HOMBO BATU AS A SOURCE OF KNOWLEDGE-BASED ECONOMIC DEVELOPMENT

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Abstrak

Hombo Batu, atau dikenal juga sebagai Fahombo, merupakan tradisi lompat batu masyarakat Nias yang memiliki nilai budaya tinggi dan telah diwariskan secara turun-temurun. Tradisi ini tidak hanya mencerminkan keberanian, solidaritas, dan identitas sosial masyarakat, tetapi juga memiliki potensi besar untuk dikembangkan sebagai sumber ekonomi berbasis ilmu pengetahuan. Penelitian ini menggunakan pendekatan kajian pustaka (literature review) untuk menganalisis literatur ilmiah terkait Hombo Batu dalam konteks budaya, pendidikan, dan ekonomi kreatif, dengan fokus pada publikasi tahun 2020–2025. Kajian dilakukan dengan menelaah hubungan antara tradisi, sains kontekstual (ethnoscience), dan peluang ekonomi melalui pariwisata budaya, pendidikan berbasis pengalaman, dan pengembangan produk pengetahuan. Hasil penelitian menunjukkan bahwa Hombo Batu dapat dijadikan media pembelajaran sains, termasuk konsep fisika seperti gaya, energi kinetik, dan gerak parabola, sehingga memberikan nilai edukatif yang kuat. Selain itu, tradisi ini berpotensi mendukung pembangunan ekonomi lokal melalui cultural tourism, pelatihan berbasis budaya, dan produk kreatif yang memadukan edukasi dan pengalaman budaya. Sinergi antara budaya, ilmu pengetahuan, dan ekonomi kreatif memungkinkan Hombo Batu menjadi sumber ekonomi berkelanjutan yang tetap menjaga identitas budaya masyarakat Nias. Penelitian ini menegaskan pentingnya integrasi kearifan lokal dengan ilmu pengetahuan dalam upaya pembangunan ekonomi berbasis pengetahuan.

***Kata Kunci**: Hombo Batu; Kearifan Lokal; Ekonomi Kreatif; Ethnoscience; Pariwisata Budaya; Pendidikan Kontekstual*

Abstract

Hombo Batu, also known as Fahombo, is a stone-jumping tradition of the Nias people that holds significant cultural value and has been passed down through generations. This tradition not only reflects the community's bravery, solidarity, and social identity but also holds substantial potential to be developed as a knowledge-based economic resource. This study employs a literature review approach to analyze scientific literature related to Hombo Batu in the contexts of culture, education, and creative economy, focusing on

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publications from 2020 to 2025. The review examines the relationship between the tradition, contextual science (ethnoscience), and economic opportunities through cultural tourism, experiential learning, and the development of knowledge-based products. The results indicate that Hombo Batu can serve as a medium for science education, including physics concepts such as force, kinetic energy, and projectile motion, thus providing strong educational value. Moreover, this tradition has the potential to support local economic development through cultural tourism, culturally-based training, and creative products that combine education with cultural experience. The synergy between culture, science, and creative economy allows Hombo Batu to become a sustainable economic resource while preserving the cultural identity of the Nias community. This study emphasizes the importance of integrating local wisdom with scientific knowledge in efforts to develop a knowledge-based economy.

Keywords: *Hombo Batu; Local Wisdom; Creative Economy; Ethnoscience; Cultural Tourism; Contextual Education*

A. Introduction

The Hombo Batu tradition is one of the cultural heritages of the South Nias community, North Sumatra Province, Indonesia, with historical, social, and symbolic functions. Traditionally, Hombo Batu is known as a stone-jumping practice that is not merely a physical spectacle but also reflects values such as bravery, cooperation, solidarity, and character building within the Nias community. This tradition is not only a representation of culture but also forms a part of the social identity that is continuously preserved by the local community as a symbol of strength and local cultural wisdom.

In contemporary developments, Hombo Batu is increasingly recognized not only as a cultural practice or traditional game but also as a potential economic commodity that can contribute to community welfare. This phenomenon aligns with global trends that leverage local culture as an asset in the development of creative economy, cultural tourism, and community-based education. The concept of a knowledge-based cultural economy shows that cultural resources can be utilized sustainably when integrated with scientific approaches in development, marketing, and education. Such approaches help local communities not only to preserve their traditions but also to generate tangible economic value.

One way to connect Hombo Batu with scientific knowledge is through contextual science education. The tradition embodies various physical phenomena that can be explained using the laws of motion, energy, hydrostatics, and human biomechanics. For instance, the concepts of kinetic energy and momentum can be applied to explain the jumper's motion, while principles of balance and force can be used to study how jumpers adjust their body position while

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leaping over stones. Scientific studies of this kind not only enrich the cultural meaning of the tradition but also open opportunities to develop culturally-based science learning media that are highly engaging and relevant for both the community and the educational sector.

Previous research has shown that Hombo Batu has been utilized as an effective learning medium to enhance students' understanding of scientific concepts such as physics, biology, and mathematics. For example, Hombo Batu has been integrated into STEM (Science, Technology, Engineering, and Mathematics) learning approaches to improve students' understanding of motion, force, and body coordination in elementary and secondary schools. Such studies validate that local cultural phenomena can serve as meaningful, contextual learning contexts, particularly in addressing challenges associated with abstract scientific concepts.

Moreover, the adaptation of Hombo Batu values into the educational curriculum demonstrates strong character and cultural significance. The integration of Hombo Batu into science learning has been shown to increase student engagement, enrich learning experiences, and help students understand the relationship between scientific knowledge and the social-cultural realities of their lives. This is important not only from an educational perspective but also from an economic standpoint, as the improvement of human resources through education can contribute to local economic development (Gea & Sazali, 2023).

The next concept is the use of Hombo Batu as a cultural tourism attraction. Tradition-based tourism has become a strong strategy for local economic development in many communities worldwide. Cultural tourism offers visitors direct experiences to observe, learn, and feel the authentic values of a society. Hombo Batu, with its rich cultural values and engaging physical aspects, clearly has the potential to become a unique tourist destination. Through proper promotion and educational programs, Hombo Batu can serve as a flagship tourist attraction that not only increases visitor numbers but also provides business opportunities for the local community, such as local guides, cultural souvenirs, culinary services, and cultural education programs (Kesumah et al., 2025).

Economic opportunities are also available through integration with digital technology and global languages. Promoting the Hombo Batu tradition on digital platforms with international language support can expand the reach of cultural products to a global market. This strategy supports cultural preservation while creating economic opportunities through digital marketing, cultural content, and international collaboration. Therefore, Hombo Batu has the potential to become a knowledge-based economic resource that

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synergizes culture, education, and technology (Harefa, 2024).

However, the economic potential of Hombo Batu faces several challenges. One of the main challenges is integrating traditional cultural values with modern approaches without losing the authentic meaning of the tradition. Shifts in the tradition's meaning by migrants or its perception solely as a tourist attraction or economic commodity indicate the risk of cultural essence being lost when the tradition is commercialized. Thus, culturally sensitive approaches are needed to ensure that Hombo Batu continues to provide social and cultural value to its originating community while enabling sustainable economic benefits.

Furthermore, the scientific aspect of developing Hombo Batu as an economic resource emphasizes the importance of data-driven research and empirical analysis. Studies on kinetic energy, human biomechanics, and the application of physics principles in Hombo Batu not only enrich the scientific literature but also provide a solid foundation for developing educational media, cultural training programs, and scientifically accurate promotional materials. Culturally based science education is highly engaging and contributes to economic value by improving science literacy in society while enhancing the cultural appeal of Hombo Batu (Dwi Saputra et al., 2024).

Overall, Hombo Batu is a concrete example of a cultural tradition with extraordinary potential to be developed as a knowledge-based economic resource. By leveraging scientific approaches in learning, promotion, and tourism development, Hombo Batu can make a significant contribution to the welfare of local communities. This approach not only preserves the unique culture of Nias but also integrates modern values such as education, technology, and creative economy to create long-term benefits. This research is relevant in the context of sustainable, culture-based development, as it contributes to both academic understanding and practical application in society (Harefa, 2024).

B. Research Methodology

This study employs a qualitative approach using a literature review method to explore and analyze scientific literature related to the Hombo Batu tradition in the contexts of culture, scientific knowledge, and knowledge-based economic development. This method was chosen because the research does not involve primary field data collection but instead examines relevant secondary sources, such as journal articles, proceedings, and academic publications that support the theoretical framework and conceptual analysis of the research topic.

1. Data Sources and Search Strategy

Literature data were obtained from indexed national and international

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academic journal databases, both through university journal portals and platforms such as Google Scholar and institutional journal repositories. The primary focus was on publications relevant to Hombo Batu, local wisdom, contextual science learning (STEM/ethnoscience), as well as cultural and creative economy. The search utilized keywords such as "Hombo Batu Nias," "local wisdom and education," "ethnoscience in culture," "cultural economy tradition," "local culture tourism and economy," and their variations. Selected literature met the following criteria: (1) relevance to the research topic, (2) published between 2020 and 2025, (3) possessing a DOI or clear reference, and (4) published in accredited journals.

2. Literature Analysis Procedure

The analysis began with the identification and selection of articles meeting the criteria. The content of each article was then evaluated based on its contribution to understanding Hombo Batu as a knowledge-based economic resource. Subsequently, findings were synthesized to develop a coherent theoretical framework, highlighting the interrelationships between traditional culture, contextual science, and creative economic potential.

3. Theoretical Framework

This study is grounded in several complementary theories and concepts:

1) Local Wisdom and Cultural Economy Theory

Local wisdom theory considers traditional cultural values as a source of knowledge that can be utilized for social and economic development. Hombo Batu, as a local wisdom of the Nias people, not only functions as a cultural tradition but can also be interpreted as a cultural economic asset if strategically developed through activities such as tourism, cultural education, and cultural promotion. Marbun & Halawa (2025) assert that Hombo Batu has evolved from its original function into a cultural attraction and tourist appeal, significantly contributing to the local community.

2) Ethnoscience and Contextual Science Learning Theory

Ethnoscience is an educational approach that integrates cultural practices into science learning, making scientific concepts more contextual and meaningful. Kesumah et al. (2025) demonstrate that integrating the stone-jumping tradition (Hombo Batu) into physics education through an ethnoscience approach enhances understanding of scientific concepts such as force, energy, and biomechanics in everyday student life. This integration also increases student engagement and appreciation for local culture.

3) Cultural Transformation and Social Adaptation Theory

Cultural transformation theory explains how local traditions adapt to changing times without losing their core values. Waruwu et al. (2025) highlight that Hombo

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Batu has shifted from a military and ritual tradition to a symbol of cultural identity and a tourist attraction. This transformation creates opportunities to leverage traditional culture in creative economy and cultural tourism initiatives.

4 Thematic Analysis

In this study, literature findings were classified into three main themes:

1) Hombo Batu as a symbol of culture and local wisdom,
2) The role of Hombo Batu in science education (STEM/ethnoscience), and
3) The potential of Hombo Batu in knowledge-based economic development through cultural tourism, educational content, and local creativity.

C. Results and Discussion

This study was conducted using a literature review approach aimed at examining the Hombo Batu phenomenon from various perspectives, including culture, science, education, and knowledge-based economy. The primary focus of the research is to understand how Hombo Batu, as a cultural tradition, not only maintains its existence but also has the potential to become an economic resource grounded in scientific knowledge. The results of the literature review are presented through several main themes, which are then analyzed comprehensively within the context of cultural theory, creative economy, contextual science (ethnoscience), and knowledge-based economic development.

1. Hombo Batu: Cultural Heritage and Social Identity

Hombo Batu, also known as Fahombo, is a high-stone-jumping tradition practiced by the Nias people to demonstrate bravery, agility, and maturity. This tradition has been recognized as part of Indonesia's intangible cultural heritage according to official data from the Ministry of Education and Culture, which records Hombo Batu as a customary practice, ritual, and celebration of the South Nias community. From a cultural perspective, Hombo Batu is not merely a physical activity but is rich in symbolic meaning, reflecting historical values, collective identity, and solidarity among community members. Marbun & Halawa (2025) note that the tradition has transformed from its original function as a traditional military exercise into a cultural symbol and tourist attraction, while also serving as a medium for teaching social values to younger generations. Waruwu et al. (2025) reinforce that Hombo Batu has been consistently maintained as part of the collective culture of the Nias community, even though its function has historically shifted from a war ritual to an icon of cultural tourism and identity education.

This aligns with the concept of cultural continuity, which suggests that culture persists and adapts through functional transformations without losing its core meaning in social life. This provides a strong basis for understanding Hombo Batu as a cultural heritage that continues to

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contribute to the socio-economic life of the Nias community.

2. Integration of Scientific Knowledge and Hombo Batu

An important finding from the literature review is the role of Hombo Batu in contextual science education (ethnoscience). Exploratory studies by Harefa (2025) demonstrate that Hombo Batu can be used as a STEM (Science, Technology, Engineering, Mathematics) learning medium by integrating aspects of physics, biology, and mathematics within a local cultural context. For example, in physics, the motion of the jump can be related to concepts such as force, kinetic energy, gravitational acceleration, and projectile motion. Additional research by Kesumah et al. (2025) indicates that the ethnoscience approach helps students understand scientific concepts more meaningfully because they are directly connected to their real-life experiences with local cultural traditions. Furthermore, scientific articles in *Revista Mexicana de Física E* show that analyzing Hombo Batu motion using software tools like Tracker can directly visualize physics concepts such as projectile motion, gravitational acceleration, and mechanical energy in real-world scenarios.

These findings support situated learning theory, as proposed by Lave & Wenger, which asserts that learning becomes more effective when scientific knowledge is studied in the context of students' real experiences. From an educational perspective, Hombo Batu not only strengthens science literacy but also reinforces the cultural identity of the younger generation. This aligns with the concept of cultural pedagogy, where education is not only the transfer of knowledge but also the cultivation of cultural values embedded in the community.

3. Hombo Batu and Knowledge-Based Economic Empowerment

Mapping the relationship between culture and knowledge-based economy forms the core of this study. The Hombo Batu tradition, which holds both cultural significance and educational potential, can create economic opportunities through several mechanisms:

1) Cultural Tourism and Local Economic Value

The transformation of Hombo Batu from a traditional ritual into a cultural attraction can be interpreted as an opportunity for sustainable cultural tourism. Marbun & Halawa (2025) note that Hombo Batu has become a cultural tourism attraction appealing to both local and international visitors. Cultural tourism has been a strategic approach to local economic development in various communities because it combines cultural experiences, economic circulation, and community involvement. According to creative economy theory, culture can become an economic commodity if packaged with appropriate marketing strategies,

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supported by scientific knowledge, and managed by the local community to deliver long-term economic benefits.

Through cultural promotion, Hombo Batu can increase tourist visits, which in turn creates business opportunities for local guides, catering providers, homestay accommodations, local crafts, and other culture-based creative enterprises. The development of this tourism ecosystem illustrates the strong relationship between local knowledge, cultural capital, and economic value creation.

2) Experiential Learning and Knowledge Economy

The integration of Hombo Batu into science education through an ethnoscience approach not only enhances scientific literacy but also opens additional economic opportunities, such as cultural training programs, the development of contextual learning modules, and educational tourism packages (edutourism). These products have high added value because they combine cultural experience with scientific understanding. Local culture-based curricula can be adapted as knowledge products with commercial potential while also being conservative preserving cultural heritage and strengthening cultural identity while generating economic value through educational materials such as modules, guidebooks, instructional videos, or training programs for teachers and tour guides.

3) Community Empowerment and Local Economy

The literature review also indicates that Hombo Batu preservation activities involving the local community positively influence cultural awareness and youth participation. Programs such as the Preservation of Hombo Batu, conducted through seminars, workshops, and training sessions, help strengthen the community in maintaining cultural heritage while simultaneously creating new employment opportunities and skills. Such empowerment aligns with the concept of community-based economic development, positioning the community as the main agent in the development of culture- and knowledge-based economies.

Theoretical Discussion

1) Cultural Economy and Creative Industries

Cultural economy theory explains that culture is not merely an object of preservation but can also serve as economic capital if managed appropriately. Hombo Batu, with its high cultural value supported by scientific knowledge (physics, education, cultural sociology), demonstrates how traditional culture can be combined with modern market mechanisms to generate economic value. This integration aligns with creative economy strategies, which emphasize knowledge and innovation as drivers of economic growth.

2) Ethnoscience and Contextual Learning

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The utilization of Hombo Batu as a learning medium based on an ethnoscience approach demonstrates that scientific concepts do not need to be taught abstractly. By using a cultural phenomenon familiar to the local community as a learning context, students can connect scientific concepts to real-life experiences, thereby enhancing comprehension, relevance, and engagement. This strategy also underscores the importance of situated learning in 21st-century education.

Key Findings from the Literature Review

From the conducted literature review, several main findings were obtained:

1) Hombo Batu is a culturally rich tradition, serving as a symbol of bravery, social identity, and solidarity within the Nias community, and it continues to adapt functionally with the changing times.
2) The tradition can be integrated into science education (physics, biology, mathematics) through an ethnoscience approach, facilitating the contextual and meaningful understanding of scientific concepts.
3) Hombo Batu holds knowledge-based economic potential through the development of cultural tourism, experiential learning (edutourism), as well as knowledge products and community empowerment.
4) Approaches based on cultural economy and creative industries can help bridge cultural traditions with economic development strategies grounded in knowledge, innovation, and cultural conservation.

D. Conclusion

Conclusion

Based on the results of the literature review and analysis of various scholarly sources, several key conclusions can be drawn regarding the potential of **Hombo Batu** as a knowledge-based economic resource:

1. Hombo Batu as a Sustainable Cultural Heritage

Hombo Batu is a stone-jumping tradition originating from the Nias community, initially serving ritualistic and military purposes, but it has transformed into a symbol of cultural identity and a tourist attraction. This transformation demonstrates dynamic cultural adaptation, where traditional values are preserved while being aligned with social and economic developments. Research by Waruwu et al. (2025) emphasizes that Hombo Batu remains part of **cultural continuity**, maintaining values of bravery, solidarity, and community identity. This conclusion reinforces the perspective of **cultural economy theory**, which suggests that traditional culture can become significant economic capital if managed strategically.

2. Integration of Science into Cultural Tradition through Ethnoscience

Hombo Batu can be utilized as a medium for **contextual learning** through ethnoscience and STEM (Science,

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Technology, Engineering, Mathematics) approaches. The stone-jumping activity enables students and community members to understand physics concepts such as force, kinetic energy, projectile motion, and gravitational acceleration in a tangible way. Harefa (2025) and Kesumah et al. (2025) highlight that leveraging local cultural practices in science education enhances comprehension, engagement, and the relevance of scientific concepts in daily life. Therefore, Hombo Batu is not merely a physical activity but also a source of scientific knowledge that can be communicated and developed educationally.

3. Knowledge-Based Economic Potential

The transformation of Hombo Batu into education and tourism opens opportunities for **knowledge-based economic activities**. This cultural attraction can be packaged as **cultural tourism**, **edutourism**, and knowledge products such as learning modules, training programs, and educational videos. The **community-based economic development** approach ensures that economic benefits remain within the local community, strengthening youth skills and enhancing overall community welfare. Marbun & Halawa (2025) demonstrate that Hombo Batu preservation activities integrated with tourism and education contribute significantly to local income.

4. Synergy of Culture, Science, and Creative Economy

Hombo Batu illustrates that traditional culture, scientific knowledge, and the creative economy can synergize. Culture provides context and narrative, science offers meaningful educational interpretation, and the creative economy expresses added cultural value through economically viable products or services. This synergy aligns with **knowledge-based economy theory**, where innovation and the utilization of knowledge are key drivers of economic growth while preserving cultural identity.

Overall, Hombo Batu is more than a tradition; it is a **multidimensional resource** that connects cultural identity, education, and economy. The use of local wisdom supported by scientific knowledge can create sustainable social and economic value.

Recommendations

Based on the conclusions above, several strategic recommendations can be proposed for research development, education, cultural policy, and economic planning:

1. Development of Hombo Batu-Based Educational Programs

Local governments, schools, and educational institutions are encouraged to integrate Hombo Batu into local curricula as a medium for teaching science, physics, and mathematics in context. Learning modules can be developed using an ethnoscience approach, including simulation software for visualizing projectile motion and kinetic energy. This

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approach not only improves scientific literacy but also strengthens the cultural identity of younger generations.

2. Community Empowerment and Cultural Tourism

Local communities should be empowered to manage Hombo Batu as a cultural tourism and edutourism attraction. Community involvement in tour management, guiding, and facility provision will ensure that economic benefits remain local while promoting active participation in cultural preservation.

3. Development of Culture-Based Knowledge Products

Hombo Batu can be optimized as **knowledge products**, such as guidebooks, educational videos, learning modules, and culture-based training programs. These products have economic added value as they combine education and cultural experience, making them marketable nationally and internationally. This approach aligns with principles of the **creative industries** and **knowledge-based economy**.

4. Policy and Government Support

Local and central governments need to formulate policies supporting the integration of culture, education, and the creative economy. This includes funding for research, training of cultural guides, certification for cultural tourism, and promotion of cultural tourism. Such support will strengthen the sustainability of Hombo Batu as both a cultural asset and a knowledge-based economic resource.

5. Further Research

Future studies are recommended to collect **primary data** through surveys, interviews, and field observations to quantitatively measure economic, social, and educational impacts. Mixed-method approaches can provide a more comprehensive understanding of Hombo Batu's contribution to knowledge-based economic development.

6. Digital Innovation and Global Promotion

Utilizing digital technologies, such as video documentation, online educational platforms, and virtual tours of Hombo Batu, can increase national and international exposure. This opens opportunities for global marketing of cultural and knowledge-based educational products while strengthening Indonesia's **cultural diplomacy** through local heritage.

In conclusion, this study emphasizes that Hombo Batu has value beyond a physical tradition. It is a **multidimensional resource** that can be optimized through a knowledge-based approach to generate social, educational, and economic benefits. The synergy of culture, science, and the creative economy is key to establishing Hombo Batu as a sustainable knowledge-based economic resource. Hombo Batu exemplifies how local wisdom can transform into a strategic asset for community development, education, and

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creative economy. With proper educational support, community empowerment, and strategic policies, Hombo Batu can serve as a productive and innovative cultural symbol, providing long-term benefits for both current and future generations.

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