Dealing with Private and Public Space Interface Problem in TOD Area. Case study of Batuceper Station, Tangerang

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Abstract. The Indonesian government has implemented the new strategy of Transit-Oriented Development (TOD) in dealing with urban issues, especially to overcome some of the urbanization effects such as housing deficiency, traffic jams, and private car usage. Under the PPP scheme, national private companies have initiated developing apartments in TOD of Batuceper station, located at the most populated district in the city of Tangerang. The mixture of residences with other public activities at TOD creates problems of privacy as the concern of accessibility and connectivity in the development principles. An in-depth study to examine this problem is required. Thus, this paper reviews various research related to the private and public spatial interface in the mix facilities area. This paper analyses the possible private and private space interface strategy between an apartment and other functions or activities at TOD Batuceper station development. The findings of this paper suggested that apartment design at the TOD area is a complex problem, and the proper strategy to solve such spatial interface problems depends on its linking hierarchy with other activities in the development area.

1. Introduction

Urbanization in developing countries has led to cities' horizontal growth and accordingly made problems of urban sprawl. The issues such as the increase of trip lengths and private vehicle usage, escalation of traffic jams and accidents, as well rise of criminality have affected many urbanizing cities. Therefore many urbanized cities have reinforced their public transport by developing mass rapid transit systems (MRTS) such as metro rails and Bus Rapid Transit Systems (BRTS). It is, however, essential for them to efficiently use these systems by integrating its land use with transport infrastructure to make cities livable, healthy, and smart. [1]. It has thus become inevitable to have Transit-Oriented Development (TOD) for all such cities which have existing mass transit systems or are planning to do so. By TOD, pedestrian, and Non-Motorised Transport (NMT) public infrastructures increase the accessibility of transit stations. That accessibility benefits so many people, thereby increasing the ridership of the transit system.

As Indonesia's cities are experiencing rapid growth, it is crucial to consider the implementation of transit systems to cater to massive growing travel demand. In 10 years, from 2007 to 2017, the share urban population in the total one has grown from 47.54% to 54.66% or on average of 7.12 % annually. With 147.6 million urban population in 2018, the World Bank has predicted that 68 percent of Indonesia's population is living in cities and towns in the coming ten years [2]. This high rate of
urbanization usually is followed by urban agglomeration as it has happened to the capital of Indonesia and its neighboring towns.

Jakarta includes Bogor, Depok, Tangerang, and Bekasi is the most significant metropolitan in Indonesia and the 2nd largest megacities in the world. Tangerang, in that term, includes the city of Tangerang, the city of South Tangerang and Tangerang regency covering about 1.500 km² and resides by about 5 million people [3]. To deal with urbanization in the Jabodetabek area, the Indonesian government applies the TOD concept at the Batuceper station area by developing a middle-class apartment. The TOD's location at Cipondoh district in the capital of Jakarta as Tangerang is one of the main transit areas at the Jabodetabek area [4]. On the regional scale, the TOD concept could play an essential role in reducing heavy traffic congestion and solving sprawling urban problems. However, successful TOD involves more than merely placing a transit stop in a residential neighborhood next to a transit hub as TOD's multi-elements development. It also depends on the capacity of all stake-holders support the production of liveable urban settlement [5].

The objective of this paper is to search for local references on the spatial interface between the transport nodes and residential spaces in urbanizing cities in developing countries such as Indonesia. The methodology of this study of a spatial interface that emphasizes encouraging neighborhood livelihood linkages area focusses on literature review and secondary data collection—the highlighting literature study base theoretical framework formulation. The framework then is used to review the proposed design of the Batuceper station area development in depth primarily upon how the design ideas solve the issue of a public-private spatial interface through cross-reference and written materials survey.

2. The Content of The Study

2.1. Residential development in the TOD Area

In a review of the various definitions for TOD, Cervero, Ferrell, and Murphy write that while details vary, the core principle of idea is to provide mixed-use development that is near to and well-provided by transportation changes and is encouraging to walk or ride bicycle [6]. In that principle, TOD mainly involves physical elements that consist of people, places, and connections. Concerning people, TOD provides a range of housing options and prices; make great public space; incorporate public services as amenity and catalyst. Meanwhile, as an element of place, the idea encourages mix used, promotes density, focuses on compact development, and makes each station a unique place. The concept of TOD in the connection’s elements context focus on pedestrian and bicycle connectivity; manage cars and parking; integrate station area and surrounding community; and make clean, safe, and reliable transit place and take people place [7].

By considering the above elements, it is very reasonable that the idea of TOD puts residential as its main element. That so, the development can provide such a compact and integrated plan in which housing and transit areas or even working place are in one neighborhood. The concise arrangement produces a pedestrian corridor between stations and homes and puts a commercial space in there. Consequently, it creates such a walkable and livable route with high density mixed land-use where the corridor would experience peak hour in both directions and optimize transit system. In this situation, the delineation of public and private areas is critical [8]. And therefore, it is essential to put more awareness on the design and maintenance of open place as ideal TOD is inviting and attractive to many types of users, whereas people have different standards and different reasons for using the same area.

The problems of an interface are getting complicated as a behavior of corridor users either residents or just passerby are cultural differences and, TOD designers need to address these varied concerns in ways that do not expense economic efficiency or conflict with larger community goals. Accordingly, apartments design in TOD beyond the scale of the building, typically focusing on blocks, neighborhoods, or districts, can be a crucial mechanism for achieving this balance [9]. Besides, to increase the accessibility of transit stations, TOD is supposed to integrate land use and transport planning and aim to develop planned sustainable urban growth centers. The corridor design thus is sensibly to consider the interface of public and private space to make such a smooth circulation in it. Although some
issues are mentioned but still pose many unanswered questions, mainly because of TOD unique by location and site context [10].

2.2. Private and Public Space Interaction
Interaction of private and public space in the TOD area is specific problems, mainly when housing integrates to working places. It is merely because the linkage of housings private area and public transit and working area create such a pathway. In terms of design context, there are some possibilities for interfacing those mix used spaces as each space has its characteristics. Public space is a free place for all people use and enjoyment; on the contrary, a private residence is accessible to those allowed by regulation or norm. And private and public spaces make essential such a dialog in between that reflected its constraint over permission to others depends on the socio-spatial periphery value system. Interfaces resonate with the ambivalence associated with the immediate needs to involve with and withdrawal from an urban living of visitors. For this situation, the boundary is a critical midpoint by which somebodies exchange the unpredictable existence in urban conditions in which unfriendly yet near [11]. Yet, currently's individuals, particularly privileged ones (high takings, racial or faith differences), tend to be communicated only with communities from related groups.

Also, Karacor says that public spaces support human interaction. Under this idea, the availability of one area is about its visual and physical linkage to nearby, and it implies the easiness in which people can reach a location or services. A thriving public domain is being visible and easy to use as well as related to public transport [12]. Accessible public spaces inevitably can influence their locality property prices confidently and pull social business progress [13].

The inquiry on the public-private boundary is a particular approach to a further thorough interpretation of the idea of inner-city permeability. Permeability has developed a widely-applied and mistreated idiom in public design discussion – occasionally showing as a synonym for linkage porousness, another period concerning to structures with portions of voids in them. In the earliest article, penetrability comprised the misbehavior of community, spatial, and sequential borders, with attention on the behaviors that places of family life besides creation infiltrated and distorted with an metropolitan public area, making the concentration of community life and the pathway as a place [14]. However, there have been many evaluations of the privatization of open space, yet these contemporary pseudo-public areas of a shopping mall and gated society have their boundaries with the public city that require be better understanding.

There are some methods of analyzing spatial configurative associations between building entrances and the road system. The more entries related to a street, the higher the chance that someone appears from a private space into a public one. Though, the high intensity of entrances connected to a road does not always indicate high inter-visibility. There is a difference in the way entrances compose streets, and in the way, they are inter-visible to each other. The way doorways and openings position affects the possibilities for social restriction and boulevard life.

A mixture of several micro spatial measurements creates its potential to obtain quantifiable spatial data for assessment on socio-economic data and offer an understanding of the spatial settings for secure and vital urban spaces. In the suggested approach, the penetrability level has double variables: (a) visibility—the facade estate that permits persons to view it through; and (b) openness—the frontage estate that enables persons to cross it as these variables are not co-related, so they work individually.

The visibility and accessibility measures are a combination of quantitative and qualitative measures. The first measurement is described in the degree of how pictorially or materially penetrable the facade while a qualitative category of the form is visibility or accessibility of space. This form belongs to a socio-spatial categorization corresponding to the site function—if it is a communal or personal area, lodged, underutilized, or vacant. This diversity is significant as site function can inspire or, inversely, prevent the interaction between pathway and lot, interfering in its role to metropolitan life. This scale refers to the norm that the visibility to a (semi-) public space displays further possibility to encourage connection concerning the pathway and the lot than that to a private area, which is typically more
directed and detached. Similarly, visibility of a private space produces more possible interface than the profile of a space, which in order, only exceeds the no visibility term [15].

3. Result
The Transit-Oriented Development in the Batuceper station area indeed brings residential close to transportation nodes in the walking distances. Two state companies collaborate in the National Housing Public Company (Perum Perumnas) and PT. Kereta Api Indonesia (KAI). The Apartment development has initiated the apartment is designed in an area of about 10,000m² and situated in the center of the TOD area in the northern part in the radius of 350m from Station Batuceper (Picture 1). It accommodates commercial function (30%) and accessible public space that connects to the train station at the podium level, and residential capacity (70%) situated in the tower zone. There is also public facilities and parking building placed on the podium floors that supporting TOD area.

![Figure 1. Site Location of the apartment in the TOD area](image1)

Meanwhile, to deal with spatial porosity, the apartment building has considered the existence of housings and stations in the surrounding by making such significant permeable spaces (Picture 2 and 3).

![Figure 2. The pattern of permeable spaces](image2) ![Figure 3. Permeability in the ground level](image3)

That horizontally spatial division also follow up by vertical concept. The development of TOD has put plaza as physically and visually interface space to support all functions well in their purposes (Picture 4 and 5). All those design concepts consider the users' characteristics [4].
The current social-economic data of the World Bank [8] that shows the increase of mid-class in the urban area in Indonesia suggests the middle-income group dominate the purpose of the TOD area in the Jabodetabek surrounding (Diagram 1). The mid-class, meanwhile, includes a productive class with a salary of 5-15M IDR per month. They are mainly young workers, either single or married, and most of them can buy a private car and motorbike as well as an apartment unit. In general, the characteristics and behavior of users can be identified in below Table 2. [3]

**Diagram 1.** The social-economic development of the urban population in Indonesia

| User          | Characteristic                  | Behavior                                      |
|---------------|---------------------------------|-----------------------------------------------|
| Dweller       |                                 |                                               |
| Single worker | Individual.                     | Most of them spend time at their office.      |
|               | Has various activities          | At home after working hour or night or at the weekend |
|               | Spend most of their time outside| Killing time by making social interaction outside |
|               | Need interaction space          |                                               |
| Young couple  | Consist of husband and wife     | Most of them spend time at their office       |
|               | Spend most of their time for working | At home after working hour or night or at the weekend |

**Table 1.** Apartment’s users’ characteristics
| **Family** | Consist of husband-wife and children | At home fulltime after school and working time, as well as at the weekend |
|------------|-------------------------------------|---------------------------------------------------------------|
|            | Some have baby sitter or servant     | Have their each own activities                                |
|            |                                     | Using free time along with the family                         |
| **Management** | **Administration** | Consists of *the front office*, sales, finance, general, and human resources management | Working as office time hour |
|            |                                     | Reception for guests                                          |
|            |                                     | Service.                                                     |
|            | **Security** | To ensure safety both inside and outside of a building | Working for 24 hours to keep the property and environment |
|            |                                     | Related to safety and security aspects | To make safety control |
|            |                                     | The security that responsible for one guard post and making patrol in particular and scheduled time. |
|            | **Housekeeping** | To maintain cleanliness both inside and outside of buildings | Working for 24 hours to keep the building and environment cleaning |
|            |                                     | Related to cleaning aspects | To clean the building and its surrounding |
|            | **Technician** | To maintain building mechanical and electrical function | Working as office hour time |
|            |                                     | To have access to ME rooms.                                 |
|            |                                     | To maintain building utility.                               |
|            |                                     | To maintain and repair                                      |
| **Space tenant** | **Special function tenant** | To use individual rooms at the apartment such as auditorium or tenant at commercial function | Working as office hour time |
| **User** | **Characteristic** | **Behavior** |
| **Space tenant** |                                     | To have access to the podium floor only |
| **Visitor** | **Non-train traveler** | Guests of apartment residents or use the commercial function. | Activities at working commercial working hour or uncertain (apartment guests) |
|            |                                     | Do not have access to dwelling units.                       |
|            | **Train traveler** | Train passengers who are going through Batuceper Station | To use commercial function while waiting for train departure |
|            |                                     | Do not have access to the dwelling unit.                    |

The listed characteristics indicate two central potentials of public and private spatial users: residential and non-residential. The residential belong to a single group only, but the non-residential category consists of at least three groups of people whose characteristics are incredibly different.
4. Discussion

By connecting to several transportation modes, Transit-Oriented Development at Batuceper station should not only provide transportation options benefits but also can improve the livability of its communities and neighborhoods, mainly mid-income groups, which increase in numbers (Diagram 1). The relatively narrow TOD area (Picture 1) can offer the social capital advantages of a beautiful pathway for people who both live and work in the apartment through its useful function. The position is to come because, under this TOD’s development, density plays the vital elements in encouraging less car usage, more frequent public transport usage, increasing physical activity, and offering a safer living condition. Those all design characteristics indeed could be seen on how the spatial design of the public and private interface.

The apartment design outline shows the apartment deal with the problems of interfacing public and private spaces. To deal with high density, diverse function as well as various surrounding concerns, the design divides the ground level area into three zones by significant interaction spaces (Picture 2). The spaces connect surrounding residential areas to stations and bus terminal areas by which maintains TOD Batuceper area permeability (Picture 3). Such significant circulation corridors will not only convey people both apartment residents and non-residents but also the TOD area neighboring people. Considering the socio character of the apartment residents (Table 2), it seems that privacy becomes sensitive concerns, and therefore the public-private interface is getting a critical issue of the TOD's apartment design at Batuceper station.

According to Picture 3, corridor design also places the commercial function along so that it attracts people to come and spend more time in the interaction spaces. Theoretically, this interaction space by its standing interfere with the privacy of apartment residents as visually it is very close. However, by putting the residential area and function above the commercial level (Picture 4 and 5), the accessibility of private service of the residential zone is more centralized and manageable. Therefore it seems that it be more convenient for apartment residents to have housings in the TOD Batuceper area if the interface of the public and commercial corridor and housing entrances are well handled either by location or security system. By locating apartment entrance in the invisible points, it increases apartment residents' private concerns. In this case, the apartment design has fulfilled the minimum requirement of private access by separating it mainly from the entrance of non-residential and apartment management workers.

Under the design features, it seems that Batuceper TOD’s area promotes walking and transit riding and discourages automobile use. The detailed design of the building and pedestrian path that covers people from the hot sun by building's shadows and landscape give maximum impact on the purposes of TOD. Besides the lift up of private function is optimizing the problem solution of corridor or circulation as a public-private interface as the various service denotes the availability of a wide range of amenities and activities also determine the successful TOD Batuceper’s roles. Therefore it is essential to consider secondary edge in the interface between public and private space in the vertical apartment context as a crucial aspect in residential development since they can become the focus of community tension related to territoriality or occupation of an area. However, this spatial interface strategy on dealing with the issues is not as ample proof of branch understanding of the private-public space interface problems as this study uses only a single case study.

5. Conclusion

No doubt that TOD is very relevant as Indonesian cities urbanize. The growth of mega-urban, such as the Jabodetabek region with its social problems, indicates the importance of the TOD strategy. However, the development of residential at the TOD area needs huge attention from architects and planners to make sure residential development can have a positive impact on the local neighborhood.

As for the citizens, the mid-class apartment residents primarily prefer for them to have a livable environment, a safe, healthy, and comfortable habitat for their children and themselves, as well as their businesses and workplaces. In the case of the Batuceper TOD area, the elevated housing functions not only to answer the problem of high-density living but also to respond to the questions of the public-private interface.
The vertical spatial interface could be a natural and applicable alternative solution of integrating housing entrance and community space in the TOD area. It is because vertical zoning automatically creates not only uneasy but also invisible access that different from most of the typical interface discussions that discuss how to manage the distance or access of housing entrance to the public street. In the case of TOD, where high-density living becomes essential concerns, the vertical arrangement is necessary so that traditional issues of accessibility and visibility become irrelevant but more on the entrance security management system either by security man or smart building. However, all those requirements are contextual both in terms of socio-economic backgrounds and site location. And it needs more cases to show that vertical interface requires more attention as it closely relates to urban development in developing countries context.

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