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Spatial Adaptive Arrangement of Street Vendors to the Covid-19 Pandemic in Simpang Lima, Semarang, Indonesia

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ABSTRACT

Covid-19 has caused a global crisis that has affected various aspects of life, including urban spatial arrangement, such as arrangement of street vendors activities in urban public spaces. As one of the activities supports that have developed due to primary urban activities, street vendors often occupy public spaces, as can be seen in Simpang Lima in Semarang, a central business and culinary tourism district where street vendors sell their good on pedestrian ways. Moreover, these vendors have been stabilized to accommodate their existence in sustainable manner. Hence, it is necessary to review the adaption of this arrangement to pandemics, bearing in mind the necessity of precautions against Covid-19 and physical distancing in accordance with the recommendations of the World Health Organization (WHO). This research applied quantitative methods and obtained data by collecting questionnaires and observations, showing that street vendors' spatial arrangement within the food court concept in Simpang Lima had been adaptive to the Covid-19 pandemic reviewed from space arrangement, vending facilities, and health protocol applications. Among the precautions implemented for each vendor are the arrangement of space using modular spaces of size 3 by 3 meters, so that each has their own adaptive space, in accordance with physical distancing; maintaining spaces properly ventilated; applying a distance of more than one meter between any two tables in the consumer dining space; washing utensils in running water to maximize cleanliness; and ensuring the availability of public sinks with running water for customers and the public.

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1. Introduction

The Covid-19 pandemic is a multidimensional crisis that has affected various countries around the world (Barraza et al., 2020; Permanent Mission of The Republic of Indonesia To The United Nations, 2020; Pitoyo et al., 2020; United Nations, 2020; Welsch, 2020). It has caused problems in various domains, including that of spatial planning. Concretely, in the field of urban design, it is necessary to provide additional open space and green space that can accommodate community activities in accordance with the health protocols set forth by the World Health Organization (WHO). One example is the provision of more pedestrian ways in order to meet social distancing requirements (Sharifi & Khavarian-Garmsir, 2020).

Pedestrian ways as a form of public space (Carr et al., 1992) are an important element in urban design that serves to shape the physical arrangement of space in urban areas. This pedestrian way is a space that is used as a place to trade by street vendors, which is a form of activity support that grows and develops to support the main activities in urban areas (Shirvani, 1985). Pedestrian ways in Global South countries are widely used for activities by the public, so they tend to be crowded and dense with visitors. One of the principal groups that make use of pedestrian ways as a place to trade are street vendors (Rosés et al., 2021). Street vendors, as a form of trade and services that operates in the informal sector in urban areas, are an important part of the informal economy since they can create jobs to reduce the problem of unemployment (De Soto, 1992; Rachbini & Hamid, 1994; Reid et al., 2010). Furthermore, street vendors also provide a variety of essential services and meet the basic needs of people in cities around the world, especially in Africa, Asia, and South America (Balbuena & Skinner, 2020).

Street vendors who can supply the people's daily needs cause many consumers to come to them to conduct buying and selling activities for a variety of reasons; for instance, consumers are motivated to come to the street vendors which can be seen and be see that the atmosphere is more relaxing which are far away from the formal life. Also, this gives them a respite from the burdens of their life, such as difficult and tedious daily office activities. Moreover, they can fulfil their needs at the same quality as formal purchasing and at a reasonable cost (Widjajanti, 2009). This shows that the existence of street vendors, especially in public spaces, and particularly in pedestrian ways, is very meaningful for traders and consumers, which implies the necessity of a safe space for traders and visitors or consumers who desire to participate, which may potentially cause people to gather in these spaces.

Due to the current Covid-19 pandemic, buying and selling activities between street vendors and consumers in pedestrian ways in public spaces need to be flagged as potentially causing public health problems, due to the potential crowds that can increase the possibility of transmission of the Covid-19 virus (UN-Habitat, 2020). Therefore, it becomes important to research the spatial arrangement of street vendor activity in the city's public spaces in a manner that is adaptive to the Covid-19 pandemic.
In Indonesia, since the outbreak of the Covid-19 virus in the first quarter of 2020, the Government of the Republic of Indonesia has campaigned, through the Task Force on handling Covid-19 (known as *Satgas Covid-19*), for the implementation of health protocols by all citizens of the Republic of Indonesia, referring to the recommendations of the WHO (2020). This represents an effort to prevent the spread and transmission of the Covid-19 virus through three precautions: wearing a medical mask, especially when people come closer for outdoor or indoor activities; whenever people gather or after having activities involving touching or holding the things close to them, using soap with running water in twenty seconds or hand sanitizer; and avoiding crowds through physical distancing, especially in the case of indoor and outdoor activities without proper ventilation. Prevention of Covid-19 transmission is often difficult to implement due to high population density and levels of social interaction in cities (UN-Habitat, 2020), but it still should be applied, not only by each individual living therein, but also in the creation of arrangements of street vendor activity in public spaces that are adaptive to the Covid-19 pandemic and minimize the risk of propagation and transmission.

Located in Central Java, Semarang is one of the largest cities in Indonesia, with a high population and consequently a high risk of spreading Covid-19. It is home to the popular destination of Simpang Lima, which is primarily a central business district (CBD) with trading and services, worship, offices, recreational activities and sports around Pancasila Square. Furthermore, there are street vendors that develop and occupy pedestrian ways and also engage in commerce in front of some surrounding buildings, namely: a) the E-Plaza; b) Telkom Office; c) the ex-ACE Hardware building; d) the Super Economy; and e) Simpang Lima Plaza. The arrangement of the pedestrian ways in Simpang Lima consists of the street vendors' space, a dining space for consumers separated from the vendors' space, and the walkway. In the arrangement of this consumer dining space, dining tables and chairs are arranged close to each other in such a manner that there is no distance between the dining tables. The food ordering space and cashier space were created with no distance from the consumer dining space, so they did not meet the requirements of the order requiring a distance of one to two meters to avoid crowding that could impact the spreading and transmission of the Covid-19 virus. Moreover, the street vendor activity space changed dramatically since the pandemic by providing a public sink for washing hands, but unfortunately it has spread evenly only in the corner of each location. With the Covid-19 pandemic having spread across the globe, there must be a review, or even more crucially, it is necessary to arrange the street vendors activity space around Simpang Lima that refers to the prevailing health protocols to suffer from the disease. Based on the description of the problem, then *what is the arrangement of the space of vendors in Simpang Lima that is most adaptive to the Covid-19 pandemic?*

The aim of this study is to examine the arrangement of street vendor activity spaces in pedestrian ways in the era of the Covid-19 pandemic, as well to determine which arrangements of street vendor space and consumer space are safe, comfortable, and adaptive to Covid-19 which occupy and promote people to apply health protocols according to WHO as if physical distance adjustment following the WHO. The results of this study are expected to be an input as a reference for determining an arrangement of street vendors in public spaces that is safe from the dangers of the spread and transmission of the Covid-19 virus and comfortable for vendors to provide food and drink for people around Simpang Lima, as well as for consumers, who must be supplied with food and drink, accessories, clothing, cigarettes, tyre repair services, children's toys, and balloons.

2. Methodology

2.1 Description of Study Area

One of the functional areas of Semarang, Simpang Lima is located in the heart of Semarang City where there are many informal

sectors, street vendors around the pedestrian way that support the main functions of Simpang Lima area, which acts as one of the areas that have many street vendors compared to other areas in Semarang. Furthermore, there is a square in the middle of Simpang Lima called Pancasila Square which can be utilized as an urban public space for human social interactions in Semarang. The arrangement of street vendors has been carried out by accommodating and arranging spaces for them without evicting them (Decree of the Mayor of Semarang No. 511.3/16 of 2001) by applying the concept of stabilization (McGee & Yeung, 1977).

The locations of street vendors in pedestrian ways that are located in the west side of Simpang Lima Plaza are as follows: thirty-one unprocessed food and beverage vendors, two cigarette kiosks, nine clothing kiosks, three tyre repair service and eleven accessories' kiosks. On the south side of Simpang Lima Plaza, there are twenty-four accessories' kiosks. There is a Super Economy with twenty-eight processed food and beverage vendors in front of it, two toy and balloon kiosks, and one cigarettes kiosk. In addition, fourteen semi-processed food and beverage vendors, one toy and balloon vendor, and one cigarette kiosk are located on the right side of the ex-ACE Hardware store. Finally, on the left side of Telkom Office, there are twelve processed and unprocessed food and beverage vendors, while there are twenty-eight processed food and beverage vendors in front of E-Plaza (Figure 1). All street vendor spaces around Simpang Lima are located on the pedestrian ways with separate arrangement space of the street vendors and walkways, so that there are no conflicts over space utilization (Widjajanti, 2016) (Figure 2).

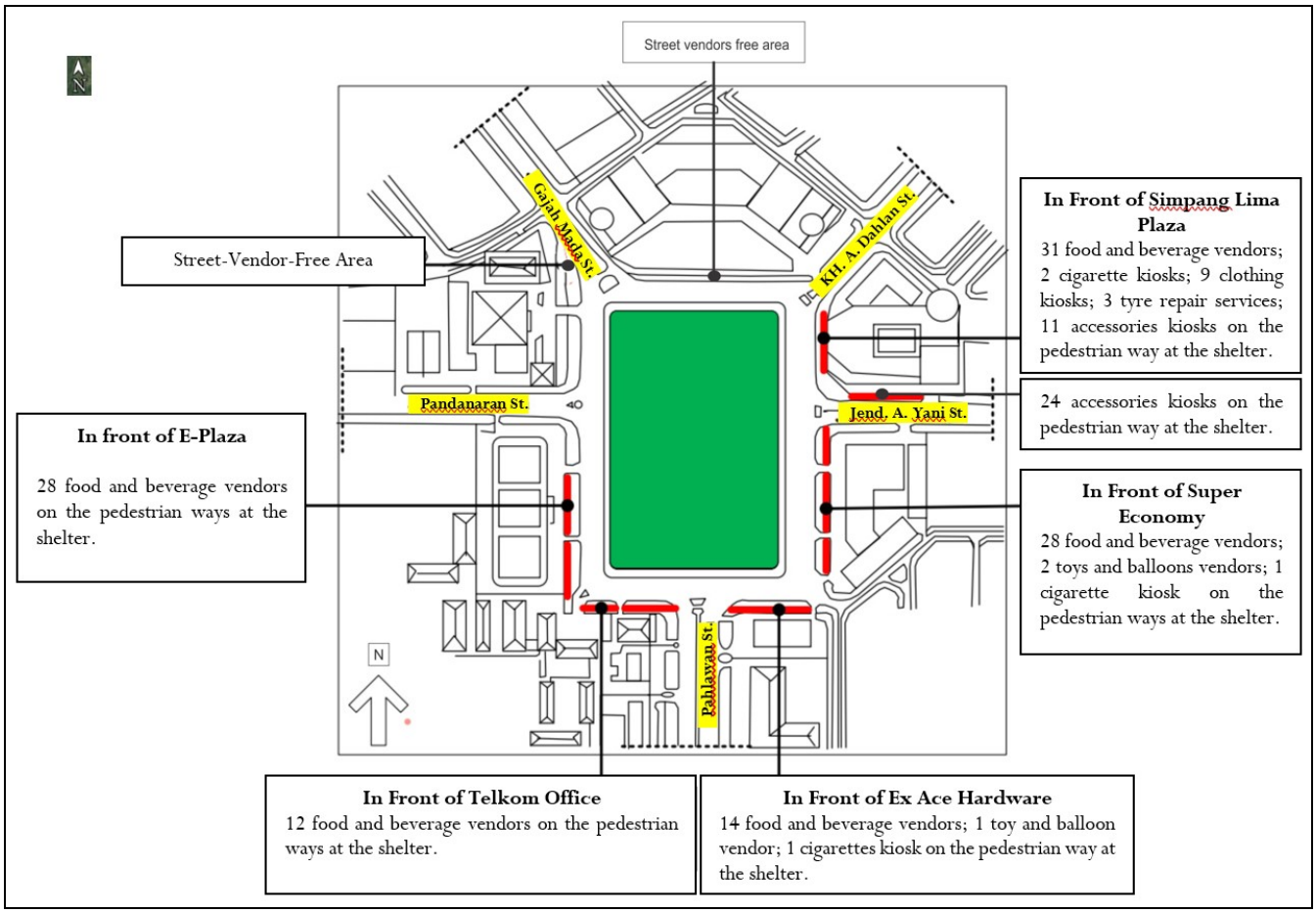

Figure 1 The Locations of Street Vendors Around Simpang Lima (Fieldwork in 2021)

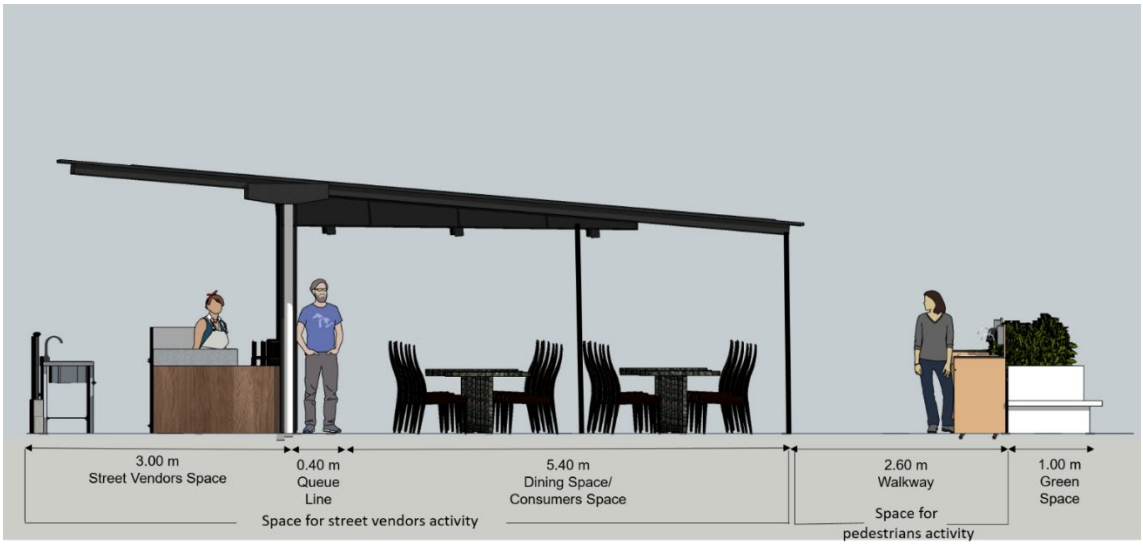

Figure 2 The Division of Space for Street Vendors and Walkways in Simpang Lima (Fieldwork in 2021)

2.2 Data Collection

The data collected in this study consists of primary data acquired from questionnaires and observations. It was obtained by distributing questionnaires to street vendors, amounting to 82 street vendors out of 149 street vendors which were determined based on stratified random sampling detailed by types of trading, amount of sample calculated in 88 (Table 1). The technique of distributing questionnaires at each street vendor location used purposive sampling counting in each location based on types of trading, then it was found to be about ninety samples (Table 2).

Besides the aforementioned methods, this research used field observation of street vendor spatial arrangements in pedestrian ways related to the division of street vendor activities spaces and walkway, as well as the distribution of handwashing facilities (public sinks) for street vendors and Simpang Lima visitors.

The on-site survey of the research was conducted for two weeks in May 2021, and the data processing was also conducted for two weeks during the same month.

Table 1 Stratified Sample in Simpang Lima by Types of Trading

Sample / Types of Trading	n1 = n/N x N1				
	n (Sample)	**N (Population)**	**N1 (Population of each type)**	**n1 (Sample total of each type)**	**SAMPLE**
Food and Beverages	82	149	113	62.19	**63**
Toys and Balloons	82	149	3	1.65	**3**
Cigarette Kiosk	82	149	4	2.20	**4**
Clothes	82	149	9	4.95	**5**
Services (top up prepaid credit and tyre repairs)	82	149	3	1.65	**3**
Accessories (helmets, bags, posters)	82	149	17	9.36	**10**
Total			149		**88**

Table 2 Purposive Sampling by Types of Trading in Simpang Lima

Types of Trading	∑ sample = ∑ type of trading/∑ population of each type x ∑ sample of each type				RESEARCH SAMPLE
	∑ type of trading	∑ population of each type	∑ sample of each type	∑ sample	
Front of Ex Ace Hardware					
Foods & Beverages	14	149	63	5.92	**8**
Toys and Balloons	1	149	3	0.02	**1**
Cigars	1	149	4	0.03	**1**
Front of Super Economy					
Foods & Beverages	28	149	63	11.84	**16**
Toys and Balloons	2	149	3	0.04	**2**
Cigars	1	149	4	0.03	**1**
Front of Plaza Simpang Lima					
Foods and Beverages	31	149	63	13.11	**18**
Cigars	2	149	4	0.05	**2**
Clothes	9	149	5	0.31	**5**
Services	3	149	3	0.06	**3**
Accessories	17	149	10	1.10	**10**
Front of Telkom Office					
Foods & Beverages	12	149	63	5.07	**7**
Front of E-Plaza					
Foods & Beverages	28	149	63	11.84	**16**
Final Total of Research Sample					**90**

2.3 Data Analysis

The data processing method used frequency distribution, and the analysis method used descriptive quantitative statistics based on street vendor perceptions of their activities' characteristics, such as types of trading, types of trading facility, trading time, types of street vendor concentration, and street vendor operational types and the space characteristics of street vendor and consumer which are related to the shape of the space, the division of vendor and consumer space, and the arrangement of consumer space (Table 3).

Table 3 Research Variables

No	Variable	Sub-Variable
1.	The activity characteristics of street vendors	– types of trading – types of trading facility – trading time – types of street vendor concentration – street vendor operational types
2.	The space characteristics of street vendors and consumers	– shape of space – the division of vendors space with consumers – the arrangement for consumer space

That the street vendors' spatial arrangements are adaptive to pandemic of Covid-19 could be recognized through the analysis of the characteristics of the activities of street vendors in pedestrian ways to find the specification of trading type, trading facility, trading time, types of street vendor concentration and street vendor operational types. The result of this analysis acted

as an input for the following analysis which is of space analysis among street vendors to recognize space size, the specification of space shape as a space for trading with unreal boundaries or tangible boundaries (Laurens, 2004) and providing washing facility for kitchen utensils or cutlery. The next analysis was about recognizing of the consumer space arrangements between cashier space and the consumers space, layout and pattern of dining table, air circulation system at consumers space and street vendors space, public sink facility (Figure 3).

The result of the research can be as an input or the guidance for the activity space arrangement in an urban public space which applies health protocols for stakeholders, and it can be used for a policy in the arrangement and development for street vendor space in urban area.

For other result of the research, it can be added other examples of informal arrangement space activities, especially that of street vendor in urban public space that apply health protocol of Covid-19 concept in activity support and pedestrian ways theory which are part of eight elements of urban design theory of Hamid Shirvani (1985) as an element of urban physical form (Figure 4).

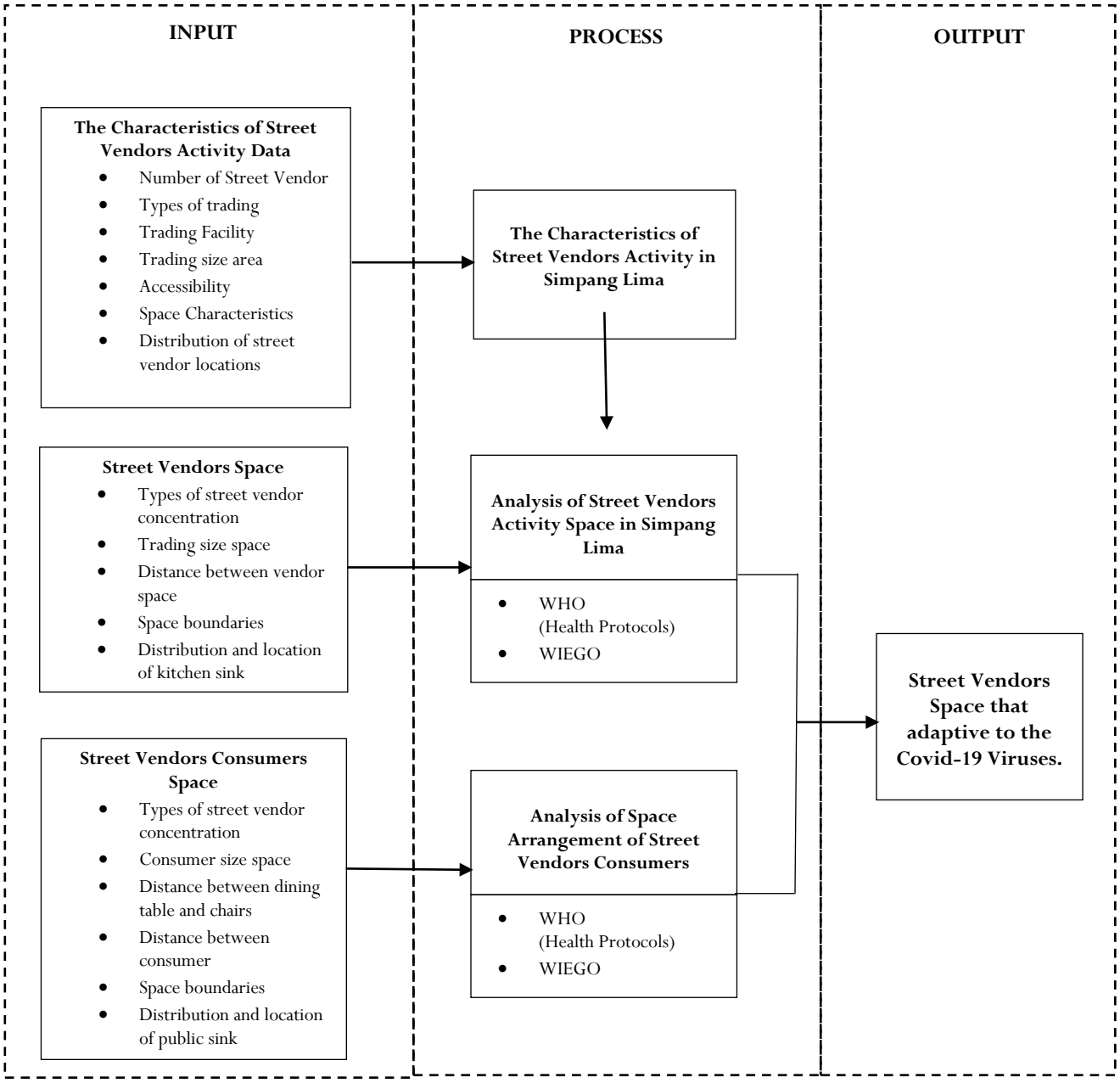

Figure 3 Framework Analysis (Authors, 2021)

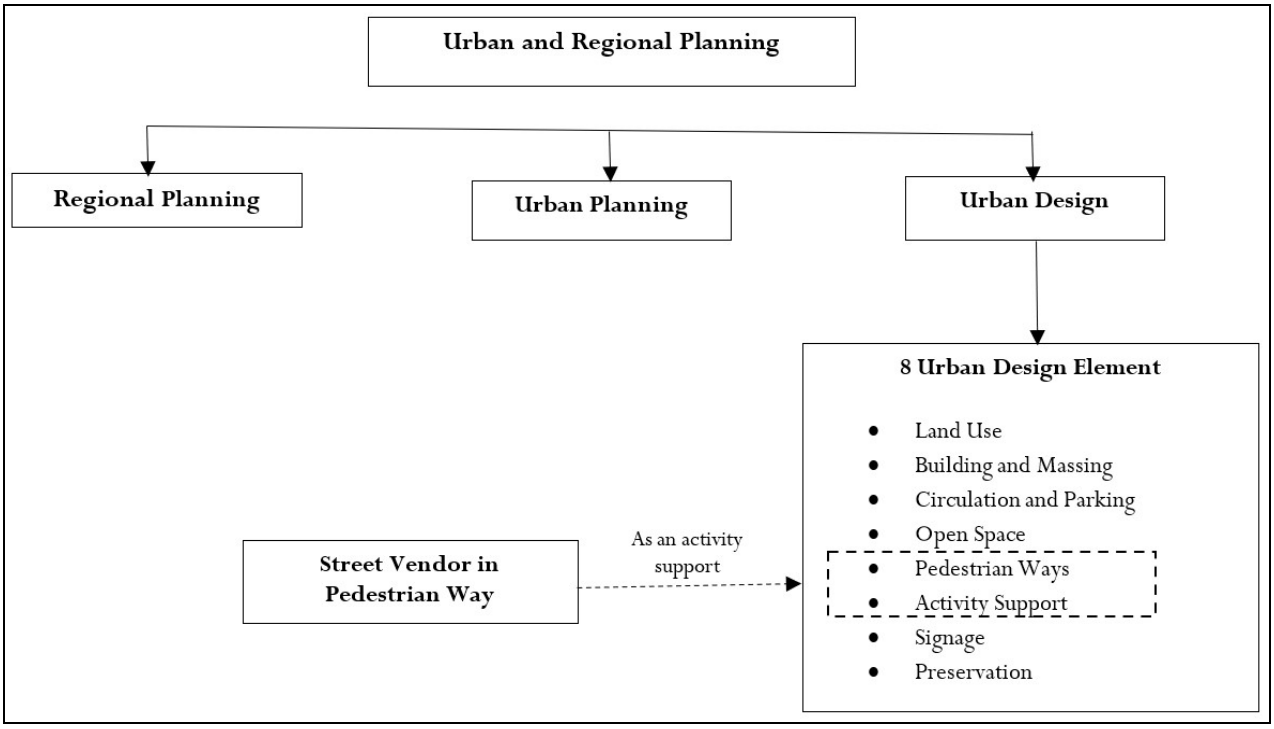

Figure 4 Research Position (Authors, 2021)

3. Result and Discussion

3.1 The Characteristics of Street Vendor Activity in Simpang Lima

The spatial arrangement of street vendor activities around the Simpang Lima Area applies the concept of a food court. The characteristics of street vendor activities consist of types of trading, types of trading facilities, trading time, types of street vendor concentration, and street vendor operational types (Deguchi, 2005; McGee & Yeung, 1977), as follows:

- Types of trading in Simpang Lima follow the main activities there as mentioned in McGee and Yeung (1977) and (Deguchi, 2005): food and beverages prepared on location (72.2%), accessories (helmets, belts, hats, bags) (11.1%), clothes (7.8%), toys and balloons (1.1%), cigarettes (5.6%), services (2.2%)
- Types of trading facilities: All street vendors (100%) are in shelters arranged separately using modular space of size 3x3 meters where there is a separation among street vendors in the form of furniture that applies the Decree of the Mayor of Semarang No. 511.3/16 of 2001, stating that the trading facility should consist of items that are able to be dismantled or easily moved, such as: display cabinets, stove tables, preparation tables, cupboards for storing food and beverage ingredients, display cabinets or shelves and storage cabinets for non-food and beverage merchandise.
- Trading time: Before the pandemic, all street vendors had their activities from 17.00–02.00, but since the pandemic the trading time has been limited to 17.00–23.00 to limit consumer visits, as stated in *Satgas* Covid-19 Government regulations. It is proved that time of trading has followed main activity area (McGee & Yeung, 1977; Widjajanti & Wahyono, 2018; Widjajanti, 2009). This is an effort to reduce the spread and transmission of Covid-19 in the community and to reduce the occurrence of crowds.
- Types of street vendor concentrations: All street vendors (100%) have a linear concentration type on the pedestrian ways following the road network pattern around Simpang Lima. As mentioned in McGee and Yeung (1977), that concentration type is a linear agglomeration that is influenced by road network pattern.
- Street vendor operational types: All street vendors (100%) that trade in Simpang Lima are permanent. This agrees with McGee and Yeung (1977), who mentioned that the street vendors permanently occupied the space.

That is all that can be improved, since most of the characteristics of street vendors in Simpang Lima mentioned above have their own special form.

3.2 Analysis of Street Vendor Activity Space in Simpang Lima

That each street vendor in Simpang Lima gets a space of 3x3 meters by using furniture such as display cabinets, stove tables, preparation tables, cupboards for storing food and beverage ingredients as a barrier among street vendors are in a proper and safe arrangement for doing the business as if the use of furniture as a barrier between the spaces for street vendor activities and other street vendor is a highly probable adaptation from vendors to local regulations governing following the Decree of the Mayor of Semarang No. 511.3/16 of 2001, which establishes that vending facilities must be as dismantle pairs and easily to be moved. In addition, the use of furniture as a space barrier belongs to the category of activity space with unreal or no permanent boundaries (Lang, 1987; Laurens, 2004) (Figure 5). According to all street vendors in Simpang Lima, the implementation of unreal boundaries on the activity space of street vendors can create favourable conditions for vendors to be able to cooperate and support each other, as well as facilitating the ability to satisfy any sudden needs for cooking preparation or to fulfil their sudden needs of their merchandise in vending which is about a percentage of respondent answers as much as 100% in data result, so that it proves their bonding with each other, which also indicates that there is good cooperation among them. This is in accordance with one of the characteristics of street vendors, whose vending patterns tend to be linear agglomeration and cooperation with other street vendors (McGee & Yeung, 1977).

The arrangement of furniture as a barrier to separate room between street vendor spaces and other activity spaces creates a space between vendors of about 1.80 to 2.00 meters which is not covered by a dividing wall. Thus, there is an open distance between the furniture and the roof of the shelters, which provides uninterrupted air circulation between street vendors and others activity space smoothly so that there is an air exchange of indoor with outdoor air called as cross ventilation in the vending space (Figure 9). This supportive condition ensures that every street vendor space gets sufficient open-air ventilation, so it meets the standards determined by UN Habitat (2020) and by WHO (2020, which establish that ventilation is important, including opening windows when indoors to increase the amount of outdoor air. Moreover, a space with good lighting and ventilation can reduce the risk of the spread of Covid-19. Based on the results of this research as mentioned above, it was found that place of activity of street vendors in Simpang Lima, which is organized without massive or permanent barriers between street vendors and others on the pedestrian ways, shows signs of adaptation to health protocols as an effort to avert the risk of spreading of Covid-19.

Facilities for washing dirty cooking utensils and cutlery, designed only for food and beverage street vendors, are facilitated by the City Government of Semarang. Every space is provided a sink with clean running water for washing utensils after use by consumers and vendors, which is located in the rear of the vendor space. This guarantees the cleanliness of cooking utensils and cutlery, as well as ensuring that they are free of viruses, since they are washed in compliance with appropriate health protocols and precautions (Figure 5). As has been mentioned, compliance with the health protocols that have been determined by WHO (2020) is guaranteed.

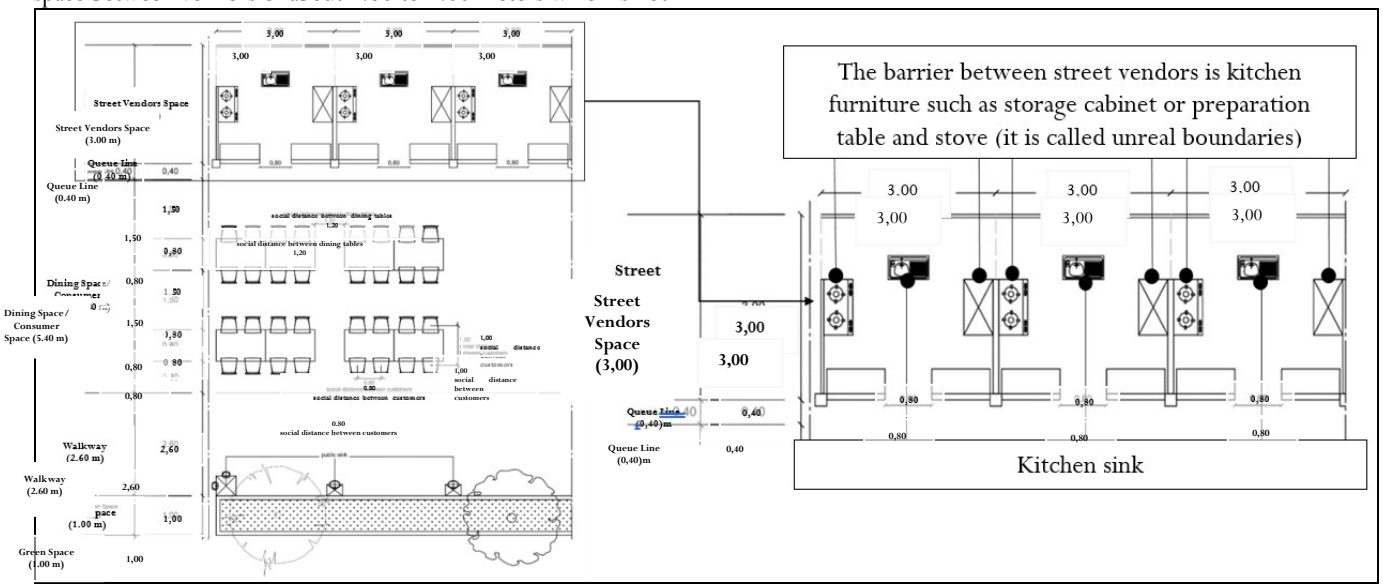

Figure 5 The Barrier Between Street Vendor Space in Pedestrian Way of Simpang Lima (Fieldwork in 2021)

3.3 Analysis of Space Arrangement for the Activity of Street Vendor Consumers in Simpang Lima

The arrangement between street vendors and consumers in doing their activities in pedestrian ways around Simpang Lima is separated is designed in a situation where the space for the activities of vendors is different from the space for consumers or buyers. The spaces between the activities of vendor and consumers are separated by furniture in the form of a display cabinet as high as 1.50 meters using wood or polyvinyl chloride (PVC) pipe with transparent and clear plastic about 0.50 mm thick, where the thickness of the plastic lowers the risk of Covid-19 virus transmission, so there is no direct contact between the vendors and the consumers. However, they can still communicate with each other in order to order or pay for food, beverages, or for non-food merchandise. Not having direct contact between vendors and consumers creates social and physical distancing, thereby lowering the risk of transmission of Covid-19 (WHO, 2021; WIEGO, 2020) (Figure 6).

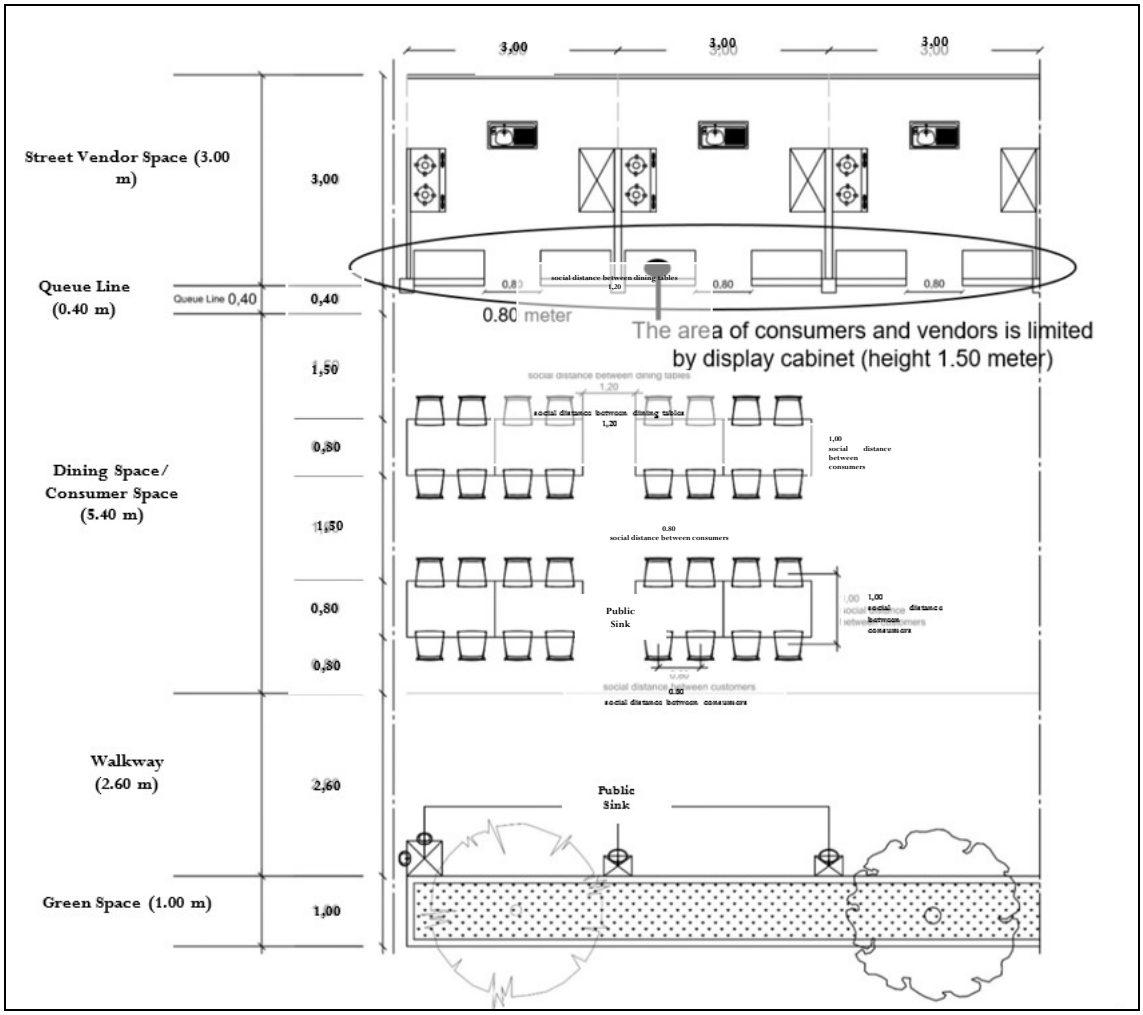

Figure 6 The Barrier Between Vendors and Consumers in Pedestrian Way (Fieldwork in 2021)

Customers for food and beverage street vendors located in the shelters are arranged in long lines, in keeping with the concept of a food court, which is used as dining space for the most customers in those areas, not only for certain vendors. Dining tables for customers are placed directly in front of the space for vendors: that is, there are is a certain distance between each dining table, a distance between the dining tables and the cashier, and there is a walkway located next to the last line of dining tables. Furthermore, this distancing functions to promote circulation in the space for consumers. This pattern, called Open Grid Layout, is an implementation of one of the strategies to arrange markets in a pandemic situation due to WIEGO (2020). This distanced arrangement of dining tables realizes an implementation of physical distancing in the customer dining space, precisely in accordance with health protocols (WHO, 2020) (Figure 7).

Likewise, there is also separation between the spaces of non-food street vendors selling items such as accessories, cigarettes, toys and balloons. The vendor space and the consumer space are separated with an aluminium or wood display cabinet of up to

1.50 meters in height, with attached transparent plastic as a barrier, so as to permit no direct contact between vendors and consumers. The arrangement of the street vendor space design shows that this space applies health protocols in a spatial design that is adaptive to the spread of the Covid-19 virus.

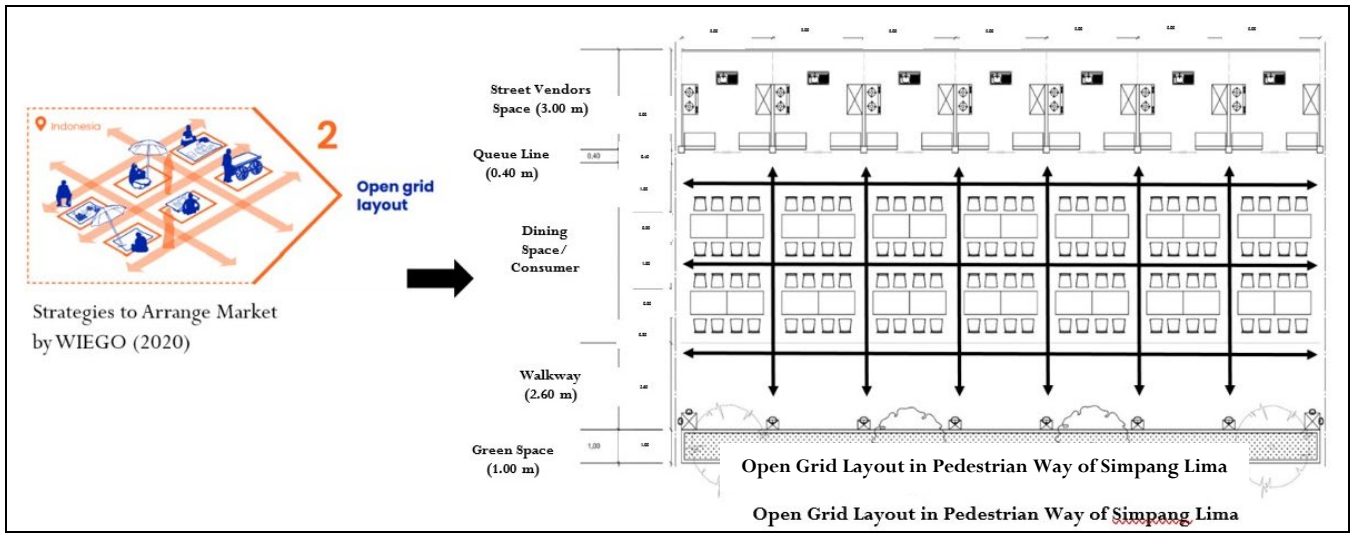

Figure 7 Street Vendor Consumers Layout in Simpang Lima (Fieldwork in 2021)

3.3.1 Dining Tables

The dining tables for customers in the dining space are separated by 1.20 meters. The distance between two facing seats is about 1.00 meter, adjacent seats are about 0.80 meters apart, and the table size for consumers is about 2.40 meters by 0.80 meters, where each table consists of 8 people sitting across from each other, which is about 4 people on a side. A distance of 0.80 meters between adjacent individuals does not fulfil the 1.00 meter distance stated in health protocols, so in the end a 2.40 meter by 0.80 meter table has only six chairs, which is about three people on a side. Thus, the current distance between adjacent customers is 1.00 meters. The arrangement of furniture used creates physical and social distancing among consumers, so that the health protocol between consumers is maintained (WHO, 2021; WIEGO, 2020) (Figure 8). Based on the perceptions of street vendors, this condition makes consumers feel safe and comfortable visiting Simpang Lima street vendors (100%) because the vendors are disciplined to follow the rule and order there in implementing health protocols for their business.

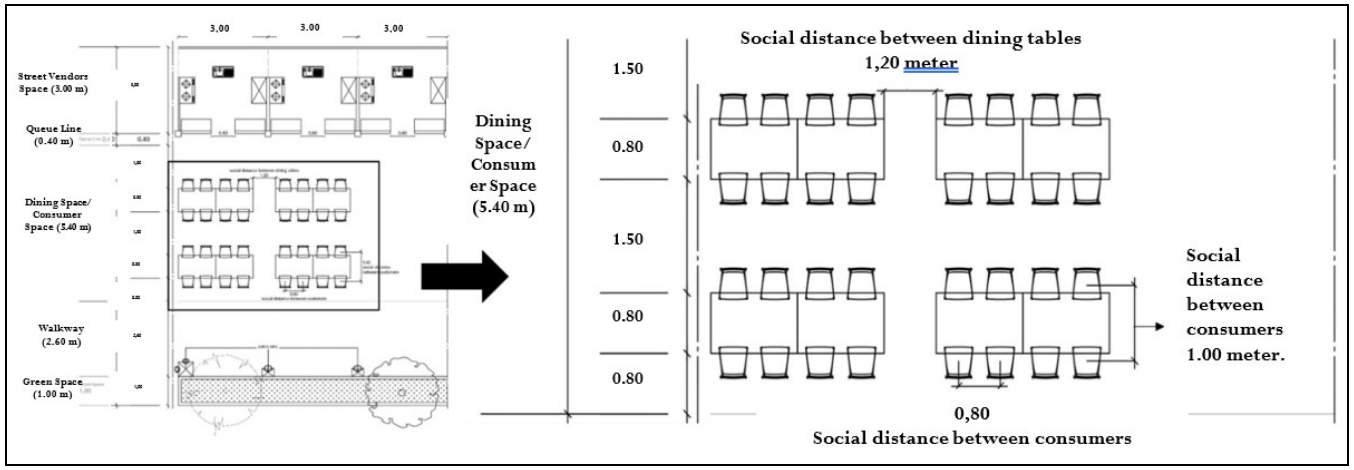

Figure 8 The Arrangement of Consumer Dining Tables of Street Vendors in Simpang Lima (Fieldwork in 2021)

3.3.2 Cross Ventilation

The arrangement of street vendor space and consumer space at Simpang Lima takes the form of shelters. There is a barrier for street vendors in the form of display cabinets which function as an object for separating vendors and customers. These conditions cause the entire layout of street vendors on the pedestrian way around Simpang Lima to become an open space that is not covered by massive walls, resulting an adequate and healthy air circulation and also high levels of insolation, consequently reducing the risk of spreading the Covid-19 viruses and meeting or conforming to a spatial design strategy that is adaptive to health protocols (UN-Habitat, 2020) (Figure 9).

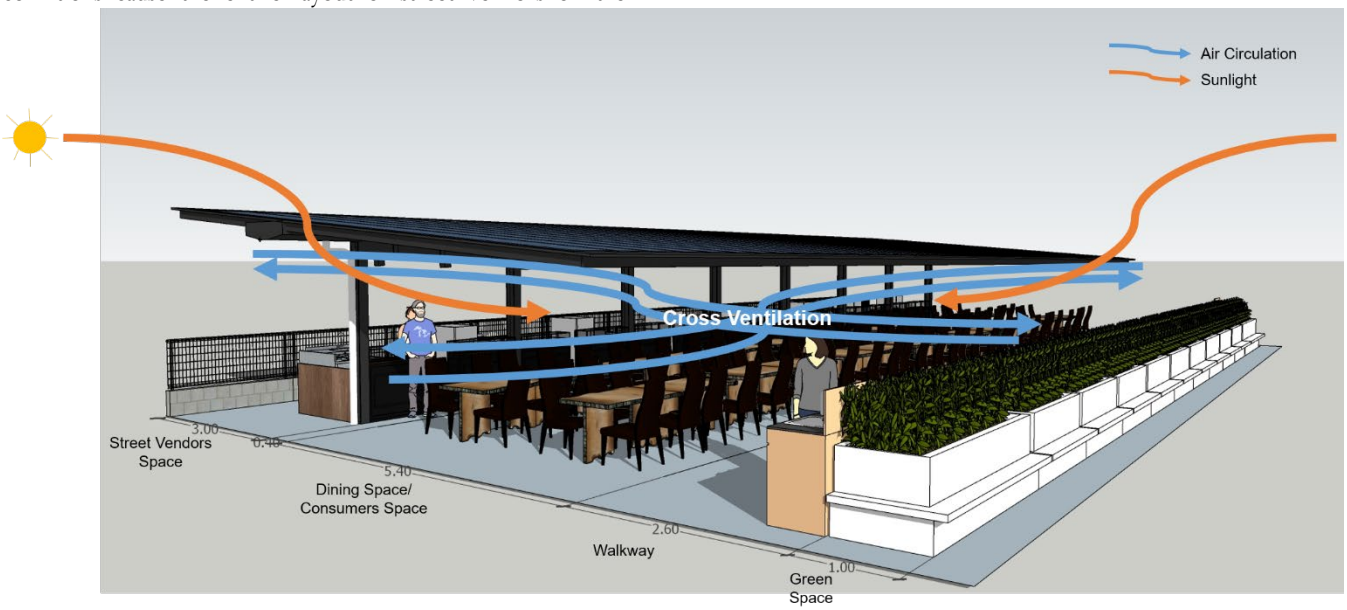

Figure 9 Air Circulation and Sunlight in the Street Vendor Space in Simpang Lima (Fieldwork in 2021)

3.3.3 The Public Sink for Street Vendor Consumers or Visitors of Simpang Lima

On the walkway and street vendor spaces in the pedestrian ways around Simpang Lima, there already are two public sinks, furnished by the Semarang City Government, located at the opposite ends of the walkway. Besides that, the vendors also added a sink between the sinks provided by the government that can be used by street vendor customers or the public to wash their hands with running water (Figure 10), and thus lower the risk of spreading Covid-19. This demonstrates that Simpang Lima street vendors do not create a new cluster for the spread of Covid-19, and moreover, this condition is advantageous for vendors because it can help recover their sales turnover and income so that the vendors can survive (Todaro, 2000).

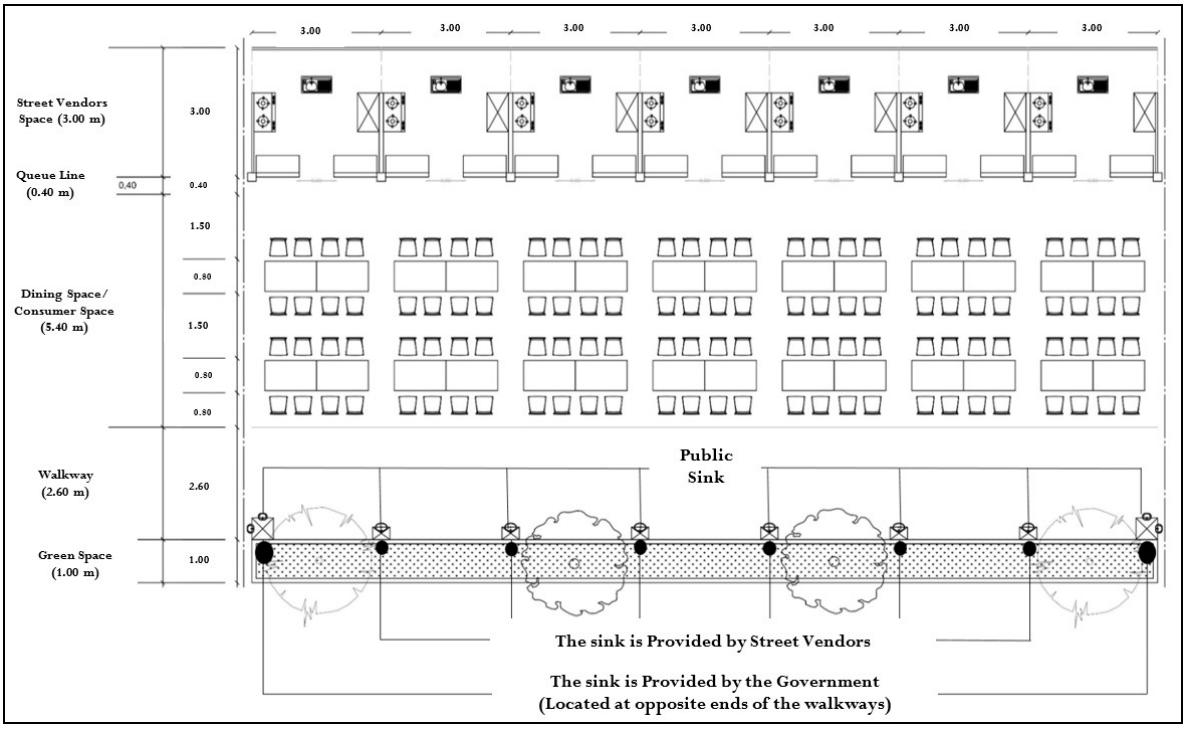

Figure 10 Public Sinks for Street Vendor Consumers or Visitors in Simpang Lima (Fieldwork in 2021)

4. Conclusion

As a result of research into the arrangement for the street vendors in pedestrian ways in the central business district of Simpang Lima Semarang, in Central Java, Indonesia, it can be concluded that the arrangements of street vendor activity spaces located on the pedestrian way have been adaptive to Covid-19.

In the arrangement of vending space, each vendor is allocated a space of 3x3 meters with a non-permanent boundary between spaces, which creates an open space area and gives rise to clear and unobstructed air circulation in street vendor activity spaces, as well as facilitating communication among vendors, so that they can cooperate with each other in selling activities, which is one of the characters of street vendors.

The arrangement of the consumer activity space, which is the dining space, and the vendor activity space is bounded by a 1.50-meter-high display cabinet and attached by wood or polyvinyl chloride (PVC) pipe of transparent and clear plastic on each top, so that there is no direct contact between vendors and consumers or between cashier and consumers.

The dining space concept uses food court ideas and is used as a dining space for the most consumers who are around the area. It applies long lines and linear dining seats, as well as having an open space without massive barriers, which creates smooth air circulation, commonly referred to as cross ventilation.

Two public sinks for consumers created by the government are located in the pedestrian ways. Vendor-provided sinks are also available. In addition, to maintain the cleanliness of cutlery and cooking utensils, washing is carried out in the available kitchen sinks, which are equipped with running water.

The size of the dining tables and chairs in the dining space is about 2.40 x 0.80 meters with a distance between the dining table of about 1.20 meters length can only be accommodated for six people sitting face to face with a seat distance between consumers next to each other along 1.00 meter and a sitting distance between consumers facing along 1.00 meter.

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