The identification of the existence of stilt houses at Musi riverside settlement in Palembang

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Abstract. The existence of Musi River influenced the forming of initial settlement in Palembang. Musi river was the main transportation way. Therefore, past people built their houses along the riverbanks. The stilt structure became the best solution as it was aligned and adaptive to the nature of the Musi River. The excellence of the stilt house is less realized by the modern city development. The emergence of new modern houses is easily found side by side with the stilt houses at riverside settlement. The stilt house as a part of vernacular architecture in Palembang tends to be abandoned. This research aims to investigate the existence of vernacular houses and settlements located on the Musi riverbank. In order to achieve this aim, study elaborate function pattern and the form of living existence. This study used a qualitative approach with two vernacular settlements at Musi riverbank as case study namely 3-4 Ulu and 30 Ilir village. Data were collected from six main sources, namely documentation, archival records, interviews, direct observation, participant observation, and physical artifacts. The result shows that there are two changes of the existence of a vernacular settlement at Musi riverside. Firstly, the existence is decreasing in term of space between houses, orientation to the river. Secondly, the existence is increasing in form of coexistence with the new activities and function accommodated by the river. Findings show that the changes are supported by community activities. The change also determines the elements of settlement and layout.

1. Introduction
Characteristics of vernacular architecture are usually created by the community with local expertise and techniques. The architectural characters are adaptive to natural, physical and social conditions. Usually, they use local resources. Therefore, the appearance of vernacular architecture is also influenced by social structure and community behavior. All vernacular forms are built to meet special needs, accommodate the values, economics, and cultural lifestyles that produce them (Oliver, 1997). There are three typologies of vernacular houses along the Musi river namely. Rumah rakit (raft house), Gudang house and Limas house. The Rumah rakit or raft houses stand on the water by using bamboo raft structure which is getting smaller in number. The Gudang and limas houses use a series of pillars to support the structure of the house which stand above the water covered ground. Besides there three types, there are also some others house stand on the ground which uses modern or stilt structure. This paper will address the stilt houses which are located above and on the ground.

The stilt house is part of the culture of people along Musi riverbanks and its tributaries. The stilt structure is the best solution as it was aligned and adaptive to the nature of the Musi River. This structure
helps occupants to anticipate tidal flood and water covered lowland as well as to keep them safe from wild animal attacks. Ecologically, the existence of the stilt house is very important to maintain the quality of the lowland environment in terms of maintaining the water catchment area. By using stilt structure, there is no need to reclaim or fill in the lowland area.

Riparians are areas along the banks of the river and are directly affected by the tides of the river. Riparian existence has an important function as a transition area between water and land. For a society who has a strong dependence on the river, this physiography affects the placement of settlements and the architecture of the dwellings. One example is the structure of Limas house. The foundation of Limas house uses not only pillars but also wooden rafts to support the building on a weak bearing capacity land like lowland area. By using this technique, the length of the foundation can be reduced significantly. In as much, the area under the house is prevented from reclamation that can damage the hydrological function of lowland.

The excellence of the stilt house is less realized by the modern city development. The emergence of new modern houses is easily found side by side with the stilt houses at riverside settlement. The statement of the problem in this paper is how the existence of vernacular houses and settlements located on the banks of the river Musi Palembang viewed from the traditional physical aspects. The development of housing and settlement in the city is facing the problem of limited land and penetrate the swampy and lowland area for housing construction. The large-scale of reclamation is happening. The capacity of the swamp area as a natural reservoir becomes smaller and the water will flood to the existing residential area including the riverside settlement. Vernacular riverside settlements which are very crowded and has a very high building density is threatened by the flood. Furthermore, the existence of a modern house is more preferable that the vernacular. The stilt house as a part of vernacular architecture in Palembang tends to be abandoned. The aim of this research is to identify the existence of stilt houses at riverside settlements located on the banks of Musi River Palembang in terms of its traditional-physical aspects in the current context. In order to achieve this aim, study elaborate the functional pattern of the stilt house and the form of living existence within the riverside settlement.

2. Methodology
This study uses a case study method with two cases of riverside settlements namely 3-4 ulu and 30 Ilir. The cases chosen can represent the phenomenon of shifting river-based settlements to current land-based settlements. The uniqueness of selected cases is expected to provide reliable data and qualified findings that enrich the theory of riverside settlements. Data collection was carried out through field observations and in-depth interviews. The observed stilt house was targeted to the one that is still occupied. The observation focused on the physical form and structure as well as the current function. Samples for interviewee are represented by indigenous people who had lived at the 3-4 Ulu and 30 Ilir areas for more than 10 years. Data from field observation and interview were triangulated by the form of living existence from the satellite image and RTRW (Rencana Tata Ruang dan Tata Wilayah) Palembang City (Palembang Municipal Master Plan). The triangulation technique is used in order to identify the functional pattern and the form of living existence.

3. Literature Review
In 1965, research on vernacular settlements researches more emphasis on humanity, the integration of buildings with the environment [1]. Studies on vernacular settlements are spread out to not only the physical form but also to the social forces and nature of the environment. The trend in 1965s directed the studies to not only limited to describe and classify forms of settlements but also to understand of the local context, ecological conditions, material availability, technical knowledge and local economic rules on architectural diversity [1,2] This trend is developing until recent research to explore the existence of the vernacular settlement.

According to a large dictionary, the Indonesian Language of Existence is the presence of which contains the elements of survival. Meanwhile, according to Abidin, Zaenal in Mentayani (2016) [3] existence is a dynamic process, be or be. This corresponds to the origin of the existence itself, which
means to get out of, or overcome. So existence is not rigid and stalled, but rather supple and elastic and depending on the ability to actualize its potentials. [3] Existence is influenced by perseverance, influence, and transformation. Existence is closely related to change. In the process of change, it contains the time dimension and socio-cultural transformation of the inhabitant society. In detail the components of settlements that tend to change and decrease their existence are 1) the structure of settlements in places associated with the canals and roads, 2) the type of building from the old type to the new type or from stilt house (house built/built on the bank) to the landed house (house on reclaimed land/land), 3) The use of building materials has changed from the use of traditional wood materials to modern materials such as namely concrete.

Factors influencing the formation of existence and change include culture, acculturation, government regulation, income level, politics, economy, lifestyle, can be the transformation of structure in society, the influence of contact with other cultures and the emergence of new discoveries about humans and their environment [2] such as the use of new technology [4]. Physical transformation is caused by the existence of a non-physical power that is cultural, social, economic and political transformation [5,6].

The key elements that indicate a vernacular architecture are: 1. traditional self-built and community-built buildings, 2. earlier building types, 3. architecture within its environmental and cultural contexts, 4. environmental conditions, material resources, structural systems, and technologies have bearing on architectural form, dan 5. many aspects of social structure, belief systems, and behavioral patterns strongly influence building types, their functions, and meanings. 6. dwellings and other building, 7. related to their environmental contexts and available resources, 8. utilizing traditional technology, 9. architecture vernacular are built to meet specific needs, accommodating the values, economies, and way of living of the culture [7]. The vernacular architecture also refers more to activities or practical actions solely in meeting environmental needs for particular groups of people, rather than as a science [8]. It is also seen as a process and product of how vernacular architecture is designed, built and used or well known as polythetic. The change towards the vernacular settlement is inevitable [9]. For the case of Limas house in Palembang, the physical change is influenced by building materials availability and new function. Furthermore, social changes such as modern culture, public preferences on smaller family, and any other modern practice contribute to the shift function limas house. These all contribute to the decreasing of the social value of Limas house. The meaning of Limas house become less in representing the status of the owner.

4. Discussion and Result
The location of this research is located in the city of Palembang in Kampung 3-4 Ulu and 30 Ilir located on the banks of the Musi River. The samples of houses are chosen to represent the occupied stilt house. The occupant of the sample house became the respondent for the interview. Field observation complemented the result form two previous data sources. Based on field observations, library search and proposition, and analysis between case units of this study found several points that will be described as follows:

4.1. Function Pattern
Riverfront architecture is the identity of physical settlements along the Musi riverside. The most basic architectural component of settlements in Palembang City is the river bank architecture. Most of the city is formed from its riverside settlements, with the physical components of buildings linked to the cultural relations of river life. In the meso component of the river, edge architecture is analyzed as follows.

Buildings area and functions are formed through a long-unplanned-growing natural process. the riparian and riverbed areas of large rivers, there are commercial and industrial functions located along the river. For medium and small river types such as tributaries, the area is dominated by residential function. Factors of dependence on rivers, access, and easiness affect the formation of functions of the area and buildings. Furthermore, the kinship factor (family relationship) also consider in deciding to build a house. therefore, the jerambah (small bridge) on dwelling on the banks of the river was built to connect all the building in the Riverside area.
4.2. The Form of Living Existence

Based on historical data and structured interviews, the existence of settlements at Musi riverside was the dependence and attachment to the river. This condition happened in the early phase of the formation of settlements until the era of the 70s. The forms of existence in the past time adapt and change in the current context. However, the character of the past existence still can be found and marked. After the 70s, there was a shift in settlement orientation that affects the existence of the living environment on the riverside.

Furthermore, the existence of current occupants’ activity resulted in the new physical setting along the riverbank. The current development has decreased the existence of a settlement in terms of density, building masses, building orientation and social space. The density of settlements is very high which is almost no distance between houses. The residential functions are mixed with the area of industry such as sawmill which is also located on the riverbank. The growth of building masses is high and concentrated along the riverbank that leads to higher building density. The road system provides better movement and access, and then the activities along the river begin to landed orientation. As the building number is increasing, the spaces for socialization such as sports fields, playgrounds or even parking area are limited along the river bank. Based on the results of field observations and in-depth interviews, there are also decreasing the percentage of the river orientated building. At 3-4 ulu village, a there area only 18% of 489 houses were still oriented to the river. Similar to this, there is only 7% of 165 houses at 30 Ilir village still oriented to the river. Figure 1 and figure 2 show the shift of building orientation at 3-4 Ulu village and 30 Ilir village respectively.

Figure 1. (a) The form of Living Existence (river/land oriented) in 3-4 Ulu Musi Riverside, Palembang (Source: ArcGIS Map, 2018) (b) Orientation house to the street and riverbank as a back area in daman river. (c) Orientation house to the street and riverbank as a back area in Semajid river.
As mentioned before, the existence of the river occurred in the early development of the settlement. However, there is a coexistence of the river over time. In the process of the existence of river settlement in Palembang, there was continuity on function and role of the river. Related to the process of continuity, there were also changes the physical and nonphysical factors that influence the existence. The physical factors are as typology, function, orientation, material, and construction while the non physical factors are economic factors, social, kinship, knowledge, awareness to the river. Study found that the existence of the river is shown by the pattern of shelter following the natural form of a river. The access line and building orientation prioritize the river as the front area. The existence of bridge, dock, toilet, and small pier also show the existence of river since they are the facilities that support the river-based activities and connect the river to land. The use of the river as transportation line and its riparian culture also show the existence of the river. The position of the river towards the road is shows in the existence of river and the coexistence with the settlement and community activity. In addition, the non-physical aspects such as attachment, awareness, knowledge, and dependence on the functions and roles of the river show the existence of the river. Social and cultural aspects such as transport support, livelihood support, water resources for daily needs, etc also determine the river existence.

5. Conclusion
Buildings do not exist and grow naturally. Factors of dependence on rivers, accessibility, and movement affect the formation of functions at the riverside area in large scale. Therefore, the settlement functions are mixed with commercial and industrial functions along the bank of large rivers. On the other hand, the settlement functions are found solely along the medium and small river. The changes are supported by community activities The change also determine the elements of settlement and layout. The orientation of the building was changed, from river orientation to path orientation. Rivers tend to be rear side of the house The location of this

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