Identification of the Architectural Housing Form and the Existence of Ulos Communities in Hutaraja Village, Samosir, North Sumatra, Indonesia

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Abstract. Tourism has played a major role in boosting the economy of every country in the world. Nonetheless, the COVID-19 pandemic has obviously taken its toll since it hit Indonesia over a year ago. This condition has urged the Indonesian government to diligently make optimal changes, especially in improving regions that have been neglected this whole time, with the purpose of establishing a tourist destination that will prove interesting to tourists. Parahyangan Catholic University plays a role in providing information in the form of scientific studies regarding architecture of the traditional Batak Toba habitation in the Samosir regency of North Sumatera province. The Hutaraja village has been selected as the object of research with the foundation being the existence of ulos fabric artisan communities as an appealing feature. This ulos fabric plays an important role in the cultural lives of the Toba Batak, and may have potential in value and aesthetic uniqueness. The purpose of this study is to identify the relation between the architectural housing form and the existence of the ulos fabric artisan communities. The study has been conducted through a qualitative approach with exploratory and explanatory methods. Its findings show that the Hutaraja village’s housing form is strongly related to both cultural and environmental aspects. On the other hand, the existence of ulos fabric artisan communities has been discovered to change the attributes of interior and exterior housing forms.

Keywords: housing form, ulos weaver, Hutaraja village

1. Introduction
The tourism sector has played an essential role in boosting the country's economy, even though the Covid-19 pandemic has obviously taken its toll for more than a year. However, various development programs have still been run in different areas to increase the tourism sector. Following the national program, Parahyangan Catholic University has also provided input through scientific studies in architecture that investigated Batak traditional housing in the Samosir District, focusing on its tourism. The research has been conducted based on various aspects, including the lay-out, accessibility, activity pattern of the inhabitants, and other aspects (both physical and non-physical) that influenced the housing space in supporting the tourism activities. This scientific study is expected to give input, suggestions, consideration and evaluation for the local government in developing the Lake Toba area into a tourist destination.

Huta Raja village is one of the settlements in the Lake Toba area selected for a reorganization project to become one of the best destinations to support the government program in developing tourism. Huta
Raja village is also known as a traditional Toba Batakinese housing form that still exists in modern life, with the Community of Ulos Traditional Clothing Weavers. This community became the main reason for the existence of Huta Raja village that eventually captured the central government’s interest in developing tourism in the area [1].

The research on the physical lay-out of the Toba Batakinese traditional housing architecture based on the existence of the Community of Ulos Traditional Clothing Weavers is fundamental because by investigating the influence of non-physical factors of the community on the lay-out of the village, we can help the revitalization process of the traditional village to be transformed into a tourist destination. This study aims to identify the relation between the housing lay-out and community existence in Huta Raja village. This research is expected to contribute both in theory and practice for the community, especially for the village council and local government, toward tourism development in the area. The results of this research are expected to help benefit the revitalization process of Huta Raja village in Lumban Suhi-Suhi Toruan with the suitable empowerment of the community. This condition is a positive influence for the development of the physical settlement environment, especially in the face of climate change.

2. Methods

This study uses a qualitative approach with the analytical descriptive method (Bungin, 2004). Data analysis has been made in the data description phase to find the tendency based on this set of data to analyse its significance and relevance. After the complete data had been collected, the set was identified based on the primary factors that form housing (such as culture) that would subsequently be analysed in greater depth through the elements that formed the culture in housing. These elements were identified, followed by the analysis process to establish the roles of each element in the culture as the primary factors that formed the housing lay-out, in this case of the Toba Batakinese traditional housing compounds.

This was followed by analyzing the use of space for ulos weaving activities, as a result of identification. The research time was allocated as follows. Phase 1: Researchers conducted a field visit in February 2020. Phase 2: The research was continued by a local team in June-December 2020, due to pandemic conditions, so they were unable to visit the study object. The research location is in Lumban Suhi-Suhi Toruan Village, Pangururan District, Samosir Regency, North Sumatra, and the exact location is Kampung ‘Ulos’ Huta Raja, as can be seen in figure 1.

3. Results and Discussions

Three basic references have been used in this research.

3.1. Architecture of housing lay-out

Amos Rapoport stated that architecture is the space for humans to live that is seen physically and is strongly related to the essential culture and norms of a group of people. These norms include social and cultural norms that will influence the architectural form. Two factors can influence the housing forms: (1) Primary factors (socio-cultural factors) and (2) secondary factors (modifying factors). Primary factors that influenced the physical form process include culture, while other factors such as climate,
geographical location and condition, as well as politics and economics are included in modifying factors. See Figure 2.

Figure 2. Relations in the Housing Form Process

Rapoport has identified several elements that will form a culture inside a housing, namely: (1) Location, which is the physical geographical location of a housing; (2) Relations to the surrounding nature, where there is landscape with certain functions based on vegetation, natural surroundings, and topography; (3) The presence of physical elements that become the characteristics of the housing; (4) A specific housing pattern based on the culture of the community for specific purposes, such as familial relationship, being nature-oriented, religion, and others; (5) Rooms or spaces with specific types based on their functions or usage, like traditional ceremonies, funerals, public spaces, and others; (6) Specific names for all physical elements based on the local culture; (7) Using a specific orientation system, as the reference for physical housing development according to the living pattern of the society; (8) Colors, textures, and specific ornaments as a part of physical characters; (9) Sounds, smells, temperature, and specific movements, which became unseen characteristics that can increase the sense awareness of the inhabitants; and (10) Different groups in society with specific activities that will attract the attention of the public outside of the housing with their activities [2].

3.2. Toba Batakne traditional housing architecture
The lay-out of Toba housing usually formed a linear pattern, which is considered whole and strong according to the ancestors. There is a square in the middle of the two linear buildings, in a huta (village) that is called alaman [3]. The area of a huta is usually shaped like a square and bordered by a two-meter tall stone fence with sharp bamboo on the top, called a parik, as the protector from human enemies and wild animals. At a glance, the shape of the village/huta is like a fortress [4]. See Figure 3.

Figure 3. The Concept of Huta Layout
(Source: Arsitektur Tradisional Sumatera Utara, 1997)

The Toba Batakne traditional building has an important role as a set of living guidelines to the community, the symbol of microcosmos that is divided into the three parts or Tri Tunggal Banua, which consist of Banua Toru (under the Earth) for the leg of the house, Banua Tonga (Earth) for the body of the house, and Banua Ginjang (the lion in the sky) for the roof of the house [5]. To Batakne society, the
respect for the microcosmos (power of nature) is placed at the top in the hierarchical ranks of their beliefs, long before Christianity entered the Batak land. The traditional Bataks believed in the concept of creation by Mulajadi Na Bolon who lived beyond the sky, and had a name according to his position [6].

The shapes of Toba Batakinese traditional buildings are quite similar to one another, which made it difficult to differentiate between them in the existence of housing space. Domenig (2003) conducted a comparison study between several building constructions and concluded that the characteristics of the housing’s structural system or jabu was a “heritage” or a copy of sopo. This happened because Batak Toba tribe had an old traditional of changing the sopo that used to be a rice silo into the housing or jabu if the number of inhabitants was increasing [7].

3.3. Architecture in the community context

According to Sasongko (2005), a community can be defined as a group of people (togetherness) that share things in their lives [8]. According to Crow and Allan (1994), a community can be divided into three components: based on their location/place; based on their interests; and based on the certain ideas that they share [9]. Meanwhile, Habraken in Wikantiyoso (1997:27) stated that as a product of community, the shape of housing space is created based on the social agreement, and not on an individual product [10]. Therefore, different communities will have different housing characteristics. The design of a house and housing shows the relationships between its individuals, family, and community, which will depend on each local culture. The consequence of this is that the spatial organization in a house, the lay-out of housing, and the accessibility to public facilities will be influenced by the community’s outlook on life. Based on the ratio of space that will be used for living and for doing crafting activities for the economy, (Silas, Johan, 2000: 233), the pattern of a housing space is divided into three types [11]:

- Mixed type, where a house is also used as a work space, but the main role of the house is as a living space. The two spaces have the same accessibility.
- Balanced type, where a living space is separated by the communal activity/working space in the same mass. In this type, there is similar interest between the housing as a living space and working space. Accessibility to the housing space is different from the working space.
- Separated type, where a working space is more dominant than the living space, so that the living space is located separately with the working space mass. The accessibility to the living space is different from the working space, as can be seen in Figure 4.

![Figure 4](https://example.com/figure4.png)

**Figure 4.** The Concept of Huta Layout

N.B. Hunian (Yellow) = Living Space & Kerja (Red) = Working Space
(Source: Arsitektur Tradisional Sumatera Utara, 1997)

3.4. Identification in the field of architecture

The term and concept of identification in the realm of architectural theory stand for the attachments between the tangible (kertaji) aspects, that is to say real, concrete things that can be seen and felt in
works of architecture. On the other hand, intangible (akertaji) aspects refer to abstract matters such as function, culture, behavior and the like. This can be seen in: structural elements (elements); experimental (space organizations); architectural elements (elements in space which accommodate the activities). The social aspects of function that are represented in the form of objects and space will follow. When one thinks about an object or specific space, one usually thinks of the meaning related to it; that is, what one can do or associate with such an object or space. [12]. The close relationship between function and cultural aspect will be shown in the architectural spaces dealing with both physical and traditional aspects of activities in daily lives. Identification in architecture can be classified into three groups, namely: form, function and culture.

4. Findings
The primary factor in forming the “physical form” of Huta Raja village is the culture, while other factors like climate, geographical position and condition, politics and economics are factors whose influence cannot be ignored. Based on the primary factor, the main discussion of the study objective will identify the elements that formed the housing related to the culture in Huta Raja village, in line with the housing theory as the implementation of the culture (according to Rapoport) that will have findings on the existence of the elements and their roles in forming the lay-out of traditional housing in Huta Raja village. The second objective is to identify the activity space of the weaver community that created the traditional cloth of ulos in Huta Raja traditional housing, in relation to their existence as a cultural group that formed the characteristics of housing space. The identification of activity space resulted in findings of the patterns of housing space in the lay-out of Huta Raja traditional housing.

4.1. Elements that formed the culture in Huta Raja Village
The elements that formed the culture in Huta Raja village can be identified geographically as the landscape concept, which consists of:

- Space lay-out is determined by the physical form of the area that has physical borders.
- The condition around Huta Raja village based on its landscape is as follows: landscape determined the function of building mass and circulation pattern according to the needs of the community; vegetation is located within the scope of housing space; mass dominance is located in the relatively flat area; there is no elevation difference in the housing area, so it will make the circulation flow easier.
- Physical elements in Huta Raja village consist of: accessibility that is formed based on the axial path where the recipient space is not influenced by access position; main circulation in the village area is for private use or purposes and has linear pattern where the building mass is facing the main circulation directly.

4.2. Pattern of physical housing space
According to the tradition of Toba Batakene society, the housing has a linear pattern, which created the hierarchy of space based on the familial pattern; while nature orientation became an important part that supported the position of the mass based on its functions, which are jabu bolon and sopo, and the direction of the housing development. There is also a space that is formed specifically as a public space called alaman. This became the orientation of the housing, where all kinds of community activities can be carried out. It is believed that there is a specific orientation in the development of Huta Raja housing which is to the east, and this orientation or direction is also followed by the physical development of the housing.

4.3. Physical characteristics
The physical characteristics of architecture in Huta Raja village is formed based on colors, textures, and ornaments, where the main ornaments are located in the middle of the building and become the center
of attention, in the shape of ox head and gorga. The dominant colors that have become the colors of the Toba Batakene tribe are red, white, and black, whereas the building development based on the directional orientation Eastward also strengthens the linear pattern of the housing.

4.4 Activities of weaver community and the housing lay-out
There are two types of weaver community in Huta Raja village, namely the weavers who work in the housing area and those who work outside the housing area. The circulation of the community can be seen in Figure 5.

Figure 5. Circulation Pattern of Housing Community

4.5 Lay-out and ulos weaver community activities
The activity space of ulos weavers has been identified at the alaman area in the housing compound. This alaman became an informal production space to the community, and the activities are considered to be the common ones for the community. The activities of ulos weaver community are conducted mostly in the eastern area of alaman, therefore making the alaman becomes more public compared to the other areas in Huta Raja village. The eastern area of alaman tends to be busier and more crowded because it is used for the working space. The reasons why this area was chosen is because it has a larger space, and the weavers can be protected from the sun by the shade from the traditional buildings like jabu-jabu.

This shows that the characteristic of the eastern area are more private than the western area. Even though the difference is not directly limited by the space elements, it can still be seen clearly. The western area becomes the transitional space for the inhabitants of western part of Huta Raja village, from the private area to be a more public area. Even though the area has become more public, the western part of the village is bordered by housing mass, so the production zone is located inside the housing zone with the same circulation path, which is the alaman.

Weavers start their activities from their house to the alaman to weave. Weaving activities are carried out in front of several houses to protect the weavers from the sun. If the weather does not permit them to work outside (rain or overheat), the activities are moved indoors to their respective houses. Weaving activities are usually conducted from 9 a.m., followed by a communal lunch, and continued with further weaving until the afternoon. In the evening, usually there is a meeting to discuss events and activities related to the ulos sales. See Figure 6.

Figure 6. Activity pattern of weavers inside the housing compound
N.B. Hunian = Living Space; Alaman = Public Space
4.6. Lay-out of the outside area the housing compound

Based on the mapping of the activity pattern of the ulos weavers, it can be identified that the activity space formed at the housing compound is located in the alaman. This alaman became the informal production space for the community, because there are other functions besides production in the alaman space, such as the reception area, a common area for cultural and other events, the main circulation at the housing compound, a vehicle parking space, and an interactive area for the inhabitants as well as the visitors.

With those various functions of the alaman, the ulos production activities are included in the commercial category, albeit an informal one. If supported by the large number of weavers (as a community), visually the common weaving activity in one space will show an interesting diversity, especially for the tourists. The building mass in the eastern area is dominated by traditional buildings that are taller and bigger than the ones in the western area. The buildings in the western area are only dominated by sopo, jabu, non-stage jabu, and one-storey modern housings. See Figure 7.

Based on the space characteristics, the eastern area is more private than the western one. Even though the difference is not directly limited by the space elements, it can still be seen clearly. The western area becomes the transitional space for the inhabitants of the western part of Huta Raja village, from the private area to the more public area. Even though the area becomes more public, the western part of the village is bordered by housing mass, so the production zone is located inside the housing zone with the same circulation path, which is the alaman. The physical zone division can be seen in Figure 8.
4.7. Indoor area lay-out

The indoor lay-out that is formed based on the activities of the ulos weaver community includes informal production space, where the physical space is formed based on the influence of building mass on the housing space. This condition can be seen in the two traditional building masses that were identified to seek the relations between the outdoor and indoor areas. These two buildings are the large jabu and the small jabu.

The indoor area in the large jabu owned by a weaver in Huta Raja village is categorized as the mixed space type, where the housing becomes one with the working space; and the main role of the building is as the living space. The weaving production took up the space that previously was used as a storage, which now has become more interactive with the outdoor area. See Figure 9.

![Figure 9. Weaving area in large Jabu](image1)

N.B. Dapur = Kitchen, R.Makan = Dining Room, Ruang Kumpul = Meeting Room, Ruang Tamu = Guest Room, Kamar = Room, Sondi = Bertenun = Weaving Room

In the small jabu, the composition of the space is like in Figure 10, where the weaving area is located at the front area of the building, that previously functioned as jambur room or terrace. The open space type makes it easier for communication between the weaving community and the other community in the alaman. Therefore, the small jabu is categorized as a mixed type, where the living area is embedded with the production area, and the main function of the house is providing living space.

![Figure 10. Weaving area in small Jabu](image2)

N.B. Dapur = Kitchen, R.Makan = Dining Room, Ruang Tamu = Guest Room, Kamar Tidur = Bedroom
Based on the description above, there are differences between the front area in the large jabu and the small jabu in providing the space for ulos weaving activities. See Figure 11. People who are allowed to weave in the area are the family or friends of the house owner. The relationship with the alaman can be seen in Figure 12.

![Figure 11. The difference between weaving area in the small and large Jabu](image1)

![Figure 12. Relations between weaving area and alaman](image2)

Based on the identification results, the weaving production space inside the building took up the front area of the building that is modified into a more interactive one with the outdoor space by providing windows. The composition of space in the small jabu is similar with the large jabu, the only difference being the size of the middle area that is smaller than the large jabu. The modification is made by taking the space of the front area (that was supposed to be a jambur) and changing it into a weaving area by adding the windows to interact with other weavers in the alaman. There are no weavers working at the front of small jabu house, due to the small size of the jabu that is unable to protect the people from the sun or inclement weather. Therefore, the owner of the small jabu usually weaves alone inside his house, or joins the others in front of the large jabu.

5. Conclusion

The main factor that forms physical housing space is culture. Other factors, such as climate, geographical location and conditions, politics and economics are the modifying factors. The main factor has been identified with Huta Raja village as a manifestation. The geographical location determines the borders of housing space, so we can identify the geometric shape of Huta Raja village and its direction of development. The landscape of Samosir helps the direction and position of mass location in the Huta Raja housing compound related to Toba Batakinese cultural elements, primary needs of Lake Toba, and the flat land condition in the area.

The physical elements in the housing compound, in this case the fostered environment, facilities and infrastructure, do not affect the physical space form of Huta Raja village, but only affect the private
characteristic of the housing compound. The linear pattern of the compound has formed the mass location according to the familial hierarchy of the Toba Batak tribe, and to the nature orientation. The area with specific type in Huta Raja village became the transitional area of the two housing lanes mentioned in the previous point.

Nature orientation system became the orientation of the development direction in Huta Raja village that had started from the bolon house, sopo, and other buildings. Colors, textures, and ornaments have formed the physical housing space with zonation based on the groups that have similar characteristics. The temperature in the housing area influenced the forming of outdoor groups, thus considerably enlivening the public space.

Huta Raja village area has a group of community with specific activities, in this case the ulos weaver community, whose members created the need of space to carry out the weaving activity. This need did not create a new space, but took over the space that has been combined and blended with the housing area for indoor activities, and used the alaman (existing space) to communicate between each other to discuss the issues of ulos production and sales.

The Ullos weaver community in Huta Raja village influenced changes in several function in the housing compound. There are some groups of space for weaving in alaman area, where the location follows the large building, which is the large jabu, especially to protect the community from the sun by sitting under the shade of the jabu. Therefore, the public area of alaman has changed from a total public area, to partly becoming a production area.

The changes also happened inside the houses in Huta Raja village. Every weaver changed their storage into a production area, and adapted their house into a mixed-type house, with an informal production area that is also used for other activities. The weaving room inside the building also adapted the mixed-type pattern because it is a part of the same mass with other living areas (bedrooms, living room, and others).

The community of ulos weavers that became a special characteristic of Toba Batak traditional housing in Huta Raja village should receive better facilities and infrastructure for their production space, both in the alaman area or in certain buildings, in order to make the weavers more comfortable and protected from the sun, but still visible to the public or visitors. The uneven spread of the working areas due to the shadows thrown by some buildings had created a chaotic outdoor area that made it seem unpleasant.

As a Batak Toba traditional housing compound, Huta Raja village has adapted a linear pattern of physical form, where the housings are facing each other and surround the common area. This shape needs to be preserved, because it has been determined by the rules laid down by and inherited from the ancestors. In the future, the development of Huta Raja village should also follow the same orders: nature orientation and linear pattern, so the cultural elements will always be preserved.

The shape and façade of traditional housing mass should also be preserved to maintain the housing characters. The building masses that have already been built in modern design can be located outside the two linear patterned compounds, so they will not destroy the cultural space in the alaman. The conservation of physical spatial form of Toba Batak housing compound can potentially be considered as cultural tourism destination, especially if supported by the existence of the ulos weaver community.

Culture, social structure, and physical order of traditional housing are the local elements that need to be conserved for maintaining the identity of local culture. The cultural diversity can be part of a tourist destination that will attract tourists and visitors from around the world.
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