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Enhancing Socio-Economic Institution Strategic Planning of Ecotourism, Mount Rinjani National Park

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Abstract

Mount Rinjani National Park (MRNP) in West Nusa Tenggara, Indonesia has been becoming more popular as an ecotourism destination. MRNP Agency, the government institution has been conducting ecotourism activities such as trekking, camping, bird and orchid observation etc. Meanwhile, the increasing number of visitors still cannot solve problems on environmental degradation which emerge because of some social and economic issues. This analysis aims to describe the ecotourism problem and program structure to conduct the ecotourism successfully according to the sub-elements of goals, needs, and barriers. The methodology used Interpretative Structural Modeling (ISM). The result shows that the key sub-elements of goals are to develop ecotourism which involves community participation and learning process, and to increase income of local people around the ecotourism area. The key sub-element of needs is institution and organization, and its regulation and policies for managing ecotourism.

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The key sub-elements of barriers are additional cost in collaboration development process which consists of planning and identification of the stakeholders and their capacity, unequal feeling among stakeholders in ecotourism collaboration because of imbalance power and strength, the lack of community participation because of operational, structural and cultural boundaries.

Keywords: ecotourism; national park; institution; policy; Interpretative Structural Modelling.

1. Introduction

Mount Rinjani National Park (MRNP) in Lombok Island, Indonesia has been designed as conservation forest in 1990 by the Ministry of Forestry of Indonesia. MNRP Agency, the government institution to manage the MRNP, has the vision to realize ecotourism, promote environmental sustainability and develop local economies. Ecotourism is now defined as responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education for staff, community and visitors [1]. The number of tourists who visit MRNP is increasing every year. It is also related to the government policy regarding Lombok Island is addressed to be one of tourism gateways of Indonesia in addition to Bali Island. Yet there are various biophysical problems and socio-economic institutions which are still needed to encounter in the ecotourism management. Every year there is a decrease in forest cover area of Mount Rinjani area of 5 714.99 ha or 4.57% per year [2]. Some rivers in Mount Rinjani decreased annually in average discharge of 3.8%, watershed damaged and hundreds of water source have lost [3]. Ecotourism activities in trekking generate negative externalities for the flora and fauna [4], logging to cook for tourists, garbage, and landslides in the trekking path. The aim of this research is to develop the relationship among the identified goals, needs and barriers which is using Interpretative Structural Modeling (ISM), classifying the elements depending upon their driving power and dependence, then finding the key sub-elements. This method is a well-established methodology to describe abstract problems and to identify relationship among sub-elements as specific items which define a problem or an issue, and to identify key sub-elements of ecotourism program to be successful. This technique is to provide information as a basis for the formulation of policy and strategic planning in form of a structure and an illustration.

2. Methodology

This research was conducted in Mount Rinjani National Park, Nusa Tenggara Province, Indonesia. The collecting data and analysis process took time from September 2014 to July 2016. The elements which are consisted of some sub-elements for this research were collected theoretically from various literature sources and experts' interview by using a questioner. The process of knowledge acquisition on contextual relationship among sub-elements was according ecotourism program implementation through in-depth interview with experts as respondents. Determination of the experts is based on criteria of (1) reputation, position and credibility on related issue/topic, (2) have minimum of 15 years experiences in the related field, (3) willing to be interviewed. Based on these criteria, it was selected experts who are derived from government institution, academic institution, agency of ecotourism management and practitioner of ecotourism. The result of experts' opinion was processed in ISM software in order to become an aggregate result. The opinion from group of

experts was used in developing the relationship matrix, which was later used in the development of ecotourism program structure. The ecotourism management program in this research is divided into three elements, namely: (1) goals, (2) needs, and (3) barriers (Table 1.) Steps of ISM method [5, 6] are:

1. Identifying and listing the elements from the research and interview.
2. Building contextual relationships among elements which depend on modeling purposes.
3. Developing Structural Self Interaction Matrix or SSIM. This matrix represents the respondent's perception elements (expert) to the target element relationships, with the symbols that represent the type of relationship between the two elements (Table 1). Symbols are:

a. V: the relationship of elements Ei to Ej, not vice versa

b. A: Ej the relationship of elements Ei, not vice versa

c. X: interrelation relationship between Ei and Ej, can reverse

d. O: Ei and Ej unrelated

Table 1: Contextual relationship among elements

Element	Contextual relationship
Program Goals of MRNP	Ti supporting Tj
Program Needs of MRNP	Ki supporting Kj
Program Barriers of MRNP	Kdi causing Kdj

Note: ij = 1, 2, 3…

4. Preparing the reachability matrix or RM. Changing the symbol SSIM into a binary matrix, namely:

a. If the relationship Ei to Ej = V on SSIM, the elements Eij = 1 and Eji = 0 in RM
b. If the relationship Ei to Ej = A on SSIM, the elements Eij = 0 and Eji = 1 RM
c. If the relationship Ei to Ej = X at SSIM, the elements Eij = 1 and Eji = 1 RM
d. If the relationship Ei to Ej = O at the SSIM, the elements Eij = 0 and Eji = 0 at RM
e. Initial RM modified to show the Direct and Indirect Reachability, that if Eij = 1, Ejk = 1, then Eik = 1

5. Characterizing elements of the ISM structure at different levels. For this purpose, the two devices associated with each element Ei of the system: Reachability Set (Ri), is a set of all elements that can be reached from the element Ei, and antecedent set (Ai), is a set of all elements which elements of Ei can be achieved. In the first iteration of all elements, where Ri = Ri ∩ Ai, are the elements of level 1. On the next iteration, elements are identified as elements in a level-iteration iteration previously removed, and new elements are selected for level-the next level by using the same rules. Furthermore, all elements of the system are grouped into different levels.

6. Developing a matrix Canonical. This matrix is prepared by classifying the same elements. The resultant matrix has most of the elements of a triangular with the highest is 0 and the lowest is 1.

7. Preparing diagraph as a chart of the elements that are interconnected directly and in a hierarchy level.
8. Generating ISM. ISM generated by moving the entire number of sub-elements with a description of the actual elements.

Methodology of ISM is divided into two parts: the preparation of the hierarchy and classification of sub-elements. Classification of sub-elements refer to the processed results of Reachability Matrix (RM) according to the transitivity rules to obtain Driver Power (DP) and Dependence (D) value (Table 2):

1. Autonomous; weak driver-weak dependent variables are sub-elements with DP values ≤ 0.5 X and $D \leq 0.5$ X; where X is the number of sub-elements. Sub-elements are generally not associated with the system, and may have little relationship although it could have been the strong link.
2. Dependent; weak driver-strong dependent variables are sub-elements with DP values ≤ 0.5 X and $D > 0.5$ X. The sub-elements in this sector are not free sub-elements.
3. Linkage; strong driver-strong dependent variables are sub-elements with DP values > 0.5 X and $D > 0.5$ X. The sub-elements in this sector should be examined carefully because of the relationships between sub-element are not stable. Any action on the sub-elements will have an impact on other sub-elements and influences its feedback which can magnify the impact.
4. Independent; strong driver-weak dependent variables are sub-elements with DP values > 0.5 X and $D \leq 0.5$ X. These sub-elements are the independent variables and remain as part of the system.

Table 2: Elements and sub-elements of ecotourism management program

1. Element: Goals
1. To highlight local characteristic/cultural products (T1)
2. To develop ecotourism which involves community participation and learning process (T2)
3. To create synergy among stakeholders of ecotourism (T3)
4. To increase income of local people around the ecotourism area (T4)
5. To involve as many parties in the planning, implementation, monitoring and evaluation (T5)
6. To create mutual understanding & collaboration among stakeholders (T6)
7. To create job opportunities (T7)
8. To apply consistently carrying capacity (T8)
9. To manage integrated waste (T9)
10. To develop environmental based facilities, products and services (T10)
11. To raise awareness about the environment and conservation issue (T1)
2.Element: Needs

1. Sustainability and uniqueness of flora, fauna and local culture (K1)
2. Infrastructure, facilities and convenient service to conduct ecotourism (K2)
3. Accessibility to the area of ecotourism (K3)
4. Carrying capacity to conduct ecotourism comfortably (K4)
5. Minimum impacts which are enable to affect natural resources environment and social conditions (K5)
6. Security for visitors doing ecotourism activities from environmental and social threats (K6)
7. Institution and organization, and its regulation and policies for managing ecotourism (K7)
8. Relationships with other ecotourism in the area of buffer zone (K8)
9. Economic contribution for conservation activities for villages/areas (K9),
10. Industrial tourism (Trekking Organizer, travel agents, hotels etc.) who manage, market, promote ecotourism (K10),
11. Environmental education and ecotourism for visitors and communities to grow concern on environmental issues (K11),
12. Community empowerment to gain a livelihood and participate in managing ecotourism (K12).

3.Element: Barriers

1. Additional cost to the process of collaboration development: planning, stakeholders and capacity identification (Kd1)
2. Inequality feeling among stakeholders in the collaboration because of the imbalance of power and strength (Kd2)
3. The lack of community participation because of operational, structural and cultural boundaries (Kd3)
4. Unclear concept and understanding of collaboration, makes its guide and instruction become narrow space, creativity and collaborative management becomes rigid and inflexible (Kd4)
5. Solidarity is confined to a particular stakeholder because of the lack of trust among parties, including the government and other parties in the management (Kd5)
6. The lack of organization and leadership skills, and imbalance negotiation among stakeholder (Kd6)
7. The lack of property rights and access to natural resources (Kd7)
8. Dependence of the stakeholders to the government (Kd8)
9. Ignoring the local specific context and identity, as well as centralized process (Kd9)
10. The concept of collaborative, community-based, bottom-up are difficult to elusive and receive (Kd10)
11. The basic ideological differences between stakeholders and institutions (Kd11)

3. Result

3.1. Element of Goals

The consistency value of the element of goals is 80.99% (>80%), it means the result is acceptable. The sub-elements of goals which are classified in Independent are to develop ecotourism that involves community participation and learning process (T2), to increase income of local people around the ecotorism area (T4), and

to create understanding and collaboration among stakeholders in decision-making, ecotourism product and services management (T6). These sub-elements have a high driver power and dependence, so they influence other sub-elements. Initial Matrix SSIM (Element : Objectives, Goals) Model of Mount Rinjani National Park Ecotourism Program Structure

Table 3

Sub-element (i-j)		**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
T 1	**1**	X	X	X	V	V	A	V	A	V	A	
T 2	**2**	V	V	V	V	V	V	V	X	V		
T 3	**3**	A	A	V	V	V	A	V	A			
T 4	**4**	V	V	V	V	V	V	V				
T 5	**5**	A	A	V	V	V	A					
T 6	**6**	V	V	V	V	V						
T 7	**7**	A	A	V	X							
T 8	**8**	A	A	V								
T 9	**9**	A	A									
T 10	**10**	X										
Kompilasi Dari Responden/DM												

Final RM Matrix (Transitivity) (Element : Objectives, Goals) Model of Mount Rinjani National Park Ecotourism Program Structure

Table 4

DM / Responden		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**DP**	**R**
Sub-element (i-j)														
T 1	**1**	1	0	1	0	1	0	1	1	1	1	1	8	3
T 2	**2**	1	1	1	1	1	1	1	1	1	1	1	11	1
T 3	**3**	1	0	1	0	1	0	1	1	1	1	1	8	3
T 4	**4**	1	1	1	1	1	1	1	1	1	1	1	11	1
T 5	**5**	1	0	1	0	1	0	1	1	1	1	1	8	3
T 6	**6**	1	0	1	0	1	1	1	1	1	1	1	9	2
T 7	**7**	1	0	1	0	1	0	1	1	1	1	1	8	3
T 8	**8**	1	0	1	0	1	0	1	1	1	1	1	8	3
T 9	**9**	1	0	1	0	1	0	1	1	1	1	1	8	3
T 10	**10**	1	0	1	0	1	0	1	1	1	1	1	8	3
T 11	**11**	1	0	1	0	1	0	1	1	1	1	1	8	3
	D	11	2	11	2	11	3	11	11	11	11	11		
	L	1	3	1	3	1	2	1	1	1	1	1		

DP : Driver Power D : Dependence L : Level R : Ranking

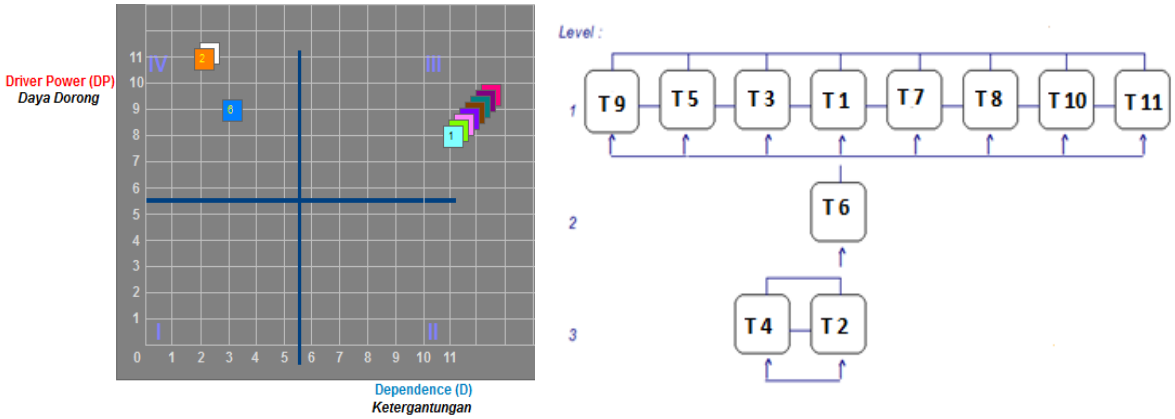

Figure 1: Relationship among driver power-dependence and hierarchical structure of sub-elements of Goal

The sub-elements of goals which are classified in Linkage are to highlight trait / local cultural products (T1) is in quadrant of linkage. Sub-elements To create synergy among relevant parties of ecotourism (T3), To involve as many parties in the planning, implementation, monitoring and evaluation (T5), To create jobs (T7), To apply consistently carrying capacity (T8), To manage integrated waste (T9) are included in the quadrant of dependent to develop environmental based facilities, products and services (T10), and to raise awareness about the environment and conservation (T11). These sub-elements should be examined carefully because of the relationship among sub-elements are not stable. Any action on the sub-elements will have an impact and on other elements and influences the impact (Figure 1).

Hierarchical structure of the elements of goals in ecotourism program consists of three levels. Sub-elements which become the key sub-elements are to develop ecotourism that involves community participation and learning (T2), and increasing the income of local people in the area around ecotourism (T4). Ecotourism is another form of tourism that combines three criteria: environmental conservation, community participation, and rewarding sustainably. The impact of community participation in tourism development is the protection of the environment, conflict resolution, employment and elapsed time. Involvement and participation in the community is one of the important sub-element of an ecotourism [8]. The ecotourism can work well when there are approaches and empowerment of local communities and indigenous peoples in order to livelihood opportunities that come from ecotourism opened wider [9]. The involvement of local communities in the buffer zone of Baluran National Park in the development of ecotourism enhanced through training and empowerment approach [10]. While the community-based ecotourism can be a strategic tool for poverty alleviation in Sirigu, Ghana [11]. Communities can increase the income derived from ecotourism for the management and capacity building for community-based ecotourism activities done together.

3.2. Element of Needs

The consistency value of the element of goals is 89.99% (>80%), it means the result is acceptable. The sub-elements of needs which are classified in Independent are the need for Institution and organization, regulation

and policies for managing ecotourism (K7), sustainable and unique flora, fauna, and local culture (K1), infrastructure, facilities and convenient service to conduct ecotourism (K2), accessibility to the ecotourism area (K3). These sub-elements have a high driver power and dependence, so they influence other sub-elements.

The sub-elements of needs which are classified in Linkage are carrying capacity of ecotourism which limits the area of ecotourism to accommodate visitors in order to conduct ecotourism comfortably (K4), Security for visitors doing ecotourism activities of environmental and social threats (K6), Economic contribution for conservation activities and incomes and for villages / areas (K9), Industrial tourism and ecotourism (Trekking Organizer, travel agents, restaurants, hotels, etc.), which is managing, marketing and promoting ecotourism activities (K10), Environmental education and ecotourism for visitors and communities to grow concern on environmental issues (K11), Community empowerment to gain a livelihood and participate in managing ecotourism (K12).

These sub-elements should be examined carefully because of the relationship among sub-elements are not stable. Any action on the sub-elements will have an impact and on other elements and influences the impact. Sub-elements of needs element which is classified in Dependent are Minimum impacts that enable to affect natural resources environment and social conditions of visitors (K5) Relationships with other ODTW that linking ecotourism TNGR with other ecotourism in the area of buffer zone (K8). This means these sub-elements have a low driver power and a high degree of dependence on other variables (Figure 2.).

Initial Matrix SSIM (Element : Need, Requirements) Model of Mount Rinjani National Park Ecotourism Program Structure

Table 5

Sub-element (i-j)		**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
K 1	**1**	V	V	V	V	V	A	V	V	V	V	V	
K 2	**2**	V	V	V	V	V	A	V	V	V	V		
K 3	**3**	V	V	V	V	V	A	V	V	V			
K 4	**4**	A	A	V	V	V	A	V	V				
K 5	**5**	A	A	A	A	V	A	A					
K 6	**6**	A	A	V	V	V	A						
K 7	**7**	V	V	V	V	V							
K 8	**8**	A	A	A	A								
K 9	**9**	A	A	V									
K 10	**10**	V	V										
K 11	**11**	V											
Kompilasi Dari Responden/DM													

RM Matrix Final (Transitivity) (Element : Need, Requirements) Model of Mount Rinjani National Park Ecotourism Program Structure

Table 6

DM / Responden		1	2	3	4	5	6	7	8	9	10	11	12	DP	R
Sub-elemen (i-j)															
K 1	**1**	1	1	1	1	1	1	0	1	1	1	1	1	11	2
K 2	**2**	0	1	1	1	1	1	0	1	1	1	1	1	10	3
K 3	**3**	0	0	1	1	1	1	0	1	1	1	1	1	9	4
K 4	**4**	0	0	0	1	1	1	0	1	1	1	1	1	8	5
K 5	**5**	0	0	0	0	1	0	0	1	0	0	0	0	2	6
K 6	**6**	0	0	0	1	1	1	0	1	1	1	1	1	8	5
K 7	**7**	1	1	1	1	1	1	1	1	1	1	1	1	12	1
K 8	**8**	0	0	0	0	0	0	0	1	0	0	0	0	1	7
K 9	**9**	0	0	0	1	1	1	0	1	1	1	1	1	8	5
K 10	**10**	0	0	0	1	1	1	0	1	1	1	1	1	8	5
K 11	**11**	0	0	0	1	1	1	0	1	1	1	1	1	8	5
K 12	**12**	0	0	0	1	1	1	0	1	1	1	1	1	8	5
	D	2	3	4	10	11	10	1	12	10	10	10	10		
	L	6	5	4	3	2	3	7	1	3	3	3	3		

DP Driver Power D : Dependence L : Level R : Ranking

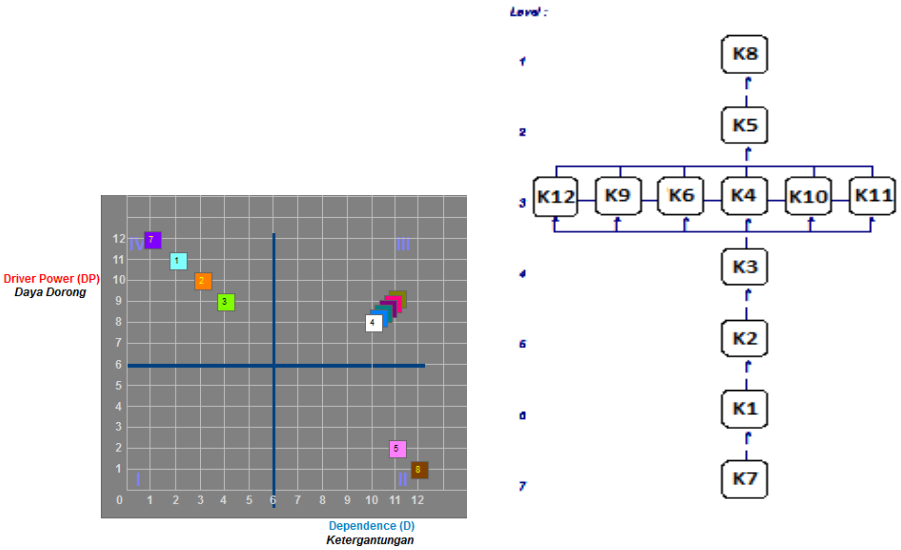

Figure 2: Relationship among driver power-dependence and hierarchical structure of sub-elements of need

Hierarchical structure of the sub-elements of Need in ecotourism program consists of 7 levels. Sub-elements that become the key variables are the Institution and organization, and its regulation and policies for managing sustainable ecotourism (K7) (Figure 2).

The development of ecotourism needed regulation of ecotourism, since unregulated ecotourism can cause social and environmental damage, especially for local and indigenous communities, because ecotourism includes specific issues related to interaction with nature, local and indigenous communities that require special legislation [12]. In Jatiluwih village, Bali formulated a model for institutional to strengthen socio-economic through community-based ecotourism (CBE) which is in accordance with the wishes of the stakeholders, with the coordination, interaction, enforcement and cooperation among stakeholders [13].

3.3. Element of Barriers

The consistency value of the element of goals is 96.69% (>80%), it means the result is acceptable. The sub-elements of barriers which are classified in Independent are additional cost in collaboration development process which consists of planning and identification of the stakeholders and their capacity (Kd1), unequal feeling among stakeholders in an ecotourism collaboration because of imbalance power and strength (Kd2), the lack of community participation because of operational, structural and cultural boundaries (Kd3), the lack of trust and solidarity among parties (Kd5) and ignored local specific context and identity, and also centralized process (Kd9). These sub-elements have a high driver power and dependence, so they influence other sub-elements.

The sub-element of barriers which is classified in Linkage is unclear concept and understanding of collaboration which makes its guide and instruction make the management narrow, uncreative, rigid and inflexible (Kd4).

It should be examined carefully because of the relationship between sub-element is not stable. Any action on the sub- element will have impacts on other elements and its feedback influences the impacts. The sub-elements of barriers which are classified in Dependent are the lack of organization and leadership skills of the stakeholders, so there is an imbalance negotiation among them (Kd6), the lack of property rights and access to the natural resources (Kd7), dependence of the stakeholders to the government (Kd8), the concept of collaborative, community-based and bottom-up is difficult to understand and receive (Kd10), the basic ideological differences between stakeholders, so they resist the changes (Kd11).

This means these sub-elements have a low driver power and a high degree of dependence on other variables (Figure 3). The hierarchical structure of sub-elements of barriers in ecotourism program consists of 7 levels.

The key sub-elements are additional cost in collaboration development process which consists of planning and identification of the stakeholders and their capacity (Kd1), unequal feeling among stakeholders in an ecotourism collaboration because of imbalance power and strength (Kd2), the lack of community participation because of operational, structural and cultural boundaries (Kd3) (Figure 3).

The identification of all different stakeholders and their motives are considered to structure a corporative network, therefore the conflicts existing between the involved parties were resolved by means of mutual understanding [14]. The involvement of a broad spectrum of stakeholders from the early stages of the planning process can reduce conflict and the scope of information in future errors [15] (Figure 3). In the ecotourism management, it needs to ensure full participation of local communities in ecotourism development process for disseminating information, raising awareness, creating a sense of ownership and helps to avoid the negative social and environmental impacts [15].

To combine ecotourism with a variety of interests, it is necessary to apply co-management which is a form of management that accommodates the interests of all stakeholders in a fair and looked at the dignity of each party as an entity that is equal in accordance with the values prevailing in the achievement of common goals [16].

The barriers to the development of ecotourism is the confidence of local communities, lack of government support, lack of funds, lack of appropriate knowledge in the field of tourism and the lack of cooperation among the people themselves [8].

The lack of community participation in ecotourism activities and the development process from the planning stage in Pekalongan cause less people have a sense of belonging [17]. As a result, people do not have a sense of responsibility to maintain the facilities and infrastructure that already exists and use it for the development of ecotourism.

Initial Matrix SSIM (Element : Constraints, Problems, Barrier) Model of Mount Rinjani National Park Ecotourism Program Structure

Table 7

Sub-element (i-j)		**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Kd 1	**1**	V	V	V	V	V	V	V	V	V	A	
Kd 2	**2**	V	V	V	V	V	V	V	V	X		
Kd 3	**3**	V	V	V	V	V	V	V	V			
Kd 4	**4**	V	V	A	V	V	V	A				
Kd 5	**5**	V	V	A	V	V	V					
Kd 6	**6**	V	V	A	V	V						
Kd 7	**7**	A	A	A	A							
Kd 8	**8**	V	A	A								
Kd 9	**9**	V	V									
Kd 10	**10**	X										
Kompilasi Dari Responden/DM												

Final RM Matrix (Transitivity) (Element : Constraints, Problems, Barrier) Model of Mount Rinjani National Park Ecotourism Program Structure

Table 8

DM / Responden		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**DP**	**R**
Sub-element (i-j)														
Kd 1	**1**	1	1	1	1	1	1	1	1	1	1	1	11	1
Kd 2	**2**	1	1	1	1	1	1	1	1	1	1	1	11	1
Kd 3	**3**	1	1	1	1	1	1	1	1	1	1	1	11	1
Kd 4	**4**	0	0	0	1	0	1	1	1	0	1	1	6	4
Kd 5	**5**	0	0	0	1	1	1	1	1	0	1	1	7	3
Kd 6	**6**	0	0	0	0	0	1	1	1	0	1	1	5	5
Kd 7	**7**	0	0	0	0	0	0	1	0	0	0	0	1	7
Kd 8	**8**	0	0	0	0	0	0	1	1	0	1	1	4	6
Kd 9	**9**	0	0	0	1	1	1	1	1	1	1	1	8	2
Kd 10	**10**	0	0	0	0	0	0	1	1	0	1	1	4	6
Kd 11	**11**	0	0	0	0	0	0	1	1	0	1	1	4	6
	D	3	3	3	6	5	7	11	10	4	10	10		
	L	7	7	7	4	5	3	1	2	6	2	2		

DP : Driver Power D : Dependence L : Level R : Ranking

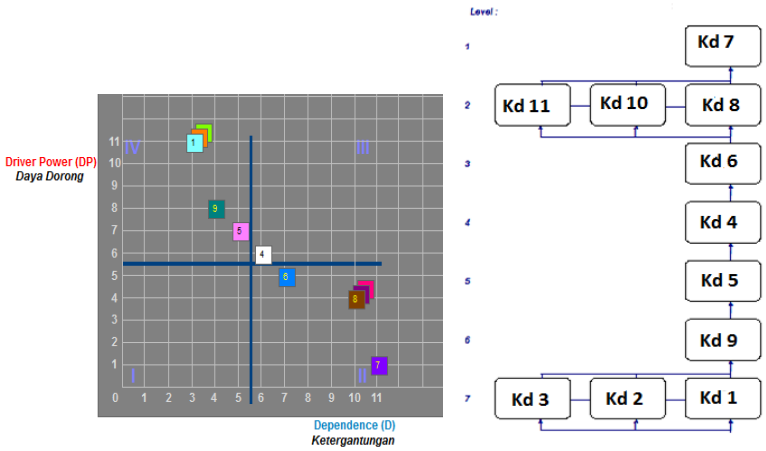

Figure 3: Relationship among driver power-dependence and hierarchical structure of sub-elements of barriers

4. Conclusion

Based on ecotourism program structure, it can be concluded that the main goals of the ecotourism program to be successful are to develop ecotourism which involves community participation and learning process and to increase income of local people around the ecotourism area.

The main needs of the ecotourism program are is institution and organization, and its regulation and policies for managing sustainability ecotourism.

The main barriers which can cause unsustainable and unsustainable ecotourism is additional cost in collaboration development process which consists of planning and identification of the stakeholders and their capacity, unequal feeling among stakeholders in an ecotourism collaboration because of imbalance power and strength, the lack of community participation because of operational, structural and cultural boundaries (Figure 4). This model may be determined more closely to the factual situation by involving elements of involved institution in ecotourism program and indicators of ecotourism program.

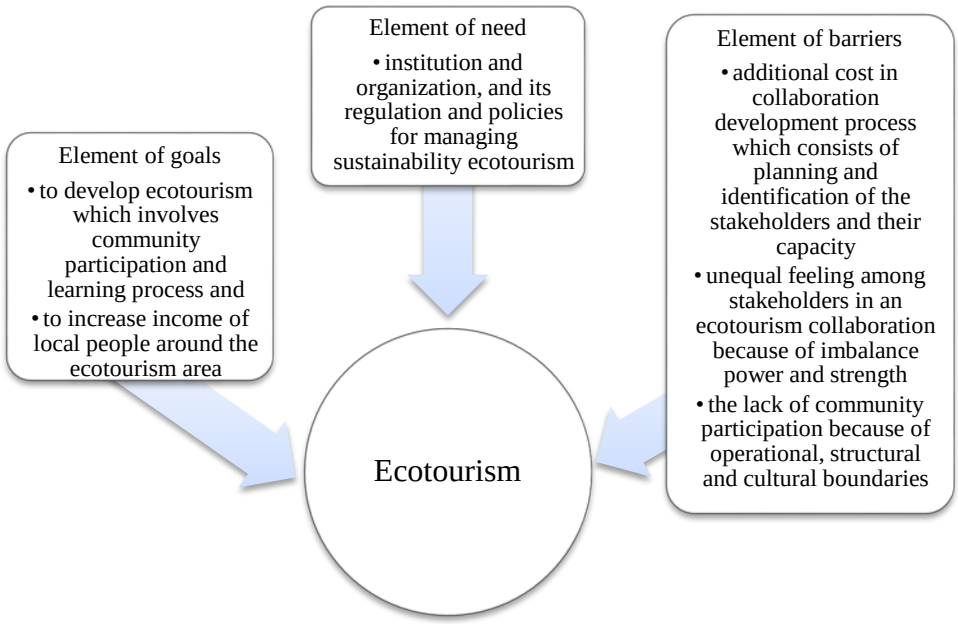

Figure 4: Ecotourism program structure to determine the policy direction and implementation

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