

Clustering analysis and key drivers of tourism village sustainability: evidence from The Mountain Merapi Tourism Area, Indonesia

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Abstract. This study aims to determine the factors contributing to the sustainability of tourism villages in the Mount Merapi tourism area, Special Region of Yogyakarta, Indonesia. This research applies Matrix of Cross Impact Multiplication Applied to a Classification (MICMAC). Thirty tourism villages were grouped into two clusters: Cluster A, representing villages with limited tourism infrastructure, and Cluster B, representing villages with better-developed infrastructure. The identification results revealed 24 sustainability variables grouped into five dimensions: economic, social, institutional, environmental, and technological. The analysis revealed that Cluster A and Cluster B share similar key drivers for village tourism sustainability, including social capital and government role. The dependent variables in quadrant III are tourist numbers, agricultural technology, cleanliness, financial reserves, early warning technology, and community disaster response. Based on the synthesis of MICMAC results, intrinsic sustainability characteristics of tourism village are endowment, built-in, and inventory.

Keywords: *Cluster Analysis; Community-based Tourism; MICMAC; Tourism Village Sustainability*

1. Introduction

Internal and external conflicts that arise among residents [1], lack of understanding of policy makers at the village and local government levels regarding comprehensive tourism village development, the absence of planning that involves stakeholders, overlapping policies, and immature planning [2], lack of financial support from the village government, differences in cultural values and local residents [3], high costs of procurement and maintenance of infrastructure, the distance of tourist locations from the capital city which is more than 10 km [4], the emergence of competition and changes in people's lifestyles [5] are sustainability challenges that many other tourism villages encounter in their development.

Sustainability for tourism villages is crucial in the long term because it opens up entrepreneurial opportunities by absorbing a large workforce. The impact can support, advance, improve, and increase sources of income for communities and regions, both directly and indirectly [6–8]. Tourism village activities can be part of the revitalization of the rural economy. This trend of activities can be an alternative for poverty alleviation [9,10]. Furthermore, tourism villages also support the implementation of the Village SDGs, which support a productive economy by utilizing village potential [11,12]. This activity is also used as a tool for conserving natural, cultural, and spiritual resources, which can raise awareness among communities and tourists about preserving and protecting these resources.

According to information from the Ministry of Tourism and Creative Industries, Indonesia has around 6,000 tourism villages spread throughout the region. This includes areas located near active volcanic zones, such as Mount Merapi in Yogyakarta. The 2010 eruption of Mount Merapi caused extensive damage, claiming not only lives but also homes, public facilities, and infrastructure. Following the eruption, villages such as Umbulharjo, Kepuharjo, and others on the slopes of Mount Merapi undertook a socio-economic recovery process by developing tourism directly managed by the community. This tourism concept is packaged in the form of tourism villages, offering unique and authentic experiences such as engaging in traditional and modern rice paddy activities such as planting rice and ploughing, and learning about village life through arts such as dancing, batik making, shadow puppetry, and so on, to preserve culture. Beyond these benefits, for over a decade, these tourism villages on the slopes of Mount Merapi have faced sustainability challenges. The threat of the eruption of Mount Merapi, limitations in the regeneration of managers, uneven community support for the existence of tourism villages, uneven distribution of tourism villages that have internal policies that are structured in articles of association as guidelines in managing tourism villages, less than optimal marketing of tourism villages that have the potential to limit the sustainability of tourism villages are challenges for the sustainability of tourism villages.

Several researchers have suggested that the sustainability of tourism villages is supported by their unique characteristics, the capabilities of their human resources, and influential figures who can bridge communication between the community and stakeholders [13,14], that identified regulation and governance as the dominant factors in village sustainability. [15]

concluded that tourism sustainability must be supported by infrastructure, tourism resources, promotion, investment, regulations, policies, and research and educational institutions. The institutional roles were importance part for tourism villages in Lombok [16], while Italy emphasized the importance of social capital as a primary requirement for the development of the tourism sector [17]. The Cikolelet tourism village in Banten [18] and in a Chinese tourism village [19] noted that increasing promotion of tourism villages is a key factor in village sustainability. Based on these research findings, it can be concluded that village tourism sustainability depends on the resources available, relationships with stakeholders, and how they are promoted to the public.

Based on the literature review, there is still a gap in research related to the sustainability factors of tourism villages. Therefore, the researchers divided the research objects into two clusters with different characteristics. From these results, the preliminary assumptions of sustainability factors obtained from the key driver and relay variable results become intrinsic sustainability characteristics of tourism villages, divided into three elements: built-in, endowment, and inventory. These intrinsic sustainability characteristics of tourism villages also contribute novelty to the existing literature.

2. Methods

2.1. Study location

This research was conducted on the slopes of Mount Merapi, Sleman Regency, Yogyakarta Special Region, Indonesia, at an altitude of approximately 500-999 meters above sea level [20]. The selected area is a rapidly developing rural tourism destination following the 2010 eruption of Mount Merapi, with unique characteristics as a volcanic disaster-prone area while maintaining community-based tourism.

To determine the research location, 12 villages within the Merapi area underwent a k-clustering analysis using orange software. During clustering, two clusters were formed: Cluster A with limited infrastructure and Cluster B with adequate infrastructure. Next, a clustering evaluation was conducted based on silhouette values approaching 1. A high silhouette value in each cluster is considered to have the most optimal structure or best represent the characteristics of the cluster. Tourism villages located in villages with silhouette values approaching 1 were then selected as research locations. This approach also considers other criteria, namely tourism villages that have been operating for at least five years and based on recommendations from the tourism office of Sleman Regency, Special Region of Yogyakarta.

2.2. Data analysis

This study used primary data collection and was conducted in two stages (Figure 1). In the first step, researchers conducted observations and interviews with tourism village managers to determine variables that contribute to the sustainability of tourism villages, using previous research as a guide. This stage resulted in the identification of the first 24 variables as factors

for tourism village sustainability, encompassing economic, social, environmental, institutional, and technological dimensions.

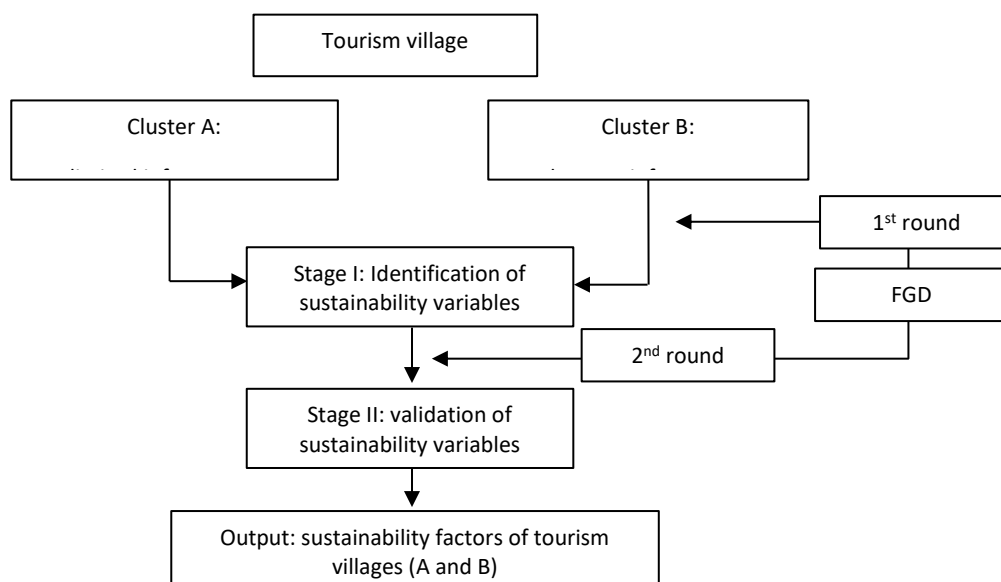


Figure 1. Data analysis stages.

The second stage, with 13 respondents among others 9 tourism village managers and 4 stakeholders with expertise, experience, and understanding of tourism village development. The researchers conducted a group discussion forum, which was replaced with in-depth interviews. At this stage, the researcher validated the identified variables and completed a pre-compiled matrix questionnaire to obtain factors for tourism village sustainability. The matrix included information about the level of influence and interdependence between the two variables. variables were assessed using the MICMAC questionnaire, compiled into a Direct Influence Matrix (MDI). For illustration, Table 1 presents an example of a 3×3 MDI matrix.

Table 1. MDI matrix [21].

	X	Y	Z	Σ row
X	0	1	0	1
Y	1	0	1	2
Z	1	0	0	1
Σ column	2	1	1	

A =

Matrix A in Table 1 is the Direct Influence Matrix (MDI). The MDI matrix is a matrix where the numbers can only be filled if there is a relationship between different variables (X to Y) or (Y to Z) and so on. However, if there is a relationship between the same variables (X to X or Y to Y), then it is not considered in the analysis; in other words, it is filled with 0 in the matrix. Meanwhile, the Indirect Influence Matrix (MII) is obtained by considering the indirect relationship between variables, which is obtained by squaring the MDI matrix (Table 2).

Table 2. MII matrix [21].

	X	Y	Z	Σ row
X	1	0	1	2
Y	1	1	0	2
Z	0	1	0	1
Σ column	2	2	1	

Based on Table 2, the number of rows and columns in the Boolean matrix changes due to the squaring of the variable numbers. The matrix results show that the diagonal elements, which were originally 0 (Table 1), change to 1 (X to X) and (Y to Y). This calculation will continue according to the number of variables obtained. In this study, 24 variables were used, divided into five dimensions: economic, social, institutional, environmental, and technological.

Table 3. MICMAC sustainability variable matrix [21].

	Var 1	Var 2	Var n	Var 26	Influence (Y-axis)
Var 1	0	(V1,2)	(V1, n)	(V1,26)	$\sum_{j=1}^n (var_{1,j})$
Var 2	(V2,1)	0	...	...	
Var n	(Vn, 1)	...	0	...	
Var 24	(V24,1)	...	...	0	
Dependence (X-axis)	$\sum_{j=1}^n (var_{1,j})$	...	...	...	

The matrix assessment can be completed according to the criteria: 0 = no influence, 1 = low influence, 2 = medium influence, and 3 = strong influence (Table 3). This two-stage approach allows researchers to gain a comprehensive understanding of the system structure and dynamics of factors influencing the sustainability of tourism villages in the Mount Merapi area.

The MICMAC method is also capable of identifying indirect influences from hidden variable relationships through an Indirect Influence Matrix (MII) derived from the MDI matrix. The MICMAC results are then divided into four quadrants based on the level of influence and dependency, as shown in Figure 1.

I Influence variables - key variables (Strong influence, low dependency)	II Relay Variables Strong influences, high dependency
IV Exclude Variables Weak influences, low dependency	III Depending on Variables Weak influence, high dependency

Figure 2. Micmac quadrant [21].

Quadrant I is the key variable or key sustainability factor, where this variable has a very high influence but low dependence on other variables [21]. Variables in this quadrant are crucial to the system because they act as driving factors for the sustainability of tourism villages.

Interventions in these variables can have a direct impact on other variables, which can influence the sustainability of the tourism village system. Therefore, variables in Quadrant I become priority variables in tourism village sustainability strategies.

Quadrant II is the relay variable, where this variable has a high influence but also high dependence. Variables in this quadrant can be characterized by instability in the system, also called betting factors [14]. Therefore, any change in these variables can have a long-term impact on other variables due to their highly sensitive nature.

Quadrant III is the outcome variable, where this variable has a high dependence but low influence. Variables in Quadrant III are highly sensitive to changes or interventions from variables in Quadrants I and II and therefore are often used as outcome variables. Outcome variables cannot be directly intervened but can be improved through managing driver and link variables.

Quadrant IV, autonomous variables, are variables with low influence and low dependency, thus being relatively isolated from other variables. These variables tend not to impact the sustainability system of tourism villages because they have little influence on the sustainability development strategy of tourism villages.

3. Result and analysis

3.1. Result

The variables that are considered to play an important role in the sustainability of tourism villages are grouped into 5 dimensions, namely economic, social, institutional, environmental and technological, which are presented in Table 4.

Table 4. Identification of sustainability factors for tourism villages.

No	Variable	Code	Dimension
1	Number of tourists	Tourists	Economy
2	Small and medium enterprises	Sme	Economy
3	Tourism village accommodation	Accommodate	Economy
4	Private funding	Funding	Economy
5	Emergency reserve funds	Emrgfinance	Economy
6	Agrotourism	Agrotourism	Economy
7	Handicrafts made by the community and managers	Hndicraft	Economy
8	The role of the government on developing tourism villages	Rolegove	Institutional
9	Tourism awareness groups	Pkdarwis	Institutional
10	Internal policies in the form of articles of association ad/art	Intpolicy	Institutional
11	External collaboration other than funding	Partners	Institutional
12	Culture preservation	Culture	Institutional

No	Variable	Code	Dimension
13	Knowledge transfer	Trnsknwldg	Social
14	Community social capital	Soscap	Social
15	Community awareness of village potential	Potion	Social
16	Natural disaster response	Natdisastr	Social
17	Cleanliness	Clean	Environment
18	Air quality	Air	Environment
19	Soil quality	Soil	Environment
20	Clean water	Water	Environment
21	Electronic digital	Edigital	Technology
22	Telecommunication	Tlkcommn	Technology
23	Early warning technology	Ewarning	Technology
24	Agricultural technology	Agttech	Technology

The identification of variables carried out jointly by policy makers and tourism village managers, obtained an economic dimension as part of supporting the economy and income of tourism villages. The number of tourists received by tourism villages is a major factor because without their presence there will be no source of income [22]. The availability of small and medium enterprises in the form of shops selling local products (SME), the availability of accommodation managed by the community (accommodation), the development of agrotourism based on superior village commodities, both agriculture and plantations (agrotoursms) support tourism village activities, considering that the tourism village guidelines issued by the Ministry of Tourism include 5A consisting of attractions, accessibility, accommodation, activities, and facilities. Funding received by tourism villages from banks or outside the government (funding), emergency financial reserves (emrgfinance) owned by tourism villages can help carry out tourism village activities during a crisis. This is reinforced by the findings [23] where funding sources and cash funds can increase tourism readiness after experiencing COVID-19.

The institutional dimension is considered a key component of sustainable tourism, balancing other dimensions of sustainability [24]. Institutional factors identified include the government's active role in tourism villages through regulation and guidance (rolegov), tourism awareness groups (pkdarwis), tourism villages having internal policies in the form of articles of association (ad/art) (intpolicy), craft training to support local economic strengthening (handicraft), and non-funded collaboration with external parties in the form of technical support, mentoring, capacity building, or activity facilitation (partners).

Socio-cultural aspects attract tourists through lifestyle, traditions, and community values [25]. Cultural preservation, whether through arts or community activities such as village cleaning, jatilan, gamelan, etc. (culture), is used by tourism villages as one of their tourist attractions. Furthermore, managers maintain relationships with elders or previous communities to provide guidance or advice as a process of passing on local knowledge, skills, values, and practices from older generations to younger generations or subsequent managers in tourism

village activities (trnsknwld). This intergenerational relationship demonstrates a rational relationship and strengthens the community's social capital, as conveyed by [26] in using the Guthi system in Nepal for sustainable tourism. Other identifications include trust and solidarity (soscap). Community understanding and awareness of the village's potential for development as a tourism village (potention), preparedness and awareness of managers in responding to changes in the status of Mount Merapi's activity, including understanding disaster information, evacuation procedures, and necessary mitigation actions (natdisastr). The community response to this disaster can be improved through communication and a public awareness action plan.

In environmental conservation, waste management is a crucial component of sustainable tourism villages [27]. Efforts by local communities and managers to maintain environmental cleanliness through the provision of trash bins and the management of visitor waste (clean) are part of the identified environmental dimension for the sustainability of tourism villages in the Mount Merapi area. Understanding stakeholder perceptions is crucial to balance tourism growth with ecological sustainability [28]. Within the environmental dimension, researchers also included perceptions of tourism village managers regarding the negative impacts on air, land, and water that can impact daily activities. These include the negative impacts of tourism activities on air quality, such as dust, vehicle exhaust fumes, or other pollution experienced in daily life, according to managers (water); the negative impacts of tourism activities on soil quality, including fertility, erosion, and the impact of tourism activities on soil (soil) according to managers; and the availability of clean water sources for domestic needs and tourism activities in the village according to tourism village managers (water).

In developing tourism villages, technological readiness must be considered to increase the opportunity for tourist attendance as well as tourist comfort and safety [29,30]. The technological dimensions identified in tourism villages in this region include the utilization of technological developments by using websites, social media, or other platforms as promotional media and reservations for tourism village activities (edigital), Availability of telecommunications and internet infrastructure (tlkcmn), The existence of an early warning system or device for active volcanic eruptions and can be used to monitor potential dangers or disasters in tourism villages (ewarning), Application of innovative technology or methods in rice fields and plantations in tourism villages (agttech). Rapidly developing technological advances force the entire community to follow technological developments.

3.2. Direct influence on the sustainability of tourism villages

The results of MICMAC illustrate the relationship of dependency and influence, which are explored in more depth across several quadrants (Figure 3a and Figure 3b). Each quadrant depicted on the map has different characteristics and variables. Figure 2 depicts the direct influence/dependence map for tourism villages in cluster A, while Figure 3 is the direct influence/dependence map for cluster B.



Figure 2. Direct influence/ dependence Cluster A.

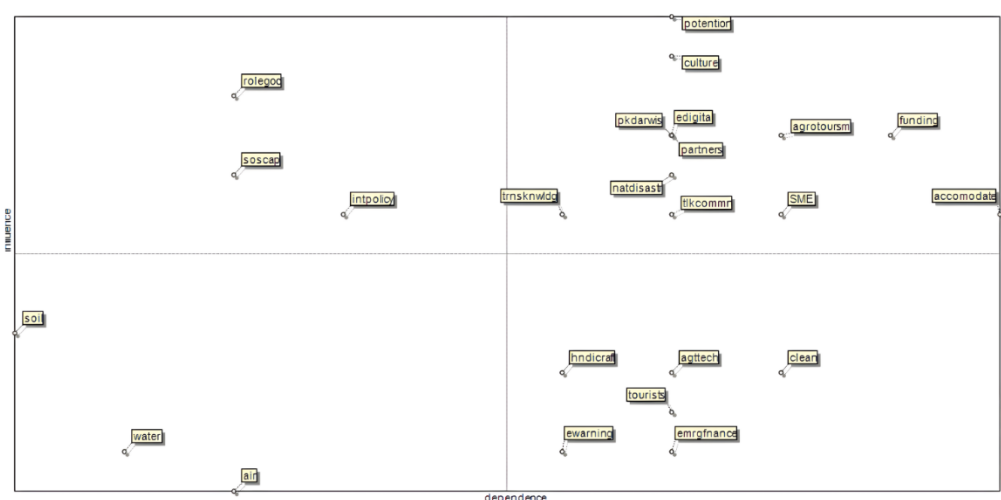


Figure 3. Direct influence/ dependence Cluster B.

Quadrant I represents the key variables driving the sustainability of tourism villages. In figure 2, Cluster A has two variables in quadrant 1 the role of government (rolgov) and social capital (soscap). Meanwhile, at the figure 3, cluster B has three key driver etc the role of government (rolgov), social capital (soscap), and internal policies (intpolicy). Internal policies for Cluster A remain a relay variable, a sensitive variable that can alter the sustainability of a tourism village if not managed properly or even create instability. Internal policies in Cluster A are in quadrant II, meaning they are not yet stable even though they have a high influence on other variables. Meanwhile, in Cluster B, internal policies have moved to become key drivers, meaning internal policies for Cluster B can already be independent and influence other variables.

Quadrant II, cluster A has 11, while cluster B has 12 relay variables. The difference between the two clusters is that accommodation (accomodate) and small and medium enterprises

(SME) for cluster B are active but still require support from various variables. Meanwhile, accommodation and SME for cluster A are still passive. These two variables are in Quadrant III, resulting from the dynamic relationship between quadrants 1 and 2.

Quadrant IV is often known as an autonomous variable, having a low level of influence and an equally low dependence on other variables [21]. If key drivers as sustainability system of the tourism village changes, these variables remain relatively stable. In this study, tourism activities in the tourism village have not yet impacted soil quality, air quality, or water availability.

The relationship between variables is also depicted in the direct influence graph shown in Figures 3a and 3b using a 75% percentage. The direct influence graph can be used to determine the level of influence from strongest to weakest [14]. The red arrow indicates the variable with the strongest direct relationship. An outward-inward direction means that the variable influences other variables. Conversely, an inward-inward direction means that the variable is influenced by other variables.

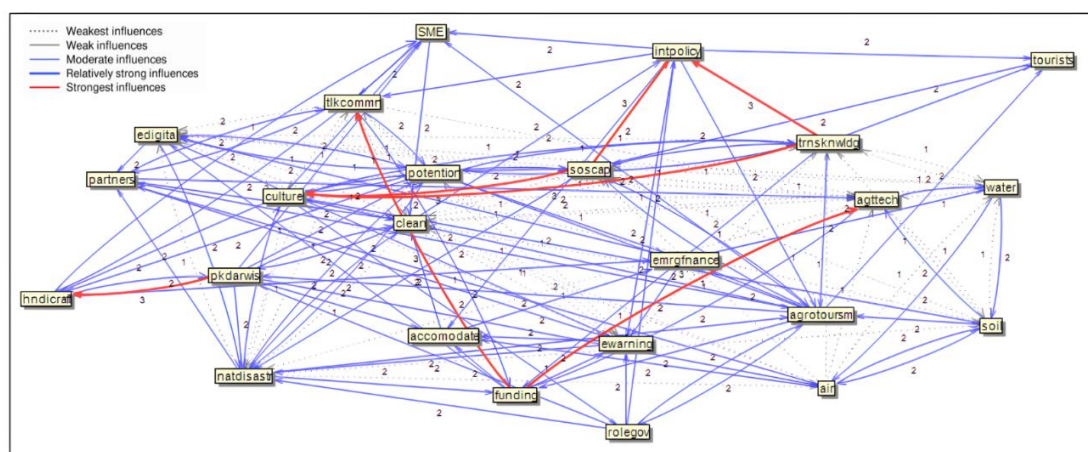


Figure 4. Direct influence/dependence graph Cluster A.

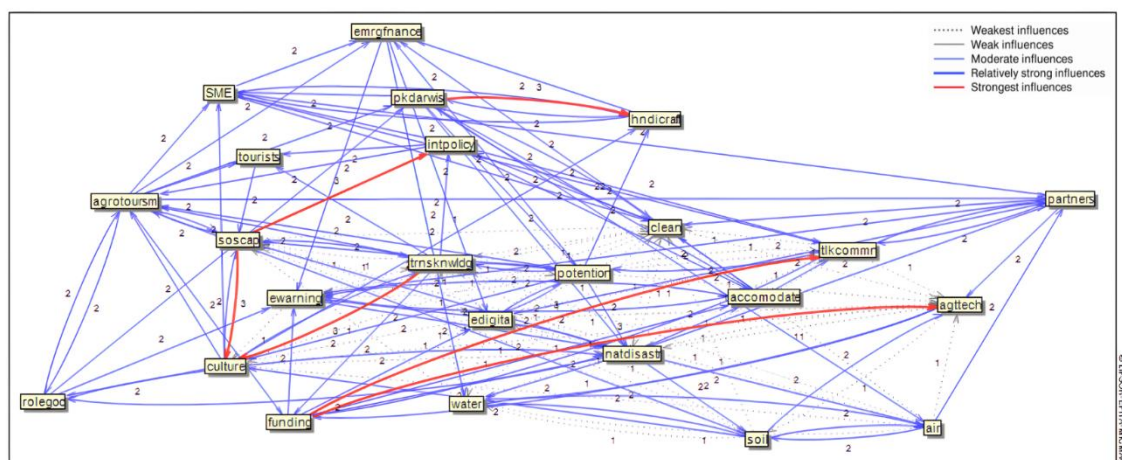


Figure 5. Direct influence/dependence graph Cluster B.

Both figures (4 and 5) show that social capital exerts a strong direct influence on internal policies and culture. Furthermore, tourism awareness groups (pkdarwis) exert a strong influence on handicrafts and has a moderate indirect influence on SMEs and emergency financial reserves.

3.3. Indirect influence on tourism village sustainability

The number of variables that shift position as generated by the Indirect Influence Matrix (MII) indicates the level of instability in the system [14]. If no variables shift position or remain in the same position, the system can be considered stable. Changes in variables can be seen in figures 7 and 8 in the form of displacement maps.

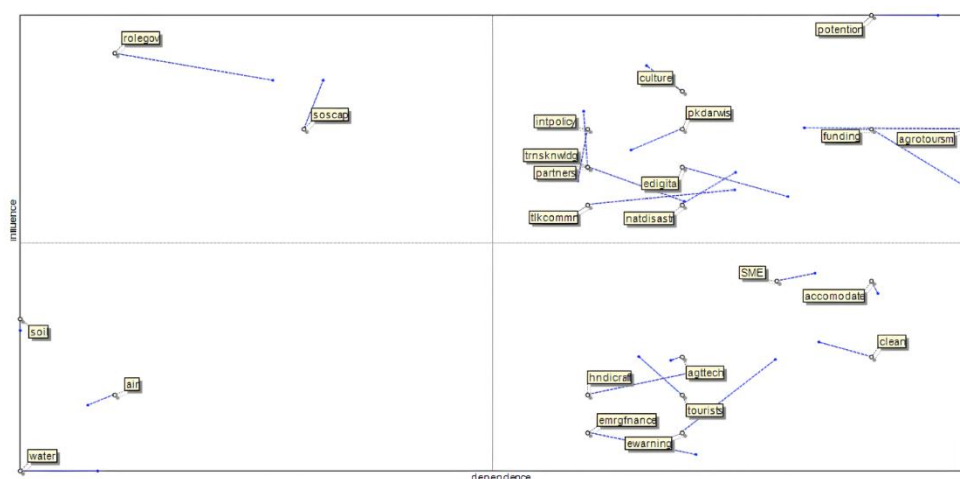


Figure 6. Displacement map Cluster A.

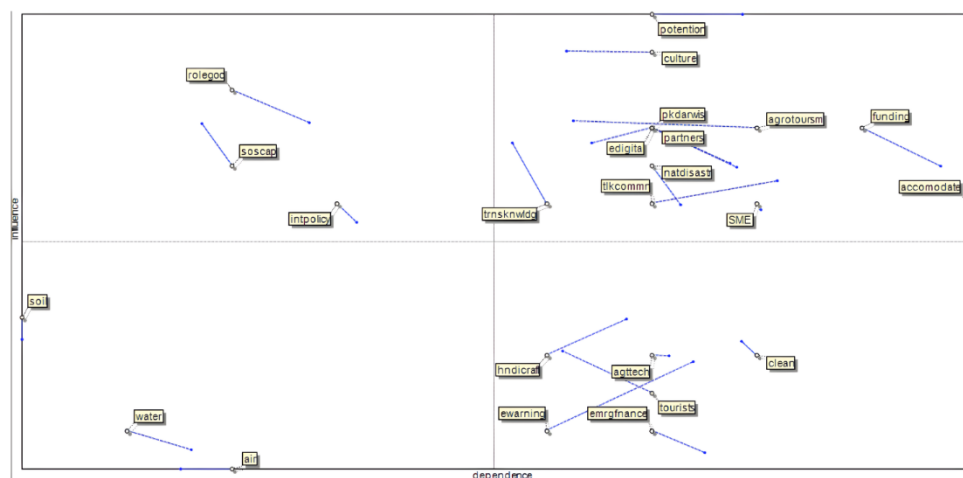


Figure 7. Displacement map Cluster B.

The displacement test results between cluster A and cluster B show the absence of these variables in the quadrant changes, indicating a relatively stable tourism village sustainability system. Therefore, to maintain the future sustainability of tourism villages, the role of government and social capital is crucial for cluster A tourism villages. Meanwhile, cluster B tourism villages, where the role of government, social capital, and the role of government are driving factors for future tourism village sustainability.

The fundamental differences between each quadrant are the unique characteristics of the tourism villages within each cluster. The similarities and differences in the MICMAC results can be seen in table 5

Table 5. Comparison of sustainability factors for Cluster A and Cluster B tourism villages.

C	Cluster A	Cluster B	Note
Key Driven	rolegov	rolegov	Inventory
	soscip	soscip	Endowment
		intpolci	
Relay	Potentior	Potentior	Built in
	Edigital	Edigital	Inventory
	Tlkcommn	Tlkcommn	inventory
	partners	partners	inventory
	Trnsknwldge	Trnsknwldge	Built-in
	Pkdarwis	Pkdarwis	Built-in
	funding	funding	inventory
	Agrtourism	Agrtourism	Endowment
	culture	culture	Endowment
	natdisastr	natdisastr	Built-in
	intpolci	accomodate	
		SME	

C	Cluster A	Cluster B	Note
Dependent	tourists	tourists	
	aggtech	aggtech	
	clean	clean	
	emrgfinance	emrgfinance	
	ewarning	ewarning	
	hndicraft	hndicraft	
	SME		
	accomodation		
Autonomous	water	water	
	soil	soil	
	air	air	

Management in rural tourism is often well developed, but local policy-making capacity is still limited due to low stakeholder involvement [31]. This statement shows that with internal policies as a key driver of sustainability in Cluster B, tourism village management has developed better than in Cluster A. It is known that Cluster B has internal basic rules in the form of (AD/ART) as a reference in carrying out tourism village tasks.

The government's role is evident in regulations outlined in Sleman Regency Regional Regulation Number 9 of 2022 concerning tourism villages. Training is also provided to support tourism village activities, such as training in tourism management, accommodation management, and visitor services. These results align with research conducted by Kristian (2023) which found that stakeholder capacity building training is necessary to improve tourism management [32].

In development, social capital encompasses trust, norms, and social relationships (networking) which are key elements in running a tourism village [33]. The form of social capital implemented here is trust and solidarity among managers, such as cooperation in developing a tourism village with a common goal. Social capital plays a crucial role in the sustainability of rural tourism, particularly those implementing community-based tourism [34–36].

Quadrant II, Clusters A and B are known to share similarities, including the presence of the private sector in the form of funding or CSR (private sector), websites and social media (edigital), telecommunications and internet networks (telecommunications), partnerships (partners), intergenerational relationships with knowledge transfer (trnsknowledge), tourism-awareness groups (Pokdarwis), agrotourism, cultural preservation, and natural disaster response (natdsster). The absence of one of these variables, tourism awareness groups, in the management of a tourism village, will destabilize the sustainability of the tourism village, and vice versa. Consequently, the impacts are in quadrant III.

Quadrant III is highly dependent on variables within the system, often referred to as impact variables. Visitor numbers, agricultural technology, success, financial reserves, self-warning

technology, community response, and handicrafts, all of which are outcomes of the sustainability system. The fewer outputs obtained, the better the sustainability system of the tourism village. For example, high and low visitor numbers and financial reserves are significantly influenced by sustainability systems operating in quadrants I and II. With embedded social capital and the government's role as the primary driver, managers can optimize agrotourism and cultural preservation as sensitive variables. These results can be derived from visitor numbers and financial reserves.

From quadrant IV, regarding environmental variables, the management stated that there have been no complaints from the community to date. The availability of water, air, and soil remains a source of life. Therefore, these variables fall into quadrant IV, meaning they have little impact on the existing tourism village activity system. However, management is expected to continue to pay attention to and maintain environmental preservation in the long term.

Based on these findings, it can be concluded that to achieve sustainability in tourism villages, the tourism village must have intrinsic tourism village management characteristics that are endowment, built-in, and inventory-based, as shown in figure 8.

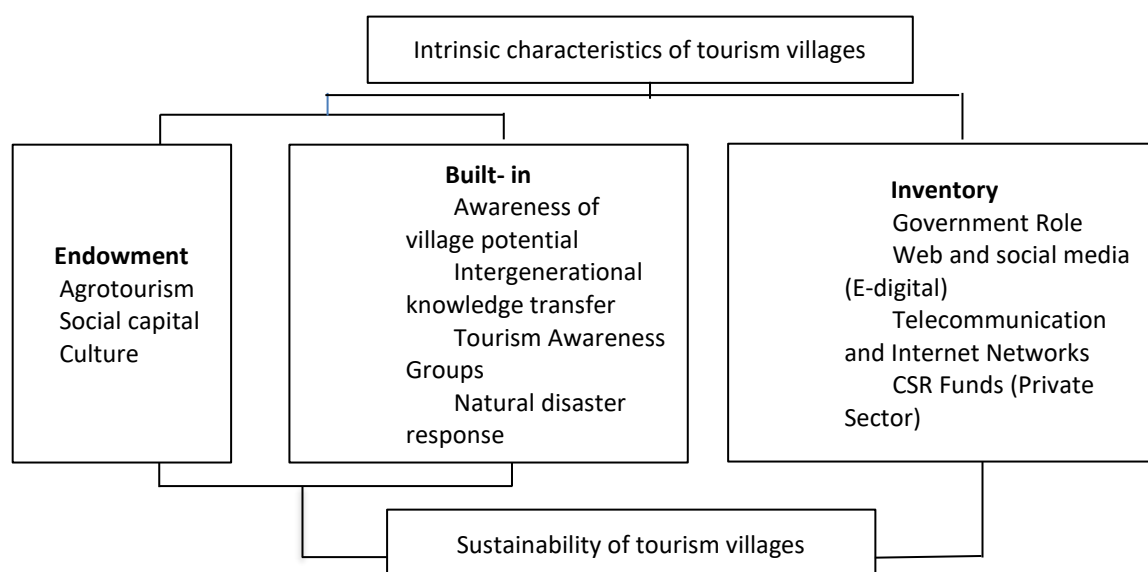


Figure 8. Intrinsic sustainability of tourism villages.

The sustainability of a tourism village is inseparable from the intrinsic characteristics inherent in the local community. These same characteristics are formed by three interrelated elements: endowment, built-in, and inventory, which collectively form the foundation of a tourism village's sustainability.

Endowment is an innate asset that a village has had since its inception, is multidimensional, and is not limited to natural resources alone. Having abundant agricultural resources can improve the livelihoods of farmers [37]. This means that agricultural and plantation resources,

which have long been the basis of village life, are now transforming into potential agrotourism attractions [38]. In these results, tourism village has agrotourism, social capital, and culture as endowment intrinsic. Local cultural heritage in the form of traditions, customs, and arts that have been passed down from generation to generation and become the unique identity of tourism villages. These three dimensions of endowment are not something that is formed artificially but rather are inherent gifts and are a comparative advantage of tourism villages.

Strong endowments organically shape innate capabilities within tourism village communities [39]. Endowments in the form of social and cultural foster collective community awareness of their village's potential, thus encouraging active participation in tourism development. The wealth of local knowledge derived from agricultural and cultural traditions creates a sustainable intergenerational transfer of knowledge, ensuring that local wisdom is uninterrupted and remains relevant in tourism village management. Strong social capital encourages the formation of active Tourism Awareness Groups (Pokdarwis) as local institutions that organize and mobilize community participation. The community's long experience in managing natural resources forms a responsive and adaptive disaster response capacity, so that tourism villages can withstand external disturbances. However, endowment and built-in resources alone are insufficient to ensure the sustainability of a tourism village without the support of a well-managed inventory. Inventory is a stock of resources consciously identified, managed, and optimized to support the operation and development of a tourism village.

Inventory as intrinsic sustainability rural tourism among other the role of government as an institutional foundation that provides direction and legitimacy for tourism village management. Digitalization through the web and social media has become a vital promotional instrument in the technological era, enabling tourism villages to reach tourists widely and increasing interest in Telecommunications and internet networks are basic infrastructure that cannot be ignored, considering that digital connectivity has become a fundamental need for modern tourists in communicating and accessing information while traveling. Funding from the private sector through CSR plays a strategic role in strengthening the financial capacity of tourism villages, considering that dependence solely on income from tourist visits can limit the scope for development [40].

The sustainability of tourism villages in the Mount Merapi tourist area forms three integrated and mutually reinforcing systems. It is creating a sustainable tourism village ecosystem with resources that serve as an endowment for inherent assets, built in by utilizing resources as the ability to manage the tourism village, and inventory as planned support that optimizes both.

4. Conclusions

This study identified 24 factors for the sustainability of tourism villages in the Mount Merapi Tourism area, Special Region of Yogyakarta. Cluster A, with limited infrastructure, has a majority of developing and pioneering tourism villages. Cluster B, with adequate

infrastructure, has tourism villages that are mostly independent and advanced. Although the Micmac results between clusters A and B have differences in quadrants I, II, and III, in terms of village sustainability, at least a tourism village must have intrinsic characteristics consisting of endowment, built in, and inventory. Endowment is in the form of agrotourism, culture and social capital. Built-in consists of community awareness of the village's potential, intergenerational knowledge transfer, and natural disaster response. And inventory consists of the role of government, web and social media, telecommunications and internet networks, and CSR funds from the private sector.

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