Permeable interior: Unfolding threshold space within transit corridor

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Abstract. At a transit corridor, threshold plays a key role in creating connectivity between the interior of transit facilities and its immediate urban context. The threshold is a choreographer of spatial experience and might potentially generate various public activities. As a transitional space, the permeability of threshold space’s boundary becomes an important factor for the users’ spatial experience and in providing a sense of safety and direction for the pedestrian. Such penetrable properties also help the users predict what is going on in and around the space. This paper suggests that threshold space can be read as an interior space. Therefore, the author uses interior theories as a groundwork for the case study. This paper aims to reveal how permeability in threshold space within transit corridor might have an impact on its atmosphere and the people’s experience within. It also argues that permeable threshold can have a significant impact on users’ perception of the transitional space. The method used on this paper is a qualitative method, including literature review, case study, and field observation. The findings may be useful in planning threshold space in the future to create a better and safer transit experience.

1. Introduction
At transit spaces, a corridor has an essential role in connecting the interior of a transit facility to its urban environment. Because it gives an important impression of a transit facility and the city that surrounds it, the corridor accommodates the in-between experience. Therefore, it should be designed comprehensively from the beginning. In Indonesia, the regulation in designing transit corridor as pedestrian path has already stipulated in the attachment of Regulation of the Minister of Agrarian Affairs and spatial planning / Head of the national defense agency (Rapermen No. 16 Tahun 2017). However, in it does not elaborate further about specific design requirements and details.

As the connector of the interior and the city, a transit corridor can be defined as a threshold space. The particular characteristic of a threshold space is its ambiguity because it lies in between the interior and exterior space. Thus, it has the quality of both spaces as the threshold acts as bridge between interiority and exteriority. On the other hand, the threshold can create relations between both. The body of threshold can be created through barrier which creating boundary. These boundaries can create a statement where the threshold is and how much influence the threshold space can give on pedestrians whom in the transit corridor. Therefore, boundary playing an important role when discussing about threshold space.

In the discussion of the threshold space within the transit corridor also, the role of spatial boundaries becomes important in providing users’ needs, without disturbing their respective activities and spatial
experience. In that account, this paper aims to look at the potential of transit corridor’s boundary its impact on the user’s spatial experience and atmosphere. The observation for the case study was conducted at a transit corridor that connects Pasar Senen Railway Station and Senen Main Street, which now is one of the busiest railway stations in Jakarta.

This paper will observe and analyze how boundary helps to create interiority of the transit space and to shape the experience of the people in a transit corridor. Focusing on the boundary as delimiting elements of corridor’s interior and exterior. The expected result from this study is to unfold the potential of the boundary (in creating threshold) along the transit corridor.

2. Literature Review

2.1 Interiority and threshold space

According to [2], interiority is explained as an abstract quality that is formed from some dynamic parameters. It is this abstract quality that shapes the awareness of the existence of the interior. McCarthy also argues that interiority is non-absolute and is a transformative concept and depends on various condition according to the context and location. McCarthy stated, "Interiority is not a guarantee of inside location". McCarthy also states that the existence of interiority is always side by side with the exteriority, as 'subject to the trauma of separation'. Exteriority, on the contrary, is an abstract quality that is often associated with outside. Because of it always in line with interiority, the definition of exteriority also depends on how individuals place the perception of interiority in the surrounding space. Meanwhile, the area lies between those two is defined as a threshold. The threshold is not a part of interior neither exterior, however, it sets the limits for both and takes both characteristic. This condition makes threshold can be defined as in-between condition (between exterior and interior), so there can be an ambiguity on its spatial quality. Boettger [1] explained, threshold opens up space and arranges transition, however at the same time threshold also can be read as part of the boundary itself, which seen as a barrier. As threshold acts an element that provides a transition, it also arranges spatial sequence including atmosphere, movement, view, spatial characteristic and spatial quality.

2.2 Boundary in Threshold Space

According to Joedicke in Boettger [1], delimitation defines a the threshold space by giving it spatial volume and body. Delimitation can be seen and elaborated physically through the vertical and horizontal element, or non-physical elements such as odor, temperature, and sound. While Hernes [3] distinguished boundary into 3 (three) categories on how boundary regulates a space, which is “ordering, distinction, and threshold”. As of ordering devices, boundary acts as ‘tolerance limit’, as Harsbarger said [3], for activities/actions and human interaction which creates ‘some stability of expectation’. Whilst as a distinction, boundary acts as 'markers of identity' and plays a role in conveying different physical, social and mental characteristics by which space is distinguished from the environment [3]. It also negotiates with time in contributing to make a precise and authentic setting of spatial atmosphere and user’s experience. As a threshold, Hernes [3] stated that boundary can become threshold when it has the capability to become crossed by material/resources, human and other material (in this case wind, sun rays, etc.). That refers to the traits of a boundary which is, as March Simon [3] said, ‘permeable’.

In defining and analyzing a threshold space, Boettger [1] brings up 6 (six) parameters: delimitation (spatial definition), sequence (spatial sequences), geometry (spatial structure), topography (spatial situation), materiality (spatial design), and furnishing (spatial function). From those six parameters, only delimitation will be discussed further in this paper because it focuses on how the threshold space is defined and perceived in its entirety through its delimiting elements (boundary). Yet actually, studying this parameter offer further understanding of how threshold space regulates activities, sequence, and atmosphere within it.
3. Methodology
This paper uses a qualitative method to dissect its issue. It begins with a literature review and a case study is selected to analyze the thesis question in context. Direct observation and mapping are used to study the chosen site, which located at Pasar Senen Railway Station, Jakarta, at the west part of the transit corridor. The case study is used to give an understanding of what threshold space is--its in-betweenness characteristic, and also uncover the role of threshold's boundary as permeable elements in regulating the threshold space.

4. Case Study Analysis
Pasar Senen station is selected because it is one of the major train stations in Jakarta. It is one of the busiest stations, which serves inter-city and inter-provincial routes and it covers various classes from business to economy class, as well as several KRL routes. Therefore the role of the transit corridor that connects visitors to and from the interior of the transit facilities and city space becomes very important in this station.

4.1 Analysis
4.1.1 Physical attributes of the selected path
The northern part of the station is marked by residential and small-scale government offices, as well as privately owned businesses. While in the south, it is marked by a variety of public facilities, densely populated private housing and private business. The western part is marked by shopping centers and public facilities as well as major roads, Senen street. While the eastern part bordering with residential housing and private business. Elongated shape of the station, spanning from west to south. The west side corridor is chosen to be observed.

4.1.2 The selected points
Due to its elongated form, the transit corridors requires to be observed at several points to obtain more detailed information and break down the pedestrians' experience to the detail. The points are selected base on its physical characteristic or particular interior qualities. Point (1) is the beginning of the path, it is the transition point from the main road, Jalan Raya Senen. Point (2) is where the spatial atmosphere changes because of discontinuation corridor’s spatial body. At Point (3) The body of the corridor as a representation of the general transit corridor. And point (4) is the transition point, from the corridor to the interior of a transit facility. The points are being observed by direct observation, mapping,
photograph, and video to see how pedestrians react on the arrangement of the spatial delimiting elements in the form of transparent boundary.

4.1.3 Analysis of Point 1
This point is where the transition between the exterior (the city) and the interior of the transit corridor begins. At this point, the city slowly diffuses with the interior of the corridor and pedestrians gained focus on its interiority. The interior of the corridor is built from several physical boundaries such as metal roof, the structural columns, and the walking surface. When these physical boundaries allow the corridor's interior to have interchangeable qualities between the exterior factors (sun, wind, noise, etc.) and interior quality, hence it becomes a threshold. At this point, the spatial quality of the city greatly affects the corridor's atmosphere.
At point 1 also, the exterior plays an important part in building the pedestrians’ perception. As they walk along the path, the city landscape permeate into the corridor. Pedestrians are also consciously building their mental maps of the landscape while they walk by using the city landscape as a point of reference to determine their position. On the other hand, pedestrian also can determine their position towards the transit facilities by seeing how the layout of buildings arrangement around them. They look for certain architectural features, such as notable architecture as a landmark or the area where public-service motorcycle (ojek) are parking as a node. Unfortunately, in this case study, the surrounding city landscape is quite monotonous and does not really have significant features. No buildings that are really stand out, therefore pedestrians will find a some difficulties in building their mental maps based on the surrounding architecture (figure 5).

Permeable boundary also allows direct interaction between interior and exterior elements. In this case, the direct interaction occurred, for example, through ‘ojek’ driver who offered their service to the pedestrians. This kind of direct interaction with surroundings will trigger some form of communication (through hand gestures, or voice), and could possibly have some positive impact on pedestrians, presumably they would feel less detached with the surroundings. Although, other kinds of direct interaction such as y.

**Figure 5.** Different variations of information given by interiority and exteriority characteristic in each point.

**Figure 6.** Large portion of transparent boundary as threshold allows the nearest city dweller (ojek driver) intervene the interior of corridor and making contact with the corridor’s space user.

Permeability in the interior of transit corridors can also affect how users capture spatial sequence and predict what happens in or around the corridor. As a public space, which is always active and crowded, visual access is important in order to calculate time. For example, pedestrians can decide whether they should walk faster or slower, based on their perception of the surroundings. The ease to see what happen
ahead is also important for the sense of safety, hence, pedestrians could predict how to react if they perceive danger.

4.1.4 Analysis of Point 2
As we get closer to approach the transit facility, the focus shifted from the landscape to the architecture of the facility. Thus, the city becomes the background while the interiority of transit facility slowly permeates. In this point, the inconsistency of the horizontal boundary (the roof) changes the perception of the height limit of space and distorts the continuity of the transit corridor. It is interrupting the rhythm of spatial delimiters. This leads to the influence of the transit corridor's exteriority characteristics expanding and increasing, especially in visual. Thus, the continuity of the transit corridor becomes distracted. This creates a bit of confusion for the user. However, when viewed from the direction of the Senen main street, the discontinuity of canopy as a space delimiter does not feel significant. This is because the loss of some parts of the canopy is replaced by the leaves and branches of shady trees as if a natural ‘canopy’. The leaves and twigs are also capable of maintaining color tone on the interior of the transit corridor and the temperature within it, so it is not perceived differently. The only thing that becomes quite prominent was the corridor that becomes noticeably higher.

4.1.5 Analysis of Point 3
At point 3, threshold’s boundary plays a significant role in the user’s movement. It allows pedestrians to enter and exit the transit corridor at will. Boundary is needed to regulated for movement and emphasize the path. As mentioned above, pedestrians need to feel safe and comfortable when they walk through the transit corridor. Therefore, access should deliberately be controlled to maintain pedestrian’s focus and

To control movements, the materials and furnishing elements of the transit corridor plays a significant part in its interior setting. The physical properties of the corridor are not only a form giver but also defining the behavior within (boundary as a distinction). For example, the roof will filter sunlight and protect from rain and people would feel more protected yet in the other hand creating affordance to occupy the space. The path’s surface will affect how pedestrians move, the gap between the array of columns will signify freedom of entrance or exit, and furnishing element such as planters will act as an added boundary and will limit pedestrians’ access and help filtering the sunlight or dust from infiltrate the corridor.
During observation, the authors found interesting phenomena. Some physical elements of the corridor actually offer affordance for pedestrians. The different heights between the corridor and the street can afford pedestrians a place to sit, while the columns offer a temporary leaning spot. It shows that people are always looking for comfort in every situation, although their action might potentially interrupt the flow of other pedestrians. Even so, these behavior are interesting to observe because they give clue to what other possibilities we might think about when planning for a transit corridor.

4.1.6 Analysis of Point 4
The interiority of the transit corridor diffuses with the interiority of the transit facility. At this point, pedestrians will get themselves ready to enter their main destination. Ease of visual access will prepare them for what lies ahead, in return, some will respond by moving faster or some will move slower to adapt to the new situation (figure 6). On the other way round, people entering the corridor from inside the transit facility would be looking for a well-defined boundary, although its permeability would help them to see the activities inside, so they can be assured that they are on the right path that will lead them to the city.

4.2 Findings
The analysis from each point suggested that a transit corridor resembles the character of a threshold space. Pasar Senen’s transit corridor clearly focusing the pedestrian senses on the interiority of the station. This can be seen from how detailed and progressive the interiority elements of the station are displayed along the corridor rather than its more monotonous exteriority elements. But still, the architectural boundaries such as roof, paved path and rows of columns, is penetrable by exteriority elements. The threshold boundary can be the transition from the outside (the city) to the inside (corridor), the surroundings act not only as a background but also as a point of reference. Certain characteristics from the context form the pedestrians' mental maps. Permeable interior helps pedestrians to understand what kind of place they are in and gives them a better understanding of its immediate context. The permeable interior builds pedestrians' perception of the surroundings that helps them to predict and decide their action within the transit corridor, as experienced in point 1 to 2. Furthermore, physical and non-physical boundaries help the interior to regulate pedestrians’ movements along the corridor, as analyzed in point 3. The permeable interior gives better visual access to comprehend what is going on at the transition point between inside and outside, hence people can predict and prepare their next step.

5. Conclusion
Through this study, it can be concluded that arranging boundary or threshold is very important in designing transit corridor. the boundary defines the spatial atmosphere, arranges spatial experience and regulated people’s movement by its rhythm, placement, transparency, and many more.

In threshold space, the permeable boundary can help pedestrians to get the sense of what is happening around them, hence, it would help them to orientate, familiarize and navigate their way through the transit corridor. A boundary is not always a physical attribute of space, through the article, it has been shown that boundary can be an intangible aspect such as air, sound or light. In the future, the planning of transit corridor should consider boundary as an important aspect of the corridor, not only as a form giver but also as choreographer of experience.

The permeable boundary allows external factors to easily intrude into the interior of the corridor. It should be noted that for some pedestrians, the intrusion of too many exterior aspects would cause anxiety and threaten the sense of safety. Permeable boundary also gives permission to understand the social condition of urban space where the pedestrian in. In public corridor, the possibility of seeing or making social contact with the inhabitants of the urban space will break the feeling of being disconnected between the pedestrian and surrounding environment.

In planning a public corridor also, we must fully aware of the notion of fear of crime in public space. The corridor design should be able to integrate spatial elements that would overcome anxiety, for example, it should incorporate good lighting, clear pathways, visual connectivity and good surveillance.
For further study, the idea of regulating and choreographing boundary or threshold needs to be raised in public space discourse. Design of public facilities, especially transportation facility, tends to prioritize the basic functions, but have not been too aware of the importance of people’s spatial experience in the future. For further research, it would be more interesting if the research is done with a quantitative method. Therefore, parameters regarding pedestrians' experience and their perception could be measured, in the result, the conclusion could have more depth.

6. Acknowledgments
The work described in this paper was fully supported through a research grant by the University of Indonesia. The author thanks the management of Indonesian Railways Company, especially those who involve in Operational Area 1, (PT. KAI DAOP 1) Jakarta, and the Head of Pasar Senen Railway Station who had given the permission and opportunity for the author to do the observation.

7. References
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