Hybrid spaces: Sustainable city components in the transit area of Jatinegara Station Indonesia

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Abstract. The Jatinegara Transit Area is an area of stations, residences and markets that have the potential to be developed into a Transit Oriented Development (TOD) area. The development aims to create a sustainable city and will become a hybrid area of a new residential ecosystem. In the research location, the rate of urbanization is relatively high which causes social and environmental problems that are very dangerous to the health and welfare of residents. Problems related to the environment include: increased CO2 emissions, loss of biodiversity, air pollution and climate change. Social problems involve the reduced space for interaction between residents due to the fulfilment of housing. Holistic planning is needed to solve this problem, through social and environmental approaches to create a sustainable city by developing a hybrid space model. The research method uses analytical methods (planning documents, design projects and literature), observation methods, comparative methods, etc. The first stage is mapping the existing conditions and the next stage is creating a model that applies a hybrid space. The conclusion of this research is that hybrid space is an alternative to improve air quality and provide public space for community interaction in terms of environmental and social sustainability.

1. Introduction

The development of the city today is characterized by many positive phenomena as well as negative changes, most of which affect the natural environment and cause a decrease in the quality of living conditions: the rapid development of motorization, congestion and increased air pollution, an increase in the process of urban expansion to the outskirts and the destruction of the city centre, the process reduction and pollution of green open spaces, unmet recreation areas, etc.

This time the dream of achieving sustainable urban development has been partially realized by creating a new type of public space defined as “hybrid space” [1]. The complexity of human activities and needs in contemporary cities continues to increase as well as demands to fulfill various needs, obligations and desires. This process requires a new special room, which must respect the many types of activities that are combined in certain places. It is necessary to design a public space and a multifunctional experimental building. In the design process, it is imperative to integrate different visions and disciplines to create a more integrated and comprehensive urban structure than is possible with just the number of separate sites and buildings.
Research related to hybrid space as a city component for a sustainable city, among others; a hybrid space is characterized by various types of connections: a combination of different functions, real and virtual spaces, urban solutions with architectural solutions, and solutions in the field of landscape and transportation architecture, historical and contemporary relationships, culture and natural connections [2]. In line with this, Trancik, the author of Finding Lost Space [3], states that public open spaces in cities are places that make citizens more alive. Because public open space can be used for interaction and recreation of its residents. In order to be able to provide sufficient and high-quality green space to urban residents, local authorities are increasingly in search of new, adaptive and flexible forms of urban gardening, characterized by high accessibility and hybrid functions [4,5]. Hybrid design is a specific situational response to the challenges of City Sustainability [6], therefore modelling is needed to assess environmental performance. Conclusion From the discussion of studies that are in accordance with this research topic, it can be obtained an understanding that efforts to improve environmental performance must be initiated by understanding the components of the city.

Based on the conclusions of previous studies, this study will focus on the redevelopment of the Jatinegara station transit area to improve environmental quality, reduce levels of air pollution and minimize vehicle use. The purpose of this research is planning a hybrid space in the transit area with the hope that it will provide input to the local government as an effort to improve the quality of the urban environment. Hybrid spaces to limit transportation needs and improve environmental conditions by developing greenery (various types of green elements) in public spaces, and increasing the amount of space for pedestrians and bicycle routes, etc.

1.1. Study area
To find the right approach to expand green space in high density urban environments and promote its socially and economically sustainable development. Jatinegara Subdistrict is known as one of the areas with moderate density in the Municipality of East Jakarta which was chosen for the case study, because it has the potential to be developed into a Transit Oriented Development area. The research area is located in three sub-districts, 1) Jatinegara District, namely the area of Rawa Bunga Village and Balimester Village. 2) Matraman district, which is located in the Pisangan Baru Village area. 3) Pulo Gadung sub-district is located in the Pisangan Timur village area.

| Area Classification | Density | Low | Medium | High | Very High |
|---------------------|---------|-----|--------|------|----------|
| Population Density  | person/ha | < 150 | 151 – 200 | 201 – 400 | > 400 |

Table 1. Population density based on area classification [7].

Based on The Indonesian National Standard Number: 03-1733-2004 concerning Procedures For Planning Housing Environments In Urban Areas, Jatinegara Station is located in Rawa Bung and Balimester Villages with a population density of 75240 / km² with an area of 1.55 km² including the High Density Classification of 206 people / ha (based Table 1).
Figure 1. Existing Jatinegara station area.

Figure 1 shows the land use in the research area that is included in the transit-oriented city development plan. A transit-oriented development area is an integrated area for mass public transportation that encourages the movement of pedestrians, cyclists, the use of mass public transportation and restrictions on motor vehicles within a radius of 350 m (three hundred and fifty meters) to 700 m (seven hundred meters) and the centre of the area, which has the principles of a transit-oriented area [8].

2. Theoretical framework

2.1. Hybrid space

The need for open public space between private spaces gave birth to the idea of a new space, which Nissen called a hybrid. Hybrid open spaces will create new activities: private open spaces that are publicly accessible. The character of a hybrid open space according to the Minister of Public Works Regulation No.6/PRT/M/2007 concerning General Guidelines for Building and Environmental Planning is open, free and easily accessible to the public, even though it belongs to certain parties [9]. Hybrid open space is a place that has been dedicated to the public interest based on an agreement between the owner and the government. Of course, it is not easy for private owners to simply give their land to other people whose motives are not yet known.

The starting point and core of the Hybrid Space concept consists of the introduction of a blend of environmental and physical situations, greening and road network integration in urban, architectural, social and cultural spaces. Our environment is currently being transformed rapidly by Digital, which is widespread and transforming the Physical as well as the social, cultural and economic organization of our society. Therefore, Hybrid Spaces focuses on hybrid fields that arise from the combination and fusion of environments, objects and services in production, distribution, use and recycling network systems in the information / communication age.

Dense urban environments seem to be the ideal scenario for hybrid architecture as they promote compact cities instead of scattered cities. As a mixed-building hybrid of organisms that enjoy a "dense and fruitful atmosphere", they must evolve in a dense environment to meet their needs. Dense city based on complex, diverse, interrelated and dynamic which is fundamentally related to the nature of hybrid architecture. When they take up "less space, land and infrastructure, they need less maintenance" the uninhabited space remains available for future development or for other activities [10].

2.2. The potential of hybrid spaces in cities

A hybrid space can host urban designers, architects, and landscape architects. In designing, of course, it is necessary to identify who will be present in the space, how the connections between buildings are, as
well as the types of plant vegetation that are important to increase the city's oxygen levels. There are several potential locations for the presence of hybrid space, among others [11]:

- **Railway Stations**: At some stations there are borders with trade, education, or residential areas. Free and safe walking access to and from the station is the key to the realization of the hybrid space. The access created should be an underground route. Apart from access, open spaces in the form of parks for residents to wait for public transportation or to sit and rest can be created, especially at stations that have adequate land.

- **Mass Rapid Transit (MRT) and Light Rail Transit (LRT) Stations**: Currently MRT and LRT stations are being built with connections between surrounding buildings in the form of bridges or underground. MRT Jakarta, for example, has planned underground hybrid spaces that are connected to the surrounding buildings as well as the TransJakarta bus stops in the vicinity. The underground connections will be complemented by shops for small and medium enterprises. This basement, although not open, can be a place for residents to rest after walking.

- **Office buildings without a "partition"**: Currently office buildings in Jakarta still have a "partition" in the form of a guardrail for security reasons. Meanwhile, in Singapore, for example, inter-buildings already have a common space at the back without fences, which can be accessed by the public so that public activities arise. Public activities between these offices can be filled with scheduled events such as bazaars, art performances, or events to show off community activities.

- **Shopping centers**: Shopping centers are the locations most frequently visited by residents, therefore the existence of a hybrid open space is easily realized here. Space can be an open garden equipped with the presence of small and medium business traders.

In the end, hybrid spaces become one of the pillars of the sustainability of urban public open spaces. The successful creation of hybrid spaces will never happen without the cooperation of the government, private sector and society. It is time to implement various building construction regulations that include public open spaces, for the sake of the mental health of residents and the urban environment.

### 2.3. Principles of public hybrid space

There are many principles in shaping a hybrid public space, among which the most important ones need to be mentioned: the creation of an expressive identity, providing high quality and cohesion with the city structure, providing flexibility in solutions and a variety of functional programs, providing the possibility of permanent and changeable activities, providing security and accessibility, etc. [1].

There are several types of hybrid public spaces in urban areas, for example; a combination of squares and city parks, public parks, industrial estates turned into new cultural landscapes, cemeteries used as public parks, playgrounds, riverbanks as parks, waterfront areas for greeneries, vertical gardens, intersections and transportation centers, walking paths, large-scale urban sculptures, experimental space revitalized history, public spaces combined with hybrid buildings (often high-rise, large-scale buildings), etc. [1]. In the planning process, urban spatial forms, including hybrid public spaces, have an important role as instruments such as urban architecture and design, urban composition, landscape architecture, transportation planning, and construction design.

There are many different solutions of public hybrid space in contemporary cities, namely outstanding examples of expressive identity: 1) hybrid public space as a link between spatial elements in urban structures, 2) hybrid public space as a new spatial element in city squares, 3) hybrid public space as an effort to revitalize the city, 4) public hybrid space with a light structure as a dominant feature, 5) public hybrid space as a solution to climate change, 6) public hybrid space as part of a high-rise building, etc. [12].

### 3. Research methodology

The research method used to achieve this research objective is a descriptive method that describes the conditions of the research area with the physical planning of the area based on local government
regulations. In descriptive method research, there are two important things, namely descriptive and analytical.

The analytical method used by the author to achieve the objectives of this research is a qualitative analysis method [13]. In this case, the determination of the concept of public hybrid space planning is carried out by analyzing the criteria of the existing conditions with an emphasis on open space planning and arrangement of residential areas and policies regarding land use based on Detailed City Spatial Planning. Before planning development, it is necessary to know the spatial regulations that apply to the area, so that they do not damage the existing spatial plan. This analysis is expected to improve the performance of the area and improve the quality of the environment to achieve comfort and sustainability of the city.

Types of data used in this study are divided into primary data and secondary data, namely: 1) Primary data is data that is obtained directly from the object of research; Existing physical conditions of the Jatinegara Station Area with a radius of 700m, land use, Conducting interviews with related substance parties and communities related to the Jatinegara Station Area. 2) Secondary data is data obtained indirectly through the object of research but from various relevant sources such as books, journals, government documents, and reliable sources from the internet; Regulations and policies related to the Jatinegara Station area and East Jakarta City Administration Macro Data.

4. Discussion and analysis

4.1. Public space

Public places Based on the theory of Hybridized Typologies [2], it is necessary to develop a densely populated city prioritizing emerging new uses in existing typologies public spaces in high density contexts and are tried to categorize them as follows: 1) Multi-level, multi-functional space (appears to use railway station space as a public space); 2) New types of urban space in development-intensive settlements: 3) New types of urban space in urban districts and integrated development; 4) Pedestrian friendly planning in cities; 5) Urban green.

Based on the above categories, the research area is included in a multi-level / multi-functional room that uses a train station as its main magnet. For this reason, this area is a public hybrid space around the station which is connected to the residential space. Green open space planning with increased building intensity which allows wider green open space and can be used as a public hybrid space. Outdoor open space in the research area is less than 10% of the total area of the research area. As for the exclusive conditions of the green open area in the research area are as Figure 2:

Figure 2. Existing conditions Green open space.
Jatinegara Area in the Regional Spatial Planning (RTRW) of DKI Jakarta 2030 (Perda No 1 of 2012) The direction of its development is carried out with a strategic development strategy for Economic Interests; The activity centre at the node develops mass public transportation through the concept of Transit Oriented Development (TOD) and develops trade areas, services and high-intensity mixed activities for national and international service scales. The secondary activity centre area is an urban area that functions to serve provincial scale activities or several administrative cities / regencies. The planning area refers to the provisions of the Urban Design Guide Lines (UDGL) for the Jatinegara Triangle Area. The formulation of a hybrid open space plan is as Figure 3:

4.2. Settlement function
To rebuild this dense area functionally a hybrid space with a vertical occupancy function begins with room cleaned; spaces are reorganized based on the principle of multifunctionality, pedestrian areas [14]. Hybrid space formation principles also depend on the urban planning context of the territory and specifics of the social-economical and investment conditions of the urban planning regeneration [15]. The formation of the hybrid space allows the creation of an economical environment which is a point of economic growth for the external environment. This capacity is determined by the "concentration" effect that appears in the trade. The "concentration" effect arises with the "hybridization" of social, business, residential, retail functions in a renewed urban area. The principle of hybrid space planning is based on socio-economics. Approaches that allow the estimation of functional interaction options in perspective should define the importance of the hybrid space for regional development and adjacent (one-quarter) urban planning structures. In addition, the principle of contextual innovation is based on a human-scale hybrid space and the natural environment of friendliness, communication, and contextuality. Such a hybrid space should reflect the peculiarities of the region and the landscape in the region.

Based on the redevelopment theory, the design perspective of the Jatinegara Station area as a secondary economic centre that functions as a centre for trade and service activities in the East Jakarta area, is to maximize land use, so high and medium-sized buildings are proposed for offices and commercials. functions, which form the dominant spatial complex. The surrounding buildings are designed for vertical housing (centre height up to 30 m). In addition, the surrounding station facilities are planned as hybrid open spaces with public parks. as for the description of the area plan is as Figure 3 and Figure 4:
Figure 4. Research area planning.

Figure 5. Hybrid space planning view.

5. Conclusion and recommendation
In the future, the quality of urban space will depend on the quality of public places to achieve sustainable cities. During the research work it has been noted, that the original and unique spatial composition of the public hybrid space has become one of the determining elements that influence and shape the spatial identity to enhance its quality. Penetration of different character spaces thanks to the multi-functional principle of buildings as well as the flexibility of the conscious and unique spatial composition of the spatial composition of urban complexes and public spaces, can form a harmonious and sustainable and sustainable city in the XXI century.

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