A Comparative Study of the Traditional Houses Kaili and Bugis-Makassar in Indonesia

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Abstract. In this study, I compared the physical elements of two Indonesian traditional houses between a Kaili tribe (Central Sulawesi) and a Bugis-Makassar tribe (South Sulawesi). If we viewed of the name, meaning and function from both traditional houses have similarities, namely the Souraja/Saoraja house (House of the King), however, observed more detail the physical elements of architecture also show the differences. The spatial, physical and stylistic systems (N. John Habraken’s theory) were applied to analyze their differences and the similarities of the physical elements of architecture on those two traditional houses. The results of the analysis identified that the physical elements of architecture such as the orientation, the function and distribution of room (the spatial system), the constructions and materials of floor, wall and roof (the physical system) and the opening types of the door and window as well as ornaments used showed similarities. Meanwhile the physical elements of architecture such as the arrangement of columns, form and spatial pattern as well as the placement of the stairs (the spatial system), the constructions and materials of foundation, column and beam (the physical system) as well as the form of the roof and façade found differences of both traditional houses.

1. Introduction
The diversity of Indonesian traditional architectures which spread out through all areas in Indonesia becomes unlimited sources for knowledge. The traditional architecture of Indonesian is closely related to the local customs because a house is not only a place of residence, but also a center of social relations, traditional laws, religions, taboos and myths. J. Crawfurd [1] divided the human settlements in the era of the Dutch East Indies (Indonesia) into two categories. Firstly, the houses of the maritime tribes (Sumatera, Kalimantan, and Sulawesi) which stand on columns located on the riverside or seaside and generally called as a stilt house. Secondly, the houses of the agricultural tribes which are found in Java, Bali and other islands in Indonesia.

Generally, the Indonesian traditional houses have many similarities, each other, however, in principle, they have any significance differences, especially in the cultural background, geography, concept and architectural form in detail. The Kaili and Bugis-Makassar tribes are two tribes in Indonesia located on the Sulawesi Island. These two tribes have the traditional houses which are made from wood with a similar name called Souraja/Saoraja*, means a big house or house of the king and his family (table 1). Although they are similar in names, philosophy and etc. there are also many differences in their characteristics. Therefore, the author interested to explore the characteristics of these two traditional houses in order to obtain their similarities and differences. Besides that, there were only a few reports studied about the Souraja/Saoraja house mainly in comparing two objects with the similar
name and meaning. This paper is expected to become a reference for other researchers whose same object or any things that want to investigate from the Saoraja/Souraja house..

2. Methods

2.1. Research objects
Traditional House of Kaili Tribe (Souraja) and Traditional House of Bugis-Makassar Tribes (Saoraja). Kaili tribe is one of the ethnic majorities in the territory of the province of Central Sulawesi. It has several types of the traditional houses and one of them is a Souraja house (Figure 1). According to Walter Kaudern in Masining Mariani (1999) [2], the typology of traditional architecture of Central Sulawesi is classified into three types. Firstly, type A, the house with a rectangular form that is divided into two parts; the bottom part as a barrier of the house body and the top part as the house body which only consists of the elements of roof. Secondly, type B, the house with a rectangular form which is divided into two parts; the bottom part as a barrier that is supported by columns, and the top part as the house body which consists of the elements of wall and roof. Third, type C, the house with a rectangular form which is composed of a number of columns to support the house body and roof and Kaudern made an analogy as a stilt. From the classification above, the Souraja house can be put in type C.

The Souraja house in Kaili is divided horizontally into three rooms [3]: the front room (Lonta Karavana) which has functions for receiving guests and as a bedroom for male guest who want to stay overnight, the middle room (Lonta Tatangana) which is used to receive close relatives with the bedrooms and dining room, and the back room (Lonta Rorana) which is used for dining room, Avu (kitchen) and Pakuntu (an open space as a place for relaxing). Similarly, the Souraja house is classified vertically into three parts: a. The top part (Landue/attic) as a place to store heirlooms, b. The middle part as a dwelling place, and, c. The bottom part (Kolong/empty room underneath the house) as a place for storing the agricultural products.

The Bugis and Makassar tribes are located in the province of South Sulawesi. The traditional houses of the Bugis and Makassar are often called in one name as the traditional house of Bugis-Makassar because they have similar morphology, philosophy and culture. The traditional house of Bugis-Makasar is classified into three categories regarding to social statuses (strata) of its residents; firstly, Sao-raj (sallasa), the big house for the royalties (Anarakung) (Figure 2), secondly, Sao-piti, the small house for ordinary people (Maradeka or Tosama) and thirdly, Bolla, the a house for the civilians (Ata or Suro) [4]. According to Abu Humid [5], the concept of the traditional architecture of Bugis-Makassar came from a philosophy called as "Sulapa Appa" where all aspects of human life will become perfect if they are in a rectangular form. This philosophy is reflected in the form of houses, the walls and the layout plan which are oriented to the four natural elements such as earth, fire, water and wind. In their activities, the Bugis-Makassar peoples are always guided by their customs and beliefs that are implemented in the building process of the house. The house should be built under a supervisor who is known as PanritaBolla [6].

By viewing vertically, the Saoraja house (Bugis-Makassar) consists of three parts [7]. They are Rakeang/Pammakkang ( attic) is a place to store food supplies, Allo-bolla/kale-ball is a place used for a living room, bedroom, dining room, and Awaso/stiring (Kolong) is a place to store agricultural tools, carpentry and also a place for livestock. Meanwhile, by seeing horizontally, the souraja house is divided into three parts, such as Lontang ri saliweng/padaserang dallekang (the front room) is a place to receive guests and guest bedrooms, Lontang retenggah/padaserang tangnga (the middle room) is a place that has function as as a bedroom for family and children, and Lontang rilaleng/padaserang riboko (the back room) used as a bedroom for girls and the elderly parents [8]. Besides that, there are two additional rooms, namely dego-dego, the open space in front of the house which has function as a waiting place for guests or used for relaxing place and dapureng (kitchen) that is located at backside of the house.
2.2. Research methods
This research used the purposive sampling method and literature study, which focused on the physical elements of the architecture as the spatial, physical, and stylistic systems that classified by N. John Habraken. This study was started by introducing the traditional architecture of the Kaili and Bugis-Makassar, then a comparative study of both the Souraja/Saoraja houses in detail, and ended with the conclusion.

3. Results and discussion
(Comparative study of the traditional houses of Kaili and Bugis-Makassar)
Any different ways can be used to see the type of the house and N. John Habraken [9] classified these ways into three systems, namely the spatial, the physical, and the stylistic systems. In this study, I used those three systems in comparing the traditional houses of Kaili (Souraja) and Bugis-Makassar (Saoraja) houses in order to observe their differences and similarities. These three systems will be explained detail in the following part (table 2).

3.1. The spatial system
In this system, we identify the spaces characteristics of the house and the relationship between one space to another. The arrangement of columns, orientation, function and distribution of rooms, form and spatial pattern as well as the placement of the stairs were the physical elements of architecture observed as the spatial system in this study. As results, the grid pattern was applied in the arrangement of column for two traditional houses (the Souraja house and the Saoraja house) and the distance between the columns was similar in size with ranges from 1.5 m to 3 m. In contrast, the differences were detected on the total number of columns and the arrangement of columns where the Souraja house has approximately 41 columns by arrangement of 4 columns for each row started from the front to the back of the house. However, the Saoraja house was built with approximately 63 columns with 6 columns for each row in its arrangement (Figure 3 and 4). In their orientation, both traditional houses were shown a clear similarity where the direction of the house faced to the street. Although there was a rule believed by the Bugis-Makassar peoples about the orientation of the house that should face to the north or the east, but it has been rarely applied and more dominantly in facing to the street (Figure 5 and 6).

Both traditional houses have the similar function and distribution of rooms viewed from horizontal and vertical side. By horizontally, the rooms were mainly distributed into three areas, such as the public area which was located at the front of the house, the private area that consists of bedrooms and living room in the middle side of the house, and the service area consisting of the open space and a kitchen at the back of the house. Meanwhile, by vertically, the distributions of rooms were classified into the attic (the top part of the house) which was analogous to the human head and used for storing of heirlooms. The middle part of the house has functioned as the rooms for residence and analogous to the human body, and the bottom part of the house or the Kolong (the empty room underneath the house) which is analogous to the human foot and used as a place to store agricultural products and livestock (Figure 7~10).

In the form and spatial patterns, although the basic form of room in the both traditional houses was rectangular but it was extended from the front to the back of the house on the Souraja house, however, it more varied such as the form of the letter "L" on the Saoraja house. The differences also were found in the arrangement of rooms where the Souraja house was classified in The terrace~The rooms of dwelling~Open space~The kitchen with the open space (the relaxing room) located in the back of the house. On the other hand, the rooms of Saoraja house was arranged from The terrace~The open space~The rooms of dwelling~The kitchen and back terrace with the open space or the relaxing room was located at the front of the house (Figure 11 and 12). During investigating the stairs, I found that these two traditional houses have similarities in the usage of the stair materials (wood) and the number of the stairs located at the back of the house (only one stair). Meanwhile, the difference was obtained in the amount of the stairs located at the front of the house where there were two stairs faced each other with the number of steps of 7 or 9 every stairs on the Souraja house and only one stair that facing towards the house with 11~15 steps on the Saoraja house (Figure 13 and 14).
3.1.1. The arrangement of columns

![Figure 3. The floor plan of the Souraja](image1)

![Figure 4. The floor plan of the Saoraja](image2)

3.1.2. The orientation

![Figure 5. The orientation of the Souraja](image3)

![Figure 6. The orientation of the Saoraja](image4)
3.1.3. The function and distribution of rooms

Figure 7. Distribution of rooms horizontally

Figure 8. Distribution of rooms horizontally

Figure 9. Distribution of rooms horizontally

Figure 10. Distribution of rooms horizontally

3.1.4. The form and spatial pattern

Figure 11. The spatial pattern of the Souraja

Figure 12. The spatial pattern of the Saoraja
3.1.5. The placement of the stairs

Figure 13. The placement of the stairs of the Souraja
Figure 14. The placement of the stairs of the Saoraja

3.2. The physical system

In the physical system, we observed any aspects that related to the constructions and materials used for build a house, such as roof, floor, wall, foundation, and beam. In this study, it was detected that the middle part of these two traditional houses which were consisted of the floor and the wall has the similar construction (using pegs and pens in their joint system) and similar material (wood type). Besides, these two traditional houses also have the similar construction of roof, called as the gable roof that were used the similar woods (ulin wood, bayan or merbabu wood) and covered by rumbia leaves (Figure 15 ~ 20). In contrast, the bottom part of the house (the Kolong) which consists of foundations, columns and beams has difference constructions and materials used on both the traditional houses. The Souraja house used the foundation system with the columns were planted directly into the ground around +/- 1m, and then covered by cast concrete. Meanwhile, the foundation of the Saoraja house used the natural stones or the cast concrete in a cubic form (Figure 21 and 22).

The Souraja house used the beams with dimensions of 0,07m x 0,11m and 0,06m x 0,15m and the columns with a rectangular cross section with dimensions of 0,16m x 0,16 m and 2 ~ 2,25 m in high. The columns and beams were made from the iron wood or the merbabu wood. The joint system of columns and beams was made by passing the beams from two different directions through a hole in the column until they come out about 20 cm. Assuming this system is applied to the modern houses with the new materials usage, the detail construction will be performed more artistically. On the other hand, the cross section of columns on the Saoraja house was a rectangular form with dimension of 0,15m x 0,15m and has a high dimension between of 2,1 ~ 2,25m. Meanwhile, the dimension of the beam was 0,04m x 0,125m. The construction of the Saoraja house has two stacked beams made from the jackfruit wood or the durian wood. The construction of the Saoraja house used two types of the beams, such as pattodo/pattolo and palangga/arateng. The pattodo is the beams located at the width side of the house and have a function to connect one column to another column. Meanwhile, the pallangga is the flat beams with their lengths are longer than the length of the house and it has the functions as a place of the floor beams and also as a buffer to the columns of the house (Figure 23 and 24).
3.2.1. The construction and materials of the roof

Figure 15. The construction of the roof of the Souraja

Figure 16. The construction of the roof of the Sauraja

3.2.2. The construction and materials of the floor

Figure 17. The construction of the floor of the Souraja

Figure 18. The construction of the floor of the Sauraja

Ulumanu, 6/8 cm
Kaso, 4/6 cm
Talea, 4/6 cm
Kasogania, 6/8 cm
Vumbu, 6/8 cm
Leleambalesu, 4/6 cm

Figure 15. The construction of the roof of the Souraja

Figure 16. The construction of the roof of the Sauraja

Be apaced +/- 1-1.5 cm

Be apaced +/- 1-1.5 cm
3.2.3. *The construction and materials of the walls*

**Figure 19.** The construction of the wall of the Souraja

**Figure 20.** The construction of the wall of the Sauraja

3.2.4. *The construction and materials of foundation*

**Figure 21.** The system of foundation of the Souraja

**Figure 22.** The system of foundation of the Sauraja
3.2.5. The construction and materials of column and beam

![The construction of the column-beam of the Souraja](image)

![The construction of the column-beam of the Sauraja](image)

Figure 23. The construction of the column-beam of the Souraja

Figure 24. The construction of the column-beam of the Sauraja

3.3. The stylistic system

As the stylistic system, the elements of architecture correlated with models and styles of a house are observed. In this study, I investigated the form of roof, facade, opening types of the door and window and ornaments used as the stylistic system. As results, there were two main similarities between these two traditional houses. Firstly, these two traditional houses have the similar opening type of the door (the swinging french door) and window (casement window), where two door or window leaves can be opened or closed until 180 degrees. In addition, there was trellis on the window of both traditional houses made from wood bar with the amount of odd number and put vertically side by side. Secondly, the ornaments of these two traditional houses used the similar motifs, such as animals and plant motifs and also Islamic motif or Arabic calligraphy on the door or window, or carving pompeninie on walls, attics, and eaves outskirts (Figure 29 ~ 32).

In contrast, the differences can be found on the placement of the doors and the windows. There was a rule in placing of the doors and the windows in the Saoraja house where they should be put on a measured location with even numbers. In contrast, no regulation for the Souraja house. In addition, the difference was also clearly visible on the form of the roof. The roof of the Souraja house has a slope of +/- 30º and the basic form of the roof was a triangle with the gable roof type used and made in two storeys. The triangle part was covered by sheets of wood occupied by two small windows. On the other hand, the Saoraja house has the roof with the isosceles triangle as the basic form. Although this house also used the gable roof type, there were the frames, which crossed each other at the end of the ridge. The triangle part of the roof has a slope of 30º~40º which was covered by the sheets of wood made in 3~5 stacks and represented the status of the owner. Another difference was shown at the front view of the house or the facade. The Souraja house has a symmetric of view between the left side and right side of the house, despite that the Saoraja house looks asymmetric (Figure 25 ~ 28).
3.3.1. *The form of the roof*

Figure 25. The construction of the column-beam of the Souraja

Figure 26. The construction of the column-beam of the Sauraja

3.3.2. *The façade*

Figure 27. The facade of the Souraja

Figure 28. The facade of the Sauraja

3.3.3. *The form of doors and windows*

Figure 29. The form of door and window of the Souraja

Figure 30. The form of door and window of the Sauraja
3.3.4. The form of doors and windows

![Figure 31. The ornaments of the Souraja](image1)

![Figure 32. The ornaments of the Sauraja](image2)

4. Conclusion

Comparison of the Souraja house (Kaili) and the Saoraja house (Bugis-Makassar) based on observations of the physical elements of the architecture of the three systems are classified by N. John Habraken, can be summarized as follows; On the spatial system, I found the similarities of the physical elements of architecture on both traditional houses such as the orientation and the function as well as distribution of rooms. Meanwhile, on the physical elements such as; the arrangement of columns, form and spatial pattern as well as the placement of the stairs found differences of both traditional houses. Construction and material on the middle part of the house (floor and wall) and top part of the house (roof) shown similarities, whereas, construction and material on the bottom part of the house (foundation, column and beam) found differences on the physical system elements. The similarity shown from the physical elements of architecture on the stylistic system contained in the opening types of the door and window as well as ornaments used, while the differences was found in the physical elements of the form of the roof and facade.

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