



## Visualization Mapping of the Socio-Technical Architecture based on Tongkonan Traditional House

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**Abstract**—The socio-technical architecture of constructing a community's traditional house is a zine-qua-non at the locus of developing tourism destinations in several areas worldwide. A socio-technical system is an old approach that is realigned with developing integrated tourism components, especially various tourist attractions based on local cultural treasures. The results of this qualitative research with a phenomenological approach analyze and explain the noumena (meaning) behind the phenomena (facts) regarding socio-technical architecture based on Tongkonan traditional houses in Tana Toraja, Indonesia. The study results found that architectural works are full of symbolic meaning in constructing Tongkonan traditional houses. The crystallization of basic values and value orientation as the noumena (meaning) behind the socio-technical architectural phenomenon of the Tongkonan traditional house that stands upright is because five pillars support it as a representation of 5A (Attractions, Accessibility, Accommodation, Amenity, Ansilarity) as a component of tourism development. The Tongkonan roof model, which at first glance looks like a person praying by raising their hands up or to God, the Creator of the universe, is proof of the basic values and orientation of the socio-cultural and spiritual values of the Toraja people. The image of a rooster, sun, and arrangement of horns mounted on the Tongkonan wall proves the rich treasures of local socio-cultural life (local wisdom, local genius) of the local community as a result of creativity and innovation that sustainably has value.

**Keywords**—Architecture; socio-technical; Tongkonan traditional house; base value; value orientation.

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### I. INTRODUCTION

In the current digital era, it is not easy to see separate socio-technical architectural works at various points [1]–[4], including the arrangement of tourism destinations that apply information technology [5]–[7]. This phenomenon is based on the socio-technical understanding, according to Rapoport [8], that architecture is a space where human life is more than just a physical dimension but also involves non-physical dimensions, including basic cultural institutions. This institution includes the rules of the social and cultural life of the people that are accommodated and simultaneously affect the visible architecture [9].

Socio-technical architecture regarding the construction of a community's traditional house is a zine-qua-non that is easily recognizable in actual and virtual as a tourist attraction in several regions in Indonesia (Krong Bade traditional house in Aceh, Bolon in North Sumatra, Selaso Jatuh Kembar in Riau, Gadang's house in West Sumatra, Kebaya in Betawi, Joglo in Central Java, Bangsal Kecono in Yogyakarta, Loka in West Nusa Tenggara, Panjang in West Kalimantan,

Dulohupa's house in Gorontalo, Baileo's house in Maluku, Kariwari in Papua, Karampuang in Sinjai Regency, Balla Lompoe in Gowa regency, etc.) and around the world (Izba in Russia, Ger in Mongolia, Iglo in Canada, Hanok in Korea, Maison Obus in Cameroon, Xinle in China, Yoshinogari Dwellings in Japan, Beach Hut Denmark, etc.).

Socio-technical architecture in the field of tourism based on information and communication technology/ICT (hardware, software) is a single unit [5]–[7], [9], in the arrangement of the 5A components (attractions, accommodation, accessibility, amenities, ancillary) of tourism [10]. Tourism development always incorporates ICT elements in socio-technical architecture as a focus and locus; as Golembiewski et al. [11] stated that in every scientific study, the focus and locus must be clear [12]. Likewise, when talking about computerization for ICT systems, it is almost impossible to talk about it as just a machine. In other words, ignoring the socio-technical architectural perspective in designing and constructing community-based tourist attractions is very difficult.

Research on ICT-based socio-technical architecture has been around for a long time, although it still seems to be losing prestige compared to technical-procedural approaches and positivist methods. Therefore, the meta-analysis of the results of this study discusses the socio-technical architecture based on the Tongkonan traditional house in Tana Toraja, Indonesia.

There are several domestic and foreign experts [13]–[15] who provide an understanding of architectural concepts [9] but are limited to the physical and technical dimensions. It differs from the thoughts of Rapoport [8], who states that architecture is a space in which human life is more than just a physical dimension but also involves non-physical dimensions, including basic cultural institutions. This institution includes the rules of the social and cultural life of the people that are accommodated and simultaneously affect the visible architecture [9]. In other words, architecture is tangible and intangible technically and socio-culturally.

In the socio-technical concept, a work process cannot be seen as two separate things: a technical system and a social system, and the two must be seen as a unit. Socio-technical systems theory is a perspective on the architecture of social organizations that emphasizes the interrelationship of the technical and social dimensions [2], [16]–[19]. The socio-technical architectural system theory means that the system is composed of related elements and is open and dynamic. Open because it relates to the organizational environment that accommodates the development of socio-technical architecture, while it is considered dynamic because it follows changing trends and is adaptive to community expectations.

In the context of architecture and ICT systems, socio-technical systems theory underlies a design approach that aims to meet the needs and provide satisfaction to system users, the efficiency and success of the implemented system, and effective change management. In essence, an architecture based on socio-technical systems theory emphasizes the application of technical ICTs without forgetting non-technological issues. Therefore, socio-technical construction concerns the socialization, interaction, participation, and synergy of all parties who use or benefit from the system.

One of the concepts that developed as a complement to socio-technical architecture is participatory design. This design is also known as the Scandinavian school of design [20]. The design and development of technological and socio-cultural systems that emphasizes the comprehensive participation of user and stakeholder involvement throughout all stages, including in initial planning, testing, and implementation. The construction of a traditional Tongkonan house often involves a cultural meeting beforehand. Tongkonan is a traditional house of the Toraja tribe that has an important role in the life of the local community. Before starting the construction of the Tongkonan, This part is a pre-construction meeting [21], [22], as a series of stages and traditional ceremonies that must be carried out. One of the cultural meetings held is a family meeting involving the closest family members who will live in the house. This meeting aims to discuss and decide on various aspects of development, including design, location, and determining the best time to start construction.

Social informatics is an umbrella term covering a collection of research that studies the social aspects of

computerization, including its design, use, and consequences. In addition to developing socio-technical theory, social informatics also develops views about society and technology and how information technology affects and is influenced by socio-cultural conditions.

Usability Engineering is a research design and method that aims to maximize, streamline, and satisfy groups of system users to achieve their goals. This benefit engineering approach prioritizes user capabilities and the interaction between users and technology, especially at the user interface level. This approach is more focused on interface design and its effectiveness in supporting the tasks a computer system user must carry out.

Based on the description above, this study aims to analyze and explain the symbolic meaning and basic values of the socio-technical architecture of the Tongkonan traditional house in Tana Toraja, Indonesia. In particular, this study aims to understand the noumena (meaning) behind the phenomenon (fact) of the Tongkonan traditional house concerning tourism development. This study uses a qualitative approach with a phenomenological perspective to explore the basic values and value orientations of the socio-technical architecture of the Tongkonan traditional house.

Research on ICT-based socio-technical architectures has been around for a long time, although it seems it is still less popular than technical-procedural approaches and positivist methods. Therefore, a meta-analysis of the results of this study discusses socio-technical architecture based on the Tongkonan traditional house in Tana Toraja, Indonesia. The importance of this research lies in the need to understand the significance of Tongkonan traditional houses in the development of tourism in Tana Toraja, Indonesia. A growing number of tourism visitors are emphasizing rural ones [23].

The Tongkonan traditional house is a cultural heritage site that is significant not only for its architectural design but also for its symbolic meaning and basic values. Understanding the basic values and symbolic meaning behind the socio-technical architecture of Tongkonan traditional houses can provide insights into how tourism development can be sustainably managed in Tana Toraja. The researcher asked several questions as follows:

- What are the basic values and symbolic meaning behind the socio-technical architecture of the Tongkonan traditional house in Tana Toraja, Indonesia?
- How can understanding the basic values and symbolic meaning of the Tongkonan traditional house contribute to sustainable tourism development in Tana Toraja, Indonesia?

## II. MATERIALS AND METHOD

### A. Materials

Socio-technical architecture is produced through process stages, as introduced by Kelly and Duerk [24], namely fact-finding, theme determination, goal setting, display requirements in a design, and concept generation. The search for facts is accumulated based on the phenomena seen in Tana Toraja and in various regions in Indonesia where the Tongkonan traditional house is designed and built to indicate the existence of Toraja people who live, socialize, and interact

with their socio-cultural environment. The determination of the theme of socio-technical architecture is focused on the reconstruction of the Tongkonan traditional house, whose basic components are the same wherever it is built. Based on the theme, the goal was set, namely the construction of the Tongkonan traditional house, which was designed as a re-actualization of local socio-cultural values with a very artistic touch in the form of ICT-based architectural works that allow them to be identified in the real world where Toraja people live and in cyberspace because users use devices (hardware) engineering-technological. In addition, the researcher conducted a visualization analysis regarding the concept of Socio-Technical Architecture.

### B. Method

An eco-design approach was employed to study the socio-technical architectural work of the Tongkonan Tana Toraja Indonesia traditional house [25], [26]. It results from developing tourist attractions as sustainable value creation and innovation. This approach allows stakeholders, tourists, and local communities to be responsible for cultural and environmental sustainability through continuous learning. The type of research used to produce the socio-technical architecture of the Tongkonan traditional house is Research and Development [27] through the application of the ADDIE approach (Analysis, Design, Development, Implementation, Evaluation). Observation, interview, and documentation techniques were used in the field research to collect data, information, and knowledge (tacit, explicit, cultural) about the architectural work of the Tongkonan traditional house. The results were analyzed using a symbolic-interpretive approach [28], [29] to find the noumena (meaning) behind the phenomenon (facts) of the Tongkonan traditional house in Tana Toraja, Indonesia.

In order to investigate the concept of Socio-Technical Architecture, the researchers utilized Vos Viewer for data analysis. The biblioshiny application analysis method involves mapping data from research articles related to selected keywords obtained from the Scopus database. The first step was to examine 577 articles in the Scopus database related to Socio-Technical Architecture to understand the concept of Socio-Technical Architecture. Later, a search was conducted in the Scopus database for articles that contained both "Socio-Technical" and "Socio-Technical Architecture" keywords, resulting in 25 articles. The selection criteria included a minimum publication period of 10 years, year of publication, country of origin, field of study, and document type. The selected articles were then exported as Bibtext files for analysis using the biblioshiny application Bibliometrics.

## III. RESULTS AND DISCUSSION

### A. Mapping Research Position in Visualization

To see the relationship between the critical thinking of the teacher and pedagogic concepts, a mapping of research positions with visual analysis is presented. Fig. 1 shows that the problem of Socio-Technical Architecture is closely related to several themes, such as socio-technical systems, information systems, human-computer interaction, social networking (online), societies and institutions, architectural design, and knowledge management. However, based on the

results of research mapping with a bibliometric analysis approach using Scopus data (577 articles) with the help of a biblioshiny application, it can be seen that research on Socio-Technical Architecture is still rarely carried out, especially in the scope of socio-technic architecture on social impact aspects. Most of the issues surrounding socio-technic architecture contain technology-based architecture by Wesseling et al. [30], which reveals that socio-technic architecture is a study that must be studied more deeply on the cultural philosophy of a region.

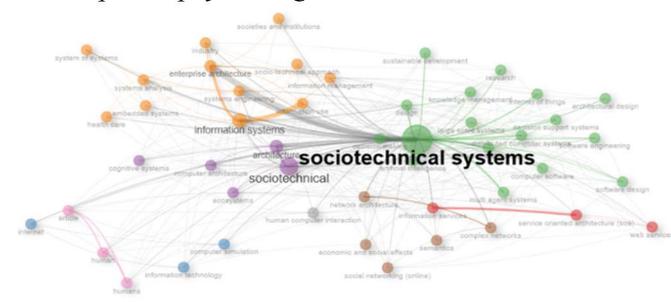


Fig. 1 Mapping and Research Positions Visualization. Source: Processed by Authors Using VOS viewer, 2022

Fig. 1 above shows the position of Socio-Technical Architecture research visually. Based on the description and explanation of the research results, it can be constructed into a socio-technical architecture of the Tongkonan traditional house based on the basic values and orientation of the local cultural values of the Tana Toraja people, which are inherent in each of its elements as shown in Fig. 2.

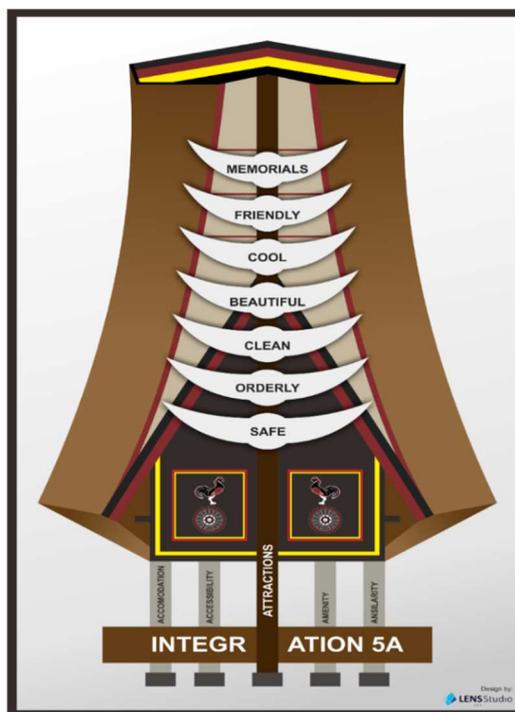


Fig. 2 Socio-Technical Architectural Meaning of Tongkonan Traditional House

Based on the results of the research [10], [31]–[34] it can be described the socio-technical architecture of the Tongkonan Tana Toraja traditional house is explained based

on the results of symbolic-interpretative perspectives as follows:

1) *Tongkonan construction:*

The traditional Toraja house stands upright because it is supported by at least four or five pillars representing 4A or 5A (Attractions, Accommodation, Accessibility, Amenity, and Ansilarity) as the main basic components in tourism development. After all, in the research article, this is added to the accommodation, which some experts understand is part of the Amenity. The philosophical meaning of the number four is seen in the shape and type of wall pattern of the Tongkonan traditional house with four basic colors. The four basic colors are red symbolizing life; yellow symbolizing grace; white symbolizing purity; and black symbolizing death. This understanding of the meaning of black was also later cultivated by the Tana Toraja people and certain people or communities in other areas who chose black clothes to wear when mourning the dead. Likewise, some people in Tana Toraja or other areas wear white clothing when going to places of worship.

Tongkonan construction is one of the main attractions of Tana Toraja, a South Sulawesi, Indonesia regency. This traditional Toraja house stands upright because it is supported by at least four or five pillars representing the 4A or 5A (Attractions, Accommodation, Accessibility, Amenity, and Ansilarity) as the main basic components in tourism development. The pillars also symbolize the strength and stability of the community that built the house. The Tongkonan is a cultural heritage and a unique architectural masterpiece that attracts tourists worldwide.

The Tongkonan traditional house also holds a philosophical meaning reflecting Toraja culture and beliefs. The number four is seen in the shape and type of wall pattern of the Tongkonan traditional house, which has four basic colors: red symbolizing life, yellow symbolizing grace, white symbolizing purity, and black symbolizing death. The Toraja people believe that death is not the end of life but rather the beginning of a new journey, and this belief is reflected in the use of black in the Tongkonan construction. The four basic colors also represent the balance and harmony of life, which is an important aspect of the Toraja culture.

The meaning of black in Tongkonan construction is reflected in the architectural design but also in the cultural practices of the Toraja people. When mourning the dead, certain people or communities in other areas also wear black clothes. Similarly, the choice of white clothing to be worn by some people in Tana Toraja or other areas when going to places of worship is also related to the philosophical meaning of white in the Tongkonan construction. These cultural practices reflect the strong connection between the Toraja people and their cultural heritage, passed down through generations.

The cultural practices of using black and white in Tongkonan construction reflect the strong connection between the Toraja people and their cultural heritage. When mourning the dead, the Toraja people wear black clothes as a sign of respect and mourning. This practice has been passed down through generations and reflects the Toraja people's beliefs about death and the afterlife. Similarly, the use of white clothing when going to places of worship is also related

to the philosophical meaning of white in the Tongkonan construction. White represents purity and cleanliness, a sign of respect and reverence. These cultural practices are important to the Toraja people's culture and traditions. They reflect the deep connection between the Toraja people and their ancestors, their respect for the natural world, and the cycles of life and death. Using black and white in Tongkonan construction and cultural practices also symbolizes the balance and harmony valued in Toraja culture.

The preservation and promotion of these cultural practices are important for sustainable tourism development in Tana Toraja and North Toraja regencies. The Toraja people's culture and traditions are a unique and valuable aspect of the region's tourism industry, and they can attract visitors interested in learning about different cultures and ways of life. The preservation and promotion of these practices can also contribute to the local economy and help to support the livelihoods of the Toraja people.

The preservation and promotion of the Toraja people's cultural practices can be achieved through various means, such as cultural festivals, museums, and cultural centers. Cultural festivals, such as the Toraja International Festival, provide a platform for the Toraja people to showcase their cultural heritage and attract visitors worldwide. Museums and cultural centers can also serve as a repository of the Toraja people's artifacts and cultural practices and provide educational opportunities for visitors to learn about the Toraja people's way of life.

In addition to promoting cultural practices, sustainable tourism development also requires a commitment to environmental conservation and community empowerment. The Toraja people's culture and way of life are closely tied to their natural environment, and preserving this environment is essential for the sustainability of the tourism industry. Community empowerment is also important to ensure that the benefits of tourism are shared equitably among the local community and that the community has a voice in tourism development decisions.

Preserving and promoting the Toraja people's cultural practices are important for sustainable tourism development in Tana Toraja and North Toraja regencies. Cultural practices can attract visitors interested in learning about different cultures and ways of life and contribute to the local economy. Promoting cultural practices should be accompanied by a commitment to environmental conservation and community empowerment to ensure the sustainability of the tourism industry and the preservation of the Toraja people's culture and way of life.

In addition to promoting cultural practices, environmental conservation is crucial for sustainable tourism development in Tana Toraja and North Toraja regencies. These regions are known for their natural attractions, such as rice terraces, waterfalls, and mountain views, which are important components of the local tourism industry. However, these attractions are also vulnerable to environmental degradation and climate change, which can negatively impact the tourism industry and the local community's livelihoods.

Community empowerment is also important for sustainable tourism development in the region. The local community should be involved in the decision-making process regarding tourism development, and their voices should be heard and

respected. Community-based tourism initiatives can also be developed to ensure that the local community benefits from tourism and has a sense of ownership and pride in their cultural heritage.

In conclusion, preserving and promoting the Toraja people's cultural practices are important for sustainable tourism development in Tana Toraja and North Toraja regencies. A commitment to environmental conservation and community empowerment should accompany the promotion of cultural practices. The sustainable development of tourism in the region can create economic opportunities for the local community while preserving and promoting the Toraja people's culture and way of life. By balancing economic, social, and environmental considerations, tourism can contribute to the local community's well-being and preserve the natural and cultural heritage of Tana Toraja and North Toraja regencies.

## 2) *The Roof of the Tongkonan:*

The roof of Tongkonan, which is at first glance looks like a person "praying" by raising their hands up or to God, the Creator of the universe, indicates that the value base and value orientation in tourism development includes various strategic perspectives. Tongkonan built on clay represents a resource-based strategy perspective and, along with the function of the Tongkonan to store agricultural products (agriculture and plantations), which the Toraja people call *alang sura*. Meanwhile, the appearance of Tongkonan's very artistic physical form can, directly and indirectly, attract the attention of visitors or tourists representing a market-based perspective and in line with the local, regional, national and international brand image that remembers the identity of the Tongkonan traditional house in Tana Toraja, Sulawesi Province, Southern Indonesia.

The Tongkonan traditional house is an architectural masterpiece and a symbol of the Toraja people's culture and beliefs. The design of the Tongkonan roof is particularly significant, as it resembles a person "praying" and raising their hands to God. This reflects the spiritual aspect of the Toraja people's culture and their strong connection with their beliefs and traditions. Tongkonan houses are typically built on clay, representing a resource-based strategy perspective. The function of the Tongkonan is to provide shelter and store agricultural products, such as rice, maize, and coffee, which are important commodities in the region. The storage area is called *alang sura* and is integral to the Toraja people's agricultural practices.

The appearance of the Tongkonan's artistic, physical form is also significant in attracting the attention of visitors and tourists. This represents a market-based perspective, as the unique design of the Tongkonan can create an opportunity for cultural tourism and contribute to the local economy. The preservation and promotion of the Tongkonan traditional house are also in line with the local, regional, national, and international brand image, which remembers the identity of the Tongkonan traditional house in Tana Toraja, Sulawesi Province, and Southern Indonesia.

The Tongkonan's artistic physical form attracts visitors and tourists and is a source of pride for the local community. The Tongkonan is a symbol of the Toraja people's cultural heritage and their unique architectural mastery. The preservation and

promotion of the Tongkonan traditional house are therefore important for the tourism industry and the Toraja people's cultural preservation.

The Tongkonan traditional house can also be used as a platform for cultural exchange and education. The Toraja people can raise awareness and understanding of their traditions and beliefs by showcasing their cultural heritage. This can also help to promote intercultural understanding and respect, which is important in today's globalized world. The Tongkonan traditional house is a cultural attraction and an important factor in the local economy. The tourism industry in Tana Toraja and North Toraja regencies provides employment opportunities for the local community and generates regional income. The preservation and promotion of the Tongkonan traditional house can contribute to the sustainable development of the local economy.

In addition to employment opportunities and income generation, the tourism industry in Tana Toraja and North Toraja regencies can also promote cultural exchange and understanding between tourists and the local community. The Tongkonan traditional house is a cultural attraction and platform for cultural exchange and learning. Tourists can learn about the Toraja people's culture, beliefs, and traditions by visiting the Tongkonan and interacting with the local community. This can lead to a deeper understanding and appreciation of the local culture and promote cross-cultural understanding and respect.

The preservation and promotion of the Tongkonan traditional house also has environmental benefits. Using local materials and traditional construction methods can promote sustainability and reduce the environmental impact of tourism. The Tongkonan houses are typically built using natural materials, such as bamboo, wood, and thatch, readily available in the region. Reserving the Tongkonan houses can also help protect the local biodiversity and ecosystems.

Moreover, preserving and promoting the Tongkonan traditional house can also have social benefits for the local community. The Tongkonan is a cultural heritage and a social hub for the Toraja people. The Tongkonan serves as a place for social and cultural activities, such as weddings, funerals, and other ceremonies, which are important aspects of the Toraja people's social life. Preserving the Tongkonan houses can also help promote the local community's cultural identity and pride.

The Tongkonan traditional house is an important cultural asset contributing to tourism development in Tana Toraja, Sulawesi Province, and Southern Indonesia. However, the preservation and promotion of the Tongkonan should be done responsibly and sustainably to avoid negative impacts on the environment and the local community. The development of tourism infrastructure and activities should be done in consultation with the local community and in a way that respects their cultural values and traditions. Sustainable tourism practices, such as eco-tourism and community-based tourism, can be promoted to reduce the negative impact of tourism and maximize the benefits for the local community.

The Tongkonan traditional house is a cultural asset and a source of income for the local community. However, tourism development in the region should be done responsibly and sustainably to ensure that the benefits are distributed equitably, and that the natural environment is protected. The

development of infrastructure and activities should be done in consultation with the local community and in a way that respects their cultural values and traditions.

Sustainable tourism practices, such as eco-tourism and community-based tourism, can be promoted to minimize the negative impact of tourism on the environment and the local community. Eco-tourism can help reduce tourism activities' carbon footprint and promote conservation efforts, such as reforestation and wildlife protection. Community-based tourism can help to promote local participation and empower the local community to benefit from tourism activities.

Promoting sustainable tourism practices also requires the participation of all stakeholders, including the government, the private sector, and civil society. The government can provide policy support and incentives for sustainable tourism practices, while the private sector can invest in eco-friendly infrastructure and activities. Civil society organizations can play a role in raising awareness and promoting sustainable tourism practices among tourists and the local community. In promoting sustainable tourism practices, involving all stakeholders is crucial. The government can play a significant role by providing policy support and incentives for sustainable tourism practices. For instance, the government can develop regulations encouraging eco-friendly tourism practices and offer tax incentives for businesses implementing sustainable measures. Additionally, the government can invest in infrastructure development that supports sustainable tourism, such as public transportation and waste management facilities.

The private sector also has a critical role in promoting sustainable tourism practices. Businesses can invest in eco-friendly infrastructure and activities, such as renewable energy sources, sustainable water management systems, and responsible waste disposal methods. Businesses can also implement sustainable tourism practices, such as reducing their carbon footprint and promoting local products and services.

Civil society organizations can also play an essential role in promoting sustainable tourism practices. They can raise awareness among tourists and the local community about the benefits of sustainable tourism and encourage them to adopt sustainable practices. Civil society organizations can also provide training and capacity building for local communities to enable them to participate in sustainable tourism initiatives.

### 3) *The image of a rooster, sun, and arrangement of horns mounted on the Tongkonan wall:*

It proves the richness of the local cultural treasures (local wisdom, local genius) of the Toraja people (in Tana Toraja Regency with its capital Makale and North Toraja Regency with its capital Rantepao) as a result of creativity and sustainably value innovation. The meaning of result of the creativity and innovation of the community is the carving of a chicken and the sun, which symbolizes prosperity (welfare) and justice, while the buffalo horn symbolizes wealth and luxury. Creativity, innovation, and added value on an ongoing basis as a tangible manifestation of the knowledge creation process through the SECI (socialization, externalization, combination, internalization) model is the basis for a knowledge management approach, as well as a configuration

and synergy of resource-based strategy perspectives and core competencies with a resource-based perspective market.

The image of a rooster, sun, and arrangement of horns mounted on the Tongkonan wall is a testament to the richness of the local cultural treasures of the Toraja people in Tana Toraja and North Toraja regencies. These local treasures, also known as local wisdom and genius, are the result of the creativity and innovation of the community. The meaning behind the carving of a chicken and the sun symbolizes prosperity and justice, while the buffalo horn symbolizes wealth and luxury. These carvings and symbols not only have aesthetic value but also represent the cultural and spiritual values of the Toraja people.

The creativity and innovation of the Toraja people are an ongoing process of knowledge creation, which is based on the SECI (socialization, externalization, combination, internalization) model. This model emphasizes the socialization and sharing of knowledge, the externalization of tacit knowledge into explicit knowledge, the combination of knowledge from various sources, and the internalization of tacit knowledge. This approach to knowledge management is essential for preserving and promoting the local cultural treasures of the Toraja people.

The configuration and synergy of resource-based strategy perspectives and core competencies with a market-based perspective are also important for sustainable tourism development in Tana Toraja and North Toraja regencies. The resource-based strategy perspective emphasizes the use of local resources, such as agricultural products and natural attractions, while the market-based perspective focuses on meeting the needs and preferences of tourists. The core competencies of the local community, such as their skills in carving, weaving, and music, can also be leveraged to create unique tourism products and experiences.

The resource-based strategy perspective emphasizes using local resources, such as agricultural products and natural attractions, as a competitive advantage in tourism development. This perspective is particularly relevant in Tana Toraja and North Toraja regencies, known for their unique cultural and natural resources. The Toraja people have a rich tradition of agriculture and horticulture, which can be leveraged to create unique agro-tourism products and experiences. In addition, the region is known for its natural attractions, such as the Toraja highlands, which are home to lush forests, rice terraces, and waterfalls.

The market-based perspective focuses on meeting the needs and preferences of domestic and international tourists. This perspective is important in creating tourism products and experiences that are tailored to the target market. For example, tourists from different countries may have different food, accommodation, and activity preferences. By understanding the needs and preferences of the target market, tourism operators can create products and experiences that are more likely to be successful and generate positive economic impacts.

The core competencies of the local community, such as their skills in carving, weaving, and music, are also important in creating unique tourism products and experiences. These competencies can be leveraged to create handicrafts, textiles, and musical performances reflecting local culture and traditions. By showcasing these products and experiences,

tourists can gain a deeper understanding of the local culture and contribute to preserving and promoting the local heritage.

Moreover, the core competencies of the local community play a crucial role in the sustainable tourism development in Tana Toraja. The community's carving, weaving, and music skills can be used to create unique and memorable tourism products and experiences. For example, the Toraja people's carving skills can create wooden souvenirs, such as masks, sculptures, and furniture, reflecting local culture and traditions. Similarly, the community's weaving skills can be used to create textiles, such as traditional fabrics and clothing, which are unique to the region. The community's musical performances can also be leveraged to create cultural events and festivals that attract tourists and promote the local heritage.

By showcasing these products and experiences, tourists can gain a deeper understanding of the local culture and contribute to preserving and promoting the local heritage. This, in turn, can create economic opportunities for the local community and contribute to sustainable tourism development in the region. Additionally, the community's involvement in the tourism industry can enhance their pride and ownership in their cultural heritage, leading to its preservation and transmission to future generations. One of the most important aspects of sustainable tourism development is the involvement of the local community in the tourism industry. By involving the local community in tourism, they can share their knowledge, skills, and cultural heritage with tourists, creating authentic and memorable experiences. This can also help to promote and preserve the local culture and traditions, which can be a source of pride and identity for the community.

When the local community is involved in tourism, it can also create economic opportunities for them. By showcasing their products and experiences, the local community can earn income from tourism activities. This can provide a sustainable source of income for the community and contribute to the region's overall economic development.

Moreover, the involvement of the local community in the tourism industry can enhance their sense of pride and ownership in their cultural heritage. When the community promotes and preserves its cultural heritage, it can help maintain and transmit it to future generations. This can ensure that the cultural heritage is not lost or forgotten and can contribute to the community's well-being. The involvement of the local community in the tourism industry can create employment opportunities and contribute to the region's economic development. The community can be involved in various aspects of tourism, such as tour guiding, handicraft production, and hospitality services. This can provide income for the community, help diversify the local economy, and reduce dependence on agriculture.

The involvement of the local community in the tourism industry can also promote cultural exchange and understanding between tourists and the local community. When tourists have the opportunity to interact with the local community, they can learn about their culture, traditions, and way of life. This can promote mutual respect and understanding and contribute to developing a more inclusive and tolerant society. However, it is important to ensure that the involvement of the local community in the tourism industry is sustainable and responsible. This means the

community should be involved in decision-making, and their cultural heritage should be respected and protected. Tourism should also be developed to minimize negative environmental and community impacts.

## *B. Discussion*

Descriptions, explanations, and arguments regarding the basic values and orientation of socio-technical architectural values inherent in the visualization of images of Tongkonan traditional houses confirm the views of experts and the results of previous research [10], [31]. According to Rapoport [8], as quoted by Lehtinen [35], the broad meaning of the concept of architecture is understood as a space in which human life is more than just a physical dimension but also involves non-physical dimensions, including basic cultural institutions. This institution includes the rules of the social and cultural life of the people that are accommodated and simultaneously affect the visible architecture. In other words, architecture is tangible and intangible, technically and socio-culturally.

Based on this analysis, the local cultural values of the Toraja people, which are inherent in the image of the Tongkonan traditional house, can confirm the application of a phenomenological approach that reveals the noumena (meaning) behind the phenomena (empirical facts) under study. The results of the analysis, synthesis, and discussion of socio-technical architectural works of Tongkonan traditional houses also strengthen the assumptions of experts and researchers that there is architectural value creation for developing tourist attractions in the form of traditional Tongkonan houses. The Tongkonan model is loaded with basic values and orientations for the socio-cultural values of the Tana Toraja community, where currently the Tana Toraja traditional house is developed as a tourist attraction in two regencies, namely Tana Toraja Regency (the main regency) and North Toraja as a regency resulting from regional expansion.

The basic values and value orientations of changing local potentials into competencies of valuable tourism resources on a wider spectrum (regional, national, international) are realized through the development of one of its elements as a trigger for changes and improvements in the quality of other tourism components, namely attractions as a trigger for quality improvement, accommodation, accessibility to and from any tourism destination that provides Tongkonan traditional houses amenities and ancillaries. The integration and synergy of the five tourism components [31] are the foundation and pillar for the reconstruction of the Tongkonan traditional house, which represents a work of socio-technical architecture that is attractive for stakeholders and local governments as for visitors or tourists.

On the one hand, the development of the 5A tourism component with the attraction of the Tongkonan traditional house as a trigger through the re-actualization of the Sapta Pesona program, which includes the creation of security, order, cleanliness, beauty, coolness, and friendliness of the physical-social-psychological environment to provide memories for all (stakeholders, visitors, tourists) shows an integrated, synergistic and lasting dimension of socio-cultural architecture, as viewed by experts [1]–[4], [7], including the arrangement of objects of attraction. Tourism states how difficult it is nowadays to see the separation between the

technical and socio-cultural dimensions in architectural works encountered in Indonesia and throughout the world.

Then, on the other hand, the re-actualization of architectural works with shapes and variations of coloring patterns on Tongkonan shows the dimensions of technical architecture as a result of human creativity, taste, and initiative, which are also very valuable. In addition, it implies the meaning (noumena) behind the phenomenon (empirical facts) as the basic values and orientation of local cultural values developed by the community, as the expert view states that the interpretative-symbolic approach (symbolic anthropology) is a symbol or object, event, sound of speech, or physical or written forms that are given meaning by humans [28], [29], [36], [37]. Humans can give meaning to every event, action, or object related to thoughts, ideas, and emotions. In other words, when it is seen from the analogy of two sides of a rolling coin in the form of dimensions of social architecture on the one hand and dimensions of technical architecture on the other, it can confirm the accuracy of the authors' assumptions regarding integrated and synergistic socio-technical architecture based on traditional houses Tongkonan in Tana Toraja Indonesia.

#### IV. CONCLUSION

The architectural work of the Tongkonan traditional house is full of symbolic meaning as the crystallization of the basic values and orientation of the local cultural values of the Tana Toraja people. Tongkonan architecture also reflects the noumena (meaning) behind the socio-technical phenomena (facts) because the construction stands upright, supported by five pillars as a representation of the 5A (Attractions, Accessibility, Accommodation, Amenities, Ansilarities) of tourism, especially its attractions. The Tongkonan roof model, which at first glance looks like a person praying, is proof of the basic values and spiritual orientation of the Toraja people. The image of a rooster, the sun, and the arrangement of horns mounted on the Tongkonan wall prove the rich treasures of the local socio-cultural life of the local community. Judging from the analogy of two sides of a rolling coin, in the form of dimensions of social architecture on the one hand and dimensions of technical architecture on the other, an integrated and synergistic socio-technical architecture based on a community's traditional house is a zine-qua-non at the locus of development—tourism destinations in several regions around the world.

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