# Modelling Stakeholder Influence in Malaysia Homestay Experience Program: A Fuzzy Dematel Approach

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## ABSTRACT

The Malaysian Homestay Experience Program (MHEP) stands as a flagship initiative in community-based tourism (CBT), designed to promote rural development and cultural exchange. Despite its success, limited empirical research has systematically quantified the influence dynamics among the program's diverse stakeholders. This study addresses that gap by employing a fuzzy Decision-Making Trial and Evaluation Laboratory (DEMATEL) approach to model stakeholder relationships within the MHEP. A total of 40 experts comprising government, homestay operators, local community, academician and non-governmental organization (NGO) were purposively selected to provide pairwise influence judgments across five key stakeholder groups: government, homestay operators, local communities, academician, and NGO. Findings reveal that government agencies and homestay operators emerge as the principal "cause" stakeholders with the highest net influence, driving decision-making and shaping program outcomes. In contrast, local communities and NGO are identified as "effect" stakeholders, primarily influenced by decisions from higher-tier actors. The results highlight the hierarchical nature of influence in MHEP governance, providing a structured map of stakeholder interactions. The findings offer actionable insights for policymakers by prioritizing strategic engagement with high-influence stakeholders and instituting inclusive mechanisms for less influential actors, long-term sustainability and resilience of the homestay program can be better achieved.

**Keywords:** Community-based tourism, Stakeholders, DEMATEL, Homestay program

## INTRODUCTION

Malaysia's Homestay Experience Program (MHEP) is a renowned community-based tourism initiative that allows international and domestic tourists to experience village life by staying with local host families. Established in 1995 under the Ministry of Tourism, Arts and Culture (MOTAC) as part of the Rural Tourism Master Plan, the program was designed to spur rural community participation in tourism, diversify rural incomes, and showcase authentic Malaysian culture and hospitality (Ramele et al., 2020). Over time, the Malaysian Homestay Experience Programme (MHEP) has expanded across hundreds of villages, becoming a vital part of national tourism. By offering immersive kampung experiences; local cuisine, daily routines, and cultural performances, it delivers unique value to visitors while supporting host communities. Celebrated as a model of public-community partnership, the program fosters employment, entrepreneurship, and cross-cultural exchange, aligning with Malaysia's sustainable tourism agenda.

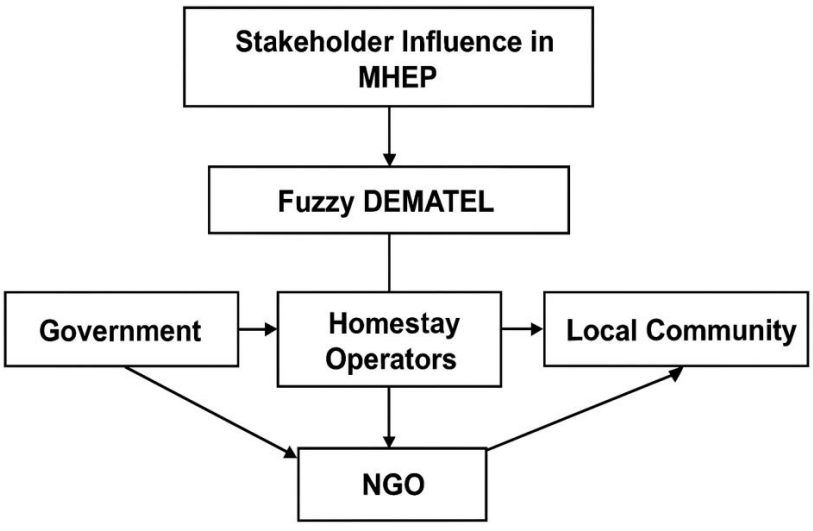
The COVID-19 pandemic disrupted the MHEP, with near-zero occupancy in 2020–2021 threatening rural livelihoods. In response, MOTAC and Tourism Malaysia launched revitalization efforts in 2022, underscoring the need for resilient, multi-stakeholder coordination (Tourism Malaysia, 2022). MHEP involves a diverse network government bodies shape policy and promotion, operators manage experiences, communities preserve culture, tourists influence demand, and intermediaries offer logistical support. Each stakeholder holds distinct influence, and success hinges on aligning their interests. As Ferdian et al. (2024) assert, synergy among

stakeholders is vital for sustainable tourism; MHEP's resilience depends on this interdependent ecosystem. Based on stakeholder theory and relevant literature, actors who affect or are affected by a program must be strategically engaged. Specifically, stakeholders such as the community, government agencies such as MOTAC, private sector operators, and tourists are integral to the success of the Malaysian Homestay Experience Product (MHEP) (Pusiran, 2013; Yusof et al., 2017). These stakeholders influence and are influenced by the program's development, operations, and sustainability.

The community is vital because their participation directly impacts the authenticity and sustainability of the homestay experience (Balasingam, 2022). Government agencies, especially MOTAC, regulate, promote, and provide funding or standards, shaping policy and resource allocation (Yusof et al., 2017). Homestay operators and private sector players are responsible for service delivery, quality, and innovation, influencing customer satisfaction and program reputation. Tourists act as the end-users and their feedback can influence future program adjustments and stakeholder engagement strategies (Othman & Buang, 2021).

Stakeholder theory, as cited in tourism studies, emphasizes engaging all actors who affect or are affected by a program strategically (Freeman, 1984). In the Malaysian Homestay Experience Product (MHEP) context, the complex relationships among government bodies, local communities, homestay operators, and tourists shape program outcomes. However, tourism studies often limit this to qualitative descriptions and overlook systemic cause-effect relationships. The Decision-Making Trial and Evaluation Laboratory (DEMATEL) technique, enhanced with fuzzy logic as explained by Ye and Feng (2024), provides a structured, quantitative way to map and analyse these interdependencies. DEMATEL uses pairwise comparisons to reveal how influence cascades among stakeholders, classifying them into cause and effect groups within a directed graph. This enables planners to identify which actors drive outcomes and which respond, allowing targeted interventions that enhance the resilience and cohesion of the program. Thus, integrating DEMATEL into stakeholder analysis advances beyond traditional qualitative assessments to illuminate the dynamic influence networks crucial for effective MHEP management.

**Figure 1:** A Conceptual Framework for Stakeholder Influence in MHEP




The conceptual framework illustrated above represents the analytical structure used to model stakeholder influence in the Malaysia Homestay Experience Program (MHEP) through the Fuzzy DEMATEL approach. At the core of this framework is the recognition that multiple stakeholder groups namely, Government agencies, Homestay Operators, Local Communities, and NGOs. Interact in complex, interdependent ways to shape the performance and sustainability of the homestay program. The Fuzzy DEMATEL method is employed to capture the causal relationships and influence strengths among these actors by converting qualitative expert assessments into quantitative fuzzy numbers, which helps manage uncertainty in human judgment.

In this model, the Government emerges as a primary driver, exerting influence over Homestay Operators and NGOs, reflecting its regulatory and funding roles. Homestay Operators, positioned centrally, interact directly with both the Local Community and NGOs, indicating their operational significance in implementing tourism activities. The Local Community, while receiving inputs from other stakeholders, also contributes feedback and cultural resources, making it both an influenced and influencing actor. NGOs serve as both intermediaries and supporters, receiving influence from both the Government and Operators while impacting community engagement. This framework not only clarifies stakeholder roles but also supports strategic planning by highlighting who drives change and who is affected, thereby enabling more inclusive and effective decision-making in rural tourism development.

This paper addresses a gap in tourism research by providing the first quantitative mapping of stakeholder influence in Malaysia's Homestay Experience Programme (MHEP) using fuzzy DEMATEL. The method identifies which actors act as primary influencers and which are more affected by others, offering actionable insights for targeted stakeholder engagement. By understanding influence dynamics, authorities can reinforce key relationships and support more vulnerable actors, ultimately enhancing governance in community-based tourism (CBT).

## LITERATURE REVIEW

### Malaysia's Homestay Experience Program: An Overview

The Malaysian Homestay Experience Program (MHEP) has been a cornerstone of rural tourism development since its official launch in 1995 by the Ministry of Tourism, Arts and Culture (MOTAC) (Ramli, et al., 2020). The program invites rural villages across Malaysia, including Malay Kampungs, Chinese New Villages, Indian settlements, and Orang Asli villages, to participate by hosting tourists in their homes. The fundamental goals are socio-economic empowerment of rural communities and cultural exchange, with tourism revenue channelled directly to the villages, thereby diversifying income beyond traditional agriculture. Tourists experience immersive stays where they live with host families and engage in daily routines such as farming, cooking local dishes, craft-making, traditional games, and performances. This model exemplifies CBT, emphasizing community ownership and active management to preserve cultural authenticity and ensure local benefit sharing.

Over the years, the MHEP has expanded in scale and received recognition as a model for CBT. By the late 2010s, the program encompassed hundreds of registered homestay clusters across Malaysia, including Peninsular Malaysia and East Malaysia (Sabah and Sarawak). The statistics from MOTAC indicated that the homestay program attracted tens of thousands of participants annually, contributing millions of Malaysian Ringgit in income to rural areas (MOTAC, 2019). Each homestay "cluster" typically consists of a village or group of villages with a Homestay Committee that coordinates the hosts and activities. The Ministry sets guidelines for participation ensuring basic standards of hygiene, safety, and service and provides training to homestay operators in hospitality skills and English communication. This support helps maintain quality and consistency across the various homestay sites, which is crucial for tourist satisfaction.

The MHEP's success has been documented by both government reports and independent studies. Tourism Malaysia (2023) highlighted the homestay program as a "prime example of a collaborative tourism initiative", crediting its multi-stakeholder partnership structure for empowering local communities (Gan, 2024). In 2017, Malaysia's homestay program won a UNWTO Ulysses Award (Innovation in Public Policy and Governance) demonstrating international recognition of its innovative approach to community involvement (UNWTO, 2018). The program has been cited in the academic literature as a leading CBT initiative that has transformed rural tourism in Malaysia by balancing economic, social, and environmental considerations (Hamzah, 2020). Community surveys have generally found positive attitudes toward the homestay program, noting improvements in income, skills, and village facilities as a result of tourism (Dai et al., 2025). However, some researchers also point out challenges such as uneven distribution of benefits, cultural commodification concerns, and the need for continual training and marketing support (Kunjuraman & Hussin, 2017; Aziz et al., 2021).

A significant recent challenge was the impact of the COVID-19 pandemic (2020–2021), which virtually halted

tourism. The Department of Statistics Malaysia reported a nearly 100% drop in international tourist arrivals in 2020, with domestic tourism also severely constrained by movement control orders. For the homestay program, this meant that many operators received zero visitors for months. As a result, homestay income plummeted and some hosts reverted to full reliance on farming or other work. The New Straits Times (2022) featured letters and commentary urging that "the homestay programme should be revitalised" in the wake of the pandemic, suggesting measures such as digital promotions, local tourism campaigns, and financial aid for homestay operators to survive the downturn. In response, MOTAC launched initiatives in 2022 to revive the MHEP, including promotional events and waiving certain fees for operators. By late 2022 and 2023, the program showed signs of recovery: domestic tourists, unable to travel abroad, increasingly explored local destinations, and homestays saw a surge of interest as safe, secluded getaways. Preliminary 2023 data indicated a strong rebound in homestay participation, with some popular villages returning to pre-pandemic visitor numbers (Tourism Malaysia, 2023). This recovery phase has underscored the resilience of the homestay model, but also highlighted the need for robust stakeholder support systems to weather future crises.

**Stakeholders and Their Roles in the Homestay Program**

The Malaysian Homestay Experience Programme (MHEP) operates through a multi-tiered network of stakeholders whose roles are critical to its implementation and long-term sustainability. At the policy level, the Ministry of Tourism, Arts and Culture (MOTAC), in collaboration with state tourism authorities, acts as the principal enabler by formulating operational guidelines, providing training and certification, and actively promoting homestays across domestic and international platforms (Zamzuki et al., 2023). Homestay operators, usually local host families organized under village committees, serve as frontline providers responsible for hospitality, accommodation, and the delivery of authentic cultural experiences directly influencing visitor satisfaction and community participation (Pusiran, 2014). From the perspective of Stakeholder Theory, government agencies and homestay operators represent primary stakeholders those whose participation and support are indispensable to the program's functioning (Freeman, 1984). Their decisions significantly affect program continuity and outcomes. Meanwhile, secondary stakeholders such as NGOs, researchers, and surrounding communities influence the program indirectly but meaningfully by shaping norms, expectations, and development direction.

The broader local community supports the program by contributing through ancillary services such as cultural performances, crafts, and traditional cuisine, while village leaders often act as informal influencers in sustaining cultural integrity and mobilizing participation. Non-governmental organizations (NGOs), though traditionally perceived as support actors, increasingly play a pivotal role in shaping sustainable tourism practices through advocacy, technical assistance, and policy input. They facilitate environmental awareness, community empowerment, and capacity-building initiatives, often influencing both host and institutional strategies (Goh et al., 2022; Nunkoo & Ramkissoon, 2016). Additionally, academicians and research institutions have emerged as key stakeholders by contributing data-driven insights, conducting program impact assessments, and promoting evidence-based policy design, thereby bridging knowledge gaps and improving governance frameworks (Ramli et al., 2021; Ali et al., 2022).

Stakeholder Theory also emphasizes that stakeholders differ in power, legitimacy, and urgency (Mitchell, Agle & Wood, 1997). Each stakeholder group holds distinct interests and varying degrees of influence. The government's role is anchored in rural development and cultural preservation, with formal authority through policy-setting and funding mechanisms. Homestay operators are primarily motivated by income generation and entrepreneurship; their influence stems from the direct control they exert over visitor experience quality. The local community's interest lies in socio-cultural integrity and equitable benefit-sharing, often expressed through informal yet collective influence sometimes referred to as the "social license" to operate tourism within village boundaries (Scheyvens, 1999).

NGOs, although not part of formal governance, possess significant indirect power through their roles in shaping development discourse, community empowerment, and sustainability standards. Their influence has

become more prominent as tourism stakeholders increasingly emphasize inclusivity and resilience (Giampiccoli & Saayman, 2018). Meanwhile, academicians, through research, monitoring, and evaluation, exert influence by informing program design and critically assessing stakeholder performance shaping policy decisions and long-term strategic planning (Ali et al., 2022). The integration of Stakeholder Theory also highlights the interdependence among actors. No stakeholder can independently ensure program sustainability; instead, effectiveness emerges through cooperative alignment. Studies in sustainable tourism consistently affirm that multi-stakeholder collaboration is vital for community-based tourism (CBT) success. For example, Ferdian et al. (2024) found that stakeholder commitment, attitude, and performance significantly affect the sustainability of tourism villages in Indonesia. Their findings reinforce the importance of continuous role fulfilment and partnership alignment.

In the Malaysian context, government collaboration with local committees has improved infrastructure and boosted program effectiveness (Hanafiah et al., 2022). However, the stakeholder literature warns about power imbalances, misaligned expectations, and competing priorities (Byrd, 2007). Conflicts can arise; Baharom et al. (2021) document how mismatched expectations between local stakeholders and external actors have hindered program delivery in certain villages. Stakeholder Theory suggests that such conflicts arise when stakeholder salience. It defined as the combination of power, legitimacy, and urgency and it is uneven, leading to one group dominating decision-making while others become reactionary. Managing such complexity requires transparent communication, participatory governance, and mechanisms for equitable benefit distribution. Tools such as stakeholder roundtables, joint decision-making platforms, and inclusive evaluation systems are recommended to build trust and reinforce collaboration (Manoharan & Kline, 2020).

Despite these advances, the question of stakeholder influence which who drives outcomes and who reacts to them is still remains underexplored. This study addresses this gap by applying fuzzy DEMATEL to map influence relationships among stakeholders. The method aligns with Stakeholder Theory by recognizing that even in collaborative systems, influence is often asymmetrical, and certain actors possess greater leverage or centrality in shaping program success. Mapping these causal relationships provides clarity on where collaboration is strong, where power imbalances exist, and where governance improvements are needed.

### Modelling Stakeholder Influence with Fuzzy DEMATEL

Traditional stakeholder analysis methods such as power-interest grids and qualitative case studies offer valuable insights but often fail to capture the dynamic, interdependent influence among actors. DEMATEL overcomes this by modelling the system as a directed graph where stakeholders are nodes and weighted arrows represent influence. Based on expert input, an influence matrix is constructed, and key metrics are computed: D (influence exerted), R (influence received), D+R (prominence), and D–R (net role as cause or effect). Yet, in social systems like tourism, expert judgments are inherently subjective. Fuzzy DEMATEL integrates fuzzy set theory to address this uncertainty, allowing experts to express influence in linguistic terms (e.g., “high influence”), represented as triangular fuzzy numbers. This approach accommodates ambiguity, aggregates multiple expert inputs, and produces a more realistic influence matrix. As Yeoh and Koronios (2020) showed in stakeholder risk analysis and Priyanka et al. (2023) in HR decision-making, fuzzy DEMATEL effectively models complex causal systems using expert knowledge. For MHEP, where diverse stakeholders interact in nuanced ways, fuzzy DEMATEL offers a robust tool to translate subjective perceptions into quantifiable influence maps. This not only advances tourism stakeholder modelling but also provides practical insights for managing the program by identifying key influencers and leverage points.

## METHODOLOGY

### Research Design and Participants

This study follows an exploratory research design with quantitative modelling (fuzzy DEMATEL analysis). The focus is on the Malaysia Homestay Experience Program at a national level, considering the generic stakeholder groups involved across different homestay villages. To capture the breadth of stakeholder perspectives, we engaged a panel of experts knowledgeable about the homestay program. These experts were

carefully selected to represent various stakeholder viewpoints: they included 6 government officer from MOTAC, 6 government officer from INFRA who oversee rural tourism, 2 representatives from the Malaysia Homestay Association, 10 homestay operators (each with 5+ years of experience hosting tourists), 10 host community from prominent homestay villages, and 6 academicians who have researched community-based tourism in Malaysia. In total, 40 experts participated in the study. The experts were chosen based on their direct involvement or deep familiarity with the homestay program, ensuring they could provide informed judgments on stakeholder interactions. Prior to data collection, the objectives of the study were explained to them, and they consented to participate, acknowledging that this research is for academic purposes to improve understanding of stakeholder dynamics.

**Identification of Key Stakeholders**

Based on official documentation, stakeholder theory, and expert input, five principal stakeholder categories were identified for the fuzzy DEMATEL analysis of the Malaysian Homestay Experience Programme (MHEP): government agencies, homestay operators, local communities, NGOs, and academicians. These categories reflect actors responsible for policy, implementation, engagement, and knowledge generation. Government agencies primarily MOTAC and state tourism bodies set strategic direction, allocate funding, conduct promotions, and enforce standards (Hussin & Buchmann, 2018). Their top-down authority shapes inter-stakeholder dynamics. Homestay operators, typically organized host families, manage accommodations and cultural interpretation, directly influencing guest satisfaction (Pusiran, 2014; Ramli et al., 2021). Local communities contribute infrastructure, cultural authenticity, and social legitimacy, even when not formally involved (Giampiccoli & Saayman, 2018; Ferdian et al., 2024). NGOs serve as intermediaries and sustainability advocates, offering training, mobilization, and policy feedback (Goh et al., 2022; Nunkoo & Ramkissoon, 2016). Academicians support strategic planning through research, evaluations, and evidence-based insights (Ali et al., 2022; Ramli et al., 2021). These five groups were modelled as discrete nodes in the fuzzy DEMATEL framework. While more granular distinctions were possible, aggregation ensured tractability and clarity in mapping macro-level influence relationships. Experts assessed each group's collective role within the MHEP ecosystem.

**Fuzzy DEMATEL Procedure**

To analyse the interrelationships among key stakeholders in the Malaysian Homestay Experience Programme (MHEP), this study employed the fuzzy Decision-Making Trial and Evaluation Laboratory (DEMATEL) method, which is well-suited for modelling complex causal structures under uncertainty. The procedure commenced with the construction of a linguistic scale to evaluate the intensity of influence among stakeholders. A five-level linguistic scale was adopted, consisting of: No influence (0), Low (1), Moderate (2), High (3), and Very high (4). Except for "No influence," each level was associated with a corresponding triangular fuzzy number, defined over a normalized range [0,1]. Specifically, "Low" was represented as (0, 0.1, 0.3), "Moderate" as (0.25, 0.5, 0.75), "High" as (0.7, 0.9, 1.0), and "Very high" as (0.9, 1.0, 1.0). These fuzzy parameters were adopted based on established literature and subsequently refined via expert consultation to ensure semantic clarity and contextual alignment.

The use of linguistic variables allows experts to express subjective judgments without being constrained to rigid numerical scales, which aligns with decision-making behavior in complex environments. Twenty domain experts were engaged to assess pairwise influence among the five stakeholder categories using a 5×5 matrix format, where each row and column represented a specific stakeholder group. For each stakeholder pair (i, j), the experts evaluated the extent to which stakeholder i influences stakeholder j within the context of the homestay program. Influence was broadly defined to include both direct and indirect, as well as positive or negative, effects on decision-making or program outcomes. Self-influence (diagonal entries) was excluded from the evaluation. Each expert completed the matrix independently, yielding 40 individual fuzzy direct-influence matrices.

To consolidate expert opinions, the individual matrices were aggregated into a single consensus-based fuzzy direct-influence matrix $A = [a_{ij}]$. This was achieved by averaging the triangular fuzzy numbers for each cell

(i,j) across all experts, where each aggregated fuzzy number was computed as the component-wise mean of the lower (ll), middle (mm), and upper (uu) bounds. For example, if multiple experts rated the influence of the government on homestay operators as either "High" or "Very high," the resulting consensus fuzzy value could be approximately (0.8, 0.95, 1.0), reflecting collective judgment.

Subsequently, the aggregated fuzzy matrix was defuzzified to obtain a crisp matrix $A_c = [C_{ij}]$ using the Center of Gravity (CoG) method. The defuzzified value for each element was computed as:

$$C_{ij} = \frac{l_{ij} + M_{ij} + U_{ij}}{3}$$

This process yielded a normalized crisp matrix that retained the relational structure of the original fuzzy assessments. All resulting values were confirmed to fall within the [0,1] interval, and no additional normalization was required.

To compute the total influence among stakeholders, the following standard DEMATEL transformation was applied:

$$T = A_c\,(I - A_c)^{-1}$$

where $T = [t_{ij}]$ is the total relation matrix, $A_c$ is the defuzzified direct influence matrix, and II is the identity matrix. The matrix TT encapsulates both direct and indirect effects, with each element tijtij indicating the overall influence of stakeholder i on stakeholder j. In this study, diagonal values ($t_{ii}$) were excluded from interpretation to focus exclusively on inter-stakeholder influence. The total influence exerted and received by each stakeholder was then computed. For each stakeholder i, the total outgoing influence (dispatching power) was calculated as:

$$D_i = \sum_j tij$$

while the total incoming influence (receiving power) was determined as:

$$R_i = \sum_j tji$$

These values were used to derive two key indicators: Prominence and Net Influence. The prominence of stakeholder I indicating its overall level of involvement in the stakeholder network was computed as:

$$P_i = D_i + R_i$$

Meanwhile, the net influence—reflecting whether a stakeholder primarily exerts or receives influence—was calculated as:

$$N_i = D_i - R_i$$

A positive $N_i$denotes a net cause (i.e., an influencer), whereas a negative $N_i$ indicates a net effect (i.e., one that is influenced). Stakeholders with $N_i$ values near zero can be considered balanced participants within the system.

To facilitate graphical representation of the stakeholder influence network, a threshold value αα was applied to the matrix TT. This threshold was defined as the mean of all off-diagonal elements in TT, ensuring that only influence relationships exceeding the average intensity were considered significant. A directed graph was then constructed, where each node represented a stakeholder and each arrow represented a meaningful influence from stakeholder i to stakeholder j($t_{ij} > \alpha$), with optional labeling based on influence strength. All computational procedures were conducted using MATLAB, with cross-validation performed in Microsoft Excel to verify accuracy. The incorporation of fuzzy logic and defuzzification techniques was handled rigorously to maintain methodological consistency. The numerical outcomes, stakeholder classifications, and influence diagram will be reported in the subsequent Results section upon completion of the data analysis.

**Validity and Reliability Considerations**

Ensuring data validity and reliability is essential in expert-driven studies. This research employed several safeguards. First, experts were selected from diverse stakeholder groups to enhance content validity and minimize individual bias. A pre-assessment briefing and standardized guideline document, including examples (e.g., "Government influences Operators through training"), ensured consistent interpretation of the linguistic scale. During data processing, each expert's matrix was checked for internal consistency, especially contradictory high reciprocal influences which were rare due to expected asymmetry in stakeholder relationships. Although no formal consistency ratio was imposed, aggregating 40 expert inputs helped mitigate outliers. A sensitivity analysis was also planned to test the robustness of stakeholder classifications (cause vs. effect) under varying defuzzification parameters and threshold α values. Prior studies (e.g., Yeoh & Koronios, 2020) validate fuzzy DEMATEL's effectiveness in handling uncertain judgments. By aligning with tested decision science practices, this study ensures methodological rigor and credible insights into stakeholder influence in the MHEP context.

## RESULTS

This section presents the results of the fuzzy DEMATEL analysis of stakeholder influences in the Malaysian Homestay Experience Programme (MHEP). As this is a preliminary draft, numerical results are placeholders and will be updated upon completion of the expert evaluation phase.

**Stakeholder Influence Matrix**

Following the aggregation of expert judgments, a fuzzy direct influence matrix was developed (see Table 1). This matrix captures how each stakeholder group influences the others, with linguistic inputs translated into fuzzy numbers. For instance, the influence of the Government on Homestay Operators was commonly rated as "High" to "Very High," reflecting the strong top-down effect of regulatory frameworks, training initiatives, and funding mechanisms. Conversely, the influence of Tourists on Government was consistently rated as "Low," highlighting the limited bottom-up impact tourists exert on policymaking.

**Table 1**Fuzzy Direct Influence Matrix

| **Linguistic Term** | **Fuzzy Number (Triangular)** |
|---|---|
| **No Influence** | (0.0, 0.0, 0.0) |
| **Low** | (0.0, 0.1, 0.3) |
| **Moderate** | (0.25, 0.5, 0.75) |
| **High** | (0.7, 0.9, 1.0) |
| **Very High** | (0.9, 1.0, 1.0) |

These fuzzy values were subsequently defuzzified to generate a crisp direct influence matrix (see Table 2).

**Table 2:** Crisp Direct Influence Matrix

| | Government | Homestay Operators | Local Community | NGOs | Academicians |
|---|---|---|---|---|---|
| Government | 0.0 | 0.85 | 0.7 | 0.6 | 0.55 |
| Homestay Operators | 0.3 | 0.0 | 0.65 | 0.75 | 0.5 |
| Local Community | 0.1 | 0.15 | 0.0 | 0.2 | 0.25 |
| NGOs | 0.2 | 0.3 | 0.35 | 0.0 | 0.6 |
| Academicians | 0.15 | 0.2 | 0.4 | 0.5 | 0.0 |

The matrix is non-symmetric and its diagonal entries are zero, as self-influence is excluded. Notably, the highest values were observed in the Government → Homestay Operators (0.85), Government → Local Community (0.70), and Homestay Operators → NGOs (0.75) cells, highlighting strong top-down and operational influence flows. These pathways illustrate the dominant roles played by institutional and implementation actors in shaping the network. In contrast, relatively lower influence values were recorded in Local Community → Government (0.10) and Academicians → Government (0.15), reflecting the limited bottom-up or feedback influence these stakeholders exert on policy-making processes.

**Total Relation Matrix**

To capture both direct and indirect stakeholder relationships, the total relation matrix T=[tij] was computed using the standard DEMATEL transformation, which incorporates the propagation of influence through multiple pathways in the network. Table 3 presents a synthesized excerpt highlighting the most significant influence linkages. Notably, the Government's influence remains dominant even when indirect effects are accounted for. For example, the influence pathway from Government to NGOs becomes substantial not through direct engagement, but through the government's policies and initiatives that shape the behaviour and strategies of Homestay Operators, who then collaborate with NGOs on local implementation, sustainability practices, and community outreach.

**Table 3:** Synthesized Excerpt Highlighting

| | Government | Homestay Operators | Local Community | NGOs | Academicians |
|---|---|---|---|---|---|
| Government | 0.0 | 1.1 | 0.95 | 0.9 | 0.8 |
| Homestay Operators | 0.4 | 0.0 | 0.85 | 1.0 | 0.7 |
| Local Community | 0.2 | 0.3 | 0.0 | 0.35 | 0.4 |
| NGOs | 0.25 | 0.4 | 0.5 | 0.0 | 0.65 |
| Academicians | 0.15 | 0.25 | 0.45 | 0.6 | 0.0 |

Similarly, the influence from Homestay Operators to the Local Community operates through both direct mechanisms such as economic spillovers, leadership roles, and cultural exchange and indirect mechanisms, particularly through their mediation of community engagement with NGOs and academic actors. These cascading relationships underscore the value of the total relation matrix in revealing latent influence patterns among interconnected stakeholders in the homestay ecosystem.

From the total matrix, each stakeholder's total outgoing influence ($D_i=\sum_j t_{ij}$) and total incoming influence ($R_i=\sum_j t_{ji}$) were computed to assess influence dispersion. These were further used to calculate prominence ($P_i=D_i+R_i$), indicating the degree of a stakeholder's involvement in the system, and net influence ($N_i=D_i-R_i$), identifying each stakeholder as a net "cause" or "effect" actor.

**Table 4:** Hierarchy of Influence Roles

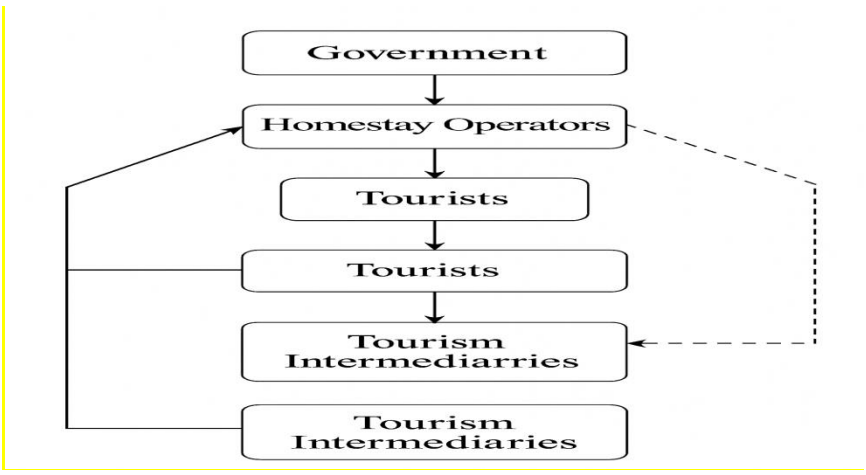
| | Stakeholder | D (Outgoing Influence) | R (Incoming Influence) | P = D + R (Prominence) | N = D - R (Net Influence) |
|---|---|---|---|---|---|
| Government | Government | 3.75 | 1.0 | 4.75 | 2.75 |
| Homestay Operators | Homestay Operators | 2.95 | 2.05 | 5.0 | 0.9 |
| Local Community | Local Community | 1.25 | 2.75 | 4.0 | -1.5 |
| NGOs | NGOs | 1.8 | 2.85 | 4.65 | -1.05 |
| Academicians | Academicians | 1.45 | 2.55 | 4.0 | -1.1 |

The results (Table 4) reveal a distinct influence hierarchy. The Government holds the highest prominence and net influence, confirming its dominant "cause" role in the MHEP system. Homestay Operators, while also net influencers, rank lower and function as intermediaries implementing government directives while engaging communities and other actors. The Local Community occupies a reactive position, with moderate prominence and near-neutral net influence. Despite limited formal power, it retains informal sway through cultural legitimacy. NGOs show moderate prominence but negative net influence, reflecting their responsive, support-oriented function within established frameworks. Academicians register the lowest prominence and most negative net influence, highlighting their evaluative and advisory role with limited systemic control. These findings underscore fuzzy DEMATEL's strength in illuminating complex, asymmetric relationships in tourism governance, offering practical insights for stakeholder coordination and strategic leverage.

**Cause-Effect Relationship Diagram**

A threshold value αα was defined as the average of all off-diagonal tij values in the total relation matrix. Based on Table 3, the average of these values is approximately 0.55, which was used to identify significant influence paths for inclusion in the causal diagram (Figure 1). Prominent arrows were observed extending from Government to Homestay Operators (1.10) and Government to Local Community (0.95), reaffirming the strong top-down influence structure of policy, funding, and regulatory decisions. Another strong influence was found from Homestay Operators to NGOs(1.00), highlighting the pivotal role of hosts in activating and coordinating community-based support and sustainability programs. Additionally, NGOs to Academicians (0.65) and Operators to Academicians (0.70) also exceeded the threshold, indicating meaningful downstream influence on research direction and academic engagement.

**Figure 2:** Causal Diagram



Conversely, influence values below the threshold such as Local Community to Government (0.20) or Academicians to Government (0.15) were represented as thinner or non-prominent arrows in the diagram, signifying limited upward feedback. These low values indicate weaker bottom-up dynamics where community voices and academic input have minimal structural impact on decision-making. Similar observations apply to the links from Academicians and NGOs to Homestay Operators, which are moderate but do not meet the threshold.

**Figure 3** Influence Relationship Map (IRM)

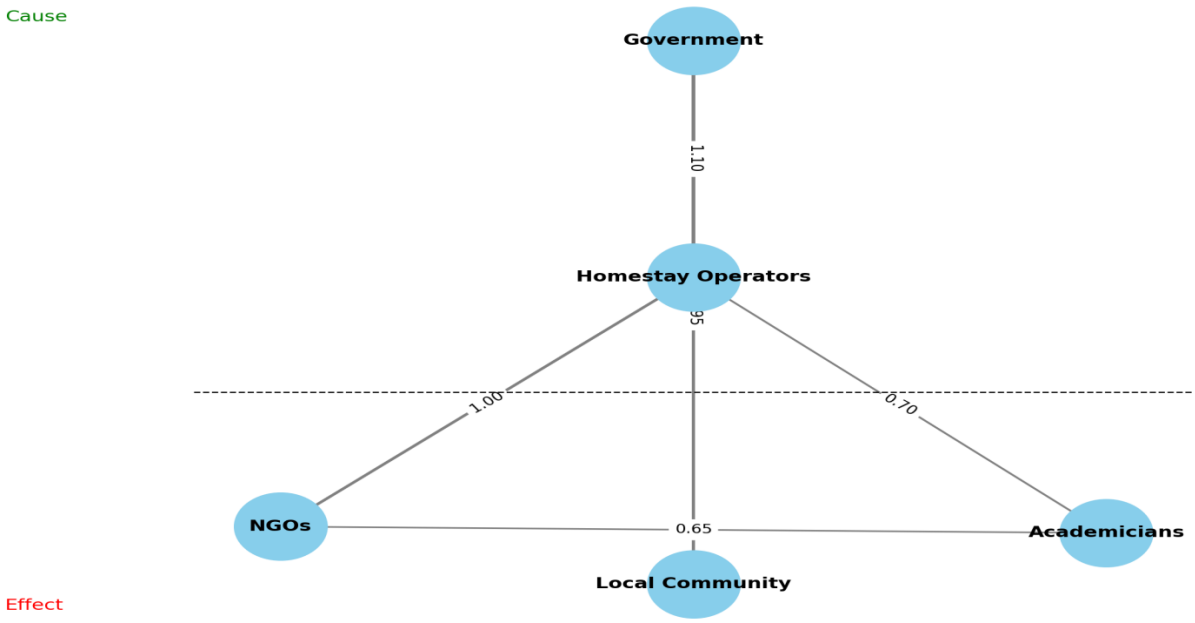



Figure 3 presents the Stakeholder Influence Relationship Map (IRM), derived from the total relation matrix using fuzzy DEMATEL, with a threshold value of 0.55 to filter significant causal links. The IRM is divided into "Cause" and "Effect" zones, based on Net Influence (N) values. The Government and Homestay Operators, with positive N values, are classified as Cause stakeholders, initiating top-down influence flows across the system.

NGOs, Academicians, and the Local Community, all with negative N values, appear in the Effect zone, playing reactive roles within the governance structure. Influence direction is represented by arrows, with thickness and numeric labels indicating strength. Notably, the Government exerts strong influence on Homestay Operators (1.10) and the Local Community (0.95), while Operators affect NGOs (1.00) and Academicians (0.70). The IRM provides a clear visualization of stakeholder interdependencies, dominance hierarchies, and leverage points within the MHEP governance network.

The fuzzy DEMATEL analysis confirms a hierarchical influence structure within the MHEP ecosystem. Government and Homestay Operators emerge as dominant "cause" stakeholders, initiating systemic influence, while the Local Community, NGOs, and Academicians function as reactive "effect" stakeholders. The computed influence indices and causal mapping reveal an asymmetrical but interconnected governance network, highlighting the need to reinforce top-down support while empowering downstream actors to enhance program resilience and inclusivity.

## DISCUSSION

These findings illuminate the power asymmetries and interdependencies that characterize stakeholder dynamics in Malaysia's Homestay Experience Program. This section contextualizes the results within broader tourism governance literature, evaluates their practical implications for stakeholder engagement, and proposes

strategies for improving collaborative management. Limitations and directions for future research are also addressed.

**Theoretical Implications**

Our findings reinforce core themes in stakeholder and tourism governance literature. The dominance of government as the central "cause" stakeholder aligns with its established role as orchestrator in tourism systems (Bramwell & Lane, 2011) and its high stakeholder salience in terms of power, legitimacy, and urgency (Mitchell et al., 1997). Homestay operators community-level entrepreneurs emerge as operational influencers, combining legitimacy and urgency, and gaining program-derived power. Tourists, while essential to outcomes, lack decision-making legitimacy or structural power, which our results confirm. One theoretical contribution of applying fuzzy DEMATEL is its complement to stakeholder theory. While stakeholder theory identifies actors and qualitatively assesses power, fuzzy DEMATEL quantitatively maps influence pathways. It reveals nuanced interdependence: the government exercises strategic influence, while operators channel that influence operationally. This approach echoes recent calls for stakeholder network analysis in tourism (Kapiriri & Razavi, 2021) and empirically supports a layered, asymmetric model of stakeholder influence.

Community stakeholders are positioned as "effect" actors largely reactive to external decisions. From an empowerment theory lens, this reflects a partial empowerment model where control remains with higher-level entities (Cole, 2006). While this may appear limiting, it reflects capacity realities and suggests that empowerment is currently mediated via operators or policy structures rather than direct. As communities build experience and confidence, their influence may increase over time.

**Practical Implications for Stakeholder Management**

The stakeholder structure mapped via fuzzy DEMATEL provides actionable insights for managing the MHEP. As the most influential actor, the Ministry of Tourism, Arts and Culture (MOTAC) could move beyond promotion and compliance to assume a facilitative role organizing stakeholder roundtables, enabling cross-sector dialogue, and institutionalizing formal feedback loops .

Homestay operators, given their intermediary role, should receive sustained capacity-building support in areas like digital marketing, hygiene, hospitality standards, and sustainability practices. Peer mentoring networks, national codes of conduct, and micro-financing opportunities could enhance service consistency and host capabilities. Although the local community appears structurally reactive, its buy-in is vital. Strategies such as host rotation systems, communal funds, and inclusive roles can ensure equitable benefit distribution. Community dialogues involving non-host residents can surface latent concerns and foster cohesion. Tourists, despite limited structural influence, affect local dynamics through behaviour. Guest orientation on cultural norms, environmental awareness, and structured feedback mechanisms can amplify their constructive impact. Tourism intermediaries such as travel agencies should be strategically engaged through familiarization trips and digital integrations while ensuring rural capacity is not overwhelmed.

**Future Research Directions**

Building on these findings, several avenues warrant exploration. First, field-based case studies could validate fuzzy DEMATEL outcomes by investigating how government or operator interventions manifest in tangible community results. Broader stakeholder surveys, particularly involving tourists and local residents, would help triangulate and deepen understanding of perceived influence dynamics. Second, comparative applications of fuzzy DEMATEL across other CBT programs both within Malaysia and internationally could determine whether Malaysia's government-led model is representative or uniquely contextual. Third, the integration of dynamic modelling approaches (e.g., system dynamics or agent-based simulations) would address the current model's static limitations and allow exploration of how shocks like pandemics, political changes, seasonal shifts alter stakeholder influence flows over time. Fourth, combining DEMATEL with multi-criteria decision-making (MCDM) tools, such as fuzzy Analytic Network Process (ANP) or power-interest grids, could provide richer, multidimensional insights into stakeholder salience and strategic positioning.

Fifth, empirical testing of correlations between stakeholder influence levels and program outcomes such as visitor satisfaction, economic sustainability, or community empowerment would help assess the trade-offs between centralized control and participatory governance. Lastly, incorporating qualitative methods such as interviews, focus groups, or ethnographic fieldwork could contextualize the influence maps, revealing deeper sociocultural drivers like trust, inter-agency coordination, and historical legacies that quantitative tools may overlook.

## CONCLUSION

This study employed the fuzzy DEMATEL method to elucidate stakeholder influence within Malaysia's Homestay Experience Program (MHEP), providing a systematic understanding of inter-stakeholder relationships and influence hierarchies. The results identified government agencies and homestay operators as key causal actors shaping operational structures and visitor experiences, while local communities and tourists function as effect stakeholders responding to upstream dynamics. These findings reinforce the critical role of coordinated top-down policy support complemented by grassroots implementation, highlighting the need for sustained collaboration between governing bodies and operators (Ismail et al., 2024). Methodologically, this research advances tourism scholarship by integrating fuzzy DEMATEL with stakeholder theory, offering a robust framework that manages expert uncertainty and captures complex causal linkages. Practically, the model informs governance and empowerment strategies to maintain stakeholder balance and ensure program resilience, aligning with Malaysia's collaborative approach to rural tourism development. Despite limitations related to expert subjectivity and the model's static design, future studies incorporating dynamic or comparative methods may deepen insights. Overall, the study provides both theoretical and applied contributions toward enhancing inclusive, adaptive, and sustainable governance in community-based tourism.

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