Space Compatibility Based on Spatial Behavior of Street Vendors in Urban Public Space in Chinatown, Semarang

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Abstract Street vendors grow rapidly in Asian developing countries, including in Indonesia. They grow massive and uncontrolled in the urban public spaces, causing losses on the public spaces’ main function. Furthermore, waste from the street vendors’ activities causes environmental degradation and urban aesthetic reduction. Eviction and relocation are usually done by the government to overcome the problems. The government evicted and moved the street vendors to another place as planned. Street vendors’ relocation often did not succeed because they always return to their original places. The indication is the street vendors felt uncomfortable in the new location or the new location was incompatible with their activities. Until now, the government has not been able to provide the proper location for the street vendors. The study of compatible space for the street vendors is an urgent matter because the study of the street vendors which have been done so far was more focused on aspects of social, economic and political/policies. This study aims to identify space compatibility based on the spatial behavior of street vendors at their activity's location. This research used the descriptive quantitative method with questionnaires and Geographic Information System (GIS) as a tool to map the street vendors’ location. The results showed the compatibility space of street vendors based on the type of neighborhood activity, type of activity around public spaces, neighborhood activity time, numbers of visitors, visitor movement patterns (flow of visitors and visitor activities) and spatial patterns.

Keywords: street vendors, compatibility space, urban public space

1. Introduction
The urbanization resulted in the urban informal sector to grow and develop rapidly. Urbanization causes high migration of the population from rural to urban areas. The rapid urban development attracts the migrants to seeking an opportunity in the urban area to improve their family economic conditions. It happens in Asia in which the number of people has doubled in less than fifty years [1]. Unfortunately, an increasing number of urban residents are not in line with the increase in employment in the formal sector, which is selective in recruiting labor candidates thus it raises the problem of unemployment in urban areas. As a response to this phenomenon, the informal sector attracts the unemployed to work in this sector.

The growth of the informal sector occurs rapidly in cities in developing countries such as India, Bangladesh, Sri Lanka, Nepal, Vietnam, Cambodia, the Philippines, Thailand, Singapore, Malaysia, Korea, and Colombia, including Indonesia. ILO-URDI data (2013) show that 60.2% of the workforce
in Indonesia work in the informal sector [2]. In Thailand, workers in the informal sector are 71.9% of the total national workforce (National Economic and Social Development Board, 2004). In contrast to the formal area, there are no special requirements for people who want to work in the informal sector. Hart (1985) explained that the informal sector provides an opportunity for the urban population to earn revenue [3]. The informal sector is indirectly part of the economy of the city. The most visible informal sector activity in urban space is the activity of street vendors. Street vendors prefer to use public space than a private space because public space is an easily accessible space, used by the public and does not accentuate the impression of exclusivity as a private space [4]–[8]. According to Shirvani (1985), the existence of activity support in public spaces is strengthening the functions of public space as space for urban community interaction [9].

This research is focused on the Chinatown of Semarang City, which located in Central Semarang Sub-district. According to Local Regulation no. 14 in 2011 (RTRW 2011-2031), Chinatown belongs to the part of city area 1 (Bagian Wilayah Kota 1) which is a mixed area of settlements, offices, cultural heritage, tourism, trade, and services. Besides, Chinatown is also a cultural conservation area which is a unique area of Chinese cultural revitalization and become one of the tourist destinations of Semarang City. This condition triggers the rapid development of street vendors in Chinatown, which spread in every alley of Chinatown as follows: Gang Pinggir, Gang Warung, Gang Beteng, Gang Baru, and Gang Wotgandul. The conflict of the utilization of space for street vendors in public space, changes in space function due to street vendors in public space, street vendors are considered to be a nuisance element or unplanned element or out of place [10], [11]. Based on these problems, the purpose of this study is to assess the compatibility space of street vendors based on their space behavior in the urban public space in Chinatown of Semarang City. The purpose of this research is to find the compatibility space of street vendors based on the behavior of space in city public space in Chinatown of Semarang City. The results of this study can contribute to a theoretical and empirical understanding of the compatible space for street vendors which suit their environment.

2. Methods
This research was conducted in 2017 during weekdays and weekends. This condition was confirmed in 2019 that the situation and circumstances of street vendors in Chinatown were still the same. This study used a quantitative approach, based on deductive thinking which verified the existing theories as follows: the concept of street vendors, the theory of activity and space, space behavior, production space, and third-space. Those theories need to be understanding of the basis of constructing hypotheses. Data collection was obtained by questionnaires which were given directly to street vendors in the Chinatown of Semarang City as the respondents, and also conducted observations to observe things affected street vendors in determining the density and patterns of visitor or consumers’ movement in the trading location. The sampling technique in this research used disproportionate stratified random sampling, which is a sampling technique for the population with layered members but less proportional [12], [13]. The population of street vendors is stratified but not proportional, for example, the number of street vendors who sell fast food is not as same as the number of street vendors who sell food processed on the spot. Data analysis was obtained using cross-tabulation by crossing the public space type to the behavioral of space to find out suitable space for street vendors as the location of their activity.

3. Compatibility Space Based on Street Vendors’ Behavior in Chinatown’s Public Space
This analysis conducted to find out the suitable space in accordance with the behavioral pattern of street vendors to be used as the location of activity. The main activities are considered to affect the street vendors in choosing the area, thus encouraging street vendors to move in the public space around the main events of the region. Street vendor, as one of the activity support, has characteristics to approach consumers, cutting or blocking the visitor path to the functional activities of the city [14], [15]. It gives one of the characteristics of street vendors in choosing trade locations. Street vendors in utilizing public space as the location of its activity will be discussed based on its activity around the road, activity time, visitors accumulation, patterns of visitor’s movement, and spatial pattern.
3.1. Based on Activity around the Road

This analysis is divided into two, based on its activity location, which is based on the activity of the Chinatown and based on the activity around the road. Based on the activity of the Chinatown, it has various activities dominated by trade, entertainment or recreation, housing, worships, and offices activities. It makes street vendors attracted to do trade activity in the Chinatown area, which considered as a strategic place to get a high number of visitors. Street vendor, as one of activity support, will arise because it supports or complements the main activities of the city [9]. Revealed from the statement of street vendors who stated located in the Chinatown area because it is influenced by the existence of trading activities (47.9%); housing, trade, worship, office, entertainment or recreation (30%); and entertainment or recreation (12.2%). Besides, from the results of the research indicate that street vendors are located in the spaces of functional areas of the area, then the relationship of street vendors with the main activity of complementarity or street vendor is the activity support activities of functional cities in the Chinatown area.

Figure 1. Map of Activity of the Chinatown, Semarang City

Seeing from the findings indicate that the street vendors were influenced by the existence of the main activities of the trade area, entertainment or recreation, housing, worship, and offices. It shows that the behavior of street vendors is depended by the various activities in that place. Lefebvre explained that good urban planning could accommodate all activities in accordance with the behavior and users, so that street vendor as activity support is an activity that is very important to be accommodated space [16]. Spaces that have diverse activities are essential considerations to accommodate because this space is always used for street vendors location. Therefore, the space for this street vendor activity needs to be accommodated in urban planning, the policy of structuring and controlling (Figure 1). Based on the activity around the road, street vendors choose the location of its activities on the main roads of Gang Pinggir, Jalan Beteng, Gang Wotgandul, Gang Baru, and Gang Warung. The street vendors also stated that they are located on the five sections of the road because of the various activities around them. Based on the results of the research, street vendors are located in the Chinatown’s roads because it is close to schools, housing, shops, markets, offices and worship facilities (36.6%), and near shops (33.3%),
resulting in diverse activities in road segments in the Chinatown area is the attraction of street vendors to choose this location to trade. The existence of street vendors in each of the Chinatown’s road segments is activity support for functional activities in Chinatown.

It is proven that street vendors are located in the Chinatown road segments due to various types of activities. It shows that the behaviors of street vendors are influenced by the environmental conditions in the Chinatown area, which have different activity types. Therefore, the environment that exists or has a variety of activities is a suitable space for the location of its activities, thus attracting the attention of street vendors to be used as a trading location. The existence of behaviors located that are affected by environmental conditions and the existence of suitability of the space, it becomes important to accommodate and plan the space of street vendors in the planning of spatial planning in the Chinatown area. These findings reinforce Shirvani’s (1985) statement that activity support arises in favor of one or more of the significant activities in the area (Figure 2).

Figure 2. Map of type of activity around the road in the Chinatown, Semarang

3.2. Based on Activity Time

McGee and Yeung (1977) and Deguchi (2008) explained that the time of street vendors’ activity always follows the rhythm or time of activity in the area. Based on the findings of this research, it is found that the dominance of open-close time of street vendors in Chinatown area is at 04.00-15.00 (65.3%); 15.00-24.00 (21.1%); 07.00-24.00 (7.5%); and 07.00-15.00 (5.6%). While the dominance of long-time activity is morning-afternoon (62.4%); evening (11.3%); morning (17.4%) and 24 hours (7.5%) with daily or weekly and weekly trading periods. From the calculation results show that street vendors choose the location of trade in road segments in Chinatown area, because it can move in accordance with the rhythm or time of community activities or visitors within the region.

Statement of street vendors on the activity time (opening-closing time); long-time of trading; and the reason for choosing the time for trading in the morning (work), afternoon (rest), afternoon (off-work),
night activities, this shows the activity followed the rhythm of the time of community activities or visitors in the Chinatown area, so that the activity time of street vendors vary according to the characteristics of community activities in the Chinatown area. This shows that the behavior of the street vendors is influenced by the time of community environment activity in Chinatown area and the existence of suitability with the environment activity, the street vendors are interested to take advantage of space in Chinatown area as trading location (Figure 3). Referring from the research that street vendors are located in the Chinatown area because it is influenced by the activity of the community environment and the existence of suitability or conformity with the environment, so it can be said there is a matching location street vendors with the environment or can be called as a compatible activity space of street vendors [9], [17]–[19].

**Figure 3.** Map of street vendors’ activity time in Chinatown, Semarang

### 3.3. Based on Visitors Accumulation

The nature of street vendors who always approached the consumer is related to the selection of location street vendors in the move. Based on the results of data processing, street vendors declare to choose the location because of the high number of visitors or circulation visitors community (92.9%). From the results of the calculation shows that the street vendors choose the location on the road circulation of society or visitors are high. Space with a high flow of people or visitors raises the concentration of consumers, so the possibility of selling more merchandise.
Figure 4. Map of accumulated visitors in Chinatown, Semarang

The behavior of street vendor locations is strongly related to the high number of visitor circulation/visitor accumulation which also means highly rated area. The number of respondents who declared the situation because of the large circulation of visitors explained that the five roads are their consumer concentration. This location becomes a potential location for street vendors, so it can be said there is a match between location and environment (compatibility) [9], [17], [18]. The distribution of street vendor locations in Chinatown area can be seen in Figure 4.

3.4. Based on The Patterns of Visitor Movement
Analysis of visitor movement pattern is divided into three parts, which are the analysis of visitor movement patterns based on visitor flow activity and analysis based on visitor activity and analysis based on visitor purpose.

a. Based on Visitors’ Flow
Space that has a high circulation of society or high vehicle also means highly regarded [17]. As a result, this space is in great demand by street vendors to be used as a location of activity. The majority of street vendors in the Chinatown area stated that the flow of visitors on the road from home to recreation or entertainment or shopping (59.2%); from home to work, from home to school, from home to recreation or entertainment or shopping (22.1%); and from home to work (15.5%). Based on the results of the research is known that street vendor chooses a location is closely related to the flow of visitors, so it can be called the street vendor to approach the flow of visitors within the region. This condition indicates that the street vendors choose the location on the road that has the potential of consumers because it is in the flow of visitors.

Based on the street vendor statement, it is suggested that the road segment being the trading location is the connecting link from the residence to the destination of the community or visitor of the area. These connecting links have high mobility or many communities or visitors passing through this path, resulting in community accumulation [14]. Thus, the results of the study show that street vendor selects the location on the road segment that connects the activity and the street vendors are also approaching the visitor path to the destination of the community or visitors (Figure 5). Referring to the research findings that have been found meeting room or space where the intersection of visitor path by street vendors is the road linking the origin of the movement with the aim. The area on the flow of visitors attracted the attention of street vendors to be utilized as a location. Street vendors capture this condition as an opportunity to use the space as a place of activity [18], [20]. The street vendors are located in the Chinatown area due to the flow of visitors, thus explaining that there is suitable site suitability or compatibility [9], [17]–[19].
b. Based on Visitor Activities

Street vendor states that in every road, there is a variety of activities conducted by the community or visitors. This condition shows the number of activities conducted by visitors in the region. Based on the statement of street vendors majority said it is located in the Chinatown area because many people are in buying and selling activities (58.7%); many people relaxing or doing sports activity or even sightseeing (13.6%); and many people relaxing or doing sports activity or walking, lots of people walking or passing, many people are shopping, schooling, worship, culinary, work (18.3%). This shows that street vendors choose trading locations because there are many visitors or communities around them.

A large number of visitor activities caused the movement of visitors in the area, causing the pull of street vendors to re-locate on the road segment [18]–[20]. Street vendor's statement about the number of community activities on the Chinatown roads gives the understanding that this location is crowded by visitors, or there is visitor accumulation. Mc Gee and Yeung (1977) and Deguchi (2005) noted that street vendors concentrate on areas with high customer visits. Therefore it can be said happened street vendors suitable to be in that location because of the various activities of visitor. Multiple locations with diverse visitor activities and also the location of street vendors can be seen in Figure 6.
c. Based on Visitors Purposes

Street vendor selects location related to the destination of the visitor to street vendors. The majority of street vendors in Chinatown road segments say visitors come to street vendors because of the main purpose (74.5%); side goals (16.1%); main and side goals (9.4%). The high percentage of street vendors being the main purpose of visitors shows that the presence of street vendors in the Chinatown area is important for the community or visitors. The pattern of visitor movement reflects the behavior patterns of visitors in the area [18], [19]. The result of research also shows that street vendors located in the Chinatown’s streets are very influenced by visitor movement pattern that is shown from the main purpose of visitor come to street vendors.

The street vendor becomes the main purpose of the community or visitors to the area shows that street vendors can meet the needs of the surrounding community. This condition also shows the nature of street vendors as complementary [21] and supporting activities (activity support) of the main activities of the region [9]. The street vendor becomes the main purpose of the community or visitors to describe the Chinatown area have the interest of visitors to high street vendors. Street vendors seize this opportunity to take advantage of space in the Chinatown as the location of their activities. The result of the research shows that there is a match between the location of street vendors and the environment because the existence of street vendors is the main purpose of the visiting community. So it can be said that this location is compatible [9], [17]. Distribution of location street vendors in the Chinatown area, which is a location that has the interest of visitors to the high street vendors are in Figure 7.

Figure 6. Map of visitors movement patterns based on visitors activities in Chinatown, Semarang
3.5. Based on Spatial Pattern

Based on the street vendors’ statement, the behavior of street vendors are located in Chinatown area because it is influenced by the space pattern or the use of space is settled. This condition illustrates that the trading location is related to the pattern of space.

Figure 7. Map of visitors movement patterns based on visitors’ destinations in Chinatown, Semarang

Figure 8. Map of spatial pattern analysis in Chinatown, Semarang

Referring to the results of the study, the majority of street vendors stated that they are located because of settled space (96.2%) and do not settle or moved (6.7%). The high pattern of space or the use of settled space is related to the permit use space. Street vendors claimed to have obtained permission from the local government called kelurahan; or rukun tetangga (often read as “RT”) which is the smallest scale of the local government in a residential area consisting of several houses in it; or the owner of the building around the street vendors. Based on the result of research, it is found that the pattern of street
vendor space is settled because of the permission to occupy space. Thus, it can be said that the compatibility of street vendor locations with their environment [9], [17], [22]. The existence of permission to trade on Chinatown road area makes street vendor feel safe from the action of control and evictions. These findings also show that the behavior of street vendors in determining the location of their activities in the public sphere is influenced by the pattern of settled space.

4. Conclusions
Based on the results of research, the location of street vendor activity that is compatible or suitable with the characteristic on the mainline of Chinatown area, namely Gang Pinggir road, Wotgandul road, Beteng road, and Gang Warung road is a path connecting Beteng road (the road connecting Chinatown area with city Semarang) with Gang Pinggir (the road is connecting Chinatown area with Semarang City from Pekojan direction). The compatible space (suitable) for the street vendors to trade in the Chinatown public space area that is utilizing the sidewalk, main roadside, and connecting roads. Street vendors in determining a compatible location for trading are as follows:

a. Area activity, street vendors, are located because of the diversity of the main activities of the region, such as trade, shelter, worship, office, and entertainment or recreation or sports activities. The relationship of the street vendors with its complementarity area activity or street vendor is activity support the functional activity of the area.

b. Activities around the road, street vendors, select the location around Gang Pinggir road, Gang Wotgandul road, Beteng road, and Gang Warung street, because of the diversity of activity types nearby: schools, residential, shops, markets, offices, and the facilities of worship. The activities of street vendors around these streets are supporters of functional activity of the Chinatown area (activity support).

c. Activity time, street vendors move in accordance with the rhythm or time of community activities area that lasted all day:
   - Street vendors' business hours (at 04:00-15:00 which coincide with the time of community activity to shopping for daily needs, leaving for school or education purpose, working; at 15:00-24.00 which is community time to return home after their daily activities, visitors come for recreational purposes such as cultural tours, culinary delights, and worshipping).
   - The long-time activity of street vendors (morning-noon; morning-evening; afternoon-evening).
   - Period of daily and weekly activities.

d. Accumulation of visitors, street vendors choose the location on the road that has a circulation of people or visitors that high consumer concentration, so the possibility of selling more merchandise.

e. Patterns of visitor movement (Figure 9):
   - The flow of visitors, street vendors in choosing the location of street vendors approach the flow of visitors of the area, such as the flow of visitors from home to their purposes (recreational, entertainment, or shopping); the movement from home to work or school and vice versa. Street vendors select locations with high potential to attract customers who are in the flow of visitors.
   - Visitors activities, street vendors, are located in many segments of the community activities in the vicinity, such as many people with activities of buying and selling, many people come to relax, do sports activity, or walk, many people walking or passing, schooling, worshipping, working, and come for culinary purpose.
   - Destination visitors, street vendors, become the main purpose of visitor area, indicating that the existence of street vendors is important for the local community or visitors because it can meet the needs of surrounding communities and urban communities.

f. Space utilization or pattern of street vendors are settled because of the permission from "kelurahan" or "RT" or direct to the owner of the building in the surrounding street vendors are. Street vendor feels safe to move and can avoid the action of control and eviction.
Figure 9. Charts of location and place of street vendors in Chinatown, Semarang, based on spatial behavior

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