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Identifying Urban Public Spaces Through Substance and Surface Approaches

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Abstract
The provision of well-designed sidewalks in urban environments with mixed-use functions can increase pedestrian activity. This research aims to examine the role of substances and surfaces in the city's public space. The objective of this research is to create a city design guide for livable and interactive urban public spaces. The research was conducted using qualitative methods, the approach of Gibson (1979) about substance and surface, and the walking experience from Rapoport (1977); Jacobs (1993) was used in this study. Data collection was done by walking, direct observation, interviews, and visual documentation with photos, videos, and sketches. Analysis using descriptive narrative. This study reveals aspects of interaction, behavior, connection, and space use patterns in the city's public spaces as aspects that play a role in substance and surface. The presence of a substance on the vertical surface (facade) and horizontal surface (pedestrian way) can intervention with visitors to the store and make the pedestrian way function as a workspace. However, substances can also be a distraction in the human circulation space.
Keywords: Public Area; Substance; Surface; Walking Experience; Urban Design.

1. Introduction

The city is a space that is the center of human activity and the environment, so many say that the city is the most effective and efficient space to carry out productive activities regularly and can establish communication with humans and the space they occupy (Farida, Yudana, & Rini, 2017). The communication carried out can express the close relationship between humans and space because humans need space to live. The space needed by humans must be suitable to be inhabited when used (Tuan, 1977). Currently, urban design is believed to impact people's health and welfare positively. Research findings show that the provision of well-designed sidewalks in urban environments with mixed-use functions can increase pedestrian activity (Jackson, 2003). It can integrate marginalized sectors, such as the weak economy, into urban life and increase the sense of place in the community (Jackson, 2003).

In this research, pedestrian paths are identified as critical public spaces for urban spaces because they can show vitality in urban areas. Jacobs (1991) reveals that urban vitality is generated through the interaction between human activities and urban space. Then Lynch (1984) stated that urban vitality is the ability of urban systems to maintain internal survival, growth, and development. So that the elements of urban space, space patterns, and surfaces can determine the human experience when walking in public spaces. (Lan, et al., 2019; Yue, et al., 2020; Sulis, et al., 2018; IDRUS, et al., 2010; Sung & Lee, 2015; Pan, Yang, Quan, & Liao, 2021; Jiang, Han, Liu, & YE, 2022). The element of urban space is referred to as substance which refers to the part of the environment that is in a solid state, has a hierarchy, and is structured. So, the substance in an urban environment can affect human behavior when experiencing the visual perception of an object and judged based on its surface. While the surface is the outermost layer of the object seen by humans, the surface has a composition such as a layout, color, and texture. The surface is essential for human perception and incredibly visual perception because humans can physically react to what they see (Gibson, 1979; Nonaka, 2019; Chatterjee, 2011).

To understand the substance and surface of public spaces, we will reveal them through the experience of walking on pedestrian paths in urban spaces. Walking in practice benefits the environment and public health (Erkılıç, Özmen, & Kararmaz, 2022) and can provide a spatial experience of everyday life in urban spaces (Pallasmaa, 1996; Tuan, 1977). Walking is associated with reduced dependence on vehicle use (Zhu et al, 2014; Lee et al, 2014). In addition, the urban built environment provides an experience for pedestrians (Degen & Ros, 2012)

2. Objective

This research does not discuss urban vitality from a macro perspective, but the study focuses on examining the role of substances and surfaces in urban public spaces. This research aims to formulate urban design guidelines for public spaces in urban areas, especially pedestrian paths in commercial spaces. Thus providing a spatial experience of everyday life in urban spaces.

3. Methodology

Qualitative methods we used to conduct this research. To conduct qualitative research, we used an approach of substance and surface (Gibson,1979; Chatterjee, 2011; Nonaka, 2019) and walking experience (Rapoport, 1977; Tuan, 1977; Jacobs, 1991; Pallasmaa, 1996; Lund, 2005; Dunn, 2008; Barter, 2011; Suwarlan, 2020; Erkılıç, Özmen, & Kararmaz, 2022). For primary data collection, we walked and documented with photos and videos. As well as conducting interviews directly with area visitors and traders in the city space. Secondary data collection by conducting literature studies such as journals, books, and news. The method of analysis used the descriptive narrative method. The research location is in the Suryakencana area, a strategic area of the city (KSK) designated as a cultural tourism destination, commercial center, and culinary center that still maintains the identity of "Chinatown" in the city of Bogor.

4. Literature Review

4.1 Urban Vitality

Urban vitality has a vital role in developing an urban area and is often used as an evaluation material for the quality of urban development (Landry, 2000). Jacobs (1961) states that urban vitality manifests the diversity produced by the interaction between human activities and urban space. However, Lynch (1984) defines *urban vitality* as the ability of the urban system to maintain viability, both internally developing and evolving from suitable urban forms. Maas (1984) explained that urban vitality is seen in three aspects, namely

- human activities as space users using roads and public spaces continuously,
- human activities and opportunities in urban spaces, and
- the environment in which these activities are carried out.

This is reinforced by Montgomery (1998), which states that urban vitality can be seen based on the time of human activity in urban space and the facilities provided, thus creating a functional city space. Human activities can reflect how humans can participate in urban life. Jacobs (1961) states that to achieve urban vitality in a city, the city must have a relatively dense population concentration to affect intensive land use and high-density buildings. The recommended land use to support urban vitality is mixed land use to convert a single function into a versatile spatial function and provide more significant opportunities to support human activities (Koe, 2013).

4.2 Substance and Surface

Gibson (1979) explained that affordances are closely related to the medium, Substance, surface, and surface layout as the basis for the categories identified in human perception. Medium is things that can be seen or sometimes cannot be seen, such as air, gas, and water. However, we can see things more clearly with the medium because it provides movement from each part to the other, so the medium is the main category of perception and thus can also be considered an identifiable subject. A substance is denser than a medium: it can be liquid or stiff like iron/wood. The two substances have different properties or qualities; a person cannot stand on water because water has no density. However, wood/iron has a density, so other solid objects do not easily penetrate it, and we can stand on its surface because of its density. Gibson (1979) reiterates that a surface bounds a medium, and affordance can be intertwined with a surface layout. According to Nonaka (2019), Substance refers to the part of the environment in a dense, hierarchical, and structured state. So Substance in an urban environment can affect human behavior when experiencing the visual perception of an object and judged based on its surface. While the surface is the outermost layer of the object seen by humans, the surface has a composition such as a layout, color, and texture. The surface is essential for human perception, primarily visual perception, because humans can physically react to what they see. Substance and surface are a concern for users of urban space in their daily lives because Place is part of the habitat where city space users stand based on their point of view.

4.3 Walking Experience

Pallasmaa (1996) explained that bodily experience is needed, such as walking experience, which aims to discover spatial experiences in everyday life in urban spaces. Experience can be generated through sensory experience when we are in certain places (especially in urban spaces) through the senses of smell, touch, sight, hearing, and taste (Tuan, 1977; Dunn, 2008). Sensory senses are generally based on a comprehensive and realized understanding of our environment (Pallasmaa, 1996). Methodologically, by walking in urban spaces, we can understand how all the senses can be integrated with how the body moves (Lund, 2005; Barter, 2011). Walking in practice can bring environmental and health benefits to urban communities and provide the foundation for sustainable and balanced mobility within cities (Erkılıç, Özmen, & Kararmaz, 2022). Walking activities are generally divided into two activities, namely dynamic activities such as walking and running activities, while static activities such as standing, sitting, and leaning activities (Rapoport, 1977). When viewed from the standard speed of a person walking, it is possible to observe the surrounding environment and observe an object in detail and create a walking experience (Rapoport,

1977). The pedestrian path, which is the primary path for pedestrians, is expected to meet livable principles, namely having easy mobility for walking and having aesthetic value to public spaces (Suwarlan, 2020), as well as good pedestrian paths that can invite people to come, interact in the space, and create a space experience while performing each pace (Cambra & Moura, 2020).

4.4 Study Areas in The Suryakencana Area

The Suryakencana area is the Chinatown area, located straight from the main entrance to the Bogor Botanical Gardens by crossing Otto Iskandardinata Street and Ir H Juanda Street. At first, the area was a small village for the Chinese and served as the economic center of Bogor in the 1800s, and continues until now (bogor, 2021). Its strategic location makes Chinatown the most urban environment because it has a very high density. In order to make efficient use of space, the majority of the existing building forms are Shophouses with a linear pattern of streets following the main road corridor. The shophouse seems to be a 'landmark' for the Chinatown area itself, where the lower floor is used as a commercial/trade area, and the upper floor is used as a residential area (Bogor, 2021). In this Suryakencana area, these shops sell daily necessities, such as electronic stores, clothing and textile shops, household appliances stores, supermarkets, pharmacies, Etc. As well as various street vendors selling in front of these shops, both permanently and temporarily. In this study, the author has a research objective to determine the behavior of street vendors with shop owners so that it can affect the pattern of space use in the city's public spaces and impact regional visitors. The first step is to study literature such as journals, books, and news. The aim is to obtain information and identify the area, and its activities, such as visitors and street vendors. This information is used as a reference at the initial survey stage and checked with field conditions. Field studies were carried out by observing; we walked and documented with photos and videos. As well as conducting direct interviews with area visitors and traders in the city space. To check all the data collected, we do drifting, a journey without a definite destination, so we will stop when there is an object that speaks and is interesting for us to explore (Sadler S. , 1998).

5. Result and Discussion

Field observations were carried out along SuryaKencana road in Bogor City with a length of 1 km, starting from the border of the botanical garden to the border of the Siliwangi road, as shown in figure 1. Suryakencana road is dubbed as a tourist destination with very diverse activities in its daily life, ranging from food trading, Street vendors, trading of basic needs, and other activities carried out individually or in groups. Based on this, we can see how urban space is used based on substance and surface mechanisms. Substance and surface that will discuss in this paper are how behavior and relationships can affect the pattern of space use, the function of the space, who the actors are, and how it affects pedestrian circulation.

Figure 1. Mapping of Travel Routes on Suryakencana road, (source: author).

Based on observations in the field, there are several types of space use used by shop traders and how street vendors sell, such as there are several open shops that expand their merchandise to the pedestrian way and form a linear pattern, then there are street vendors who sell in front of open shops. or closed, attached to the front of the shop,

even though the activities in the store have different functions. Street vendors are selling in front of shops that are no longer active. Thus, these phenomena are interesting to analyze and study further to determine the impact.

5.1 An open store that expands its wares to the pedestrian way and forms a linear pattern

Based on figure 2 (a), (b) this food vendor places his merchandise cart in front of the shop, and the dining area is placed inside the shop. The shop is a food court that sells various kinds of fried foods, especially *combro*, yummy chicken noodles, yellow Soto, fried bean sprouts, dim sum and *nasi tim*, and *cakue*, each of which has its cart. The food court has a high density both on weekdays and on holidays starting at 11.00 WIB to 13.00 WIB in the afternoon and 16.00 WIB to 18.00 WIB in the afternoon. Although it has a high density in a place that is not too wide, the circulation and mobility patterns in the place can be entirely organized so that visitors who want to eat and finish eating do not overlap. This is due to the food vendors who put their carts in front of the shop and use part of the pedestrian area so that visitors who come to order food are done on the outside and inside the shop specifically for the dining area. Figure 2 (c) shows the response of regional visitors to the merchandise carts placed in front of the shop. Shop traders consider that placing their carts in front of the store can provide great potential because their merchandise carts can be used as markers so that many visitors to the area are interested in their merchandise. In addition, placing the cart in front can provide good air circulation because every trader sells using a stove that can cause smoke, so the smoke from each trader's cooking does not interfere with culinary activities inside.

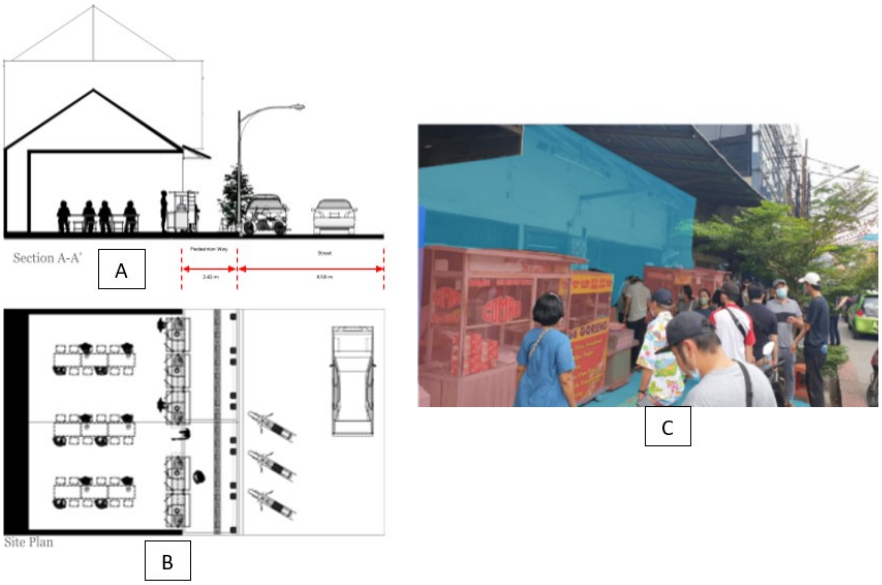

Figure 2. (a) The overall cut of the trading space; (b) Circulation and Mobility; (c) Merchandise cart in front of the shop

Food court food vendors and other food vendors, such as satay traders, placed a cooking/burning area in front of the shop and used part of the pedestrian path, and the dining area is placed inside the shop (figure 3). The cooking/burning area in figure 3 can intervene in area visitors buying their merchandise and make it easier for area visitors to order food. The placement of the cooking/burning area in front of the shop allows for other activities, such as interacting with traders and paying close attention to visitors.

Figure 3. Expansion Satay Merchant

Apart from food vendors, other traders, such as bicycle sellers, are expanding their merchandise to pedestrian paths (figure 4). The bicycle shop sells various types of bicycles, both in new and used conditions, which are sold at relatively low prices, and the shop offers bicycle repair and maintenance services. So, do not be surprised if the shop has become one of the favorite bicycle shops in Bogor, especially for bikers. Based on figure 4, the space use pattern of the bicycle shop utilizes part of the pedestrian path. On the inside, the shop is focused as a display area for new and used bicycles, and on the outside, the shop is focused as a service area. The location of the area is because the store area is not too wide, so to accommodate all these needs, the shop owner has extended his shop to the pedestrian path. Other than that, another reason for the store to extend the store is to facilitate the circulation of visitors, both visitors who want to see bicycle displays and those who want to do assembly and repair.

Figure 4. Expansion Bike Merchant

Based on this, it can be concluded that food court traders, satay traders, and bicycle sellers are substances that use space in front of the horizontal surface (pedestrian way) because the substance in the shop penetrates outside the surface. Substance using a horizontal surface intervenes with visitors so that visitors are interested in their wares. Traders cause the intervention behavior; shop traders tend to make some public spaces a selling area. (figure 5)

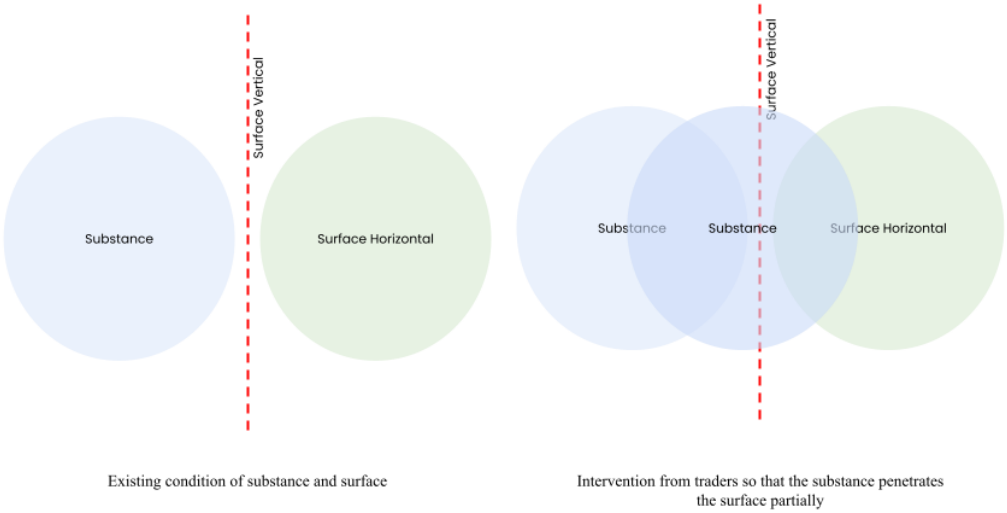

Figure 5. Existing Condition Diagram and Substance and Surface Intervention

5.2 Street Vendors Sell in Front of Shops That Are Open or Closed, Even Though the Activities Inside The Store Have Different Functions

Figures 6 (a) and (b) show two different activities that sell simultaneously; inside the shop is a clothing shop with closed sales and on the outside is a street vendor selling meatballs. Both traders are open every day simultaneously from 10.00 WIB to 18.00 WIB. The street vendors choose to sell regularly in front of the clothes shop because the shop's location is quite strategic, so it has easy access to visit. If observed, the space use pattern of the meatball vendor uses part of the outside area of the clothes shop; the dining area is placed right in front of the barrier (opening), which is still part of the shop, while the street vendors' carts are placed in a part of the pedestrian path. Figure 6 (c) shows the response of shop owners to street vendors who sell in front of closed shops, the condition of these street vendors can provide benefits for clothing shop traders because with the presence of street vendors selling in front of the shop, these street vendors can be used as an intervention to attract interest—area visitors who

want to eat on the spot. So, after a visitor finishes eating, the visitor usually enters a clothing store to look around and buy it. Figure 6 (d) shows that the dirty plate and glass washing area is placed on the outside so that many pedestrians complain because they are quite disturbed, especially when the shop is full of shoppers; as a result, pedestrians cannot walk on the pedestrian path. In practice, pedestrian paths are expected to have easy and safe mobility to create an experience and interaction.

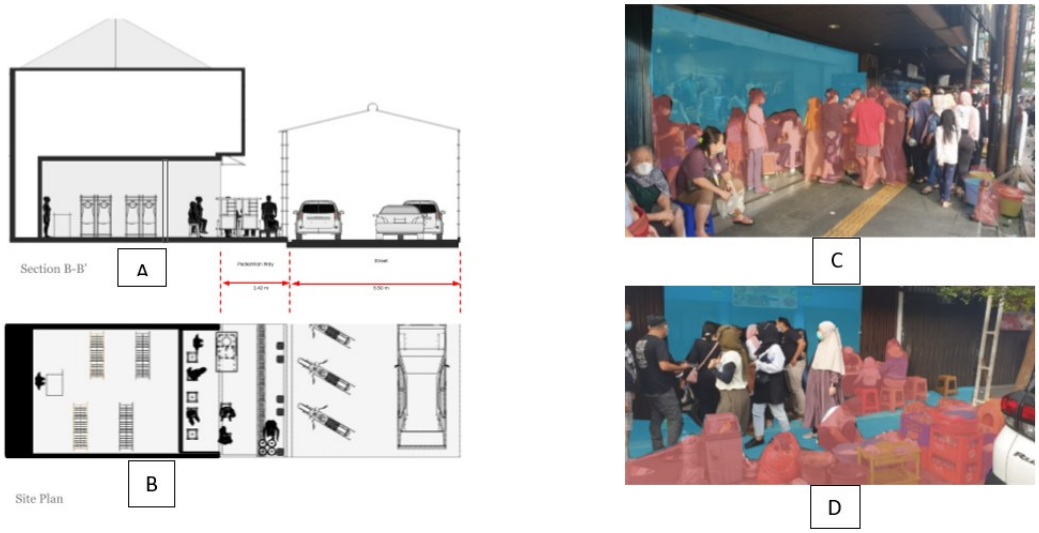

Figure 6. (a) The overall cut of the trading space; (b) Circulation and Mobility; (c) Merchandise cart in front of the shop; (d) The washing area is located on the pedestrian path

Based on this, it can be concluded that the presence of street vendors indicates that there is intervention from outside to inside, so that street vendors create a new function space, namely the public area as a selling area. Furthermore, the street vendors are part of the substance of the clothes shop. However, it becomes a distraction for pedestrian circulation. We know that pedestrian paths in urban areas are critical to facilitating pedestrians, so pedestrian comfort and safety are the focus that must be considered (Figure 7).

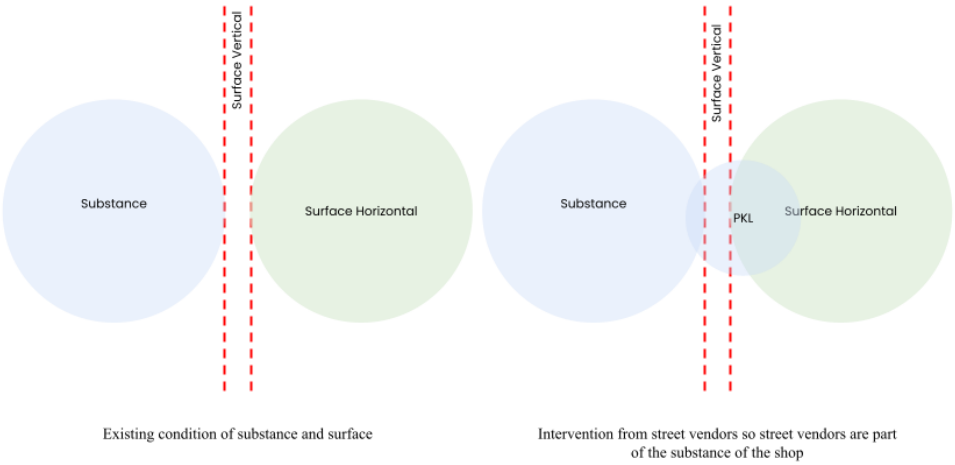

Figure 7. Existing Condition Diagram and Substance and Surface Intervention

5.3 Street Vendors Selling in Front of Inactive Shops

Figures 8 (a) and (b) show the activities of street vendors who sell temporarily. The PKL considers that the closed shop with a dead surface is a significant and profitable potential because the PKL can sell using the entire surface of the closed shop. In general, the target buyers from these PKl are day laborers and drivers of public transportation, so these PKl only sell drinks and snacks. However, these temporary street vendors often experience problems when selling because government officials often reprimand these street vendors because they are considered to be selling illegally and disrupting the activities of pedestrians. Based on the observations and analysis results, these temporary

street vendors need to be addressed and given proper space to sell. These temporary street vendors can be used as an intervention that can revive pedestrian paths.

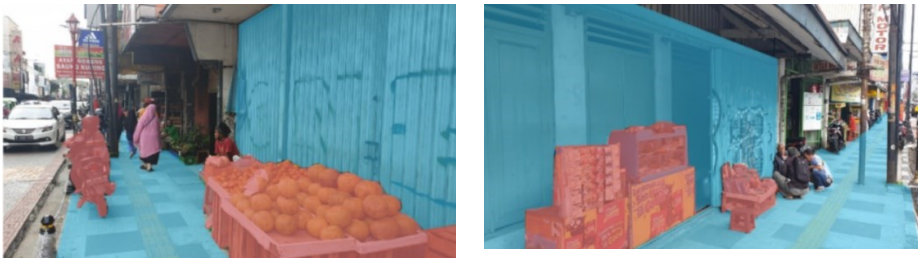

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Figure 8. (a) Temporary fruit seller; (b) Coffee and fried food seller

5.4 Behavior, connection, and pattern of substance use of space on the surface

Figures 9 (a) and (b) show the behavior, connection, and pattern of space used by street vendors and shop owners in city public spaces. It can affect the activities of city space users, especially pedestrians on the pedestrian way. Figure 9 (a) shows the behavior of street vendors and the activities of urban space users towards closed shops, so street vendors are the substance, and closed shop faces are vertical surfaces (facades) which are accommodated by horizontal surfaces (pedestrian way and pedestal). Figure 9 (a) shows that these street vendors have three behaviors towards shop owners. Street vendors intervene to shop owners because street vendors can attract visitors to the shop. Hence, street vendors and shop owners have a mutually supportive relationship with the pattern Street vendors in front of the shop. Second: street vendors have closed shops and have a pattern of street vendors in front of the shop. In general, street vendors who have occupancy behavior are usually street vendors who sell temporarily. Furthermore, the existence of street vendors on the pedestrian way can cause a distraction for city space users because the patterns created by street vendors can interfere with pedestrian circulation. There are work areas that are placed and use almost all pedestrian paths. Then, figure 9 (b) shows the behavior of street vendors and the activities of urban space users toward open shops. In figure 9 (b), it can be seen that street vendors and shop owners sell simultaneously, so the relationship between street vendors and shop owners has a mutually supportive relationship; therefore, street vendors are part of the substance of shop traders. However, there are shop traders who expand their wares so that they have a substance pattern that is partly inside the shop and partly outside the store. The existence of an expanding substance tends to make the public space an intervention area and make the public area and area for selling.

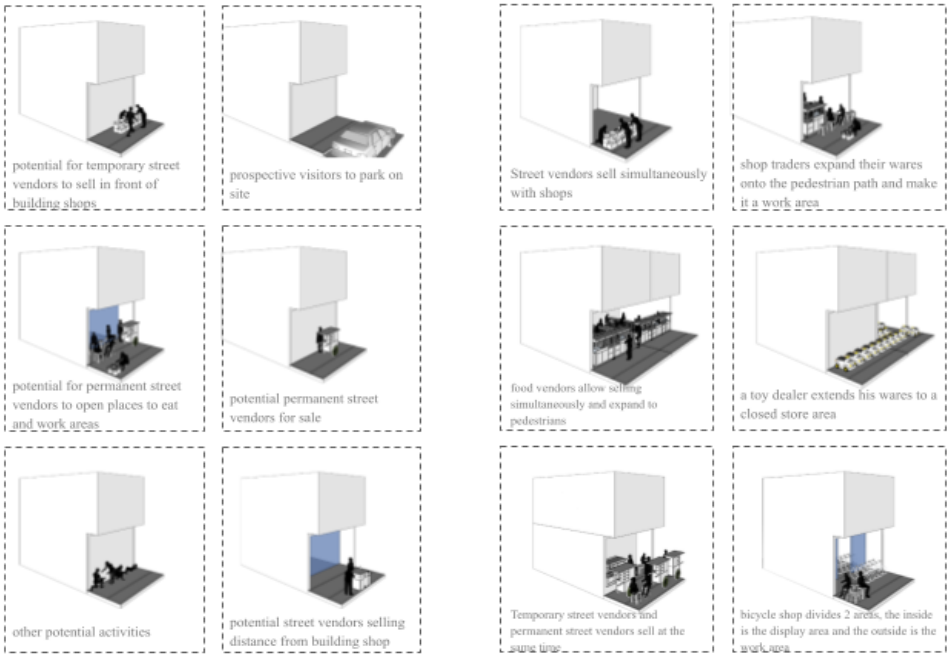

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Figure 9. (a) The behavior of the substance when the surface is closed; (b) The behavior of the substance when the surface is exposed

5.5 Results

In this case, three elements are interconnected and become the focus of the substance and surface approach: behavior, relationships, and space use patterns. Behavior describes the relationship between street vendors and owners, whether or not to intervene or for occupancy and distraction. Then, the relationship explains whether street vendors and shop owners support, harm, and interfere with each other. Also, the pattern of use of space by street vendors and shop owners, whether in front of the store, separate in front, and partially inside and outside, is the focus of table 1.

Table 1. Process Analysis of Substance and Surface Mechanisms

No.	Space Function		Behavior	Connection	Space usage pattern
	Inside	Outside			
1	Clothes shop	Food Merchant	Food vendors intervene in visitors	mutual benefit	in front of the shop and merge
2	Shop Closed	Temporary street vendors	Temporary street vendors occupy a closed shop	loss	upfront partly inside and outside. narrow the pedestrian path
3	Shop Closed	Other Activity	Permanent street vendors occupy closed shops	Bother	in front of the shop and merge
4	Cafe	Permanent street vendors	Permanent street vendors intervene visitors	mutual benefit	in front of the shop and merge
5	Toy Store	-	Expansion, so that distracts the pedestrian path	Disturbing pedestrian activity	upfront partly inside and outside. narrow the pedestrian path
6	Food Traders	-	Expansion, so that distracts the pedestrian path	Disturbing pedestrian activity	upfront partly inside and outside. narrow the pedestrian path
7	Bike shop	-	Expansion, so that distracts the pedestrian path	Disturbing pedestrian activity	upfront partly inside and outside. narrow the pedestrian path
8	Eyeglass Shop	Food Traders	Food vendors intervene in visitors	mutual benefit	in front of the shop and merge

In this case, the three elements are associated with the function of space in the Suryakencana area; the results obtained are:

1. The function of the space that is different between inside and outside can provide intervention for the space inside so that it is mutually beneficial
2. The function of the indoor space that is no longer used and the function of the outside space occupied by street vendors or other activities can harm shop owners
3. The function of the same space between the inside and outside can distract pedestrians, thus narrowing the pedestrian path

6. Conclusion and Recommendation

This study indicates that interactions, behavior, connection, and space use patterns are the basis for knowing the role of substance and surface in urban public spaces. So, based on observations of the four aspects, results show that the open surface gives the substance inside the opportunity to expand to the outside. Moreover, it shows that a closed surface provides an opportunity to transform the surface into part of the substance if there is an intervention. Substance uses a surface if the substance functions as an attracting element or sign for consumers. Substance uses a vertical surface (facade) and a horizontal surface (pedestrian), while substance uses a surface as a workspace. The substance is on the face of an open vertical surface; the substance also plays a role in attracting visitors to the store. The presence of a substance on the horizontal surface (pedestrian way) makes the pedestrian way also functions as work or commercial space and a driving force for the life of urban space. However, the presence of a substance on a horizontal surface (pedestrian way) can cause a distraction for pedestrian circulation.

Understanding the phenomenon, intervention, symbiosis, and disturbance by substance on the surface in urban space, in this case, the pedestrian way (especially road Suryakencana) will facilitate the realignment of the role of substance on the road by making urban design guidelines for livable and interactive urban public spaces. This conclusion only looks at the substance of street vendors, kiosks, shop surfaces and their facades, and the pedestrian way. I have not seen the relationship between substances such as parked vehicles, and elements of urban space, such as signage, with horizontal and vertical surfaces. So further research is needed.

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Conflict of Interests
The authors declare no conflict of interest.

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