Co-habitation Space: A Model for Urban Informal Settlement Consolidation for the Heritage City of Yogyakarta, Indonesia

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Abstract

Yogyakarta City has a sacred cosmological space formed by imaginary philosophical axes based on the centuries' old Javanese belief system. The Kraton or Sultan's Palace is the focal area with the space around the philosophical axes functioning as a buffer area, and the outer circle that serves as a supporting area. All are linked by the concept of co-habitation space.

This paper aims to explain the spatial, philosophical principles in relation to the phenomenon of changes in the urban space in Yogyakarta today. The concept of co-habitation space is physically understood as activities showing guyub (harmony/togetherness) carried out by urban citizens. These can be seen from place attachment, livelihood, and spatial territory. The focus of this research is the sharing phenomenon ('co') that takes place in kampong (urban neighbourhoods) spaces and their surrounding areas.

This study uses a rationalistic approach and mixed methods of which the main methods employed were observation and space syntax. The results of this study suggest that the level of guyub in an area is influenced by the local spatial configuration. This study concludes that the concept of co-habitation space affected the way the Sultans of Yogyakarta utilized their kingdom's territory for the welfare of their people.

Keywords: historic city; territory; co-habitation; informal settlement; space syntax

1. Introduction

Yogyakarta, Indonesia was founded in 1755 by Sultan Hamengku Bawono I after the Gyiayanti Agreement signed with the Dutch East India Company. Initially, Yogyakarta was a part of the Mataram Kingdom and later was the first capital of newly independent Indonesia during the Dutch colonial period during the reign of Sultan Hamengku Bawono IX. Yogyakarta is known as a city of culture, education, and tourism. There are many historical heritage sites reflecting the development of Yogyakarta City including the Kraton (royal palace) complex, temple complex, Malioboro Street, and several other buildings that were built during the royal period and the colonial era. These heritage sites and buildings have made Yogyakarta one of the world heritage cities.

In the cosmological space principle, Yogyakarta City is the only city in Indonesia with such complex spatial structure ranging from philosophical values of space to urban cosmological principles. There are two axes that underlie the formation and development of the city. The first is an imaginary axis that starts from the south at the sea at Parangtritis Beach, passing through Panggung Krapyak, the Kraton, the Pal Monument, and finishing in the north at Mount Merapi. This axis symbolizes local wisdom linking the environment and human beings. The second axis is the philosophical axis that starts from the palace, passing through Pangurakan Street, Margo Utomo Street, Malioboro Street, and Margo Mulyo Street, ending at the Pal Monument. This axis symbolizes man's relationship with God.

There are four Patok Negoro (patok is a wooden boundary marker) representing the imaginary spatial region of the city. These stakes are situated on the city's four cardinal directions. There are six rivers in the city; three rivers are in the city; three rivers are on the west of the palace, and the other three are on the east of the palace. The space that is flanked by the six rivers has a neutral value philosophically and thus becomes a sacred site.

Of the six rivers, one river, the Code River, crosses the center of Yogyakarta City. The river both touches and is perpendicular to the philosophical lines. The riverbank of the Code River is densely populated. The people living in this area have generally been utilizing the land, which is actually owned by the Kraton. This is considered to be a symbol of the sultan's discernment and wisdom and the guyub (harmony/togetherness) existing between the sultan and his people.

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The development phenomenon of Yogyakarta City in the last twenty years has been mostly marked by the growth of new road networks and buildings supporting the tourism-related activities in Yogyakarta, all of which are dominant in the buffer and supporting areas around the Kraton, especially on the riverbank of the Code River. The city of Yogyakarta can be simply described as containing three main areas, namely: core area or the palace and its surroundings; the buffer area or the area around the philosophical axes; and the supporting area that is the urban area of Yogyakarta.

The buildings and infrastructure development interventions that have generally occurred in the buffer and supporting areas are highlighted as a major problem in this study. The presence of new buildings such as hotels, shopping centers, office buildings are necessities for a tourist city. However, when their presence is not in accordance with the local character and values, it can cause many social, spatial, and cultural problems.

Some of the problems encountered during the twenty years of development of Yogyakarta City include the declining value of guyub in kampongs as the result of gentrification of commercial area that caused de-territory of living; the disconnection of the chain of work and life in the kampong system because of the shifted social values and culture into economic values; and the fading away of the spaces rich with cultural meaning as they shifted into spaces with formal characteristics. This study aims to discover the value of spatial guyub contained in the social life of Yogyakarta people today.

The study sites are located in Gowongan Village and Suryatmajan Village. There are three focal locations (kampongs), namely Jogoyudan, Macanan and Tegal Panggung which later became Suryatmajan. All of these seem to be the best examples representing the problems and the local values that were studied. These kampongs are densely populated and located on the riverbank of the Code River. Joyoyudan, Macanan and Tegal Panggung (Suryatmajan) have a settlement contour with an average slope of 20 to 35 degrees. The locations of the kampongs are lined up and passed through by one of the philosophical axes of Yogyakarta City. In the last 20 years these areas have experienced many spatial interventions, notably the shift from an RT (neighbourhood association area) into a single parcel with a hotel function and the shift of an area from a residential area into a medium and small-scale commercial area (co-working space).

2. Theoretical Approach

Four theoretical approaches were used to classify and structure the space into research variables, namely place attachment, livelihoods, setting territory, urban spatial integration, and accessibility.

Place attachment discusses either physical or non-physical relationship between people and their environment, focusing on social environment, human interaction, and spatial connection (Hidalgo and Hernandez, 2001). Scanell and Gifford (2010) explain that the main issue to be discussed in place attachment is the human element along with their psychological process. In another context, place attachment may include place identity, place dependence, nature bonding, and social bonding (Raymond, Brown, Weber, 2010). The theory on place attachment is still being studied and enriched from many viewpoints (Low and Altman, 1992). Therefore, this study will fill the theoretical gap in place attachment studies.

In accordance with the second approach, urban livelihood, this research focuses more on the actors and the already formed (existing) social settings. According to Rakodi (2002: 17), the livelihood approach is the most suitable and comprehensive approach for current society compared with the traditional approach. The livelihood approach can give a positive contribution to public policies and practical aspects especially in the context of eradicating poverty which is usually associated with slum areas and dense populations.

Some essential components in the livelihood system include social aspects, spatial-physical aspects, natural aspects, financial aspects, and the people themselves. The connection between livelihood system and place attachment can be seen in the human and social aspects which are dynamic and different from one place to another. In a public space a process, which is driven largely by micro-economic factors that are invariant and tend to give cities a similar global structure and a background residential space process driven by cultural factors, tend to make cities locally different in manifested network forms (Hillier 1996; Hillier 2006; Hillier 2009). The components of urban livelihood system include four items: the first is complexity, which covers the form of adaptation and the community's survival strategies; the second is size of informal enterprises, which relates to the spatial use of the neighbourhood as the manifestation of multifunctional
spaces such as home-based enterprises; the third is mobility, which covers the mode form and the mobility of the society in neighbourhood areas or the mobility outside the area; the forth is linkage, which means the network, spatial, and social systems within a city-wide scope (Chambers, 1995; Karunanayake and Wanasinghe, 1995; Hongladarom and Isarankura, 1988; Clarke, 1995).

In the context of marginal living space, the research focuses on several issues within the livelihood approach. The first issue is spatial exclusion, which refers to geographical borders and urban service, economy, and market (Chambers, 1995). The second issue is spatial proximity, which explains the scale and the relationship between the community's income related to market, service, and workers. The next issue is participatory and action oriented, which serves as an attempt to involve the community in the planning of their living space (Clarke, 1992; Davidson, 1996).

Another issue is the economic hub, which refers to the economic connection among the living spaces (Lloyd-Jones, 2000). The fifth issue is municipal policy, which refers to the relationship between the community and the local government in terms of economic, spatial, and social systems (Gilbert, 1988).

The sixth is unclear ownership, which explains that the ownership of space or living space plays an important role in explaining the existing livelihood aspects (Islam and Khan, 1988). The next issue is formal and informal trading, which refers to the relationship between space and society's economic conditions (Sinha and Khan, 1997). The last issue is being restricted and fragmented, which explains the spatial and social condition existing in the environmental system. Therefore, one can find information about spatial depth that can be used only by the local community and social relationships among either adjacent or fragmented areas (Lloyd-Jones, 1993; Dewar, 1994).

The third approach is spatial territory. Territory can be understood as a mechanism, in which a group or an individual regulates and controls certain areas based on certain motives such as kinship, profession, or specific control. Territory is not best understood through territoriality, but through an examination of the relation of the state to the emergence of a category of space (Elden, 2010; Karrholm, 2005). Altman (1975) explains that people possess certain personal space as a mechanism of privacy.

According to Eismam (1981) privacy means an attempt to monitor or coordinate the information heard or seen in certain environment or living spaces. Regarding its characteristics, territory has a symbol or concrete thing as a sign of control owned by certain individuals or groups (Halim, 2005). Based on its types, territory is classified into four kinds: personal, community, social, and free territory.

With regards to space, Brower (1980) states that territory is tightly connected with individuals or groups in marking their physical setting or space. In the context of territory and its changes, Deleuze and Guattari (1983) propose three terms to describe the relationship between individuals and groups in relation to spaces they control. These are territory as the initial setting created by individuals or groups, territory as a new setting in which another individual or group join the initial setting, and re-territory where a space is created based on adaptation or resilience of new things emerging in the initial setting.

In this research, the territory discussion will focus on the living space or living space setting that receives some kind of intervention from development activities that trigger de-territory and re-territory attempts by the society.

The fourth approach refers to the relationship between territory and urban setting. There are five elements that have to be considered in developing an urban setting: hybridity, connectivity, porosity, authenticity, and vulnerability. These five elements can be the benchmark to measure the quality of a large-scale urban system and a medium-scale living space. According to Ellin (2006: 7), the development of segmented and fragmented urban areas might create negative impacts especially on the inhabitant cycle and the space itself. Urban integrated spaces might be a solution to create a flow or, in other words, a sustainable platform which can be the foundation for a balanced life.

In terms of living space, integration becomes an essential aspect to determine the quality of a community and their environment or the mutual relationship between buildings and the landscape (Ellin, 2006: 9). Based on the theoretical approaches above, this research explored the physical and non-physical spaces. It focused on community livelihood and tried to discover a new formula for integration considering the new emerging function of living space along the Code River.

3. Methodology

In this study the researcher used a rationalistic paradigm with mixed methods. This study attempted to identify and explore the consolidation model of living space that integrates the livelihood kampung and urban economy in order to create mutual benefits for urban development in Yogyakarta.

According to Creswell (2010) the mixed method relies on two research designs, namely quantitative and qualitative, to obtain more complete information rather than just using either design. The former required observations on the entire riverbank of the Code River to collect primary data and quantitative identification of the actors and their relationship with the space.
The later design explored the model related to the finding of suitable spatial integration to accommodate the existing livelihood kampong setting as well as the new form of place attachment and its potential impact on the territory. To analyze the data, space syntax was used to process the spatial data in the form of a spatial integration map of some existing consolidated hybrid living space modelling.

The spatial analysis simulation in the data analysis was performed through a quantitative approach of numeric space syntax. Space syntax is both a theory and a tool developed by Bill Hillier (1984). This involves algorithm-based predictive analytics with a spatial configuration value approach. Space syntax provided an evidence-based platform for the creation of a spatial strategy. A city is a spatial system with a high degree of complexity. Using the network configuration approach can make it easier to understand a city system's structure. The data source used in the simulation were road network data and data from a survey on space patterns and space uses in a settlement. To conduct the spatial analysis, the author used a network observation method that connected every part of Yogyakarta City to the objects under observation. This was intended to obtain an overview of the research sites' integration pattern and structure connectivity with the macro scale area of Yogyakarta. This overview was subsequently used to understand the spatial network intelligibility of the observed sites in relation to the city's facilities that represented the interrelation pattern of life (livability) between the river area and the city's network.

4. Spatial Integration

The integration measure is a relative description of each axial line's depth with respect to all other axial lines in the graph. It was obtained by repeating the depth measure from each line to all other lines in the system and normalizing the obtained sum for each line by the total number of lines in the graph. Integration is how close each segment is to all others with different types of distance and at different scales. This is known as "to-movement".

The latter is considered by several researchers as the most powerful functional mechanism driving the pattern of movement, the distribution of land uses, building densities and large-scale spatial and physical elements such as landmarks and open areas.

The result of integration at urban scale of Yogyakarta (citywide) shows that the living space along the riverbank of the Code River is located close to the grid lines of the urban frame, which are the orientation lines of the city. Therefore, the living space has the potential to be an area with massive development because there will be a lot of movements through each segment to get into the city center located in the urban frame grid. These movements can cause rapid development of commercial facilities, but at the same time these can create slums and densely populated living spaces along Code River's riverbank.

From the analysis of global integration value (HH), it can be seen that the Malioboro area has the highest integration value of 1.28. The residential area around the Code River has an integration value ranging from 0.94 to 0.33. From the global integrated value, it shows that the residential area around the Code River is generally separated from the area system. The average connectivity value of the area through which the philosophical axis passes is 5.2, and the connectivity value of residential areas around the Code River has an average value of 2.7.

With such low values of connectivity, the accessibility of the Malioboro area toward the settlement area is low. With these low average values of global integration and connectivity between Malioboro area, the main area of Yogyakarta (city core), and the residential area around the river, the settlements are segregated in terms of the area network structure. The structure development of the settlements around the river is not influenced by the city core of Yogyakarta. Rather, it is influenced by the settlements themselves due to the needs of space and residential areas.
The settlements along the Code River have a settlement pattern with an organic structure with high density. The neighborhood pattern in the settlements is connected by access roads the size of an alley or passage. These alleys have become a shared space for the residential units that do not have front yards.

With such a condition, the residents have agreed to add extra function to the alleys as an alternative space to interact. As a result, these alleys, in addition to being connecting lines, function as public space where residents can gather. As seen from the interface map (Fig. 3.) showing the pattern of inter-relationship among areas in each kampong, the alleys that are the kampong's public area have a direct connection to residential units (private area). The access roads (alleys) have created a pattern of neighborhood in the residential sub-units where these function to bind these sub-units within the residential areas.

From the integration value analysis on the residential areas on the Code River, the researcher discovered that each area had a unique integration value, which was influenced by the proximity of the settlement network with the city core system. The separation between residential areas and the city core has resulted in each area on the riverbank of the Code River having its own core system that affects the area's structure system on both a local and global scale.

Fig.4. Interface Map

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Fig.5. Global Integration Settlement

5. Living Space Consolidation

5.1 Livelihood Living Space Assets of the Code River's Riverbank

Livelihood assets found in the three locations have a similarity in terms of place in relation to natural variables. Natural is understood as an aspect that binds the system of social life of the people living in the three kampongs. The aspect of 'nature' is intelligibility that is known to have a similarity in diversity, such as the diversity of contours, the shape of the buildings, space patterns, and individual backgrounds.

Two of the kampongs, Jogoyudan and Macanan, are located in Gowongan Village. These kampongs have a high level of place relationship that is directly proportional to the financial aspects. Both the areas of the two kampongs are densely populated with a 0.46 m² density. There are about 13 accommodations consisting of five-star hotels, unclassified hotels, and guesthouses. The existence of commercial and service functions generally has penetrated the second layer beyond the street and some of the commercial buildings are located side by side with a kampong located on the riverbank of the Code River. There is some difference in the living conditions between Jogoyudan and Macanan in terms of the percentage of human and social aspects. This is known to be higher in Macanan (an average of 5.5 out of 10) while lower in Jogoyudan (an average of 3 out of 10).

The Suryatmajan kampong is generally seen to have a high social level (9 out of 10). This condition can be
understood from the kampong's financial and physical condition within its environment. The financial condition is generally at the middle level with small to medium-size enterprises. In terms of the physical aspect, there are small-scale shelters with a quality that is below average. However, the residents have higher social condition than those of the other kampongs in Gowongan Village. Many of the residents work in areas around the kampong with a job level that is slightly different from the two kampongs.

The livelihood diagrams show that all the three kampongs located on the banks of Code River are similar in terms of place/location and the diversity of the residents. This similarity has the score of 4-5 out of 10. These similarities are included into the natural aspect together with the human aspect, and these are seen as strong bonds in the livelihood system of the three kampongs.

However, the three kampongs have some differences in other aspects. As an example, Macanan and Jogoyudan are more dominant in terms of their physical aspect (9 out of 10), while Suryatmajan is more dominant in terms of its social aspect (8 out of 10). Hillier (2000) explains that in the case of rapid growth, the time factor seems to be very important in the economic and social consolidation of each district. This seems fair to assume that the consolidation process in these older settlements is different from that of the new peripheral districts that grew from nothing. The aspect of diversity and place attachment are proofs that the people of the riverbank of the Code River have a strong relationship with their space, especially in relation to the understanding of how the community should use their space. Philosophically, the fact that these people have utilized the space that actually belongs to the Sultan corresponds to the concept of a co-habitation space.

5.2 Settlements' Territorial Pattern

There is a variety of territorial space patterns formed on the kampongs' organic patterns. This territory pattern formed a shared space consisting of a small area or an area between houses. This shared space is commonly linked by small alleys in a kampong that intersect with the remaining space, porches, and the alleys themselves. This shared space can accommodate social activities that are generally concentrated in the morning and evening. In addition to functioning as a shared space, this space can be used as a temporary extension of a private space on a mutual agreement. The agreement is the indicator of guyub (harmony/togetherness) of the residents in the area (one territory). The higher the level of tolerance and solidarity in the settlement spaces, the higher the level of guyub in the community.

5.3 Place Attachment in Yogyakarta

The results of the study in relation to the person variable show that, in general, people of the three kampongs have diverse cultures and beliefs. However, the kampongs are united on the basis of collective experience, and most of the residents have lived in the kampongs for decades.

Residents who came from other areas have been able to get along with the native residents because they might work in the same workplace, have similar occupations, or have a guyub (harmonious) mutual relationship, such as sharing a rented house or room. The concept of sharing (‘co’) is present based on the relationship between the Sultan and his people. The Sultan has lent the riverbank area called Wedi Kengser to the people to be used as a shared space in accordance to an agreement called kekancingan.

Kekancingan is understood as the sultan's way of giving a legal basis for his people to use spaces belonging to the Kraton Yogyakarta with the purpose of improving social wellbeing. The permit (kekancingan) applies to all Kraton's land that is usually called the Sultan's Ground. However, one can share this lent space to another, who might come from a different
place, based on another agreement between them called ngindung.

The investigation on place variable reveals that the strong connection between the Sultan and his people is symbolized by social activities such as cultural events where the people actively participate. Another conclusion from place variable analysis on the nature condition reveals that the three kampongs basically reside on the riverbank of the Code River. This condition is poor because this area is prone to landslides, and the overlapping infrastructures built in the area seem to increase the risk.

The study reveals positive findings with regards to process variables that include effect, cognition, and behavior. It illustrates the process of the place attachment in the three kampongs. This includes the fact that these kampongs are clean despite their density; people can build shelters independently; the settlement environment is closely connected to the Sultan's Ground; these kampongs are known as old kampongs and the residents have strong collective memories; the people are open minded, and they are responsive to disasters (earthquakes and cold lava flow). People seem to be proud of their kampongs, and this feeling is reflected by the fact that many of the residents work as entrepreneurs in the creative industry sector.

6. Result and Finding

Based on the comparison of the four main variables investigated in this study, namely spatial integration, livelihood, territorial pattern, and place attachment, it can be understood that Yogyakarta City has a social space that reflects the philosophy of the sultan and his people working together towards urban development (co-habitation).

In the discipline of urban architecture, the philosophical foundation is reflected by the territory setting; the inter-space integration in the kampongs; the residents' emotional connection to the place (their kampongs); and the way of life that has been created.

The pocket spaces and alleys are public open spaces that show the community's high degree of solidarity in their social life. With these spaces, they have broken technical boundaries that normally would not be violated. These flexible and multifunctional spaces are a high form of community agreement in the utilization of space based on the harmony (guyub) of the residents.

This research discovered that interactions among humans and between humans and spaces are underpinned by the principle of guyub. The Guyub principle is understood as one of the noble values handed down through generations with the concept of co-habitation space.

This principle is implemented in the spatial context, especially in the kampongs in Yogyakarta City. There are two ways to understand the co-habitation space concept, Magersari and Ngindung. Magersari is one example of the relationship among people and between people and their sultan in the context of place. Magersari, in terms of physical aspect, means that the land belonging to the royal family can be utilized for the wellbeing of the people, both for living and working. Another finding is the relationship between people and spaces without involving the Sultan, which is called ngindung. Ngindung is an arrangement in which a landlord divides his parcel into smaller parcels and allows other people use these parcels in accordance to the principle of guyub.

7. Conclusions and Recommendations

7.1 Conclusions

The study concludes that the concept of sharing ('co') that has been implemented by the Sultans of Yogyakarta to improve the wellbeing of their people can be reflected in the concept of co-habitation space. This is an intangible identity in the public life of Yogyakarta reflected in the patterns of guyub space that have been formed.

The buffer and supporting areas of Yogyakarta City are known to have a social and physical dimension that are interconnected to the principle of guyub. Because Yogyakarta is a cultural heritage city, kampongs that still preserve the guyub value are an important element in the spatial system of Yogyakarta City. The spirit and soul of the city space together with the interactions between the community and their culture can be seen from the strong guyub value a kampong has.

7.2 Recommendations

To address the inevitability of development (construction of buildings), the management of space...
configuration can be adjusted to new things without putting aside the values previously applicable. A historic city becoming a tourist city should be based on local concepts and values that are understood in the context of modernity. This can become a new formula in urban development programs. Inter-space and intra-space connectivity can be a new formulation in the development of Yogyakarta City in the future.

The key phrase for the recommended design from the result of this study is re-configuration of spaces. Yogyakarta, which has become one of Indonesia’s top tourist destinations and a city of a creative industry, has huge potential in integrating informal and formal urban areas, especially the areas along the philosophical axes of the city.

The principle of this integration can be a mixed use between settlements and private sector functions (hotels, offices, etc.), between settlements and markets (traditional and modern markets), and between settlements and infrastructure, such as train stations or transit points of transportation. With this space collaboration, the design can combine elements of formal-informal as well as old-new values in a synergized compact space without weakening each other.

Fig.12. Recommended Design for the Integration between a Kampong and a New Function

The keyword guyub is preserved by maintaining organic spaces that are combined with a network of organic alleyways as the cornerstone of the kampong design. The integration between organic spaces and formal spaces should provide different accesses, so that it can provide a new solution for the presence of development without destroying the existing environment. The effort to restore the territory through local principles can be done by strengthening open public spaces with the support from the government’s program in creating the ‘co’ value (shared value) from socio-culture-economic activities. These activities can be conducted through partnerships between the government and private or public sector and community partnerships.

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