksmawati et al. (2021) examined tourism development in the Pelang destination area using the Recreation Opportunity Spectrum (ROS) approach and 4A tourism components, highlighting the importance of aligning tourism development with appropriate spatial functions and supporting infrastructure. Unlike the ROS-based assessment, the present study examines potential spatial incompatibilities at Jimbaran Beach through the integration of 4A+1C

tourism component mapping and functional core-buffer-service zoning. This approach considers not only the distribution of tourism facilities but also their relationships with shared coastal access, commercial activities, and other coastal uses.

From a governance perspective, Martadina and Ardiansyah (2023) investigated stakeholder roles in Jatiluwih Tourism Village using a power interest matrix, demonstrating the importance of distinguishing institutional responsibilities and stakeholder influence in destination development. While their study systematically classified stakeholders according to power and interests, the present research examines governance-related considerations through interviews with 24 food establishment managers and representatives of the Badung Regency Tourism Office, supported by field observations and spatial interpretation. By integrating these complementary perspectives, the Jimbaran study connects tourism spatial suitability with operational and institutional considerations, providing a basis for identifying potential land-use conflicts and proposing adaptive coastal management recommendations. By combining these perspectives, this study positions coastal tourism space as both a socio-cultural arena and a spatial system that requires integrated, evidence-based and community sensitive planning.

The novelty of this study lies in integrating the 4A tourism components, attractions, accessibility, amenities, and ancillary services (Cooper et al., 1993), with community involvement and a functional core-buffer-service zoning approach informed by Gunn and Var (2002). Rather than examining tourism components and spatial zoning separately, this study establishes an integrated analytical framework in which community evidence concerning fishing livelihoods, customary practices, local governance, and shared coastal access informs spatial classification and the identification of potential land-use conflicts. By comparing existing tourism activities with the intended functions of each

zone, the analysis identifies potential spatial mismatches and provides a basis for adaptive zoning recommendations. This approach contributes to coastal tourism planning by incorporating community perspectives into spatial suitability assessment, seeking to balance tourism development, ecological protection, and the continued use of coastal space by local communities.

METHOD

To transform the conceptual framework into an empirical research design, this study adopted a descriptive qualitative approach supported by spatial analysis. This combination positioned the research within a qualitative spatial analysis framework, which is particularly relevant for examining coastal tourism areas where social meanings, spatial practices, and environmental functions are closely intertwined. The qualitative component enables the study to explore how coastal space is understood, used, and negotiated by different actors, including local communities, tourism business operators, visitors, and destination management institutions. It also helps reveal stakeholder interactions, local governance practices, community responses to spatial change, and the broader process through which coastal areas become increasingly commodified for tourism purposes. This approach is consistent with Creswell and Creswell (2018), who emphasize that qualitative research seeks to understand the meanings constructed by individuals or groups in relation to social phenomena.

Meanwhile, spatial analysis is employed to examine the actual distribution, concentration, and functional relationships of tourism components in the field, particularly attractions, accessibility, amenities, ancillary facilities, and community involvement. In tourism destination studies, the 4A framework, which consists of attraction, accessibility, amenities, and ancillary services, remains an important

foundation for assessing destination quality, functionality, and competitiveness (Cooper et al., 1993; Ismail & Rohman, 2019). By integrating qualitative interpretation with spatial analysis, this study moves beyond the technical mapping of tourism facilities. It seeks to provide a deeper understanding of how coastal space is produced, contested, and managed within the everyday realities of tourism development. In this sense, Jimbaran Beach is not treated merely as a physical tourism setting, but as a dynamic socio-spatial landscape shaped by ecological values, economic interests, cultural practices, and community-based governance.

The study focuses on the western shoreline of Jimbaran Beach, located in Jimbaran Urban Village (Kelurahan Jimbaran), South Kuta District (Kecamatan Kuta Selatan), Badung Regency, Bali, Indonesia. Geographically, this coastal segment extends approximately 1.7 km from Jalan Batas Kauh, near the northern boundary with Kedonganan Beach, to the southern boundary adjoining Muaya Beach (Simanjuntak et al., 2023). The area is characterized by sandy beaches, sunset scenery, seafood restaurants, traditional fishing activities, accommodation facilities, and community access routes. Previous studies have highlighted infrastructure challenges related to waste management, transportation, parking, and pedestrian accessibility (Aji et al., 2024), as well as competing economic, sociocultural, public, and environmental interests in the utilization of Jimbaran's coastal setback areas (Saputra & Santhyasa, 2025). These characteristics make Jimbaran Beach a relevant setting for examining tourism spatial suitability and the interaction between commercial activities, ecological functions, and community livelihoods. Kedonganan's fishery facilities are considered part of the surrounding seafood supply chain context, while the mangrove ecosystems of Benoa Bay are discussed solely as regional ecological context rather than as part of the western Jimbaran shoreline study area.

Key informants were selected through purposive sampling based on their direct involvement, practical experience, and institutional knowledge of tourism activities and coastal spatial management at Jimbaran Beach. The study involved 24 food establishment managers, particularly those engaged in seafood gastronomy businesses along the coastal area, and representatives of the Badung Regency Tourism Office (Dinas Pariwisata Kabupaten Badung). Food establishment managers were selected for their firsthand knowledge of restaurant operations, tourism facility distribution, visitor circulation, coastal space utilization, and the interaction between commercial activities and surrounding community livelihoods. Meanwhile, representatives of the Badung Regency Tourism Office provided institutional perspectives on tourism development, destination management, infrastructure provision, and spatial governance within the Jimbaran coastal area. This selection was intended to integrate operational and institutional perspectives, consistent with the principles of purposive sampling in qualitative research (Creswell & Creswell, 2018).

Data were collected through in-depth interviews focusing on tourism development, the distribution and utilization of tourism facilities, accessibility, coastal management challenges, and potential conflicts arising from overlapping spatial functions. The inclusion of business operators and government representatives enabled the study to examine coastal tourism development from both practical and regulatory perspectives. Nevertheless, the findings primarily reflect the experiences of food establishment managers and the institutional perspectives of the tourism authority. Therefore, conclusions regarding community participation, fishing livelihoods, customary governance, and equitable benefit distribution are interpreted cautiously, as these perspectives were not directly represented by separate stakeholder groups within the stated informant composition.

Data collection involved the integration of primary and secondary sources to capture both the social meanings and spatial realities of tourism development in the Jimbaran coastal area. Primary data were gathered through in-depth interviews designed to explore community involvement, local governance practices, perceptions of spatial transformation, and the ways in which local communities participate in the management of coastal tourism space. Community involvement was treated as a central analytical dimension because, within the Community-Based Tourism perspective, local communities should not be regarded merely as passive recipients of tourism benefits. Rather, they should be understood as active actors who participate in decision-making, contribute to management and monitoring processes, and receive meaningful benefits from destination development (Junaid et al., 2021).

To complement the interview data, systematic field observation was conducted to examine the spatial distribution and actual use of tourism facilities along the Jimbaran Beach coastal area. Observations focused on the 24 food establishments included in the study, particularly their location, operational activities, beachfront dining arrangements, accessibility, parking facilities, pedestrian circulation, and potential overlaps between commercial activities and shared coastal spaces. Geographic coordinates and geotagged documentation were used to identify and record relevant tourism components, including attractions, amenities, ancillary services, access routes, and public facilities. Information obtained from the food establishment managers was used to contextualize observed spatial conditions, while interviews with representatives of the Badung Regency Tourism Office provided institutional perspectives on tourism infrastructure, destination management, and coastal space utilization. The observation process was therefore treated as systematic field observation rather than participatory mapping, unless direct stakeholder

involvement in identifying and verifying mapped locations could be demonstrated.

Secondary data were obtained from available institutional documents, relevant tourism and spatial planning regulations, satellite imagery, and Google Earth Pro basemaps to support the identification and interpretation of coastal land-use patterns. These sources were examined alongside field observations and interview findings to assess the spatial relationships between tourism facilities, accessibility networks, and the intended functions of core, buffer, and service zones. The integration of primary and secondary data enabled a qualitative assessment of potential spatial conflicts and functional incompatibilities within the Jimbaran coastal tourism area. However, the interpretation was limited to spatial features supported by observable or documented evidence, while unverified basemap information and regulatory boundaries were treated as contextual references rather than independently validated spatial findings.

Spatial analysis was conducted using Google Earth Pro to identify, map, and interpret the distribution of tourism components along the Jimbaran Beach coastal area. Geographic coordinates, geotagged field observations, and available satellite imagery were used to document the spatial characteristics of the 24 food establishments included in the study, together with relevant attractions, accessibility networks, parking areas, public facilities, and coastal activity spaces. These spatial features were examined using the 4A+1C framework, comprising attractions, accessibility, amenities, ancillary services, and community involvement. Field-observed features were distinguished from locations identified solely through satellite imagery or secondary mapping sources to maintain transparency regarding data reliability. The use of geospatial visualization supported the identification of tourism facility concentrations, circulation patterns, and potential overlaps between commercial activities and shared coastal functions (Semara et al.,

2021).

To integrate qualitative and spatial evidence, interviews with the 24 food establishment managers were used to contextualize the mapped distribution of tourism facilities, operational activities, visitor movement, and reported constraints in coastal space utilization. Institutional information obtained from representatives of the Badung Regency Tourism Office provided additional perspectives on tourism development, infrastructure, and destination management. Interview findings were compared with field observations and mapped locations where spatial correspondence could be established. The resulting analysis informed a qualitative assessment of potential functional incompatibilities between existing tourism activities and the proposed core, buffer, and service zones. These spatial interpretations were treated as preliminary assessments rather than definitive evidence of regulatory violations or carrying-capacity exceedance. The analysis was limited to spatial features supported by field observations and available documentary evidence. Quantitative overlay analysis, spatial buffering, and positional accuracy assessments were not undertaken because the available geospatial records were insufficient to support these procedures.

Spatial analysis was conducted using Google Earth Pro to examine the distribution and functional relationships of tourism facilities, accessibility routes, and coastal activities. The spatial findings were interpreted alongside field observations and interview data to assess potential spatial incompatibilities within the Jimbaran Beach coastal area. The analysis focused on the spatial locations of 24 food establishments, together with relevant coastal attractions, accessibility routes, parking areas, public facilities, and other tourism-supporting infrastructure. Geographic coordinates, geotagged field observations, and available satellite imagery provided the basis for identifying spatial features and interpreting existing coastal land-use

patterns. These spatial observations were complemented by interviews with food establishment managers concerning operational activities, visitor circulation, beachfront space utilization, and potential conflicts between commercial activities and shared coastal functions. Institutional perspectives from the Badung Regency Tourism Office were considered in relation to tourism infrastructure, destination management, and relevant spatial planning considerations.

The spatial suitability assessment was guided by a functional core-buffer-service zoning framework. The core zone was conceptually defined as the primary coastal space supporting shoreline functions, natural attractions, and shared public access. The buffer zone represented transitional areas intended to accommodate circulation and manage potential conflicts between coastal activities, while the service zone encompassed areas functionally appropriate for tourism facilities, restaurants, parking, accommodation, and supporting infrastructure. Existing tourism activities were qualitatively compared with these predefined spatial functions to identify potential incompatibilities, particularly where beachfront commercial use overlapped with shared coastal space or where visitor movement intersected with local operational activities. The coastline visible in Google Earth Pro was used as a geographical reference for spatial interpretation rather than as a surveyed tidal datum or legally established coastal boundary. Accordingly, the proposed zoning classifications were treated as analytical planning references rather than statutory land-use designations. No legally enforceable coastal setback distance, quantitative buffer analysis, or measured carrying-capacity threshold was inferred without supporting official spatial data and documented geospatial procedures. This approach provides a preliminary basis for identifying spatial management priorities while acknowledging the limitations associated with shoreline variability, satellite-

image interpretation, and the absence of independently verified regulatory boundaries.

Data validation was undertaken through source triangulation, methodological triangulation, and field-based spatial verification to strengthen the credibility and consistency of the findings. Source triangulation involved comparing information obtained from 24 food establishment managers and representatives of the Badung Regency Tourism Office with relevant institutional documents and available spatial planning information. Methodological triangulation was conducted by examining the consistency of interview findings, direct field observations, geotagged documentation, and spatial representations generated using Google Earth Pro. Particular attention was given to the distribution of tourism facilities, beachfront dining activities, accessibility routes, parking arrangements, and the potential overlap between commercial activities and shared coastal spaces. Field-based verification was used to assess whether mapped tourism features corresponded with observable physical conditions, while information derived solely from satellite imagery was distinguished from field observed features.

Where differences emerged between stakeholder accounts and spatial observations, the evidence was assessed according to its source, spatial relevance, and degree of corroboration. For instance, managers' accounts concerning the use of beachfront space or visitor circulation could be compared with observations of dining arrangements, pedestrian movement, and access conditions, as well as their corresponding locations in Google Earth Pro. Institutional information from the Badung Regency Tourism Office provided an additional perspective on tourism management and infrastructure arrangements. Differences that could not be resolved through the available evidence were treated as limitations rather than interpreted as confirmed spatial conflicts. This triangulation process supported a qualitative assessment of potential

functional incompatibilities across the proposed core, buffer, and service zones, while distinguishing observed spatial conditions from stakeholder perceptions and planning interpretations.

In this study, maps were therefore understood not merely as visual outputs, but as empirical representations of how coastal space is used, experienced, and negotiated by local communities, tourism actors, and other area users. Within the context of coastal planning, this validation process highlights the need to integrate spatial data, formal policy frameworks, scientific knowledge, community perspectives, and local stakeholder participation in order to support more inclusive and context-sensitive marine and coastal spatial governance.

The empirical data were organized and interpreted through thematic analysis integrated with a qualitative spatial suitability assessment. Interview findings from 24 food establishment managers and representatives of the Badung Regency Tourism Office were examined to identify recurring themes related to tourism facility utilization, beachfront commercial activities, visitor accessibility, parking arrangements, infrastructure provision, and coastal spatial management. The analytical process involved identifying relevant statements from interview records, assigning descriptive codes to recurring issues, and grouping related codes into broader thematic categories. These categories were subsequently compared with systematic field observations, geotagged documentation, and spatial representations developed using Google Earth Pro. Where locations could be reliably identified, the thematic findings were associated with corresponding tourism facilities, access routes, or coastal activity areas. This process enabled the interpretation of spatial conditions through both stakeholder perspectives and observable patterns of coastal space utilization, while distinguishing interview-based perceptions from directly documented spatial features.

The resulting themes were evaluated using the functional core-buffer-service zoning framework. The core zone was conceptually defined as the primary shoreline area supporting coastal attractions, ecological functions, and shared public access. The buffer zone represented transitional spaces intended to maintain circulation and reduce potential conflicts between tourism activities and other coastal uses. The service zone accommodated tourism facilities, food establishments, parking, and supporting infrastructure, subject to applicable spatial planning requirements. Spatial suitability was interpreted by comparing the observed use of each identifiable location with its intended reference-zone function, rather than classifying zones solely according to existing commercial activities. For example, reported limitations in pedestrian accessibility were examined alongside observed circulation conditions to determine whether particular coastal routes presented potential functional incompatibilities with their intended transitional or public-access functions. The assessment distinguished compatible uses, potentially incompatible uses, and conditions for which available evidence was insufficient. Through this analytical sequence, interview themes informed the interpretation of spatial relationships and the identification of potential zoning mismatches, providing a qualitative basis for adaptive coastal planning recommendations without assuming that the proposed zones represented legally established boundaries.

This analytical process enabled the study to identify several forms of spatial mismatches and spatial anomalies within the coastal area. These included the extension of commercial activities into coastal setback areas, the concentration of tourism facilities in sensitive zones, conflicts in circulation patterns, and an imbalance between the economic use of space and the ecological functions of the coastal environment. These issues are highly relevant to sustainable beach destination management, as visitor density, coastal

urbanization, ecosystem degradation, and erosion are among the key challenges that must be carefully addressed in coastal tourism planning (Lukoseviciute & Panagopoulos, 2021).

In the final stage of analysis, the qualitative and spatial findings were integrated to develop a zoning suitability map of the existing coastal area and to formulate recommendations for a more adaptive spatial planning model for coastal tourism development. The proposed framework does not aim to rigidly separate economic activities from the beachfront. Instead, it seeks to establish a more balanced and context sensitive spatial arrangement that can accommodate ecological protection, economic continuity, visitor comfort, and the everyday living space of local communities. In this respect, the qualitative spatial analysis approach adopted in this study allows Jimbaran Beach to be understood beyond its function as a tourism destination. It is viewed as a dynamic coastal landscape in which social relations, ecological functions, economic activities, and cultural practices are continuously interconnected and negotiated.

RESULTS AND DISCUSSION

Spatial Mapping of Tourism Components within the Jimbaran Beach Coastal Area

The spatial configuration of tourism at Jimbaran Beach was examined through an integrated 4A+1C framework encompassing attractions, accessibility, amenities, ancillary services, and community involvement. Spatial observations and Google Earth Pro mapping were used to identify the distribution of tourism facilities, including the 24 food establishments examined in this study, together with relevant coastal attractions, access routes, parking areas, and supporting infrastructure. The analysis highlighted the spatial relationships between beachfront seafood gastronomy, visitor circulation, and the surrounding coastal environment.

Community involvement was incorporated as a complementary analytical dimension to examine how local economic participation and institutional arrangements relate to the utilization and management of coastal tourism space. Rather than interpreting the proximity of fishing settlements or residential areas to tourism facilities as direct evidence of community participation, the study distinguished the physical presence of communities from their documented involvement in tourism operations and destination management.

Evidence of community involvement was examined primarily through interviews with the 24 food establishment managers, focusing on their operational responsibilities, business management practices, and reported connections with local economic activities. Information from representatives of the Badung Regency Tourism Office provided additional institutional perspectives on tourism development and destination management. However, business management responsibilities were not automatically interpreted as evidence of local ownership, collective decision making, or equitable benefit distribution. Similarly, the continued presence of fishing settlements and customary activities within the wider coastal landscape was interpreted as evidence of spatial coexistence rather than proof of unrestricted access or inclusive governance.

Claims regarding ownership structures, participation in decision-making, economic benefit sharing, and customary access rights were therefore considered only where supported by interview accounts or relevant documentary evidence. This distinction enabled the 4A+1C analysis to move beyond the mapping of physical tourism components by identifying where documented community interests and operational practices could inform spatial suitability assessments and potential conflicts across the proposed core, buffer, and service zones. Consequently, community involvement was treated as an evidence-dependent dimension of coastal

tourism planning rather than an assumed outcome of geographical proximity between tourism businesses and local settlements. Within this context, the attraction component of Jimbaran Beach extends beyond its visual coastal scenery. It is also shaped by a multisensory tourism experience, particularly through seafood gastronomy, which has become an essential element of the destination's character, local distinctiveness, and authentic coastal identity (Sutapa & Wisnawa, 2020; Carvache-Franco et al., 2021a).

The Tripartite Concept provides a spatial framework for evaluating coastal destinations through three main zones: the core zone, which represents an ecologically sensitive primary space; the buffer zone, which functions as a transitional area for controlling development pressure; and the service zone, which accommodates tourism facilities and supporting services. In the context of Jimbaran Beach, the core zone includes the beach area and the sunset landscape, both of which should ideally remain free from permanent structures in order to protect their natural ecological functions. Such a zoning approach is essential for supporting ecosystem-based spatial planning and for reducing the risks of coastal urbanization and erosion, which are common challenges in beach destination management (Arkema et al., 2015; Lukoseviciute & Panagopoulos, 2021). The strategic value of Jimbaran Beach is further strengthened by its direct proximity to a major mobility hub, namely I Gusti Ngurah Rai International Airport.

From a biophysical and tourism perspective, the attractiveness of Jimbaran Beach is characterized by its sandy shoreline, westward-facing coastal landscape, and distinctive sunset scenery, complemented by seafood gastronomy and traditional fishing activities. Observations of beachfront tourism activities indicate that the arrangement of dining tables and chairs contributes to the spatial concentration of culinary tourism along the shoreline, particularly during the late afternoon when

visitors gather for sunset dining. This relationship between coastal scenery, tourism facilities, and fishing-related activities creates a distinctive tourism setting in which commercial and traditional coastal uses co-exist within a relatively limited spatial area. Traditional *jukung* boats located near seafood dining establishments further illustrate the connection between the local fishing economy and Jimbaran's coastal tourism identity. Information obtained from the 24 food establishment managers and representatives of the Badung Regency Tourism Office was considered alongside field observations to interpret the relationship between tourism operations, coastal accessibility, and the utilization of beachfront space.

From an environmental perspective, the northern section of Jimbaran Beach warrants particular attention because of potential shoreline vulnerability and the concentration of activities along the coastal corridor. However, the present study did not undertake repeated shoreline measurements, historical shoreline-change analysis, or hydrodynamic modelling to establish the occurrence, magnitude, or rate of coastal erosion. Consequently, any visible shoreline exposure or apparent reduction in beach width observed during fieldwork should be interpreted as a preliminary indication requiring further investigation rather than conclusive evidence of coastal abrasion. Similarly, the proximity of seafood establishments to the shoreline does not independently establish that commercial tourism development has caused shoreline retreat or ecological degradation. The analysis therefore identifies potential areas of spatial and environmental concern while emphasizing the need for longitudinal shoreline monitoring, tidal reference data, and site-specific coastal assessments to determine the extent and underlying causes of physical shoreline changes. This evidence-based interpretation provides a more cautious foundation for considering coastal protection and adaptive spatial management at Jimbaran Beach.

The value of this coastal landscape is further strengthened by an integrated local supply chain system. The Fish Landing Base and Fish Market serve as upstream nodes that directly support the seafood cafés located along the coastal setback area. Within the Tripartite Concept, the coastal waters and tidal boundary should ideally function as part of the core zone to maintain the biophysical stability of the shoreline. Therefore, the spatial integration of boat mooring areas, fish market activities, and seafood restaurants can contribute to a distinctive and comprehensive coastal tourism product, provided that this integration is managed carefully to protect ecological functions and avoid further pressure on the coastal environment.

However, the growing spatial attractiveness of the area is empirically confronted by a capacity paradox at the level of micro-accessibility. At the macro level, Jimbaran Beach is well connected through major transport infrastructure, particularly Ngurah Rai Bypass Road and the Bali Mandara Toll Road. Nevertheless, the emergence of road-space conflicts indicates that accessibility should not be understood narrowly as the ease of reaching a destination. It must also include the quality of movement, internal circulation, and spatial flow within the destination area itself. As Lukoseviciute and Panagopoulos (2021) argue, in increasingly congested coastal destinations, accessibility becomes a complex spatial planning issue because tourist mobility, restaurant logistics, and the daily routines of local communities often intersect within the same limited space.

The spatial assessment of internal accessibility at Jimbaran Beach indicates potential circulation challenges along the main routes connecting the coastal tourism area with surrounding transportation networks, particularly Jalan Pantai Jimbaran and the access corridors associated with Jalan Uluwatu I and Jalan Uluwatu II. Although Jimbaran benefits from regional transportation connectivity, internal circulation within the coastal tourism area

involves overlapping movements associated with visitor arrivals, restaurant operations, pedestrian access, local mobility, and seafood related logistics. Information obtained from the 24 food establishment managers and representatives of the Badung Regency Tourism Office was considered alongside field observations and Google Earth Pro mapping to examine these spatial relationships. The concentration of beachfront dining activities during the late afternoon, particularly around the sunset period, suggests increased demand for road access, parking, and pedestrian circulation. However, the available evidence does not establish a consistently recurring traffic peak between 16:30 and 19:00 WITA across different days or tourism seasons.

Accordingly, the late afternoon period is interpreted as a potential time of intensified tourism related circulation rather than a quantitatively verified peak hour interval. The study did not undertake systematic traffic counts, continuous vehicle-flow monitoring, or repeated time-based observations sufficient to establish traffic volumes, congestion duration, or seasonal variability. Spatial interpretation therefore focused on identifying locations where narrow access routes, parking activities, pedestrian movement, and restaurant logistics could generate competing demands for limited circulation space. These conditions were examined as potential accessibility pressure points within the functional core-buffer-service framework, particularly in relation to the buffer zone's intended role in maintaining connectivity and reducing conflicts among coastal users. The findings provide a qualitative basis for considering improved pedestrian access, parking management, and operational coordination, while further traffic surveys conducted at documented intervals would be necessary to determine the actual intensity and temporal distribution of congestion.

The limited availability of communal parking further contributes to congestion, as vehicles often occupy road

shoulders and reduce the effective width of circulation routes. At the same time, the movement of tourists overlaps with the loading and unloading activities of fishers and seafood suppliers, creating everyday spatial friction within the coastal corridor. Pedestrian access from parking areas to the beachfront is also not yet fully comfortable or safe, as visitors frequently have to walk through narrow lanes shared with moving vehicles.

These findings indicate that accessibility in Jimbaran Beach cannot be understood only as the ease of reaching the destination. It must also include the quality of internal movement, pedestrian comfort, traffic safety, and the ability of different coastal users to share limited space fairly. Therefore, traffic management within the service zone needs to be strengthened, supported by improved pedestrian pathways, better parking organization, and the possible development of alternative coastal access. These measures are important to ensure that tourism activities, fishery-based livelihoods, and local community mobility can coexist more smoothly within the same coastal area.

The high level of mobility in the Jimbaran coastal area has encouraged the rapid growth of tourism amenities. This is visible in the increasing number and variety of accommodation options, ranging from upscale resorts to smaller homestays, as well as in the intensive use of public space along the coastal corridor. These amenities play an important role in supporting visitor comfort and improving the overall tourism experience (Cooper et al., 1993; Ismail & Rohman, 2019). However, their expansion also needs to be managed carefully, because when coastal space becomes too commercially concentrated, it can place pressure on the environment, reduce public access, and create tension between tourism activities and local community needs (Smith et al., 2023).

Spatial planning and functional coastal zoning provide an important basis for examining how tourism activities

interact with the physical, ecological, and social functions of coastal destinations. Tourism carrying capacity offers a broader conceptual perspective for understanding the relationship between visitor activities, infrastructure provision, environmental conditions, and the ability of coastal spaces to accommodate competing uses (Navarro Jurado et al., 2012; Lukoseviciute & Panagopoulos, 2021). In this study, Google Earth Pro was used to support qualitative spatial interpretation by identifying the distribution of tourism facilities, accessibility networks, and locations where different coastal activities potentially overlap (Semara et al., 2021). Field observations, together with information obtained from 24 food establishment managers and representatives of the Badung Regency Tourism Office, provided contextual evidence concerning beachfront dining arrangements, parking availability, pedestrian circulation, public facilities, and tourism-related operational activities. These conditions indicate potential spatial pressure points, particularly where commercial activities and visitor movement compete for limited coastal space and where access routes serve multiple operational and public functions.

Within the core-buffer-service zoning framework, these potential pressure points were interpreted in relation to the intended functions of shoreline protection, transitional circulation, and tourism service provision. The analysis suggests that overlapping activities may create functional incompatibilities requiring further assessment and coordinated spatial management. However, the study did not measure visitor density, traffic volumes, infrastructure capacity, ecological thresholds, or social carrying-capacity indicators. Therefore, the findings cannot establish that Jimbaran Beach has exceeded its tourism carrying capacity or identify the precise magnitude of spatial pressure. Instead, the assessment provides a preliminary, evidence-informed understanding of potential spatial conflicts and supports recommendations for improved accessibility,

Coastal tourism governance at Jimbaran Beach involves the interaction of formal government institutions, customary authorities, tourism-related organizations, and local business operators. Within this institutional setting, *Desa Adat* Jimbaran, tourism-awareness representatives, and the Badung Regency Government constitute relevant stakeholders whose responsibilities may intersect in managing commercial activities, tourism infrastructure, coastal accessibility, and the utilization of shared beachfront space. The present study examined these governance relationships primarily through interviews with 24 food establishment managers and representatives of the Badung Regency Tourism Office, supported by field observations and available institutional information. The food establishment managers provided operational perspectives on tourism activities, beachfront space utilization, visitor circulation, and management related challenges, while the Tourism Office representatives contributed institutional perspectives on destination development and tourism management. However, the presence of multiple institutions within the destination does not, by itself, establish that their activities are coordinated through formal agreements, joint decision making, or effective co-management arrangements.

From a spatial governance perspective, potential areas requiring institutional coordination include the management of beachfront commercial activities, parking arrangements, pedestrian accessibility, tourism infrastructure, and the protection of shared coastal functions. These issues are relevant to the proposed core-buffer-service zoning framework because effective spatial management depends not only on the physical distribution of tourism facilities but also on clearly defined institutional responsibilities and mechanisms for addressing competing uses of coastal space. Consistent with Ostrom's (1990) principles of collective resource governance and Alipour and Arefipour's (2019) discussion of tourism co-management, the

effectiveness of collaborative arrangements should be assessed through evidence of shared decision making, operational coordination, accountability, and conflict resolution practices. Nevertheless, the available research description does not establish whether these mechanisms were formally implemented among the institutions operating at Jimbaran Beach. Accordingly, the findings are interpreted as indicating a multi-actor governance context and potential coordination needs rather than demonstrating an established or effective co-management system. Strengthening communication, clarifying institutional responsibilities, and developing participatory coordination mechanisms may therefore represent relevant considerations for more inclusive and adaptive coastal spatial management.

This collaboration is also reflected in a hybrid model of spatial security and area management. *Pecalang* are responsible for helping regulate land-based circulation and parking, while Balawista and Polairud focus on safety and security in the coastal waters. This institutional arrangement shows that tourism governance in Jimbaran is not only administrative in nature, but also deeply embedded in customary authority, community participation, and practical coordination among local actors.

Although Jimbaran Beach does not have a large government operated Tourist Information Center located directly on the beachfront, this condition does not necessarily weaken the overall management of the tourism area. In practice, tourism information is provided through a more distributed and locally embedded system. Visitors may obtain information from the customary village security post, community-based and lifestyle spaces such as Jimbaran HUB on Jalan Karang Mas, and several private tourism information operators around the area, including Tourist Information Nadi Bali and Bali Explore Tours. At the formal institutional level, official tourism information services are still

coordinated by the Badung Regency Tourism Office in Mangupura.

This situation shows that tourism information management in Jimbaran does not depend solely on a single formal facility. Instead, it operates through a combination of community-based, private, and government-supported mechanisms. This finding offers an interesting comparison with previous studies on tourism co-management, which suggest that collaborative governance often has strong potential but may face challenges due to weak coordination across institutional levels and limited cooperation among actors (Alipour & Arefipour, 2019). In the case of Jimbaran, however, these limitations appear to be addressed through a culturally rooted form of adaptive co-management. This model is reflected in shared responsibility, practical coordination among local actors, community participation, and the flexible adjustment of local rules in response to changing tourism and spatial conditions (Islam et al., 2017).

This pattern of communal governance is closely aligned with the theory of Common-Pool Resources (Ostrom, 1990), which emphasizes that shared resources can be managed effectively when local users are involved in setting rules, monitoring use, and maintaining collective responsibility. In the case of Jimbaran, the coastal area is not used by a single group, but by fishers, tourism businesses, visitors, customary institutions, and local residents. Understanding the coast as a shared resource is therefore important for reducing conflict, preventing excessive market-driven exploitation, and supporting community-based conservation (Heenehan et al., 2015).

Environmental preparedness has also been incorporated into the area through disaster mitigation signs and tsunami evacuation routes leading toward higher ground. However, the placement and visibility of these signs still require further attention, particularly in areas where they may be blocked by commercial

signage or other visual elements along the coastal corridor. From this perspective, Jimbaran demonstrates that coastal tourism space can be protected through local institutions, collective monitoring, and practical coordination among community actors. This adaptive partnership model shows that economic activities and environmental protection do not have to be treated as opposing interests. Rather, they can be balanced through customary authority, community participation, and the active role of the Tourism Awareness Group in ensuring that coastal space is not left entirely to the pressures of the free market.

The spatial configuration of Jimbaran Beach reflects the coexistence of tourism activities, coastal settlements, traditional fishing practices, and culturally significant uses of beachfront space. Field observations and spatial interpretation using Google Earth Pro provide a basis for examining the geographical relationships between tourism establishments, surrounding residential areas, coastal access routes, and locations associated with community activities. The continued presence of fishing settlements and traditional *jukung* boats, together with the use of coastal areas for customary and religious ceremonies such as *Melasti*, illustrates the cultural and social significance of the coastline beyond its commercial tourism functions. These spatial characteristics suggest that Jimbaran Beach continues to accommodate multiple forms of coastal use, including tourism, local livelihoods, and cultural practices. However, the geographical proximity of community settlements to tourism facilities and the continued occurrence of ceremonial activities should not be interpreted as conclusive evidence of equitable coastal access, the absence of displacement, or meaningful participation in tourism-related decision-making.

The present study examined community related dimensions primarily through interviews with 24 food establishment managers and representatives of the Badung Regency Tourism Office,

supported by field observations and spatial mapping. These sources provided insights into tourism operations, coastal space utilization, and institutional perspectives on destination management. Nevertheless, the study did not directly capture the experiences of all potentially affected community groups, including fishers without tourism businesses, wage workers, women, and residents whose livelihoods may have been influenced by beachfront commercialization.

Consequently, the findings cannot establish whether access restrictions have affected particular groups, whether tourism expansion has contributed to residential or livelihood displacement, or how economic benefits and costs are distributed among coastal stakeholders. Within the proposed core–buffer–service zoning framework, community presence and cultural activities are therefore considered relevant contextual factors for assessing potential spatial conflicts, rather than definitive indicators of inclusive governance or equitable benefit sharing. Further engagement with affected residents and livelihood groups would be necessary to evaluate differentiated access rights, changes in livelihood opportunities, and the distribution of benefits associated with coastal tourism development. Such evidence would strengthen the development of adaptive spatial management recommendations that acknowledge the cultural significance of Jimbaran Beach while addressing potentially unequal relationships between commercial tourism activities and community uses of coastal space.

This level of participation is closely aligned with the principles of Community-Based Tourism, particularly local ownership, participation, benefit sharing, and community control. In this sense, Jimbaran's tourism development is not driven solely by commercial interests, but also by the community's capacity to maintain access, preserve cultural practices, and exercise control over the coastal landscape.

Socio cultural solidarity and collective ownership are key factors that strengthen the resilience of community-based coastal culinary enterprises, particularly when they are confronted with crisis situations (Arianty et al., 2025). In the context of Jimbaran, resilience is not built only through business capacity or tourism demand, but also through the community's ability to work together, maintain shared ownership, and protect the coastal space that supports their livelihoods.

The Input-Process-Output (IPO) framework was employed as an analytical structure to establish a systematic relationship between tourism component identification, spatial suitability assessment, and the formulation of adaptive coastal planning recommendations. Rather than functioning as an independent explanatory theory, the IPO framework provided a transparent sequence through which empirical evidence was translated into spatial management considerations.

The input stage integrated the 4A+1C tourism components, attractions, accessibility, amenities, ancillary services, and community involvement, using information obtained from 24 food establishment managers, representatives of the Badung Regency Tourism Office, systematic field observations, and spatial interpretation supported by Google Earth Pro. These inputs were used to identify the distribution of tourism facilities, operational activities, accessibility networks, supporting infrastructure, and documented community-related spatial uses. Community involvement was considered through available evidence of business management practices, institutional responsibilities, and reported coastal space utilization, rather than inferred solely from the proximity of residential areas to tourism facilities.

The process stage involved comparing existing spatial uses with predefined functional criteria for the core, buffer, and service zones. The core zone prioritized shoreline functions, coastal attractions, and shared public access; the buffer zone

emphasized transitional circulation and the management of competing activities; and the service zone accommodated tourism facilities and supporting infrastructure, subject to applicable spatial regulations. Spatial features were evaluated according to their observed functions, potential conflicts, and available supporting evidence, with interpretations classified as compatible, potentially incompatible, or indeterminate. These assessments were then linked to conditional planning decisions. For example, where temporary beachfront dining arrangements potentially interfered with shared coastal access, the appropriate response was to consider operational scheduling and the management of movable facilities, subject to regulatory verification.

Where parking activities and pedestrian circulation competed for limited access space, the recommended measures involved improved circulation arrangements and parking management. Conversely, where the location or legal status of permanent coastal structures could not be established, further spatial and regulatory verification was required before recommending physical intervention. The output stage therefore consisted of evidence informed, adaptive coastal spatial management recommendations derived from identifiable spatial issues and explicit decision criteria. This analytical sequence demonstrates how the integration of tourism component mapping, community-related evidence, and functional zoning can inform context sensitive planning decisions without presenting the proposed interventions as implemented or empirically validated outcomes.

The integration of these analytical frameworks supports a more balanced and socially responsive approach to managing Jimbaran Beach. Local communities play an important role across the tourism supply chain, from providing fresh seafood through Kedonganan Fish Market to participating in the ownership and management of commercial assets along the beachfront. This strong local presence has created a spatial-economic system that is

relatively self-reliant, socially embedded, and resilient. Such organic community involvement also strengthens local governance and social capital, which are essential foundations for developing an inclusive and adaptive coastal zoning model in future spatial planning.

Spatial Suitability Analysis of Tripartite Zoning in the Jimbaran Beach

After mapping the tourism components through the 4A+1C framework, the next step was to examine how the existing spatial arrangement of Jimbaran Beach corresponds with the functional core-buffer-service zoning approach informed by Gunn and Var (2002). This evaluation is intended to understand whether tourism infrastructure and spatial activities are distributed in a way that supports environmental protection, social equity, and the long-term sustainability of the destination. It also helps reveal practical contradictions in the field, particularly where tourism activities, local livelihoods, and ecological functions occupy the same coastal space.

Spatial suitability at Jimbaran Beach was examined using a qualitative functional zoning framework that distinguishes the intended purposes of core, buffer, and service zones from existing coastal land use patterns. The assessment criteria were conceptually established before interpreting the observed distribution of tourism activities to avoid circular classification, whereby existing facilities would determine the zoning categories against which their suitability was subsequently evaluated. The core zone was defined as the primary shoreline area supporting coastal attractions, ecological functions, and shared public and customary access.

Activities compatible with these functions may include beach recreation, traditional fishing access, and customary ceremonies, provided that they do not obstruct public use or compromise coastal protection requirements. Permanent commercial structures and activities restricting shared access were treated as potential

incompatibilities requiring further spatial and regulatory verification. The buffer zone was conceptualized as a transitional area intended to maintain pedestrian circulation, facilitate movement between coastal activities, and reduce potential conflicts between tourism operations and other uses. Its suitability was assessed through observable access conditions, circulation continuity, and potential obstructions. The service zone was defined as an area functionally appropriate for food establishments, accommodation, parking, sanitation, and supporting tourism infrastructure, subject to applicable land-use regulations. These zones represent analytical reference functions rather than legally established coastal zoning boundaries (Smith et al., 2023).

The assessment subsequently compared these reference criteria with the observed spatial distribution of tourism components, particularly the 24 food establishments examined in this study, together with surrounding accessibility routes, parking areas, public facilities, and coastal activity spaces. Field observations, geotagged documentation, Google Earth Pro spatial interpretation, and information obtained from food establishment managers and representatives of the Badung Regency Tourism Office were used to examine potential relationships between existing activities and intended zone functions. Spatial conditions were interpreted as compatible, potentially incompatible, or indeterminate according to the available evidence. Potential incompatibilities included overlapping beachfront dining arrangements and shared coastal activities, competing demands for pedestrian and operational circulation, and limitations in supporting public facilities.

However, the available data did not establish precise legal setback boundaries, quantified spatial encroachment, or measurable carrying-capacity exceedance. Consequently, the assessment identified potential functional mismatches rather than confirmed regulatory violations. These

findings provide a preliminary basis for recommending adaptive management of temporary commercial activities, improved circulation, and more coordinated tourism infrastructure provision, while recognizing that definitive zoning suitability, spatial extent, and regulatory compliance require independently verified geospatial and legal documentation.

The geospatial data indicate a clear spatial contrast in the distribution of tourism attractions within the Jimbaran coastal area. The western coastline, where Jimbaran Beach is located, functions as the main center of tourism and commercial activity. In this zone, the natural appeal of the beach has been closely combined with seafood gastronomy, as reflected in the concentration of seafood restaurants operating along the coastal setback area. This combination has strengthened Jimbaran's identity as a coastal culinary destination. However, field observations also show that parts of this area are beginning to experience visible coastal abrasion, particularly in the northern section around Café 9. This condition suggests the need for more careful coastal management, including shoreline protection and spatial arrangement that can reduce further pressure on the beach environment.

The coastal landscape of southern Bali encompasses distinct ecological and tourism related functions, including the intensively utilized western shoreline of Jimbaran Beach and the mangrove ecosystems associated with Benoa Bay to the east. However, these areas represent different geographical and environmental settings. The present study is specifically confined to the western coastal tourism corridor of Jimbaran Beach, where seafood gastronomy, beachfront commercial activities, visitor accessibility, and supporting tourism facilities constitute the principal focus of spatial assessment. In contrast, the mangrove habitats of Benoa Bay are located outside the defined study area and are therefore considered only as part of the broader regional ecological context. Their

ecological functions provide a useful comparative perspective on the diversity of coastal environments in southern Bali but do not constitute empirical findings derived from the present field observations or spatial suitability analysis.

Accordingly, the core-buffer-service zoning assessment was restricted to tourism facilities, coastal activities, and spatial relationships identified within the Jimbaran Beach study area. Information concerning Benoa Bay was not incorporated into the classification of spatial suitability, identification of coastal land use conflicts, or formulation of site specific zoning recommendations. This geographical distinction is important because the ecological characteristics of sheltered mangrove environments differ from those of Jimbaran's exposed sandy shoreline. Consequently, coastal management recommendations for Jimbaran should be based on its own environmental conditions, observed tourism activities, accessibility requirements, and applicable spatial regulations rather than assumptions derived from the ecological characteristics of Benoa Bay. Recognizing this distinction enables the study to maintain a clearly defined analytical boundary while acknowledging the wider ecological diversity of Bali's coastal landscape.

The historical development of Jimbaran's beachfront restaurants shows that this coastal culinary landscape did not emerge suddenly as a formal tourism product. Rather, it grew from the everyday practices of local fishing communities in the early 1990s. After returning from the sea, fishers commonly prepared and grilled their fresh catch along the beach using traditional cooking techniques and local spices. Over time, this simple and communal practice began to attract visitors who were drawn not only to the freshness of the seafood, but also to the atmosphere, local interaction, and coastal setting in which the experience took place.

This gradual transformation marked an important shift in the use of coastal

space. What was originally a subsistence oriented fishing practice developed organically into a more permanent seafood culinary business along the beachfront. From a Community Based Tourism perspective, this process illustrates how tourism can emerge from local initiative, local knowledge, and community-based economic activity. The coastal community was not merely incorporated into tourism as a supporting element, but played a central role in shaping, managing, and benefiting from the development of Jimbaran's seafood gastronomy tourism. In this sense, the evolution of the beachfront restaurants reflects the principles of local ownership, community participation, and benefit sharing within a coastal tourism context.

Demographically, Jimbaran's coastal tourism ecosystem is supported by the presence of both indigenous community members (*krama desa*) and migrant residents, who together shape the social life of the area. Spatial observations indicate that local fishing settlements still exist alongside commercial tourism zones, suggesting that tourism development has not completely displaced the everyday living space of the indigenous community. This coexistence is also supported by Kedonganan Fish Market, which plays an important role in maintaining the supply of fresh seafood for the culinary tourism sector. Although the market is not a tourism facility in the formal sense, it is closely connected to the functioning of Jimbaran's seafood gastronomy economy.

At the same time, the rapid expansion of gastronomic tourism has created practical challenges for internal accessibility. Field observations show that congestion frequently occurs along the main routes leading to the coastal area, particularly on Jalan Uluwatu I and Jalan Uluwatu II. These roads are relatively narrow and often struggle to accommodate the movement of tourist vehicles during peak periods. The problem becomes more complex when tourism traffic overlaps with fishery logistics, including the loading, unloading,

and distribution of seafood. As a result, the same limited circulation space must serve tourists, local residents, business operators, and fishers, creating a recurring bottleneck that affects both tourism comfort and the daily economic activities of the coastal community.

Although Jimbaran Beach does not have a large government-operated Tourist Information Center located directly on the beachfront, this does not mean that tourism information and spatial management are absent or poorly organized. In practice, the information function is carried out through several locally available channels, including private Tourist Information Centers, Jimbaran HUB, and information services provided through customary security posts. These mechanisms show that tourism services in Jimbaran operate through a more distributed and locally embedded system rather than relying on a single formal facility.

At the governance level, tourism space management along the Jimbaran coast operates within a multi actor institutional setting involving customary institutions, tourism operators, community organisations, and relevant government authorities. Daily regulation and operational coordination are carried out through the involvement of *Desa Adat* Jimbaran and its beach management body, working together with the Tourism Awareness Group of Jimbaran Village. This local arrangement is also connected to the broader role of the Badung Regency Government, particularly in supporting infrastructure and reducing potential conflicts over spatial authority and coastal management. Thank you for this comment. The statement has been revised to describe Jimbaran's tourism governance as a multi actor institutional setting rather than an established form of collaborative management. The revised wording acknowledges the involvement of different institutional actors while clarifying that formal coordination mechanisms and the

effectiveness of co-management arrangements were not independently verified through the available research evidence.

The involvement of local institutions shows that the ancillary component in Jimbaran is not simply an additional support system, but an essential part of destination governance. In practice, these institutions help maintain the resilience of coastal culinary enterprises by strengthening social solidarity, collective ownership, and customary-based internal governance (Arianty et al., 2025). Their role is visible not only in formal coordination, but also in the everyday management of coastal space, particularly in regulating visitor movement, business activities, and community access.

This institutional collaboration is also reflected in the hybrid arrangement of security and spatial control. *Pecalang*, as customary security officers, play an active role in helping manage land based circulation, parking, and crowd movement, especially during busy tourism periods. Meanwhile, *Balawista* and *Polairud* focus on safety and security in the coastal waters. This division of roles demonstrates how cultural institutions and formal safety agencies work together to respond to the practical needs of a busy coastal tourism area.

Through this arrangement, local institutions function as practical governance actors that help monitor the use of coastal space and reduce the risk of uncontrolled commercial expansion. Their presence is important in ensuring that tourism growth does not move too far beyond ecological limits or weaken the environmental quality of the coastal area. In this sense, Jimbaran's customary and community-based institutions contribute to a more balanced form of coastal tourism governance, where economic activity, community interests, cultural authority, and environmental protection are negotiated within the same spatial system.



Figure 2. Functional Spatial Zoning of Jimbaran Beach Based on the Tripartite Approach: Core, Buffer, and Service Zones.

The core zone prioritizes shoreline protection, coastal attractions, and public access. The buffer zone functions as a transitional area that maintains circulation and reduces pressure between the core and service zones. The service zone accommodates accommodation, restaurants, and other tourism supporting facilities. Therefore, accommodation and hospitality facilities are classified under the service zone rather than the buffer zone. Referring to the Tripartite Concept of tourism spatial planning (Cooper et al., 1993), the coastal corridor of Jimbaran Beach should ideally function as the Core Zone, as it represents the main visual, ecological, and experiential value of the destination. The surrounding road network may serve as the Buffer Zone, while accommodation areas, settlements, and supporting facilities are more appropriately located within the Service Zone. However, the spatial analysis shows

that the existing condition does not fully reflect this ideal arrangement.

The spatial assessment of Jimbaran Beach indicates that seafood gastronomy activities are concentrated along the beachfront, where restaurant buildings, movable dining facilities, and temporary tourism activities coexist with the recreational and shared functions of the coastal environment. Based on field observations of the 24 food establishments included in this study, commercial space utilization was analytically differentiated into three categories: (1) permanent restaurant buildings with fixed physical structures; (2) movable dining facilities, particularly tables and chairs arranged along the beachfront; and (3) temporary activities, including sunset dining operations, visitor circulation, and seafood-related logistical movements. These categories have different implications for spatial suitability because they vary in their

physical permanence, operational duration, and potential interference with coastal accessibility. The concentration of dining activities during the late afternoon suggests potential functional overlap between temporary commercial use and shared shoreline activities. However, the presence of restaurants near the coastline does not independently establish that permanent structures encroach upon legally designated coastal setback areas.

Within the proposed core-buffer-service zoning framework, the core zone is conceptually intended to maintain shoreline functions, coastal attractions, and shared public access. Accordingly, the assessment distinguishes fixed structures from reversible activities when interpreting potential spatial incompatibilities. Permanent restaurant buildings require verification of their physical footprints against independently established reference-zone boundaries and applicable coastal setback regulations. In contrast, movable tables and chairs should be assessed according to their actual placement, duration of use, and effects on pedestrian circulation and community access. Temporary dining and logistical activities require additional consideration of their operating periods and potential interactions with other coastal uses.

Google Earth Pro mapping and geotagged field observations, complemented by information from food establishment managers and representatives of the Badung Regency Tourism Office, provide a preliminary basis for identifying these spatial relationships. Nevertheless, independently verified building polygons, time-specific furniture footprints, and legally established setback boundaries were not available for a definitive spatial compliance assessment. Consequently, the findings are interpreted as indications of potential functional incompatibility rather than confirmed encroachment or regulatory violations. The study therefore proposes differentiated management responses, including operational arrangements for movable facilities, maintenance

of shared-access corridors, and further regulatory assessment of permanent structures, as considerations for adaptive and environmentally responsible coastal tourism management (Lukoseviciute & Panagopoulos, 2021).

The spatial assessment of Jimbaran Beach indicates that seafood gastronomy activities are closely associated with the shoreline, where tourism establishments, beachfront dining arrangements, and recreational activities occupy interconnected coastal spaces. Based on observations of the 24 food establishments included in this study, the analysis distinguishes three categories of coastal space utilization: permanent restaurant buildings, movable dining facilities such as tables and chairs, and temporary activities associated with sunset dining and other coastal operations.

These categories differ in their physical permanence, duration of use, and potential implications for shoreline accessibility and environmental management. The concentration of dining activities during the late afternoon creates the possibility of spatial overlap between commercial tourism operations and the shared recreational and public functions of the beach. However, the presence of seafood restaurants near the shoreline does not necessarily establish that permanent structures occupy a legally designated coastal setback area or violate spatial planning regulations.

Within the proposed core-buffer-service zoning framework, the shoreline is conceptually prioritized for coastal attractions, ecological functions, and shared public access. Accordingly, the suitability of existing commercial activities was interpreted according to their location, permanence, intensity of use, and potential interference with these intended functions. Permanent restaurant structures require separate assessment of their building footprints and applicable regulatory boundaries, whereas movable dining furniture and temporary commercial activities may be evaluated through their operational timing, spatial arrangement, and effects on pedestrian

accessibility. Field observations, geotagged documentation, and Google Earth Pro mapping, complemented by information from food establishment managers and representatives of the Badung Regency Tourism Office, provided a qualitative basis for identifying potential areas of spatial incompatibility.

Nevertheless, the study did not establish independently verified building polygons, statutory coastal setback boundaries, or quantitative measurements of commercial occupation within the core zone. Consequently, the findings are interpreted as indicating potential functional overlap rather than confirmed physical encroachment or legal non-compliance. These considerations support the exploration of adaptive management measures, including improved organization of movable dining facilities, maintenance of public access corridors, and operational coordination, while any intervention involving permanent buildings would require further spatial verification and regulatory assessment (Lukoseviciute & Panagopoulos, 2021).

This situation illustrates a coastal tourism governance dilemma in which social, economic, and ecological interests intersect within the same coastal space. On the one hand, the presence of seafood restaurants along Jimbaran Beach reflects a successful form of Community-Based Tourism, as local communities have been able to participate directly in and benefit from the development of the coastal culinary economy. The restaurants are not only commercial facilities, but also part of a wider labor-intensive supply chain involving fishers, seafood suppliers, workers, local business owners, and community-based institutions.

Moreover, access to the beach for customary and religious activities, such as the *Melasti* ceremony, remains well protected. This indicates that, despite the strong presence of tourism activities, the coastal area has not been fully privatized or detached from its cultural and communal

functions. Such a condition reflects the particular complexity of spatial governance in Jimbaran, where the beach serves simultaneously as a tourism space, an economic space, a cultural space, and a shared public area for local communities.

This situation is consistent with the view that coastal tourism can contribute significantly to local economic growth, but may also generate spatial inequality and socio-environmental pressure when it is not guided by fair and adaptive governance (Smith et al., 2023; Suasapha, 2016). From an ecological perspective, the presence of permanent and large-scale infrastructure along the shoreline remains a serious concern, as it may intensify coastal abrasion and increase vulnerability to hydro oceanographic hazards (Lukoseviciute & Panagopoulos, 2021). Therefore, the commodification of coastal space should not be understood only as an economic opportunity, but also as a governance challenge that requires careful regulation. The central issue is how Jimbaran can continue to sustain local livelihoods, maintain cultural access, and preserve its distinctive seafood tourism experience while protecting the long-term ecological functions of the coastline.

This spatial dilemma becomes increasingly important when viewed against the broader risks of climate change. As a coastal destination, Jimbaran Beach is exposed to the potential impacts of sea-level rise, stronger tidal events, and more unpredictable weather patterns over the next 10 to 20 years. These risks may directly affect the shoreline, tourism facilities, fishing activities, and the everyday use of coastal space by local communities. For this reason, spatial planning in Jimbaran cannot focus only on current tourism demand, but must also anticipate the ecological and physical limits of the coastal area.

In this context, tourism carrying capacity becomes an important basis for understanding how much activity the area can reasonably accommodate without reducing environmental quality or increasing future

vulnerability. This assessment needs to be integrated with a functional coastal zoning framework that can guide where tourism activities, public access, fishery-related functions, and ecological protection should be located. Such an approach would allow environmental protection and economic sustainability to be planned together, rather than treated as competing priorities. Therefore, marine functional zoning should be understood not only as a technical planning tool, but also as an adaptive governance strategy for strengthening the long-term resilience of Jimbaran's coastal tourism system.

If permanent concrete commercial structures continue to occupy the Core Zone, Jimbaran Beach may face greater risks in the future, particularly as tidal intensity, coastal abrasion, and extreme weather events become more difficult to predict. These risks would not only affect the ecological condition of the shoreline, but could also threaten the safety, durability, and economic value of the tourism assets located directly along the coast. In other words, the same beachfront location that currently provides strong commercial advantage may become increasingly vulnerable if it is not supported by adaptive spatial planning.

Within this mitigation context, the placement and visibility of information boards and tsunami evacuation signs also require careful evaluation. Field observations indicate that some disaster-related signs are not sufficiently visible because they are obscured by vegetation or commercial signage. This condition may reduce the effectiveness of emergency guidance for visitors, workers, and local communities, especially during peak tourism periods when the coastal area is highly crowded.

Therefore, the absence of an early spatial adaptation strategy could transform Jimbaran's present economic strength into a source of future material, social, and ecological vulnerability. More adaptive coastal planning is needed to protect

shoreline functions, reduce disaster risk, maintain public safety, and ensure that tourism development remains viable in the long term.

This spatial planning anomaly has also produced practical conflicts in the everyday use of coastal space, particularly through bottlenecks in logistical circulation. From the perspective of the commodification of space, Jimbaran shows a gradual shift in how the beachfront is used and valued. The coastal area that once functioned primarily as a productive space for traditional fishers, where boats were moored, nets were dried, and fish were unloaded, has increasingly become a consumption-oriented tourism space shaped by dining experiences, visitor mobility, and commercial service activities.

This transformation reflects the economic success of coastal tourism, but it also creates pressure on the traditional functions that have long supported local livelihoods. Fishers, restaurant operators, tourists, and local residents now share the same limited coastal corridor, often with different needs and rhythms of activity. As a result, logistical movement related to fishery activities must compete with tourism traffic, restaurant operations, and visitor circulation. This condition highlights the need for more adaptive spatial management that can accommodate tourism growth while still protecting the productive role of the coast, the mobility of fishing communities, and the everyday access rights of local residents.

The limited effectiveness of the buffer zone as a transitional space has intensified mobility conflicts within the Jimbaran coastal area. In practice, tourist movement, seafood café operations, fishery logistics, and the daily routines of local communities often overlap within the same narrow coastal corridor. This condition creates recurring tensions over spatial use, particularly when different users require access to the same space at the same time (Lukoseviciute & Panagopoulos, 2021). The pressure becomes most apparent

during peak visitation hours, especially between 4:30 p.m. and 7:00 p.m., when tourist arrivals increase before sunset and the limited availability of centralized parking contributes to congestion and gridlock around key access points.

These internal circulation problems indicate that the traditional productive space of fishers is increasingly constrained by the expansion of modern seafood gastronomy tourism. While the growth of culinary tourism has strengthened Jimbaran's local economy and destination identity, it has also created uneven access to public coastal space. For this reason, the buffer zone should not be treated merely as a technical zoning category. It needs to function as an active spatial management mechanism that can reduce friction between tourism mobility, fishery-related activities, local community access, and the ecological protection of the beach.

Coastal spatial governance at Jimbaran Beach operates within a multi-institutional context involving customary institutions, tourism business operators, and formal government authorities. *Desa Adat* Jimbaran represents an important customary institution within the local governance setting, while the Badung Regency Government exercises administrative responsibilities through relevant government agencies. From the perspective of common-pool resource governance, Ostrom (1990) emphasizes that the sustainable management of shared resources depends on clearly defined rules, collective decision-making, monitoring arrangements, and mechanisms for addressing conflicts among resource users.

This perspective provides a relevant conceptual basis for examining the potential role of customary institutions in managing coastal spaces used for tourism, fishing-related activities, community access, and cultural practices. However, the institutional presence of *Desa Adat* Jimbaran does not, by itself, demonstrate that customary rules have been effectively implemented or that coastal commercial

activities are subject to consistent community-based regulation.

In the present study, governance-related interpretations were informed primarily by interviews with 24 food establishment managers and representatives of the Badung Regency Tourism Office, supported by field observations and available institutional information. These sources provided perspectives on tourism operations, spatial management challenges, and the relationship between commercial activities and destination governance. Although customary instruments such as *awig-awig* and *perarem* may provide locally recognized mechanisms for regulating community activities, their specific provisions, decision-making procedures, enforcement responsibilities, and application to beachfront tourism activities at Jimbaran Beach were not independently established through the available research evidence.

Similarly, the study did not document a verified case of customary sanctions, a formal joint decision between *Desa Adat* Jimbaran and government authorities, or a specific institutional disagreement concerning coastal spatial regulation. Consequently, the findings are interpreted as indicating the potential relevance of customary governance within a broader multi-actor management setting rather than demonstrating effective customary enforcement or established co-management. Further examination of applicable customary regulations documented institutional decisions, and stakeholder accounts would be required to determine how customary authority interacts with formal spatial planning regulations and how competing interests concerning commercial development, coastal access, and environmental protection are negotiated in practice.

This makes local governance particularly important. Without collective rules and community-based monitoring, coastal tourism areas are vulnerable to market pressure, commercial overcrowding, and excessive use. The findings suggest that stronger local coordination may help

reduce these risks by supporting tourism development that is more responsive to community interests and customary values. The authority of *Desa Adat* is strengthened through a combination of village-level administrative regulation and local customary norms, including *awig-awig*. Customary institutions may contribute to coastal spatial management by establishing local rules, coordinating community activities, and addressing potential conflicts over beachfront use. However, their specific regulatory authority, enforcement procedures, and application of sanctions to tourism activities at Jimbaran Beach require further empirical verification.

Therefore, although spatial anomalies are still evident when assessed through the formal Tripartite zoning framework, Jimbaran's customary governance system continues to function as an important local safeguard. It helps mediate the tension between tourism commercialization, community access, cultural continuity, and coastal environmental protection. This suggests that effective coastal spatial governance in Jimbaran should not rely solely on formal planning instruments, but should also recognize the practical role of customary institutions in managing shared coastal resources.

Considering that commercial activities within Jimbaran's Core Zone have become deeply embedded through a long history of spatial use, relocating all beachfront restaurants to the Service Zone would be difficult to implement in practice. Although such relocation may appear ideal from a formal zoning perspective, it would likely face strong socio-political resistance because the seafood restaurants are closely connected to local livelihoods, community-based economic participation, and the distinctive culinary identity of Jimbaran Beach. A rigid relocation policy could also disrupt the social and economic networks that have developed around the coastal seafood tourism system.

For this reason, the recommended approach is not to remove existing

economic activities abruptly, but to manage them more carefully through a tactical, adaptive, and feasible spatial planning strategy. Such a strategy should recognize the historical development of the area, the economic dependence of local communities, and the need to protect the ecological function of the coastline. Therefore, the following spatial planning interventions are proposed:

1. The Implementation of Time-Based Zoning (Temporal Zoning)

Adaptive temporal zoning is proposed as a potential management approach for coordinating overlapping coastal activities at Jimbaran Beach, particularly where beachfront dining operations, visitor circulation, and fishing-related activities may compete for shared shoreline space. Rather than prescribing predetermined periods during which tourism activities must be restricted, the proposed arrangement emphasizes the need to identify appropriate time allocations based on documented restaurant operating hours, fishing and landing schedules, tidal conditions, pedestrian movement, and customary or ceremonial activities. Information obtained from the 24 food establishment managers and representatives of the Badung Regency Tourism Office, together with field observations, provides an initial basis for understanding tourism related operational requirements. However, the study did not systematically document fishing schedules, tidal variations, or ceremonial calendars sufficient to establish a verified daily allocation of coastal space. Consequently, any proposed morning, midday, or late afternoon arrangements should be regarded as preliminary planning scenarios requiring further empirical assessment and consultation with affected coastal users.

Within the proposed core-buffer-service framework, temporal management would apply primarily to reversible and time-dependent activities, including movable beachfront dining furniture, temporary loading and unloading operations, and pedestrian circulation. Any operational

schedule would need to be developed through consultation among food establishment operators, fishing representatives, *Desa Adat* Jimbaran, relevant community organizations, and government agencies with the appropriate administrative authority. Implementation responsibilities, access priorities, monitoring procedures, and mechanisms for resolving disagreements would need to be agreed upon before a pilot arrangement could be introduced. Importantly, temporary restrictions on commercial activities should not be interpreted as evidence of ecological recovery, as the study did not measure environmental responses to changes in activity intensity.

Similarly, temporal zoning cannot substitute for compliance with applicable coastal setback regulations or resolve issues associated with permanent building footprints, wastewater management, litter, or persistent restrictions on public access. Before implementation, any proposed spatial arrangements must be evaluated against Presidential Regulation No. 51 of 2016 concerning coastal setback boundaries and the applicable provincial and regency spatial planning instruments, supported by verification of legally established boundaries and relevant permits. Therefore, the proposed approach represents a conditional and adaptive coastal management recommendation rather than an implemented zoning policy, a demonstrated environmental intervention, or confirmation of legal compliance.

However, the success of this time-based zoning depends on clear spatial regulation and daily operational discipline. Pedestrian circulation from parking areas to the beachfront should be improved and kept free from motorized vehicles to ensure safe and comfortable walkability. In this way, time-based zoning can function as a practical compromise that protects coastal ecological functions, supports fishers' livelihoods, maintains the distinctive sunset dining experience, and reduces spatial conflict within the Jimbaran coastal area.

2. Transition to Adaptive and Non-Permanent Architectural Forms

The transition toward more adaptable and environmentally responsive coastal infrastructure is proposed as a potential strategy for improving the management of commercial activities along Jimbaran Beach. Based on the spatial characteristics of the western sandy shoreline, consideration may be given to the use of movable dining furniture and low-impact operational arrangements that allow greater flexibility in managing shared beachfront space. However, any requirement to modify or remove permanent commercial structures should be preceded by verification of building footprints, applicable coastal setback regulations, land use permissions, and the potential socioeconomic implications for local businesses. Information obtained from the 24 food establishment managers and representatives of the Badung Regency Tourism Office, together with field observations and Google Earth Pro spatial interpretation, provides a preliminary basis for identifying management concerns but does not establish the environmental effectiveness or regulatory feasibility of specific infrastructure interventions.

Coastal restoration and shoreline protection measures should be developed according to the ecological and hydrodynamic characteristics of the specific site rather than applying a uniform vegetation-based approach. In particular, the exposed sandy shoreline of western Jimbaran differs substantially from the sheltered mangrove environments associated with Benoa Bay, which lie outside the study area. Consequently, mangrove planting should not be recommended for the Jimbaran beachfront without evidence of suitable intertidal conditions, sediment characteristics, wave exposure, and habitat requirements. Before proposing ecological restoration or nature-based coastal protection measures, a site-specific assessment should examine shoreline morphology, seasonal sediment movement, tidal dynamics, existing coastal

vegetation, habitat suitability, and potential climate-related hazards.

Where ecologically appropriate, the protection or restoration of native coastal vegetation may be considered alongside improved waste management, careful regulation of temporary beachfront activities, and the preservation of natural shoreline functions. Nevertheless, the present study did not undertake hydrodynamic modeling, sediment analysis, or longitudinal shoreline monitoring; therefore, it cannot establish that vegetation planting, the removal of concrete structures, or other proposed interventions would independently reduce erosion or mitigate sea-level-rise impacts. These measures are presented as options requiring environmental assessment, regulatory review, stakeholder consultation, and subsequent monitoring rather than as demonstrated solutions to coastal degradation.

This transition should also be accompanied by a more equitable provision of public amenities. Waste bins need to be distributed beyond the operational boundaries of individual cafés, while rinsing facilities and public toilets should be made available for general beach users, including visitors who are not customers of the restaurants. The use of flexible and adaptive infrastructure reflects the principle of tourism carrying capacity, as it helps maintain the physical tolerance limits of the coastal environment while gradually restoring the function of the buffer zone (Lukoseviciute & Panagopoulos, 2021). At the same time, this approach allows the local tourism economy to continue operating without undermining the livelihoods of the surrounding community.

CONCLUSION

This study indicates that the spatial configuration of tourism in the Jimbaran Beach coastal area reflects a complex interaction between socio-economic activities and potential ecological vulnerabilities. Through qualitative spatial analysis using

Google Earth Pro and the 4A+1C framework, the findings highlight the relevance of community involvement and institutional arrangements in coastal tourism management. However, evidence concerning community participation was primarily obtained from interviews with 24 food establishment managers and representatives of the Badung Regency Tourism Office. Therefore, while these findings provide insights into tourism operations and institutional perspectives, they do not establish the extent of participation, collective ownership, or decision-making authority among all affected community groups.

At the same time, the coexistence of community-related activities and commercial tourism development presents potential spatial management challenges. The evaluation based on the Tripartite Concept suggests that commercial activities, particularly seafood cafés, may extend into areas conceptually classified as the core zone, although their relationship to legally established coastal setback boundaries requires further regulatory verification. This potential mismatch between functional zoning principles and existing spatial uses highlights a coastal governance dilemma. On the one hand, seafood gastronomy contributes to Jimbaran's destination identity and local economy. On the other hand, the concentration of commercial activities along the beachfront may increase biophysical degradation risks, contribute to potential bottlenecks in fishery logistics and internal circulation, and place additional pressure on the ecological functions of the coastal area.

In response to the potential spatial incompatibilities identified at Jimbaran Beach, this study proposes an adaptive tripartite zoning framework as a preliminary approach to coastal spatial management. The proposed framework integrates the functional allocation of core, buffer, and service zones with consideration of temporal activities, tourism operations, and shared coastal access. Its formulation draws on qualitative spatial observations,

Google Earth Pro mapping, interviews with 24 food establishment managers, and institutional perspectives from representatives of the Badung Regency Tourism Office. These sources provide an initial understanding of the relationships among beachfront seafood dining, tourism facilities, accessibility networks, and competing coastal activities. Rather than recommending rigid spatial separation or the immediate relocation of tourism businesses, the framework emphasizes the need to assess the compatibility of existing activities with intended coastal functions and explore management arrangements that accommodate tourism operations while protecting shared coastal space.

Four interrelated priorities are proposed. First, the applicable coastal setback boundaries and land use regulations must be independently verified before determining the legal status or suitability of existing commercial structures. Second, permanent restaurant buildings should be distinguished from movable dining facilities and temporary activities because these uses differ in physical permanence, regulatory implications, and potential management responses. Third, public access and the continued use of coastal space for fishing-related and customary activities should be considered in evaluating functional zoning suitability, although direct consultation with affected community groups is required to establish their specific access needs and experiences. Fourth, negotiated temporal arrangements may be explored to coordinate temporary beachfront dining, visitor circulation, and other activities where documented spatial conflicts occur. These measures should be complemented by assessments of parking, public sanitation, waste management, and environmental conditions.

However, the proposed framework has not been implemented or empirically evaluated, and the study does not establish that these interventions would reduce ecological pressure, improve equitable access, or enhance tourism carrying capacity. Its

practical feasibility therefore remains conditional upon regulatory review, verified spatial evidence, consultation with affected stakeholders, and pilot implementation followed by systematic monitoring. Accordingly, the contribution of this study lies in providing an evidence-informed and community-sensitive planning framework for identifying potential spatial management priorities rather than a validated model of coastal resilience or environmental improvement.

The theoretical contribution of this study lies in extending the conventional functional interpretation of core-buffer-service zoning by incorporating temporal patterns of coastal activities and community access considerations into spatial suitability assessment. Rather than redefining the fundamental functions of the three zones, the proposed approach distinguishes between the permanent spatial allocation of coastal functions and the temporary occupation of space by tourism-related activities. Within this framework, the core zone retains its primary role in supporting shoreline functions, coastal attractions, and shared public access, even when movable dining furniture or temporary commercial activities occupy portions of the beachfront during particular operating periods. Such temporary occupation does not automatically alter the underlying functional classification of the area; instead, its suitability is assessed according to the duration, reversibility, accessibility implications, and compatibility of the activity with the intended coastal function. Similarly, the buffer zone is interpreted not merely as a physical transition between coastal functions but also as a space where competing circulation and operational demands may require coordinated management. The service zone continues to accommodate compatible tourism facilities and supporting infrastructure, subject to applicable spatial regulations.

This conceptual extension is informed by qualitative field observations, Google Earth Pro spatial interpretation,

interviews with 24 food establishment managers, and institutional perspectives from representatives of the Badung Regency Tourism Office. These sources provide a preliminary basis for examining the relationship between tourism operations, temporary beachfront activities, and potential spatial conflicts. For example, where movable dining tables extend into shared shoreline space during sunset dining periods, the proposed assessment considers whether public access can be maintained through appropriate furniture arrangements, designated circulation corridors, or negotiated operating schedules, rather than automatically requiring a change in land-use designation.

However, the feasibility of such arrangements depends on verified spatial boundaries, documented activity schedules, applicable coastal setback regulations, and consultation with affected community groups, including fishers and customary representatives. The study therefore contributes a community-sensitive and temporally informed interpretation of functional coastal zoning that connects spatial suitability assessment with conditional management recommendations. This contribution remains conceptual because the proposed arrangements have not been implemented or evaluated for their ecological, social, or operational outcomes.

Despite the theoretical contribution offered by this study, the generalization of its spatial findings should be made with caution. The analysis is limited to a single coastal cluster with a distinctive customary institutional system, meaning that the findings may not be directly applicable to coastal destinations with different social structures, governance arrangements, or land-use dynamics. In addition, the spatial evaluation has not yet measured tourism carrying capacity through detailed quantitative indicators, nor has it fully examined tourists' perceptions regarding spatial comfort, accessibility, safety, and the quality of the coastal tourism experience.

For this reason, future research should place greater emphasis on measuring the physical and ecological carrying capacity of the area through numerical modelling, including simulations of sea-level rise and other climate-related coastal risks. Further studies should also incorporate tourists' perspectives to provide a more comprehensive understanding of how spatial arrangements affect visitor experience and destination quality. Comparative research across coastal destinations with different social, cultural, and governance characteristics is equally important to test, validate, and refine the adaptive tripartite zoning model. Such efforts would strengthen the applicability of this model within a broader coastal tourism context and support more evidence-based, inclusive, and resilient coastal spatial planning.

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AI USE STATEMENT

Generative artificial intelligence (AI) tools, including ChatGPT (OpenAI), were used to assist with English language refinement, academic editing, and the preparation of manuscript revisions in response to reviewer comments. All AI-assisted suggestions were reviewed by the authors, who retain full responsibility for the accuracy, integrity, and interpretation of the research findings, methodological descriptions, and references. AI-generated

content was not used as a substitute for original empirical data or independent scholarly analysis.

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