








Application of the AHP Method in the Study of Archaeological Resources Management Based on Indigenous Community in Central Sumba Regency

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Abstract. The management of cultural heritage, both tangible and intangible, requires an adequate strategy to be right on target. Analytic Hierarchy Process (AHP) method is one of the decision-making methods that are currently being used in the management of cultural heritage. The management of cultural heritage always involves indigenous communities, especially in the traditional village. In addition, the government's role in managing cultural heritage is one of the important points in the Cultural Conservation Law No. 11 of 2010. This study aims to determine the strategy for managing archaeological resources based on indigenous communities in Central Sumba Regency using the AHP method. This research was conducted using mixed methods. Data were collected through observation, interviews, document studies, focus group discussions, and questionnaires. The qualitative data were analyzed by qualitative descriptive, while the quantitative data were analyzed by Analytical Hierarchy Processes (AHP). Based on the results of the AHP, alternative cultural preservation through the determination of cultural heritage and digitization of cultural data is the management strategy with the highest score. The strategy for determining the cultural heritage of traditional villages and digitizing cultural data is carried out by improving the preservation, development, and management of traditional villages so that they can provide multiplier effects not only for indigenous communities but also for surrounding communities. Economic, educational, social, and cultural benefits are expected to be achieved with support from local and central governments and other stakeholders.

Keywords: analytical hierarchy processes · cultural resource management · archaeological resources

1 Introduction

The culture of the Sumba people is famously called the Living Megalithics Traditions that thrive until today. Sumba Island has prospective intangible and tangible cultural heritages that can attract tourists to visit there. The rapid development of archeological

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resources needs a suffice and proper governmental attention and policy. The management of archeological resources cannot be separated from the roles of the government and the indigenous communities.

The traditional villages in Central Sumba have various archeological resources and traditions that deserve development and preservation, requiring the involvement of the traditional villages communities and their local culture. The traditional villages' archeological resources have the potential to be developed as a tourist attraction and for educational purposes and creative economy. The knowledge about the value of the archeological resources owned by the traditional villages can be fundamental for developing their potential. Law No. 11 of 2010 on the Cultural Heritage (*Undang-Undang No 11 Tahun 2010 tentang Cagar Budaya* [1]), Chapter (1), Article (1), Paragraph (1) states that

“Cultural Heritage is tangible cultural heritage assets in the form of Cultural Heritage Objects, Cultural Heritage Buildings, Cultural Heritage Structures, Cultural Heritage Sites, and any Cultural Heritages on land and/or in the water that need preservation due to its important value for history, science, education, religion, and/or culture through the process of establishment.”

According to Person and Sullivan (1995:8–9) [2], the effectiveness of cultural heritage management could be gained through four main steps: 1) by identifying and documenting the resources owned, both the resources and the surrounding areas; 2) by assessing the value and significance; 3) by planning and making the decision based on the essential value, opportunity, and barrier based on the conservation principles; 4) by implementing the policies that cover the site utilization and management in the future.

Shanks (2005, as cited in Raharjo et al., 2012:152 [3]) also proposed the importance of archeological resource management, suggesting some phenomena that make this research relevant: 1) globalization with physical development orientation makes the archeological remains above the ground get replaced by modern buildings due to economic development, while the remains underground get destroyed because of the development of the infrastructure; 2) the response to the first phenomenon creates the emergence of preservation movement to battle the destruction and anticipate further damage; 3) cultural tourism has become a tourism commodity, so that cultural resource has economic potential and therefore it needs to be treated as economic commodity. Hence, optimal management is required so the unrenewable cultural assets will not get damaged or vanished.

Nowadays, research method related to cultural heritage management starts to develop, not only qualitatively but also quantitatively. Hence, the research results are expected to be more comprehensive. One of the methods is the use of the Analytical Hierarchy Process (AHP) for decision-making related to cultural heritage management. Mahendra (2018) [4] has published an article entitled *The Application of Analytical Hierarchy Process to Evaluate The Concept of Cultural Heritage Revitalization: Case Study in the Galeri Nasional Indonesia Buildings*. The research applied the AHP method to evaluate the concept of cultural heritage revitalization.

2 Methods

This research was conducted in 2021 in two traditional villages of Pasunga and Wawarongu in Central Sumba Regency, East Nusa Tenggara Province, Indonesia. Those two villages were selected due to their potential tangible and intangible cultural resources.

This research applied a mixed method. The model used was the mix of embedded concurrent strategy where the quantitative data is based on the qualitative data. The qualitative and quantitative data were collected together, while the finding analysis was conducted gradually before the findings were finally integrated.

As a study applying a mixed method, the researchers selected the sample for the quantitative data collection through a questionnaire. The respondents' selection was based on Geria (2019:29) [5] through the sample selection technique with the expert survey method, where the sample was deliberately selected or chosen to get information and insight from relevant stakeholders and experts.

According to Geria (2019:29) [5], the respondents' criteria are as follows: a) possessing decent experience in archeological resource management; b) having reputation, position/occupation, and/or credibility as consistent stakeholders or experts in related fields; c) agreeing to be a respondent. The research data were collected through observations, interviews, document reviews, guided discussions, and questionnaires. The qualitative data were analyzed with a qualitative descriptive approach, and the quantitative data were analyzed with Analytical Hierarchy Processes (AHP). The research results presented were the answers to the gap between the theoretical and empirical phenomena studied by the researchers. Hence, constructive conclusions and suggestions could be drawn.

3 Discussion

3.1 The Use of the AHP Method

According to Turban et al. (2015, as cited in Geria, 2019:91 [5]), AHP is an analysis method and a policy-making tool for decision-making that is flexible and powerful. This analysis method could help decide the priorities in a decision-making process with various alternatives. Besides, this method also considers quantitative and qualitative aspects of the data. This method also reduces the complex factors into one on one comparison.

Marimin et al. (2013:193) [6] stated that AHP owns many advantages in explaining the decision-making process as it is described in a comprehensible graphic. The complex decision-making process would be outlined into smaller pieces for easier comprehension. The working principles of AHP consist of: 1) arranging the hierarchy; 2) assessing each level of the hierarchy; 3) setting the priority; and 4) logical consistency (Image 1).

According to Marimin et al. (2013:195–196) [6], each hierarchy level is assessed through paired comparison. Saaty (1983, as cited in Geria, 2013:92 [5]) argued that for any problem, a scale of 1 to 9 is the best scale to express the arguments, as shown in Table 1.

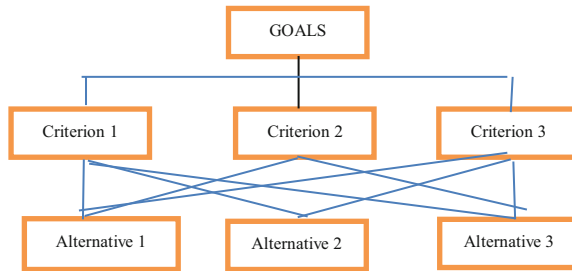


Image 1. The Hierarchical Structure of AHP. Source: Marimin et al. (2013:195) adopted by the authors

Table 1. The Qualitative Value of Saaty's Comparison Scale. Source: Marimin et al. (2013) [6]

Value	Note
1	Criterion/alternative A has the same importance as the criterion/alternative B
3	A is a little bit more important than B
5	A is more important than B
7	A is clearly more important than B
9	A is undoubtedly more important than B
2, 4, 6, 8	If doubting between two close values

This paired comparison is done in a matrix that compares each element based on decided criteria. The consistency would be tested through a matrix to make possible comparisons and the thorough sensitivity analysis of priority to the consideration changes (Marimin et al. 2013:196 [6]). Geria (2019:92) [5] stated that AHP could be used to analyze the expert respondents' data. The consistency of the experts' opinions would be checked and then combined with the geometric mean. The AHP analysis results would be used to decide the alternatives of archeological resources management expected to be implemented in traditional villages of Central Sumba.

3.2 The Implementation of AHP in the Study of Archeological Resources Management in Central Sumba Regency

The research model applied in Central Sumba Regency uses three factors: social community, cultural preservation, and business opportunity. It also has three alternatives: the culture and revitalization concern, the establishment of the traditional village as a cultural heritage and digitalization of cultural data, and cultural tourism and creative economy. The AHP model hierarchy of Archeological Resources Management Based on Indigenous Communities of the Traditional Villages is presented in Image 2.

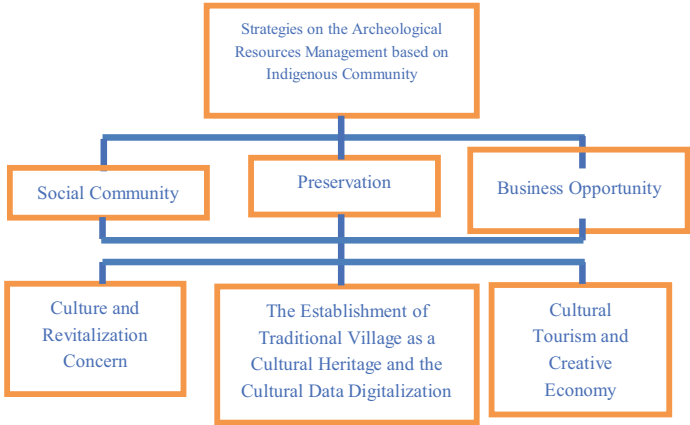


Image 2. The AHP model hierarchy of Archeological Resources Management based on the Indigenous Communities of the Traditional Villages

The correction results of AHP structurization show the weighting based on the assessment of the paired comparison between each proposed factor and alternative. The following analysis has another correction helped by Expert Choice software. The result of the factors and alternatives weighting can be in Image 3.

The weighting based on the purpose indicates that the cultural preservation factor has the most important weight, with a score of 0.392. Another important factor is the social community factor, with a score of 0.335, while the business opportunity factor scores 0.273. This means that an essential factor for the archeological resources management based on the indigenous communities of the traditional villages is the factor of cultural preservation (Image 4).

The most vital alternative in the social community factor is the establishment of the traditional village as a cultural heritage and the digitalization of cultural data with a score of 0.437. Another alternative weighting is the culture and revitalization concern, with a score of 0.308, while the alternative with the lowest weighting is the cultural tourism and creative economy, with a score of 0.255. This shows that, regarding the social community factor, the alternative solution for archeological resources management based on the indigenous communities of the traditional village is the establishment of the traditional village as a cultural heritage and cultural data digitalization (Image 5).

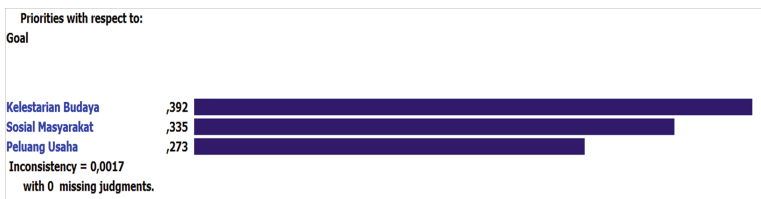


Image 3. The weighting result of AHP's factors

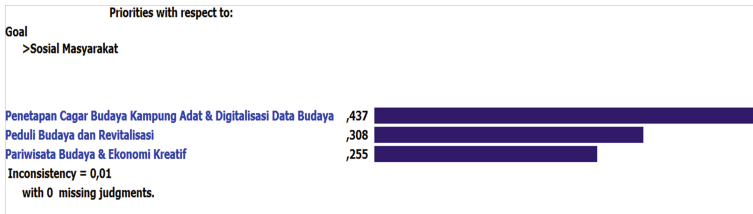


Image 4. The weighting result of the alternatives for the social community factor

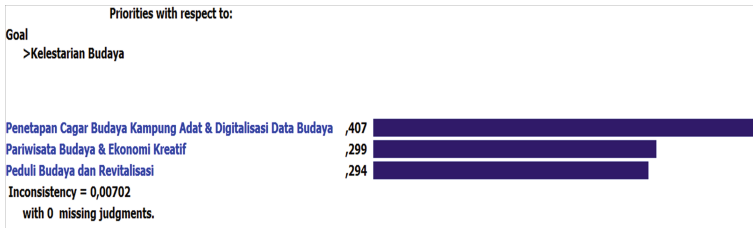


Image 5. The weighting result of the alternatives for the cultural preservation factor

The most significant alternative for the cultural preservation factor is the establishment of the traditional village as a cultural heritage and the digitalization of the cultural data, with a score of 0.407. Another alternative weighting is the factor of cultural tourism and creative economy, with a score of 0.299, and the alternative with the lowest score is the factor of the culture and revitalization concern, with a score of 0.294. This indicates that, regarding the cultural preservation factor, the alternative solution for the management of archeological resources is the establishment of the traditional village as a cultural heritage and the digitalization of cultural data (Image 6).

The essential alternative for the factor of business opportunity is the establishment of the traditional village as a cultural heritage and the digitalization of cultural data with a score of 0.383. The weighting for another alternative is the cultural tourism and creative economy, with a score of 0.332, while the lowest weighting is the alternative of the culture and revitalization concern, with a score of 0.285. This shows that, regarding the cultural preservation factor, the alternative solution for archeological resources management based on the indigenous community of the traditional village is the establishment of the traditional village as a cultural heritage and the digitalization of cultural data.

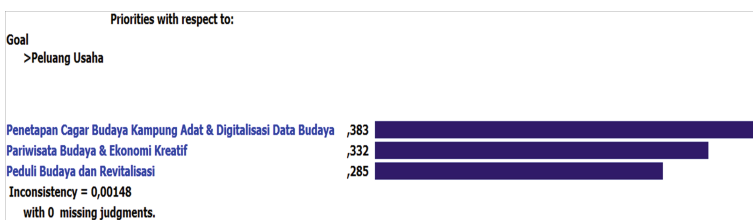


Image 6. The weighting result of the alternatives for the business opportunity factor

The involvement of the indigenous communities in managing the archeological resources is essential. According to Thomas (2004:25) [7], archeological communities need to support the involvement of the indigenous communities in preserving their cultural heritage. Furthermore, the indigenous communities should care about the cultural heritages surrounding them with the hope that their village potential could be developed.

3.3 The Strategies of Archeological Resources Management Involving the Indigenous Communities Based on the AHP Results

The involvement of the indigenous community in managing the archeological resources is one of the factors that support the management policies. This research provides three alternative management strategies, including the strategies of social community, cultural preservation, and business opportunity. The first alternative is that the social community strategy should prioritize the culture and revitalization concern strategy. The second alternative is that the cultural preservation strategy should prioritize the strategy of the establishment of the traditional village as a cultural heritage. The last alternative is that the business opportunity strategy should prioritize the alternative of cultural tourism and creative economy (Image 7).

The weighting results and the conditions of existing AHP direct toward the selection of prioritized alternative strategies in managing the archeological resources based on the indigenous communities of the traditional village. The prioritized strategies that need to be done are the establishment of the traditional village as a cultural heritage and the digitalization of the cultural heritage, with a score of 0.409. Another alternative strategy is the culture and revitalization concern, with a score of 0.296, while the alternative strategy with the lowest weighting is the cultural tourism and creative economy, with a score of 0.295 (Image 8).

One strategic policy that can be done is the establishment of the traditional village as a cultural heritage. However, before its application, some preparations are needed to support the program, such as the empowerment of the establishment of the traditional village as a cultural heritage and cultural data digitalization. The establishment of the cultural heritage is selected as an alternative as it is expected that the preservation, development, and utilization of the traditional village could be optimized due to the establishment. As stated by Rahardjo (2013:5–7) [8], based on the relevant chapters of the Cultural Conservation Law No. 11 of 2010, the cultural preservation concepts should pass some phases, including the registration phase that consists of enlistment, assessment, determination, recording, and ranking the cultural heritage. Related to protection, efforts are conducted to prevent and fix cultural heritages from damage, destruction, and annihilation. These

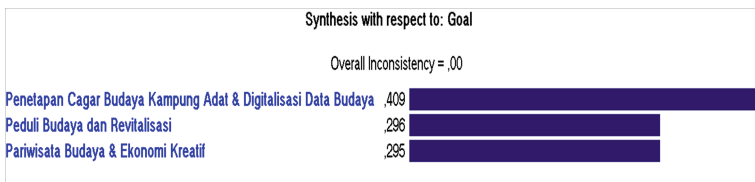


Image 7. The weighting result of the alternatives for the three factors

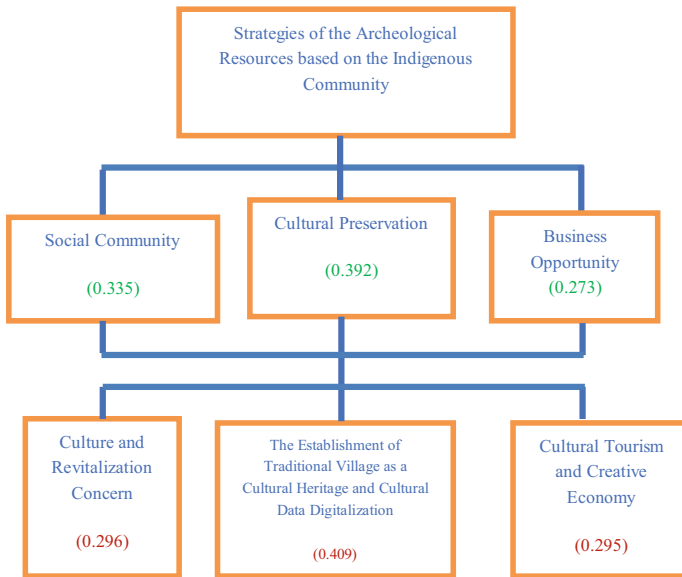


Image 8. The weighting results of the structure of the AHP hierarchy model

efforts can be done through saving, protecting, zoning, keeping, and restoring. The development issue is based on the effort to trigger activities that can develop economic activities which might preserve the cultural heritage and for people's prosperity. The utilization issue is oriented to the use of cultural heritage for religious, social, educational, scientific, technological, cultural, and tourism needs. Another management aspect is part of preservation with an objective of benefiting the people's prosperity. The central dan regional government have great authority in managing cultural heritage.

The establishment of cultural heritage ideally goes along with cultural data digitalization. During the digital era, cultural data digitalization is crucial so the cultural data can be passed on to the next generations. Lukman et al. (2020:16) [9] proposed some advantages of cultural heritage digitalization, as stated below.

- a) Cultural heritage digitalization provides an alternative for preserving cultural heritage sites. Digitalization allows more data storage in digital format, which might reduce the cost of physical maintenance and storage. The preservation process of cultural heritage is not only about the revitalization of sites or structures but also about keeping the collective memory of the people that brings identity and meaning (Malpas, 2007, as cited in Lukman et al., 2018:22 [9]);
- b) Digital heritage could build connections with the public. This follows the UNESCO World Heritage Convention and the Cultural Conservation Law No. 11 of 2010, stating that everyone has the freedom to participate and enjoy the freedom of creativity or to create cultural heritage;

- c) Cultural heritage digitalization could facilitate cultural learning by providing space, time, and perspective regarding cultural issues. The website design also enables interactions between visitors so they can explore the information deeper.

The synchronization of the cultural heritage establishment and the cultural data digitalization processes is a continuous tourism development effort based on cultural tourism. This goes along with UNESCO World Heritage and Sustainable Tourism Programme. This is a new approach integrating the dialogue and cooperation between the stakeholders so the tourism plan and cultural tourism management can be integrated. Natural and cultural assets must be protected and appreciated to develop tourism related to those fields. This program also sets a goal that the locals would be proud of and responsible for their cultural heritage. The final objective of this program is that there would be multiplier effects that the community could enjoy. Besides, the continuity of the proper management and strategy in managing the archeological resources is expected to support UNESCO's sustainable development plan. One of which is to increase economic growth.

4 Conclusion

The involvement of the indigenous communities in managing the archeological and cultural resources in the traditional village is essential. Hence, based on the alternative management strategies, the prioritized strategy that needs to be applied is the establishment of the traditional village as a cultural heritage and cultural data digitalization, with a score of 0.409. The establishment of cultural heritage effort must go along with the cultural data digitalization effort. Cultural data digitalization is a way to preserve the culture so the next generation will recognize and finally appreciate the cultural resources of the traditional village. The digitalization effort also allows easier transmission through social media. The synchronization of the establishment of cultural heritage and the cultural data digitalization processes is also the continuous development of sustainable tourism based on cultural tourism. This complies with the UNESCO World Heritage and Sustainable Tourism Programme, which aims to make the locals proud of and responsible for their cultural heritage. The main objective expected from the establishment of cultural heritage and cultural data digitalization is the betterment of the preservation, development, and management systems of the traditional village that might provide multiplier effects, not only for the indigenous communities but also for surrounding people. The benefits of economy, education, social, and cultural preservation might be gained through support from the central and regional government and other stakeholders.

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Author's Contribution. All writers are the main authors with equal contributions to this research. Nyoman Arisanti contributed according to his expertise in archaeological management, I Nyoman Rema with expertise in history, I Gusti Ngurah Jayanti with expertise in anthropology and Philipus Jeraman with expertise in vernacular architecture.

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