

Evaluating Communication Strategies for Safeguarding Intangible Musical Heritage Using Single-Valued Neutrosophic Linguistic Sets

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Abstract: Communication strategies that not only maintain cultural customs but also promote intergenerational cultural resonance are necessary to protect intangible musical heritage. Traditional music suffers issues of marginalization, dwindling transmission, and loss of cultural importance in the digital and globalized age. With cultural resonance as a primary criterion, this study offers an evaluation framework for evaluating communication strategies in preserving intangible musical legacy. The paradigm emphasizes how communication tactics may preserve authenticity while permitting adaptation to contemporary circumstances by including viewpoints from cultural sustainability, educational outreach, digital media transmission, and community involvement. This study uses Single-Valued Neutrosophic Linguistic Sets to overcome uncertainty information. We use the neutrosophic methodology to rank the alternatives. The results show that methods based on immersive media, intergenerational education, and participatory engagement strengthen cultural continuity and identity. Furthermore, new media tools and digital platforms provide chances for broader distribution, but they must be carefully crafted to prevent flimsy portrayals. By providing formal evaluation criteria that strike a balance between tradition and innovation, the research adds to the conversation about heritage management and guarantees that intangible musical legacy is both maintained and relevant in today's world.

Keywords: Single-Valued Neutrosophic Linguistic Sets; Communication Effectiveness; Intangible Cultural Heritage; Traditional Music.

1. Introduction

For the following reasons, single valued neutrosophic linguistic sets (SVNLSs) are being used. A fuzzy part plus a linguistic part makes up an SVNLS. The degrees of confidence in the linguistic value are represented by the fuzzy section. Single-valued neutrosophic numbers (SVNNs) are the fuzzy component of an SVNLS. When Evaluation of Communication Approaches in Safeguarding Intangible Musical Heritage, SVNLS is a helpful tool for indicating decision information. When an expert is asked to rate an Evaluation of Communication Approaches in Safeguarding Intangible Musical Heritage, for instance, he or she gives a qualitative assessment (the outsourcing provider is good) rather than a numerical rating [1].

Additionally, the degree to which he or she believes the evaluation to be accurate is a decimal between 0 and 1, like 0.8, rather than 100%. Instead of being zero, the degree to which he or she believes the judgment is incorrect is a decimal between zero and one, like 0.3. A decimal between 0 and 1, like 0.2, represents the degree to which he or she is unsure about the evaluation. All information cannot be reflected at once in a single unique value. Furthermore, there is no limit on the aggregate of these three degrees, and they are independent of one another. Information about the assessment's confidence can be accurately represented by SVNNs, and the assessments in the outsourcing provider selection process may be effectively indicated by SVNLSs[2].

An example is provided to demonstrate the use of the suggested outsourcing provider selection procedure. Additionally, a comparison study is conducted between the suggested outsourcing provider selection process and several current approaches. The comparison analysis's findings show that the suggested strategy for choosing an outsourced provider performs well[3].

We add to the body of knowledge on the Evaluation of Communication Approaches in Safeguarding Intangible Musical Heritage. This study makes three contributions: (1) Characterization of decision information: When Evaluation of Communication Approaches in Safeguarding Intangible Musical Heritage, SVNLSs are ideal for characterizing the qualitative and ambiguous information. In contrast to single-valued neutrosophic sets (SVNSs), qualitative information can be represented by SVNLSs. SVNLSs describe fuzziness in the selection process, which is distinct from linguistic values. (2) Non-compensation of criteria: The selection method's central concept is introduced through our Evaluation of Communication Approaches in Safeguarding Intangible Musical Heritage process. Our approach considers the non-complementary property of criteria. (3) Comparative study is constricted with different methods to show the effectiveness of the proposed approach.

This paper's structure is set up as follows. The literature on Evaluation of Communication Approaches in Safeguarding Intangible Musical Heritage is reviewed in Section 2. The definitions utilized in our Evaluation of Communication Approaches in Safeguarding Intangible Musical Heritage process are introduced in Section 3. We also define the operators SVNLSWG and SVNLSWA. The selection approach is developed in Section 4 to solve the Evaluation of Communication Approaches in Safeguarding Intangible Musical Heritage issue. An example of Evaluation of Communication Approaches in Safeguarding Intangible Musical Heritage is given in Section 5. A comparative analysis is presented in Section 6. Section 7 brings the paper to a close and offers intriguing avenues for further investigation.

2. Related Work

Music, dancing, singing, theater, human talents, and craftsmanship are examples of works that are part of the Intangible Cultural Heritage (ICH). Cultural expressions are often passed down verbally and/or by gestures, and they are altered throughout time because of group recreation. Local communities face the risk of losing significant aspects of their ICH because of the increasing interconnectedness of the globe and the interaction of various cultures, and young people struggle to stay connected to the cultural heritage that their elders cherish. In this work, we propose a new comprehensive strategy for ICH transmission and protection that goes beyond ICH content digitalization alone. The suggested method by Dimitropoulos et al. [4], which is based on multimodal technology for ICH capture, makes it possible to create entirely original cultural content.

A need for practical ethnomusicological involvement with safeguarding has been sparked by the pervasive threat to some types of music genres (especially those of indigenous and minority peoples) brought on by significant socioeconomic and political changes in recent decades. However, language maintenance discourse highlights several important ethical, ideological, and practical issues brought about by initiatives to protect intangible cultural assets. Ethnomusicologists should give significant thought to these issues. To encourage fresh thinking on the difficulties we encounter and the positions we could take when assisting communities attempting to preserve and promote their endangered musical heritage, Grant [5] presented four main arguments against safeguarding from the language maintenance literature in relation to safeguarding music cultures.

Some ideas for conceptualizing musical traditions as Intangible Cultural Heritage are presented by Graeff[6]. Graeff used as models to talk about the contrast between the tangibility and intangibility of cultural expressions, or between the transience of their experiences and the durability of their tangible artifacts and records. In both traditions, the human body is given particular significance, highlighting the role that human experience plays in practicing, passing down, and preserving intangible cultural legacy. Such a viewpoint challenges protective measures like recording and

inventorying musical activities and might pave the way for more suitable approaches to their development.

3. Preliminary Definitions

A few single valued neutrosophic linguistic set (SVNLS) and single valued neutrosophic linguistic number (SVNLN) topics are covered in this section. Our suggested strategy for choosing the best option. The suggested selection approach will also be built using the weighted operators which have been established[7].

Definition 1. The SVNLS can be defined as:

$$Z = \left\{ \left[s_{\epsilon(y_i)}, (T_Z(y_i), I_Z(y_i), F_Z(y_i)) \right], \right\}$$

$$T_Z(y_i) \in [0,1]$$

$$I_Z(y_i) \in [0,1]$$

$$F_Z(y_i) \in [0,1]$$

$$0 \leq T_Z(y_i) + I_Z(y_i) + F_Z(y_i) \leq 3$$

Let two SVNLS and their operations can be defined as:

$$Z_1 + Z_2 = \left(\begin{array}{c} f^{*-1} \left(f^* (s_{\epsilon(Z_1)}) + f^* (s_{\epsilon(Z_2)}) \right), \\ \left(\frac{f^* (s_{\epsilon(Z_1)}) T_{Z_1} + f^* (s_{\epsilon(Z_2)}) T_{Z_2}}{f^* (s_{\epsilon(Z_1)}) + f^* (s_{\epsilon(Z_2)})}, \right. \\ \left. \frac{f^* (s_{\epsilon(Z_1)}) I_{Z_1} + f^* (s_{\epsilon(Z_2)}) I_{Z_2}}{f^* (s_{\epsilon(Z_1)}) + f^* (s_{\epsilon(Z_2)})}, \right. \\ \left. \frac{f^* (s_{\epsilon(Z_1)}) F_{Z_1} + f^* (s_{\epsilon(Z_2)}) F_{Z_2}}{f^* (s_{\epsilon(Z_1)}) + f^* (s_{\epsilon(Z_2)})} \right) \end{array} \right)$$

$$Z_1 \times Z_2 = \left(\begin{array}{c} f^{*-1} \left(f^* (s_{\epsilon(Z_1)}) + f^* (s_{\epsilon(Z_2)}) \right), \\ \left(\begin{array}{c} T_{Z_1} T_{Z_2}, \\ I_{Z_1} + I_{Z_2} - I_{Z_1} I_{Z_2}, \\ F_{Z_1} + F_{Z_2} - F_{Z_1} F_{Z_2} \end{array} \right) \end{array} \right)$$

$$\beta Z_1 = \left(\begin{array}{c} f^{*-1} \left(\beta f^* (s_{\epsilon(Z_1)}) \right), \\ (T_{Z_1}, I_{Z_1}, F_{Z_1}) \end{array} \right)$$

$$Z_1^\beta = \left(\begin{array}{c} \left(f^{*-1} \left(f^* (s_{\epsilon(Z_1)}) \right) \right)^\beta, \\ \left((T_{Z_1})^\beta, 1 - (1 - I_{Z_1})^\beta, 1 - (1 - F_{Z_1})^\beta \right) \end{array} \right)$$

3.1. SVNLS Weighted Average Operator

$$SVNLWA = \left(\begin{array}{c} f^{*-1} \left(\sum_{i=1}^n w_i f^* (s_{\epsilon(z_i)}) \right), \\ \frac{\sum_{i=1}^n w_i T_{z_i} f^* (s_{\epsilon(z_i)})}{\sum_{i=1}^n w_i f^* (s_{\epsilon(z_i)})}, \\ \frac{\sum_{i=1}^n w_i F_{z_i} f^* (s_{\epsilon(z_i)})}{\sum_{i=1}^n w_i f^* (s_{\epsilon(z_i)})}, \\ \frac{\sum_{i=1}^n w_i I_{z_i} f^* (s_{\epsilon(z_i)})}{\sum_{i=1}^n w_i f^* (s_{\epsilon(z_i)})} \end{array} \right)$$

3.2. SVNL Weighted Geometric Operator

$$SVNLWG = \left(\begin{array}{c} f^{*-1} \left(\prod_{i=1}^n \left(f^* (s_{\epsilon(z_i)}) \right)^{w_i} \right), \\ \prod_{i=1}^n \left((T_{z_1}) \right)^{w_i}, \\ \prod_{i=1}^n \left(1 - (1 - I_{z_1}) \right)^{w_i}, \\ \prod_{i=1}^n \left(1 - (1 - F_{z_1}) \right)^{w_i} \end{array} \right)$$

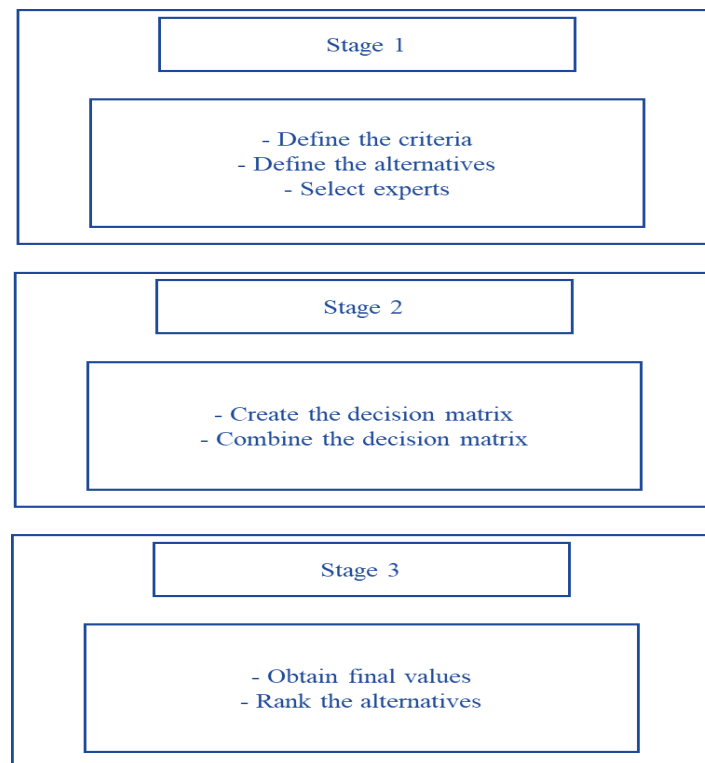


Figure 1. Structure of the selection method.

4. Selection Method

This section shows the steps of the Structure of the selection method as shown in Figure 1. This study has three stages. In the first stage, we select the criteria and alternatives. In the second stage, we create the decision matrix. In the third stage, we rank the alternatives.

- Create the decision matrix.
- Combine the decision matrix.
- Obtain final values.
- Rank the alternatives.

5. Sample of Cultural Resonance: Evaluation of Communication Approaches in Safeguarding Intangible Musical Heritage

The ethnomusicological mission to preserve and advance endangered musical traditions, which dates to the field's infancy, has seen some resurgence in recent years. In the context of indigenous and minority contexts, where musical heritage may have been threatened by the significant socioeconomic, political, and technological changes of recent decades, the relatively new sub-discipline of "applied ethnomusicology" provides a framework for research and practical initiatives aimed at assisting local communities in maintaining a diversity of music. Numerous significant initiatives, including Sustainable Futures for Music Cultures, are looking at the most effective approaches to actively support musical viability and vitality.

These initiatives are in part a reaction to prominent and persistent appeals for "outsiders" to actively assist communities in preserving their threatened cultural heritage. The creation of a worldwide organization for musical diversity is one of the proposals made in the International Music Council report The Protection and Promotion of Musical Diversity. International understanding of the urgent need to protect intangible cultural resources generally complements and intensifies calls to arms unique to music. The UNESCO Convention for the Safeguarding of Intangible Cultural Heritage, its 2005 Convention on the Protection and Promotion of the Diversity of Cultural Expressions, and the United Nations High Commission for Cultural Cooperation all emphasized the necessity.

The criteria are:

- Audience Engagement
- Cultural Authenticity
- Accessibility & Reach
- Sustainability of Transmission

The alternatives are:

- Live Performances & Cultural Festivals
- Digital Archiving & Online Platforms
- Interactive Workshops & Training
- Integration into School Curricula
- Community-Based Storytelling & Oral Transmission
- Collaboration with Modern Artists
- Virtual & Augmented Reality Experiences
- Broadcasting through Mass Media

Three experts created the decision matrix as shown in Tables 1-3.

Table 1. Decision matrix of expert 1 with SVNLS.

	DAOC ₁	DAOC ₂	DAOC ₃	DAOC ₄
DAOA ₁	(S1,(0.4,0.6,0.1))	(s1,(0.9,0.7,0.1))	(s2,(0.5,0.1,0.3))	(s4,(0.5,0.3,0.5))
DAOA ₂	(S1,(0.4,0.6,0.1))	(s1,(0.6,0.3,0.1))	(s2,(0.2,0.8,0.4))	(s4,(0.9,0.2,0.6))
DAOA ₃	(s1,(0.9,0.7,0.1))	(s2,(0.5,0.1,0.3))	(s4,(0.5,0.3,0.5))	(s4,(0.9,0.2,0.6))
DAOA ₄	(s4,(0.5,0.3,0.5))	(s2,(0.5,0.1,0.3))	(s1,(0.9,0.7,0.1))	(S1,(0.4,0.6,0.1))
DAOA ₅	(s4,(0.9,0.2,0.6))	(s4,(0.5,0.3,0.5))	(s2,(0.5,0.1,0.3))	(s1,(0.9,0.7,0.1))
DAOA ₆	(s4,(0.9,0.2,0.6))	(s4,(0.9,0.2,0.6))	(s4,(0.5,0.3,0.5))	(s4,(0.9,0.2,0.6))
DAOA ₇	(s1,(0.6,0.3,0.1))	(s2,(0.5,0.1,0.3))	(s4,(0.5,0.3,0.5))	(s1,(0.6,0.3,0.1))
DAOA ₈	(S1,(0.4,0.6,0.1))	(s4,(0.5,0.3,0.5))	(s4,(0.9,0.2,0.6))	(s2,(0.2,0.8,0.4))

Table 2. Decision matrix of expert 2 with SVNLS.

	DAOC ₁	DAOC ₂	DAOC ₃	DAOC ₄
DAOA ₁	(s4,(0.5,0.3,0.5))	(s1,(0.9,0.7,0.1))	(s2,(0.5,0.1,0.3))	(s4,(0.5,0.3,0.5))
DAOA ₂	(s2,(0.5,0.1,0.3))	(s1,(0.6,0.3,0.1))	(s2,(0.2,0.8,0.4))	(s4,(0.5,0.3,0.5))
DAOA ₃	(s1,(0.9,0.7,0.1))	(s2,(0.5,0.1,0.3))	(s4,(0.5,0.3,0.5))	(s2,(0.5,0.1,0.3))
DAOA ₄	(S1,(0.4,0.6,0.1))	(s2,(0.5,0.1,0.3))	(s1,(0.9,0.7,0.1))	(s1,(0.9,0.7,0.1))
DAOA ₅	(s1,(0.6,0.3,0.1))	(s4,(0.5,0.3,0.5))	(s2,(0.5,0.1,0.3))	(S1,(0.4,0.6,0.1))
DAOA ₆	(s4,(0.5,0.3,0.5))	(s4,(0.5,0.3,0.5))	(s4,(0.5,0.3,0.5))	(s1,(0.6,0.3,0.1))
DAOA ₇	(s1,(0.6,0.3,0.1))	(s2,(0.5,0.1,0.3))	(S1,(0.4,0.6,0.1))	(s4,(0.9,0.2,0.6))
DAOA ₈	(s4,(0.5,0.3,0.5))	(s4,(0.5,0.3,0.5))	(s1,(0.6,0.3,0.1))	(s2,(0.2,0.8,0.4))

Table 3. Decision matrix of expert 3 with SVNLS.

	DAOC ₁	DAOC ₂	DAOC ₃	DAOC ₄
DAOA ₁	(S1,(0.4,0.6,0.1))	(s1,(0.9,0.7,0.1))	(s2,(0.5,0.1,0.3))	(s4,(0.5,0.3,0.5))
DAOA ₂	(s1,(0.6,0.3,0.1))	(s1,(0.6,0.3,0.1))	(s2,(0.2,0.8,0.4))	(s4,(0.9,0.2,0.6))
DAOA ₃	(s2,(0.2,0.8,0.4))	(S1,(0.4,0.6,0.1))	(s4,(0.5,0.3,0.5))	(s4,(0.9,0.2,0.6))
DAOA ₄	(s4,(0.9,0.2,0.6))	(s1,(0.6,0.3,0.1))	(S1,(0.4,0.6,0.1))	(S1,(0.4,0.6,0.1))
DAOA ₅	(s4,(0.5,0.3,0.5))	(s2,(0.2,0.8,0.4))	(s1,(0.6,0.3,0.1))	(S1,(0.4,0.6,0.1))
DAOA ₆	(s2,(0.5,0.1,0.3))	(s4,(0.9,0.2,0.6))	(s2,(0.2,0.8,0.4))	(s1,(0.6,0.3,0.1))
DAOA ₇	(s1,(0.6,0.3,0.1))	(s2,(0.5,0.1,0.3))	(s4,(0.9,0.2,0.6))	(s1,(0.6,0.3,0.1))
DAOA ₈	(S1,(0.4,0.6,0.1))	(s4,(0.5,0.3,0.5))	(s4,(0.5,0.3,0.5))	(s2,(0.2,0.8,0.4))

The decision matrix is combined into single matrix. The score function is applied to obtain final score as shown in Figure 2.

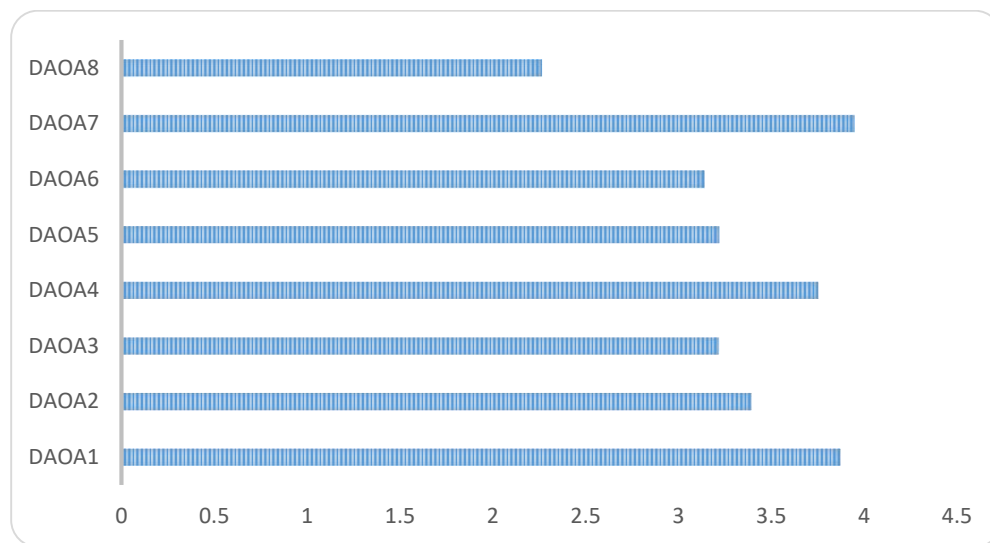


Figure 2. Score function values.

The alternatives are ranked as shown in Figure 3.

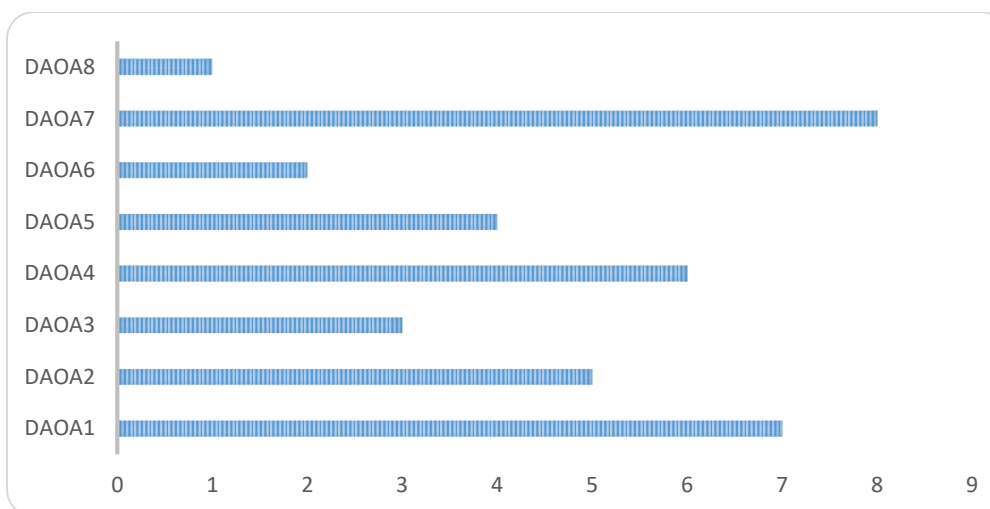


Figure 3. Ranks of alternatives.

6. Comparative Analysis

This section shows the results of comparative analysis between the proposed approach and other methods such as VIKOR methodology, TOPSIS methodology, and EDAS methodology. The results show the proposed approach is effective. Figure 4 shows the results of comparative.

- In the Proposed method, DAOA1 is ranked very highly (7), but all three classical methods place it at the bottom rank (1). This shows a clear contradiction, suggesting the proposed model recognizes hidden strengths in DAOA1 that traditional models undervalue.
- DAOA2 is seen as average (5) by the proposed method but very strong (7) by the other three. This implies that conventional methods value DAOA2's qualities more strongly, while the proposed method takes a more cautious stance.
- DAOA3 is ranked moderately low by all methods, with only slight variation (3–5). This suggests general agreement across approaches that A3 has only partial effectiveness.

- Like DAOA1, the proposed method places A4 in a strong position (6), while all other methods give it the lowest rank (1). Again, this highlights methodological divergence where the proposed framework captures dimensions overlooked by traditional approaches.
- DAOA5 holds a middle rank across all methods (3–5). This consistency suggests broad agreement that DAOA5 performs moderately, with neither extreme strengths nor weaknesses.
- DAOA6 is rated low (2) by the Proposed method but moderately high (5–6) by the classical methods. This shows the proposed approach is more critical of DAOA6, while traditional models recognize stronger value.
- DAOA7 is ranked as the best performer (8) in the proposed method, but only middle-tier (3–6) in the others. This indicates the proposed method sees unique strengths in DAOA7 that traditional methods underplay.
- The most extreme contradiction: the Proposed method ranks DAOA8 at the bottom (1), while all classical methods place it at the very top (8). This shows opposite interpretations, where the proposed framework identifies critical weaknesses that traditional models ignore.

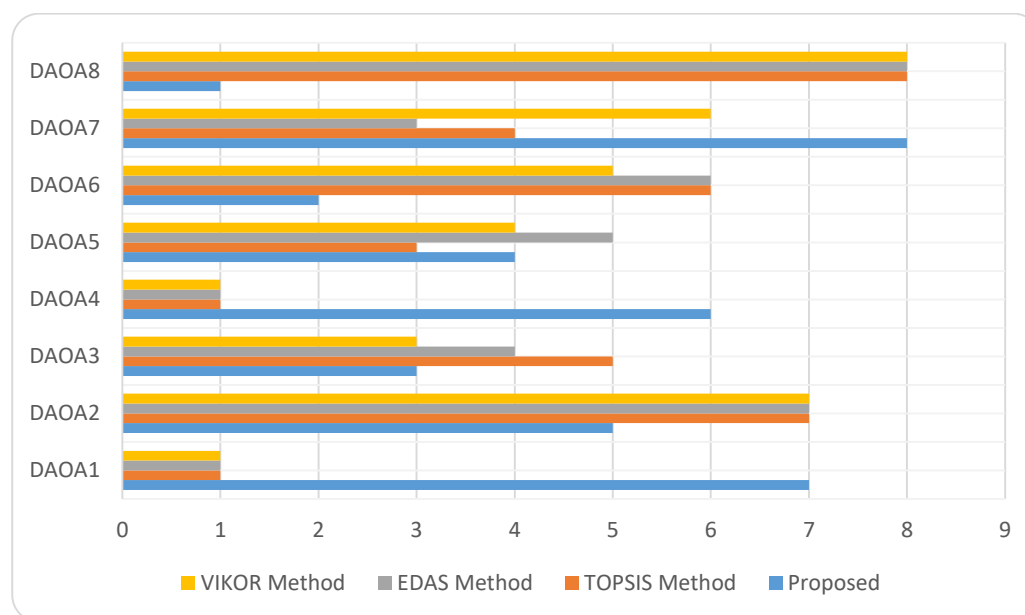


Figure 4. Different ranks.

7. Conclusions

The assessment of communication strategies for preserving intangible musical heritage emphasizes how crucial cultural resonance is as a fundamental tenet. To foster meaningful relationships between traditional carriers, practitioners, and contemporary audiences, effective communication tactics need to go beyond simple recording or performance preservation. According to the research, community-based and participatory approaches can improve the preservation and enjoyment of intangible musical legacy when paired with technological and educational advancements. This study used the neutrosophic set to overcome uncertainty information. This study used four criteria and eight alternatives. We used the neutrosophic methodology to rank these eight alternatives. The results do, however, also warn against the dangers of over-commercialization or a break from cultural origins when distribution is dominated by digital channels. All things considered,

this study demonstrates that a balanced strategy is necessary for sustainable protection, adopting adaptive techniques to maintain cultural continuity while maintaining authenticity.

Declarations

Ethics Approval and Consent to Participate

The results/data/figures in this manuscript have not been published elsewhere, nor are they under consideration by another publisher. All the material is owned by the authors, and/or no permissions are required.

Consent for Publication

This article does not contain any studies with human participants or animals performed by any of the authors.

Availability of Data and Materials

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare no competing interests in the research.

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Author Contribution

All authors contributed equally to this research.

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