

Social Network Analysis of Tourism Governance in Mandalika Special Economic Zone Based on Centrality Measures

Muhammad Firmansyah^{1*}, R. Chrisna Trie Hadie Permana², Vici Handalusia Husni³, M. Jumaedi⁴, Baiq Uswatun Hasanah⁵, Laela Ulfi Julianti Aisyah⁶

^{1,3,4,5,6} Faculty of Economics and Business, University of Mataram, Mataram, Indonesia

² Faculty of Engineering, Sebelas Maret University, Surakarta, Indonesia

**Corresponding Author: firmansyah.feb@unram.ac.id*

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Abstract : This study maps power structures and multi-actor collaboration in the Mandalika Special Economic Zone (SEZ) by integrating Social Network Analysis (SNA) and Actor-Network Theory (ANT). Fieldwork conducted in 2025 in Kuta Village, Pujut District, Central Lombok, combined a structured relational stakeholder survey, in-depth semi-structured interviews, focus group discussions, document review, and direct observation. The resulting actor-category network comprises 27 human, organizational, and non-human nodes. For comparable centrality estimates, we binarized and symmetrized the heterogeneous directed relations shown in the network maps into a connected undirected projection with 46 unique ties; we retained direction for ANT interpretation. Recalculation shows that the Indonesia Tourism Development Corporation (ITDC) ranks first, with degree 13 (normalized 0.500), betweenness 0.614, closeness 0.650, and eigenvector centrality 0.478. Hotel chains rank second. Local farmers have five ties and moderate local embeddedness but low brokerage (betweenness 0.024), whereas local youth form a pendant node with one tie, zero betweenness, closeness 0.302, and eigenvector centrality 0.018. Thus, marginality is inferred from limited brokerage and network-wide reach, not geographical proximity. ANT further shows how land-use instruments, permits, digital platforms, payment systems, and the MotoGP event calendar can reproduce or redistribute governance power. The findings support polycentric reforms that broaden local access to decision-making, procurement, and digital markets.

Keywords : *Social Network Analysis, Tourism Governance, Mandalika SEZ, Centrality Measures, Actor-Network Theory.*

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INTRODUCTION

Indonesia, particularly the Mandalika Special Economic Zone (SEZ) in Lombok, is a key destination for analysis and policy formulation because public officials link its promising tourism sector to sustainable economic development (Caraka et al., 2023; Pattaray et al., 2025). This SEZ is expected to support the nation's economic growth, increase international tourist visits, and benefit residents, making it an important part of enhancing the competitiveness of Indonesian tourism destinations based on natural beauty, cultural heritage, and regional infrastructure (Putera et al., 2025; Tz-Li et al., 2024).

Mandalika tourism is embedded in national and international development agendas. Infrastructure investment and global events can expand destination visibility, but long-term benefits depend on accountable planning, effective governance, and meaningful

stakeholder participation to distribute returns more equitably (Caraka et al., 2023; Putera et al., 2025; Amir & Prabawani, 2023).

Collaborative governance has become an important framework for addressing complex tourism and sustainability challenges. It brings together government agencies at different levels, local communities, private firms, and civil-society organizations in decision-making processes that must reconcile social, environmental, and economic objectives (Hartman et al., 2020; Wondirad et al., 2020).

This is especially true in tourism, which, like other sectors, involves various stakeholders whose interests often conflict. Therefore, key players need to communicate and coordinate effectively (Hartman et al., 2020; Wondirad et al., 2020). Collaborative governance can also reduce these conflicts and promote new ideas by encouraging greater exchange of knowledge, information, skills, languages, and resources, leading to more sustainable practices (Lo Presti & Maggiore, 2025; Sigala, 2022).

Multi-actor collaboration is therefore central to sustainable tourism development in the Mandalika SEZ. Rather than assuming that collaboration is automatically inclusive, this study examines how stakeholder positions, brokerage, and socio-technical instruments shape the implementation of Sustainability-Oriented Innovation (SOI) (Sariego-Kluge & Morales, 2025; Sigala, 2022).

This study asks how governance power is distributed among human and non-human actors in the Mandalika SEZ and what that distribution implies for inclusive, sustainable tourism. It identifies central actors and actants, evaluates the structural position of selected local groups, and derives governance options that can broaden participation and reduce dependence on a small number of gateways (Vaz et al., 2025; Seyitoglu & Costa, 2022; Pace, 2024).

RESEARCH METHODS

Research Design

The main purpose of a qualitative-exploratory design is to investigate complex social phenomena with incomplete or overly abstract existing theories. This approach helps manage stakeholder dynamics and governance mechanisms in tourism development contexts (Amir & Prabawani, 2023; Aransyah et al., 2025) and offers flexibility. This methodological approach combines multiple data collection methods to uncover prevailing governance structures in their current form, as well as the powerful forces driving sustainability in tourism development (Gonera et al., 2023). It calls for transdisciplinary discussions across innovation theory, tourism management, and sustainability studies (Heslinga et al., 2019; Scioșteanu et al., 2024).

Data Collection and Sampling

The field data collection took place during the 2025 case study in Kuta Village, Pujut District, Central Lombok Regency, where the Mandalika Special Economic Zone directly intersects with village administration, community livelihoods, and tourism operations. The study combined a structured stakeholder survey, in-depth semi-structured interviews, focus group discussions (FGDs), institutional document review, and direct field observation. This multi-method design identified relevant actors and actants, traced their relations, and compared formal governance arrangements with how coordination, access, and influence operated in practice.

The stakeholder survey was relational rather than household-based. Participants were asked to identify the organizations, community groups, and socio-technical instruments

with which they interacted; indicate the existence and direction of each relationship when identifiable; and explain whether the relationship concerned authority or regulation, coordination or information, finance or procurement, service delivery, resource access, or a digital-platform transaction. Because the centrality analysis used a binary projection, the survey established whether a substantively evidenced tie existed; it did not impose incomparable numerical weights on different relation types.

In-depth interviews covered stakeholders occupying formal, operational, and community positions. They included representatives of ITDC and Mandalika tourism-development management; Kuta Village officials; community, customary, and religious leaders; tourism-awareness and community organizations; hotel, homestay, food-and-beverage, guide, transport, and parking actors; local micro, small, and medium enterprises; farmers; youth groups; women-led enterprises; and residents whose livelihoods or access to land and tourism markets were affected by SEZ development. Where relevant, accounts from district-level government, event-management, investor, and civil-society actors were used to clarify relations extending beyond the village.

The FGDs brought village, community, tourism, and development stakeholders into a shared validation setting. Participants reviewed the preliminary actor list and network map, identified omitted actors or actants, checked the existence and direction of disputed ties, and discussed how land instruments, permits, event schedules, infrastructure, and digital systems affected local access. We triangulated interview and FGD accounts with project documents, regulations, field notes, and direct observation. We coded a tie only when the material contained explicit evidence of authority, coordination, finance or procurement, service delivery, information exchange, resource access, or platform-mediated exchange; we did not treat co-presence or simple co-mention as a relationship. The sampling frame was actor-based rather than respondent-based. Positional purposive sampling selected informants according to four criteria: formal decision authority; direct involvement in land, tourism, infrastructure, or event operations; control over information, finance, procurement, services, or platform access; and representational relevance to local livelihoods. We checked additional actors repeatedly identified during interviews or FGDs against documentary or observational evidence before inclusion. Several participants could validate the same actor category; participants were evidence sources and were not automatically counted as separate nodes. The final bounded network contains 27 nodes: 18 human or organizational actors and nine non-human actants. Thus, the analytical sample is the 27-node governance network, not a probability sample of Kuta Village residents, and the findings characterize the mapped case rather than population prevalence.

Figure 1 documents the principal field-engagement activities used to elicit and validate the relational data, while the analytical network reports stakeholders by institutional or role category rather than by personal name.



Figure 1. Stakeholder Data Collection in Kuta Village, Pujut District, Central Lombok: (a) stakeholder contribution during the FGD; (b) local community representative presenting field perspectives; (c) plenary FGD involving village and tourism stakeholders; and (d) in-depth interview and data verification with ITDC representatives and the research team

Source: Field documentation, 2025.

Network Construction and Centrality Validation

The coded edge list was transformed into a 27 x 27 adjacency matrix. The two network figures preserve arrow direction for ANT tracing. However, the arrows combine heterogeneous modes - including regulatory authority, finance, information, procurement, and digital intermediation - that were not measured on a common intensity scale. For comparable structural centrality estimates, we therefore binarized and symmetrized the matrix: we assigned an undirected tie a value of 1 when either i-to-j or j-to-i was evidenced. Self-loops and duplicate ties were removed. The resulting connected projection contains 46 unique ties.

The matrix audit verified exact node-label and row-column alignment, a zero diagonal, no duplicate ties, symmetry after projection, graph connectedness, and correspondence between each reported degree and the number of incident ties shown in the final maps. Degree centrality is reported as both the raw number of distinct neighbors and the normalized value $k/(n - 1)$. Closeness is $(n - 1)$ divided by the sum of shortest-path distances. Betweenness is normalized to the 0-1 interval, and eigenvector centrality is the leading eigenvector of the adjacency matrix with an L2 norm of 1. We independently reproduced values using shortest-path and matrix-based calculations and rounded them to three decimals.

This harmonized procedure resolves the earlier interpretive problem: closeness measures topological reach within the governance network, not physical or geographical distance. A peripheral actor with one tie therefore cannot be interpreted as being immediately connected to every actor merely because of software normalization. Centrality reflects a structural opportunity for access or brokerage, not direct proof of realized power or economic benefit.

Social Network Analysis (SNA)

In this study, SNA quantifies actors' and actants' positions in Mandalika tourism governance. Degree captures the breadth of direct connections; betweenness captures the extent to which a node lies on shortest paths and can broker exchanges; closeness captures network-wide reach through geodesic distance; and eigenvector centrality captures connection to other well-connected nodes. Interpretation emphasizes the convergence and divergence of these measures rather than treating a single score as equivalent to power (Czernek-Marszalek, 2018; Ledesma Gonzalez et al., 2021; Ruggieri et al., 2022). This approach helps identify bottlenecks and practical entry points for broader stakeholder participation in sustainable tourism governance.

Actor-Network Theory (ANT)

Actor-Network Theory (ANT) complements SNA by tracing how both human and non-human actants assemble tourism governance in the Mandalika SEZ (Chen & Wu, 2021; Conti & Farsari, 2022). Human and organizational actors include public agencies, ITDC, tourism operators, investors, community groups, and local enterprises. Non-human actants include the HPL/HGB land masterplan, environmental impact assessment and permits, investor memoranda, the MotoGP event calendar, parking procedures, online travel-agent platforms and recommendation algorithms, a digital payment gateway, and green technology systems. ANT traces how these instruments translate authority, visibility, timing, finance, and access across the network, thereby strengthening or weakening the position of local actors (Ren et al., 2023; Liu et al., 2025).

RESULTS AND DISCUSSION

Results

ITDC's Role in the Development of SEZ Mandalika and its Impact on SOI

The Indonesia Tourism Development Corporation (ITDC) is a principal developer and land-management actor in the Mandalika SEZ, coordinating relations with public agencies, investors, tourism operators, and infrastructure providers. This institutional position makes ITDC central to tourism development while also raising questions about whether alternative channels exist for local participation and community representation.

From an Actor-Network Theory (ANT) perspective, ITDC functions as an Obligatory Passage Point (OPP) (Callon, 1986), serving as the principal gateway through which land, investment, operations, and information are coordinated in the Mandalika SEZ. The recalculated SNA results support this interpretation: ITDC has 13 distinct ties (normalized degree 0.500), betweenness 0.614, closeness 0.650, and eigenvector centrality 0.478. It ranks first on all four measures, indicating both broad direct connectivity and a strong brokerage position between regulatory, investment, operational, community, and socio-technical clusters. This concentration creates dependence on ITDC-mediated routes and may restrict meaningful local participation when alternative coordination channels are weak.

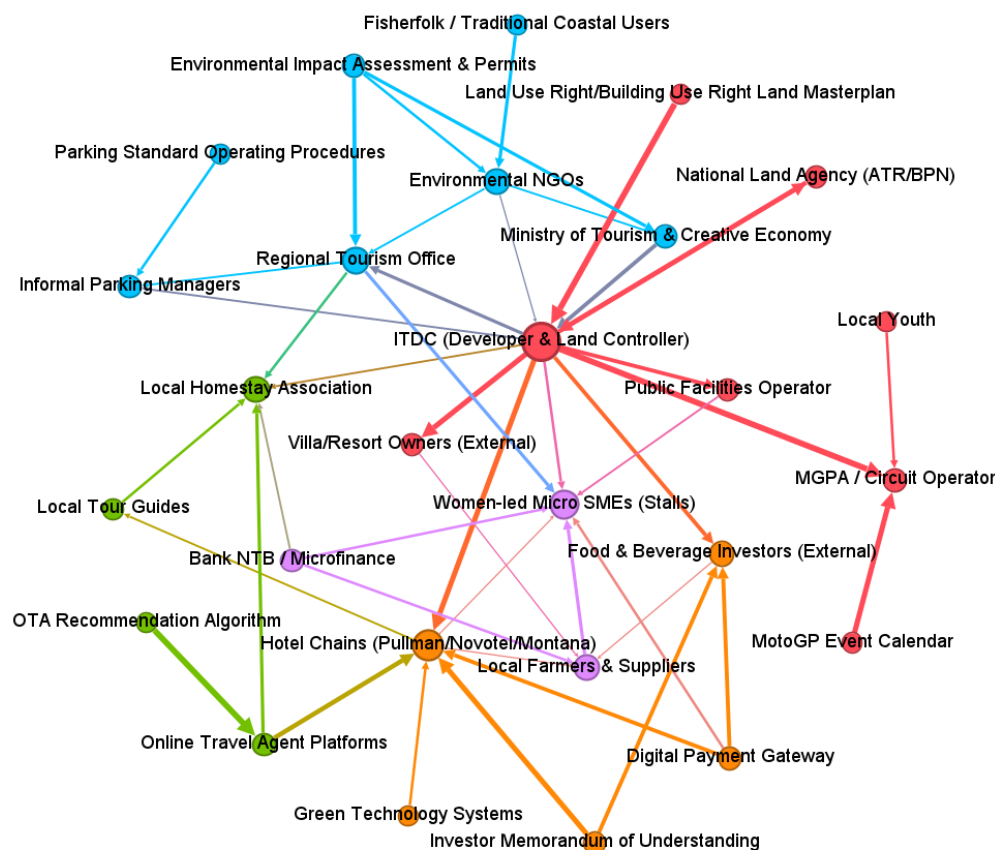


Figure 2. Network Map of ITDC's Central Role in the Mandalika SEZ and Its Relations with Local Communities

Land Use Conflicts and the Marginalization of Local Communities

The field material identified land access and recognition of local claims as recurring governance concerns around the Mandalika development area, including Tanjung Aan. These concerns extend beyond environmental impacts; they also involve commercial interests, administrative authority, and unequal access to formal decision and grievance channels. The network therefore treats land instruments and permit procedures as actants that can either concentrate authority or widen participation, depending on how their rules are implemented.

The recalculated metrics place hotel chains second in the network, with nine distinct ties (normalized degree 0.346), betweenness 0.240, closeness 0.542, and eigenvector centrality 0.360. Their position reflects direct connections to ITDC, external investment and technology actants, and several local economic actors. Local farmers, by contrast, have five ties (normalized degree 0.192), betweenness 0.024, closeness 0.413, and eigenvector centrality 0.236. This pattern indicates localized supplier embeddedness but limited brokerage and network-wide reach. Local youth form a pendant node connected only to MGPA, with a normalized degree of 0.038, zero betweenness, closeness of 0.302, and eigenvector centrality of 0.018. The corrected scores therefore support marginality without claiming that farmers or youth are topologically close to every actor.

Table 1. Centrality of Selected Governance and Local Actors in the Mandalika SEZ

Stakeholder	Degree (raw / norm.)	Betweenness	Closeness	Eigenvector	Structural Interpretation
ITDC (A1)	13 / 0.500	0.614	0.650	0.478	Dominant broker
Hotel Chains (A3)	9 / 0.346	0.240	0.542	0.360	Secondary hub
Local Farmers (A16)	5 / 0.192	0.024	0.413	0.236	Embedded; low brokerage
Local Youth (A8)	1 / 0.038	0.000	0.302	0.018	Pendant / peripheral

Note: The recalculation uses $n = 27$ nodes and $m = 46$ unique ties in the binary undirected projection. Degree normalization uses $n - 1 = 26$; betweenness is normalized to 0-1; closeness is the reciprocal of mean geodesic distance; and eigenvector scores are L2-normalized. Values are rounded to three decimals. Closeness refers to topological, not geographical, distance.

These centrality patterns confirm that governance influence in Mandalika is structurally concentrated around ITDC and hotel chains. The result does not imply that all local actors are disconnected: farmers retain a localized supplier position, but their low betweenness and closeness limit brokerage and network-wide reach. Local youth are more clearly peripheral because their single connection creates no brokerage path. Marginality is therefore inferred from the combination of degree, brokerage, reach, and connection to central actors rather than from geographical proximity.

Large Hotel Chains and Local Economic Integration

Large hotel chains can generate employment, taxes, and demand for tourism services. However, local economic integration depends on whether local workers and enterprises can access recruitment, procurement, and market linkages. In the validated network, the hotel-chain node has nine direct ties and ranks second on all four centrality measures. Farmers and women-led micro enterprises connect to this node, whereas local youth do not, showing that local access is uneven rather than uniformly absent.

The ANT analysis identifies hotel chains as a secondary hub linked to ITDC, investors, digital systems, and selected local suppliers. This position can create market openings, but it can also reinforce dependence when procurement standards, platform visibility, or investment decisions are controlled outside local enterprises. SNA alone does not prove economic exclusion; read with interview and FGD evidence, it identifies the structural points where inclusion or exclusion is likely negotiated.

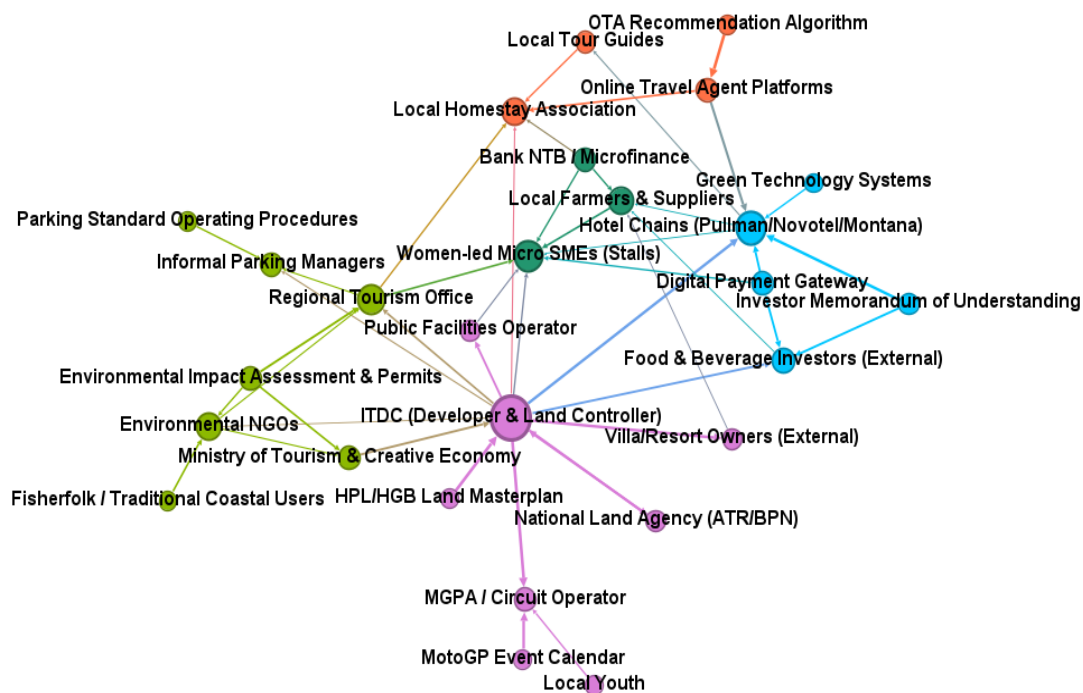


Figure 3. Influence of Large Hotel Chains on the Local Economy in the Mandalika SEZ

The Role of Local Communities and Cultural Preservation: Aligning with SOI

The validated network does not place every local or community actor in the same position. Women-led micro enterprises are relatively embedded, with seven direct ties and betweenness of 0.091; farmers have five ties but limited brokerage; and local youth are peripheral, with only one tie and zero betweenness. Capacity-building and participation strategies should therefore be differentiated: market consolidation for relatively embedded enterprises, stronger bridging channels for farmers, and durable non-event pathways for youth.

The corrected SNA results distinguish two forms of limited local integration. Local farmers and suppliers are connected to a small commercial cluster, but their low betweenness (0.024) indicates little control over routes linking that cluster to the wider governance network. Local youth have only one direct tie, to MGPA, and zero betweenness, indicating event-linked access without a bridging role in the mainstream tourism economy. These structural constraints interact with limited capital, business capabilities, and formal market access, which runs counter to the inclusive intent of sustainability-oriented innovation (Seyitoglu & Costa, 2022).

Table 2. Network Positions of Selected Local and Community-Related Actors

Actor / Group	Degree (raw / norm.)	Betweenness	Network Position	Evidence-Based Interpretation
Local Youth	1 / 0.038	0.000	Pendant via MGPA	Event-linked access; no brokerage
Women-led Micro SMEs	7 / 0.269	0.091	Relatively embedded connector	Links public, finance, facility, hotel, and supplier nodes

Actor / Group	Degree (raw / norm.)	Betweenness	Network Position	Evidence-Based Interpretation
Local Farmers	5 / 0.192	0.024	Supplier-cluster member	Directly embedded; limited network-wide brokerage
Environmental NGOs	5 / 0.192	0.089	Environmental bridge	Links community, regulatory, and environmental nodes

Note: All values come from the same binary, undirected 27-node, 46-tie projection used in Table 1. The table replaces earlier percentages that lacked a reported denominator and should not have been interpreted as survey prevalence.

Discussion

The empirical results show that the Mandalika context presents a governance challenge for Sustainability-Oriented Innovation (SOI). ITDC's leading scores across all centrality measures indicate a concentrated coordination structure. Concentration is not equivalent to exclusion in every interaction, but it increases dependence on one gateway and can limit local bargaining capacity when alternative institutional routes are weak. This is why SOI must be assessed not only by investment outputs but also by the distribution of voice, market access, and implementation capacity (Wilkerson, 2025).

Inclusive governance requires meaningful sharing of decision-making authority among public, private, and community actors. In Mandalika, the central positions of ITDC and hotel chains coexist with uneven local access: women-led micro enterprises are relatively embedded, farmers are connected but weak as brokers, and youth remain peripheral. This differentiation aligns better with SNA evidence than a blanket claim that all local actors are disconnected, and it supports targeted rather than uniform interventions (Pace, 2024; Scioșteanu et al., 2024).

ANT adds that governance power is stabilized through relations among organizations and socio-technical instruments. ITDC and hotel chains occupy central positions, but local actors are not homogeneous: some connect to finance, public facilities, and tourism markets, while others depend on a single event-related gateway. Sustainable tourism thus requires collaborative governance that creates additional coordination routes and reduces dependence on a few brokers (Wondirad et al., 2020; Sigala, 2022).

Non-Human Actants and the Distribution of Governance Power

The ANT interpretation shifts attention from stakeholders alone to the instruments that translate authority. The HPL/HGB land masterplan, National Land Agency procedures, environmental impact assessment and permits, and investor memoranda are not neutral background conditions. They sequence access to land, define which claims are administratively legible, and determine when investment can proceed. In the mapped network, these regulatory and contractual actants are routed strongly toward ITDC, stabilizing its role as an OPP. They can weaken local positions when consultation, evidence, and grievance mechanisms must pass through a single institutional gateway; conversely, public disclosure and community verification checkpoints can turn these actants into counterweights that widen participation (Ren et al., 2023; Liu et al., 2025).

Digital actants also redistribute visibility and exchange. The OTA recommendation algorithm feeds the online travel-agent platform, which links the local accommodation segment to the more central hotel cluster. Although this creates a route for homestays and guides to reach visitors, ranking rules, fees, data ownership, and onboarding standards may still direct demand toward already visible firms. The digital payment gateway

similarly connects hotels, food-and-beverage investors, and women-led micro enterprises. However, access empowers local firms only when they can meet documentation, device, fee, and financial-literacy requirements. Capacity building should therefore be paired with transparent platform rules, interoperable payment access, and local control over relevant market data (Sigala, 2022; Nakayama, 2024).

Temporal and operational actants complete this picture. The MotoGP event calendar channels demand, labor opportunities, and public attention through MGPA; because local youth connect only to MGPA, the calendar may generate short-term participation without durable brokerage. Parking procedures and public-facility standards can likewise formalize service quality while displacing informal managers if rule design excludes their knowledge and livelihoods. Polycentric governance should therefore redesign the actants and the meetings: publish procurement and event calendars in advance, include community review points in land and permit procedures, provide open platform-onboarding criteria, and reserve transparent entry routes for local suppliers, youth groups, and micro-enterprises.

These findings reinforce the view that residents should have substantive roles in tourism planning and decision-making, not only downstream service roles (Laing et al., 2009). Dependence on external capital can coexist with weak recognition of local cultural and economic assets. Governance arrangements should therefore combine investment with community representation, local enterprise access, and cultural preservation (Hartman et al., 2020; Vaz et al., 2025; Salman et al., 2023).

Mandalika reflects a broader challenge in emerging tourism destinations: investment-led growth can expand infrastructure and visibility while producing uneven access to benefits and decisions. The present network evidence suggests that social equity and environmental sustainability require regular participation by local stakeholders in policy design, procurement, platform access, and monitoring rather than occasional consultation (Sariego-Kluge & Morales, 2025; Sigala, 2022).

The case therefore contributes to wider debates on how tourism governance in peripheral destinations can reconcile external investment with locally grounded development. SOI is most useful here as a governance principle: it highlights who participates, who controls key instruments, and whether innovation creates alternative pathways for local actors rather than reinforcing existing dependencies.

In practical terms, reform should combine enterprise support with changes to governance rules. Local SMEs need finance, training, procurement information, and network access, but capacity-building alone will not alter structural dependence. Polycentric arrangements should create multiple coordination centers, transparent participation rules, and shared monitoring, while tourism planning should integrate environmental limits and community knowledge (Morrison et al., 2023; Shah & McNeil, 2022).

CONCLUSION AND RECOMMENDATIONS

This study demonstrates that tourism governance in the Mandalika SEZ is organized around a highly centralized 27-node, 46-tie network. ITDC ranks first in degree, betweenness, closeness, and eigenvector centrality, while hotel chains rank second. Local farmers retain several supplier ties but limited brokerage, and local youth remain a pendant node with one connection and zero betweenness. The recalculated closeness scores - 0.413 for farmers and 0.302 for youth - remove the earlier contradiction between

a claim of marginality and perfect closeness. In this study, closeness describes topological reach, not physical proximity.

The combined SNA-ANT analysis further shows that concentrated governance is produced not only by powerful organizations but also by non-human actants. Land instruments, permits, memoranda, platforms, algorithms, payment systems, procedures, and the event calendar translate authority and market access. When ITDC, MGPA, and major commercial operators route these actants, local participation can remain seasonal, transactional, or dependent. When rules are transparent and jointly designed, the same actors can broaden local access to decisions, procurement, finance, and visitors.

The findings therefore support a polycentric governance model with multiple legitimate decision and coordination centers rather than a single dominant gateway. Reform should combine local enterprise finance and skills development with institutional changes: community representation in land-use and permit reviews, advance and transparent local procurement windows, open digital-platform and payment onboarding, and monitoring of local participation across event and non-event periods. These measures would create alternative network paths, reduce dependence on a small number of brokers, and better align Mandalika development with Sustainability-Oriented Innovation.

If Indonesia wants to ensure the benefits of national tourism development extend beyond a few concentrated destinations and privileged groups, Mandalika's revitalization must reflect a broader shift toward inclusive and sustainable tourism governance. This transformation cannot be achieved if development remains concentrated in enclaves dominated by luxury tourism and high-end investment. Local communities should therefore be empowered as active participants and beneficiaries through entrepreneurship development, skills training, access to finance, and capacity-building in hospitality, sustainable tourism practices, and business management. Tourism development should also integrate local knowledge, traditional medicine, arts, storytelling, and other cultural assets into authentic tourism products that support cultural preservation and strengthen community pride. In addition, multi-actor collaboration should form the foundation of tourism governance through equitable partnerships involving ITDC, local authorities, community-based organizations, cooperatives, SMEs, and other relevant stakeholders, with transparent, shared decision-making processes. Future investment should prioritize sustainable infrastructure that benefits both residents and visitors, including low-impact accommodation, environmentally responsible transportation, accessible public facilities, community-based waste management, and native vegetation conservation. Finally, establish participatory monitoring and accountability mechanisms to assess tourism development against measurable social, economic, and environmental objectives, ensuring Mandalika's future development stays within sustainability limits and distributes benefits more equitably among local communities.

Overall, the Mandalika case shows that tourism growth becomes sustainable only when economic development is linked to social inclusion, cultural continuity, and environmental responsibility. Combining SOI with collaborative and polycentric governance provides a practical direction for reducing bottlenecks, broadening local participation, and building a destination whose benefits are more widely shared.

This analysis is limited by its cross-sectional, actor-category-level, and case-bounded design. The binary undirected projection is appropriate for comparable

structural centrality but does not estimate tie intensity, temporal change, or causal effects. Future research should retain a validated directed multiplex matrix, document tie weights and time periods, and compare network positions across stakeholder groups and event cycles.

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