Understanding occupants motivation for resilient and sustainable traditional houses

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Abstract. The sustainability of traditional housing in the city is threatened by the development of lifestyles and economic demands. The occupants of traditional houses consist of several generations whose needs and desires are different but must follow the times. For housing to remain comfortable for occupants and keep up with the times, this research examines how the attitudes and motivations of residents towards the existence of the house they live in. The research in this paper studies how traditional houses experience development due to changes in the lifestyle of residents and how traditional houses can survive and adapt to changing times. By collecting data through semi-structured in-depth interviews with occupants of traditional houses and observations of traditional houses in Limo Koto Kampar Riau, this study collects data on community motivations in developing traditional houses. Through the Means-End Chain analysis, this paper aims to find development in traditional houses that they do. The results showed that the portion of the house that remained did not change and the part that experienced significant changes. The paper shows how traditional houses adapt to the lifestyles of residents and new functions.

1. Introduction

A traditional house is a house that is passed down from one generation to the next. So that this house is inhabited by different generations over time. Likewise, with traditional houses in the Limo Koto Kampar Riau area. Although sometimes this traditional house is also inhabited by several generations at once, such as grandparents, mothers, fathers, children, grandchildren, and even great-grandchildren, living together in one house.

Every generation has different needs because of different times. Each person has a value that develops according to the needs and demands of his time. Values that a person adheres to will become the basis for attitudes and behaviors \cite{1,2} which not only affect his thinking and actions but also affect social life and the environment around him \cite{3}. This made them ask for an adjustment of the container in their activities at home. Then they will develop their home to suit what they need.
The value that arises from the impact of modern life concerning the characteristics of society affects the physical development of the vernacular house [4]. The values developed to shape the trend of lifestyle in society. This lifestyle can change the shape of the traditional house and threaten its sustainability. Housing development does not only occur due to developments in the availability of materials and technology or fashion. The development of housing is also influenced by the values that develop from the residents of the house in the form of lifestyle and economic demands.

Some of the traditional houses in Limo Koto Kampar Riau have a lontik style and some have a limas roof style. The lontik-style house, where the two ends of the roof joint flap upwards [5] with the height of the stage that is higher than humans. Meanwhile, the limas roof has many similarities with the existing models in Melaka, so that the local people are often referred to as the Melaka model house. The height of the stage of this limas house is higher than humans, but some are only waist-high [6]. The division of the house space is divided into 3 parts, namely the ruang muka as a friendly room, the ruang tengah as a living room, and the ruang belakang as a ruang semalu or a service room such as a kitchen [7]. Likewise, space vertically is also divided into three, namely the kolong, the ruang huni, and salang, the space in the form of an attic or space above the ceiling under the roof. As an illustration of the traditional Limo Koto Kampar house, the shape of the house is presented in Figure 1 and the house layout pattern is shown in Figure 2.

Figure 1. Lontik Houses (a) and Limas Houses (b) which are divided into 3 rooms, namely kolong, ruang huni, and salang.

Figure 2. Public house space (a) both lontik and limas at Limo Koto Kampar which is divided into 3 parts, namely the ruang muka, the ruang tengah and ruang belakang. Figure 2 (b) is a typical house development, with the addition of a corridor called sulopandan, and anjung at the front.

In Limo Koto Kampar, traditional houses have developed following the development of modernization. The residents of traditional houses develop their houses based on the new lifestyle and functions that become their needs, both functional, social, and psychological. This can be a threat to the sustainability of these traditional shelters. For this reason, it is necessary to learn how traditional houses have changed
due to the changing needs of residents and how they can survive and adapt. This research aims to show which parts of the house have survived and which have changed due to the needs of residents.

2. Methods
The research carried out data collection by means of field observations on 50 traditional houses that developed both lontik and limas in Limo Koto Kampar and semi-structured in-depth interviews with the residents. Field observations aim to collect data regarding house changes that have occurred, while interviews aim to find out the reasons for the house changes. Through this technique, various changes that occur in the traditional house are compiled in the form of photographs, house plans sketches, and notes from interviews.

This research will link the changes in a house's attributes with the reasons for the changes. The house attribute is a tangible factor and the reason for the change is an intangible factor. One of the theoretical and conceptual attempts to connect tangible factors in its contribution to intangibles is Means-End Chain [8], a theory that provides the idea that a person chooses actions that produce the desired consequences and minimize unwanted consequences. The MEC model is used as a tool to assess user perceptions and behaviors based on their values. This model seeks to explain a product in facilitating its final achievement [9]. The meant of the product in this research is the result of changes in the attributes of the house made by the occupants. By using the Means-End Chain model, it can be seen the reasons why someone chooses certain attitudes and behaviors in the home attributes that are worn. Means-End Chain not only measures attributes that are considered important or selected, but also the reasons for obtaining these important attribute levels [9].

Table 1 shows the chain that will be found by connecting the changed attributes of the houses and the reasons for the change as occupant needs.

| Variable name | Description | Elements of chains |
|---------------|-------------|--------------------|
| STR           | structure   | Attributes         |
| KL            | kolong      |                     |
| RB            | ruang belakang |                   |
| SP            | sulopandan  |                     |
| RT            | ruang tengah |                     |
| RM            | ruang muka  |                     |
| JJ            | jenjang     |                     |
| FC            | facade      |                     |
| SPT           | spatial pattern |                 |
| FT            | Functional  | Needs              |
| SC            | Social      |                     |
| PSY           | Psychological |                  |

3. Results and discussion
As stated in the research method, object sampling is aimed at traditional houses that have developed but are still occupied as residences. The characteristics of the traditional houses as object are presented in Table 2. There are four houses with lontik style houses, this is because the existence of this lontik style house is rarely inhabited as a residence. Some of them that still exist are no longer inhabited and abandoned by their owners. Meanwhile, the whole house still has a fairly high stage, namely as high as a human's waist and above. All lontik houses and 7 limas houses have a higher stilt height than humans.
Table 2. Characteristic of traditional houses objects.

| Description          | Frequency | Percentage |
|----------------------|-----------|------------|
| Roof shape:          |           |            |
| Lontik               | 4         | 8          |
| Limas                | 46        | 92         |
| Total                | 50        | 100        |
| The height of the stage: |         |            |
| Higher than human    | 11        | 22         |
| Waist - chest height | 39        | 78         |
| Less than the waist  | 0         | 0          |
| Total                | 50        | 100        |

A physical change that occurs in a dwelling is often influenced by an inhabitant background [10]. For this reason, it is necessary to know the background of the respondents in the study of the reasons for this house change. To achieve the stated objectives, data on the reasons for the development of the house were collected from respondents with characteristics as presented in table 3.

Table 3. Socio cultural and economic background of inhabitants.

| Description          | Frequency | Percentage |
|----------------------|-----------|------------|
| Family type:         |           |            |
| Nuclear family       | 30        | 60         |
| Extended family      | 20        | 40         |
| Family Size:         |           |            |
| Small (1-4 person)   | 27        | 54         |
| Middle (5-7 person)  | 21        | 42         |
| Big (7 < ... person )| 2         | 4          |
| Length of stay:      |           |            |
| < 5 years            | 4         | 8          |
| 6 - 20 years         | 7         | 14         |
| 21 - 50 years        | 5         | 10         |
| 50 - .... Years      | 13        | 26         |
| Since born           | 21        | 42         |
| Staying reason:      |           |            |
| Parents house        | 33        | 66         |
| Near workplace       | 3         | 6          |
| Keep the family house| 5         | 10         |
| Parental giving      | 9         | 18         |
| House and Land Ownership: |        |            |
| Parents              | 37        | 74         |
| Legacy               | 7         | 14         |
| Head of household    | 0         | 0          |
| Family               | 3         | 6          |
| Rent                 | 3         | 6          |
| House's Getting:     |           |            |
| From parents         | 44        | 88         |
| From the family      | 4         | 8          |
| Rent                 | 2         | 4          |
| Occupation:          |           |            |
| Labor group          | 1         | 2          |
| Informal Sector      | 16        | 32         |
| Officer              | 4         | 8          |
| Planters/farmer      | 18        | 36         |
| Traders/merchant     | 2         | 4          |
| Teacher              | 5         | 16         |
| Workplace:           |           |            |
| In the same village where they live | 31 | 62 |
| Different village in the same city | 17 | 34 |
| Out of the city      | 2         | 4          |
Every house has different developments. Each one develops according to the needs of its residents. The development of the house occurs in several parts of the house that have changed, namely structure, kolong, ruang belakang, sulopandan, ruang tengah, ruang muka, ladder, facade, and spatial pattern. The parts of the house that changed are as shown in figure 3.

The parts of the house that changed starting from the largest changes were spatial pattern 96%, Ruang belakang 96%, facade 88%, Kolong 66%, Sulopandan 54%, ladder 46%, Ruang tengah 38%, Ruang muka 28%, structure 20%. From these results, it can be seen that plan changes occurred in almost all houses. However, this plan change was not followed by many changes to the structure. Although the spatial pattern changes that occur are not merely changes in space use, but also in shifting spaces through the use of partitions so that they do not require structural changes.

Changes in the Ruang belakang also occur in almost all houses, but other rooms such as the Ruang tengah and Ruang muka are still more likely to survive. This happens because the residents still think that the Ruang Muka and Ruang Tengah are the Rumah induk, which if this space changes it will change the entire house. Technically, the Ruang tengah survives a lot because it uses the core structure of the house. Therefore, residents prefer to develop parts of the house that do not need to change the core structure. In addition to being difficult and costly, changing the main house is synonymous with eliminating heritage houses. Thus, to overcome the limitations of development, the space that undergoes many changes in the corridor or sulopandan space.

![The Changed Part of The House](image)

Figure 3. Changing parts of the house.

Another part of the house that has undergone many changes is the facade. The facade is shown more from the front of the house. However, the many changes that occur in the facade do not affect changes in the front room which is located at the front of the house. Likewise, on the contrary, the survival of the front room also does not affect the survival of the original façade of the house. This happens because the façade displays more faces, looks, and images than the room in following the development of the occupants’ lifestyle.

Kolong is a part of the house that also changes frequently. Kolong is a space that already has a bottom and top horizontal elements, namely the ground floor and the house floor. If you want to use it as room space, the occupant just adds a wall so that the change is quite easy and inexpensive. The addition of space is a housing development that is often carried out by residents because of the development of needs, especially the economic sector [11]. Thus kolong is an option for residents when they want to increase space. Because it was originally space, kolong was often used as a storage area for various items. To cover this storage as a privacy and security space, the kolong space is often closed. The closure of the kolong hole is also often intended to strengthen the structure when the flood arrives.
Changes in one part of the house that affect other parts have been explained by Acre and Wyckmans [12] that to achieve spatial quality there are things that are interconnected, namely views, internal spatial and spatial arrangements, transitions between public and private, and built and human densities. However, the housing development that occurred in the traditional houses of Limo Koto Kampar did not mostly influence each other between the parts. This is in line with what Chuapram [4] stated that modern life affects the physical changes of the vernacular house through the development of the characteristics of its society. Cultural processes that occur in society will have an impact on physical changes, also emphasized by Hacihasanoglu [13].

4. Conclusion

Several points from this paper can be used as a consideration for the continuation of future research, namely: first, the parts of the house that change a lot are the parts that do not change the core structure of the house building. Meanwhile, those that have much to do with the core structure of the house are still more likely to survive. Second, changes that occur in one part of the house do not always affect each other. Third, change is triggered by the emergence of a new function that has not been accommodated by the traditional house. The case that occurred in Limo Koto Kampar could have occurred in other places according to the development of community values.

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