Spatial justice in the distribution of public services

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Abstract. This paper aims to get a better understanding on the dynamics of spatial justice and social justice, particularly in the distribution of public services. Cities are the result of social relations that create abstract spaces, where the manipulation of power takes place to maximize profits for certain parties. It is a symbol where inequality often occurs, where it shows a striking difference between the rich and the poor. This difference does not only occur in terms of income but also the quality of the environment, public facilities, access to transportation, and the distribution of public services. This study shows how the concept of spatial justice is formed from the notion of social justice. This study will also discuss the relationship between socio-spatial structure in an unjust distribution of public services; such as access to decent basic living conditions, public spaces, and infrastructure.

1. Introduction
Spatial justice refers to the spatial or geographical aspects of justice and injustice. The concept of spatial justice comes from the conceptualization of social justice to the spatial aspects around us. The city is a symbol where inequality often occurs, where it shows a striking difference between the rich and the poor. This difference does not only occur in terms of income but also the quality of the environment, public facilities, access to transportation, and the quality of public services. Soja's [1] exploration of spatial theory raised Lefebvre's [2] statement that all human spatial forms are produced socially, thus, no social processes occur uniformly over space. As a result, social processes create uneven geography and the environment built by these social processes will be a profit and loss structure based on differences in wealth and power [1].

One way to measure spatial justice is to calculate fair and equitable distribution in the space of valued social resources and opportunities for use. Public service facilities have an important role in improving the quality of human life. Accessibility and fairness of public facilities are important indicators for evaluating the distribution of public service facilities. Most public service facilities are located in the city center. Therefore it is not easily accessible, especially for those who live in the outer area of the city. As a consequence, opportunities that arise for the use of public facilities are relatively minimal and uneven. It is necessary to get accessibility to public service facilities in various locations to fulfill spatial and social justice in the distribution of public services.

Urban areas consist of several lands uses with interconnected functions. For instance, residences depend on other land uses to provide services such as education, health, security, and open spaces. These are the basic needs of local residents that require adequate access so every resident has the same opportunity to access these facilities. Spatial accessibility plays an important role in the study of injustice because the availability and spatial distribution of public service facilities is one factor for assessing
spatial justice. Public service facilities are very important for residents everywhere in the world, especially in developing countries with relatively high poverty rates. Spatial justice supports the development and implementation of spatial development which provides all categories of people with the same opportunity to use public service facilities in the city. Therefore, it is necessary to look at the socio-economic conditions of the areas to see whether public service facilities are distributed fairly. Poor spatial accessibility to urban facilities can worsen the quality of life of residents for the affected environment [3,4]. Rawls argues that inequality must be distributed in such a way that it can facilitate those who are unable to do so [2].

This literature review is written to get a better understanding of the dynamics of spatial and social justice, particularly in the distribution of public services. To get a better understanding of the spatiality of justice, we first need to understand the process of how space is formed, the dynamics of space, and how we perceive space. Understanding the spatial concept will help analyze spatial dynamics that can trigger unfair distribution. Meanwhile, understanding the concept of justice can help determine whether the distribution of public service facilities is following the concept of social justice. To assess spatial justice as a whole does not only involve providing equal access to basic public service facilities that can be measured by distance, but also by comparing the demographics of the users of the public service facilities in an area. Spatial justice in planning is related to the spatial suitability between the level of service of public facilities and the population distribution, which must be distributed evenly despite the different socio-economic conditions of various groups of people. This can be done by studying the concept of spatial justice and accessibility, both spatially and non-spatially.

2. Theory

2.1. Spatial Awareness

Previous research explained that spatial relationships will result in social relations, which means relationships of justice or injustice will occur as well [1][5]. Spatial justice is justice that has a spatial dimension, enabling us to observe and discuss various forms of justice or injustice that occur in space. According to Gottdiener [6], social relations are spatial and cannot be discussed without the others. Social processes shape space so does space produce social activities. The processes that occur in space such as our daily activities are interrelated and have an important role in shaping and changing space. There are various kinds of resources produced in space. These resources are not only capital, land, or people, but also energy, thought, and movement. Spatial justice means talking about how these resources can be distributed fairly in space.

Space is important because space is everywhere and space forms the context for our lives. Space is where we build our community and where social relationships within the community occurred, developed, and expressed. There is a general awareness that social relationships are the direct determinant of the quality of life, even though the quality of life is not always the same in all spaces. Spatial justice is a concept that embraces all forms of justice which are then framed into spatial terms in the form of policies and planning decisions that are then implemented in space.

The production of space involves three elements: mental, physical, and social [2]. According to Lefebvre [2] space is not an object but a series of relationships between perceptual processes, physical forms, and social processes that are continuous with one another. Harvey [7] and Lefebvre [2] argue that space is a link between these three things. We understand that space is a physical form with a specific location and function, which we call it 'place'. Space is composed of relationships between things that are constantly changing. As a result, space is a dynamic process.

Every particular place is a moment in an ongoing process. For example, raw materials are a moment in the process of making a continuous product. We cannot talk about space as if space is the result of an individual’s perception that is not contaminated with social relations and the physical perception of that individual. The mental space is where we structure and analyze social events and the physical environment, which we then transform into a physical space that we can perceive as a result of an individual’s mental and social processes.
Perception makes two people see the same space differently [2][8]. Perception occurs in our minds or our mental space, which comes from the cognitive abilities, namely imagination. Mental space cannot be imagined as a blank sheet of paper because our minds are already filled with things we are not always aware of such as history, culture, past experiences, and opinions of other individuals. Perception influences our opinions of space even before experiencing space itself [2][8]. The same space can be perceived differently by different people because of their senses such as smell, visual capacity, hearing, or feeling. When an individual loses one or more senses, he will perceive the space he occupies differently from a person who has all the senses. Apart from the senses, our physical and non-physical conditions also affect how an individual perceives a space. These conditions are age, gender, socio-economic conditions, or habits of each individual because it is affected by the experience of each individual [9][10].

Space as a physical form can be identified and analyzed through the direct experience of the user of space [2]. In Lefebvre's interpretation, space can be identified through tangible elements such as stone, wood, and other materials. Each of these elements is always around us even in urban space, they just appear in different forms. The ability to touch a wooden statue or possibly sit on a metal bench is part of the process of human perception of space. From the perspective of our minds, these elements become the main components of the process of transforming space. The space we perceive is tangible, textured, visible, audible, and demands that we adapt its materiality by moving around, within, above, through, or under it. At the same time, physical space is understood by each individual by being seen, felt, smelled, heard, and so on. Human senses such as sight, hearing, smell, and taste are important factors in spatial identification. Without the senses, people will lose some of their ability to understand and transform a space.

Social space consists of relationships that are continuously and actively produced in time through routines and experiences, as well as the expressions of each individual in everyday life. Social relations are an important component in the production of space because social relations are a process that gives shape to space [2][7]. For example, in a city, public space is built, designed, and then produced through labor, technology, and an institution. It went through various processes, through different interpretations of different people. In the end, the meaning of that public space itself is adapted because it is felt and lived by the individuals involved. They are not just the ones who generated the idea and built it, but also the users of space [8].

Our knowledge of space depends on our use of it. Space is generated through social relations which can be seen in spatial practice [11] and spatial representation [2]. Spatial practice refers to the sequence, habits, and patterns of movement in and through a place. These series and patterns of movement occur daily and are motivated by a variety of goals and specific trends or habits. Spatial practice shows the existence of a perceptual process that uses the senses and involves the human body in perceiving the environment around it physically, through the help of one’s senses. For example, by not limiting the kitchen as a space for ‘cooking’ but understanding the abstract movements needed to make and prepare food. To understand this, we must also understand that the kitchen is used not only as a place to prepare or eat food, but also a place for socializing, chatting, and exchanging information that is usually done through notes stuck to the refrigerator. In other words, the perceptual dimension of spatial practice refers to why and how we move our bodies in analyzable patterns. Such collective patterns or individual routines create a connection between social activities and the spaces in which they occur.

2.2. The Interaction of Social Justice and Spatial Justice

All people have universal needs and rights [7][12], where the needs and rights to life apply to everyone everywhere. Space must be able to meet the basic needs so as not to endanger the physical or mental health of each individual [7]. Public service facilities should be accessible by everyone to fulfill their needs and rights to life [12]. Fulfillment of needs and the right to life can be measured through the distribution of public services how fair the distribution is [13][14]. The allocation of public service facilities must reflect fairness in space by demonstrating a fair distribution of public services in various locations for various groups. Spatial justice requires all types of facilities to be easily accessed, even
without transportation. Not all individual has sufficient funds to access public transportation, so facilities must be accessible within walking distance. Social justice occurs when all levels of society have the same opportunity to use available public service facilities. Rawls states that fair distribution is the distribution that produces the greatest benefit for the most disadvantaged people [3]. Analyzing the current public service spatially is very important to plan new spatial locations in planning the construction of public service facilities to increase the availability and accessibility of services to all groups of people.

Public service facilities can be said to be one of the facilities that each individual deserves to meet his needs and rights to life [13]. The term public service, as used herein, refers to the daily public services provided by the government to meet the basic needs of its citizens. Examples of these public services are educational services such as schools, security services such as police and fire stations, public transportation, clean water supply, waste collection and treatment, as well as recreational services such as libraries and parks. All of these services have spatial characters; these services are provided in facilities that are geographically distributed across space. The fulfillment of needs and the right to life can be measured through the distribution of public services and how fair the distribution is [14]. The allocation of public service facilities must reflect fairness in space, namely by showing the fairness of the distribution of public services in various locations and various groups. These limited resources and facilities must be maximized so that individuals of all social classes can enjoy equal access. Increasing the efficiency of public services, especially basic public services for residents, is one of the main ways to produce a healthy urban environment and to achieve decent living conditions for each individual.

Fairness in the distribution of public services can be analyzed based on two aspects: horizontal justice and vertical justice [14]. This vertical and horizontal justice can be used as a benchmark to see where the distribution of public services is more in favor. Public service facilities are distributed separately over the space while the number of potential users will increase continuously. Therefore, there will be some inequality in the level of spatial accessibility between spaces [15]. In addition, there is an imbalance in the distribution of public facilities over space because priority allocations are aimed at facilitating areas that are socially disadvantaged or in dire need. This will result in inequality in number but socially equal in terms of accessibility of these facilities.

Vertical justice is based on the different abilities and demands of various social groups [14][16]. Vertical equity requires that disadvantaged people be identified and given special consideration to ensure that their needs are met [14][16]. Vertical justice is related to the impact of the distribution of public services on different individuals and groups. In this case, it is related to the income or social class of each individual or a group. With this definition, the distribution of public services is fair if it supports disadvantaged groups [3]. In public service policies, vertical equity supports affordable access, special services, and discounts for low-income people. There are also efforts to ensure that disadvantaged groups do not incur excessive external costs, such as transportation costs. Vertical justice requires facilities and services to be able to accommodate all users, including those who are financially disadvantaged and with special needs.

Horizontal justice is a condition in which everyone receives the same benefits [14]. Horizontal justice is equality in terms of uniform spatial distribution in geographic areas or the same distance from each resident to public facilities [4]. Thus, horizontal justice ignores varying population densities in urban areas and does not assess whether all residents need the same level of access to public service facilities. The same individuals and groups must be treated fairly in the distribution of resources and receive the same benefits and costs. This means that public policy should not support or promote one individual or group over another because the users must get what they pay for and pay for what they get [17].

2.3. **Equal Distribution**

Distribution in spatial justice is how public service facilities can be distributed fairly across all social groups. Space can be a context for justice relations by measuring the distribution of social goods. Fair distribution of public services can be measured based on accessibility [17], efficiency [18], and effectiveness [19]. Spatial justice is generally analyzed through the accessibility index that shows the
distance and cost spent by an individual to reach that location. Therefore, differences in the level of accessibility faced by a region become an important index for evaluating spatial justice. Spatial accessibility is an important indicator because it will affect the time it will take to reach a certain facility in an emergency. This is related to measuring how effective and efficient a facility is in an area. The farther the location of a facility from the target area, the lower the level of effectiveness and efficiency [18,19]. Accessibility is used as a mechanism where we can estimate the level of need for public service facilities in an area and estimate the number of users that can be accommodated for the potential locations.

Accessibility refers to how easily public services can be accessed or obtained [17]. Accessibility can be defined as a measure of relative proximity or closeness between origin and destination [16]. In planning public service facilities in a city, it is necessary to identify a suitable location for facilities in a certain area. The selection and distribution of these facilities must be arranged so that the needs of a spatially dispersed population can be served optimally. Access to basic service facilities has a major influence on community welfare. In that case, the concept of accessibility becomes the basis for planning the distribution of public service facilities [16]. Accessibility can also be used as a mechanism to estimate the level of satisfaction, needs, and predict the number of potential users at various locations.

There are two types of accessibility: spatial accessibility and non-spatial accessibility [16]. Spatial accessibility to urban facilities is associated with the geographic distribution of facilities and deals with the spatial separation between the location of the facility and the user’s residence [20]. Non-spatial accessibility is a socio-economic and demographic characteristic and constraints, such as income, disability, and gender. Accessibility is an important component because access and distance are crucial so that all levels of society can access facilities with minimal funds, namely on foot. Because the distance must be as minimal as possible, it is necessary to see whether the distribution of facilities in an area is fairly distributed.

Accessibility consists of three main components, namely: users, the activities they need, and the transportation links between people and the required activities [21]. In this case, Moseley [21] said that accessibility can vary according to the characteristics of each individual, the socio-economic conditions of the individual, and the available transportation infrastructure. Accessibility is the result of a combination of the three components mentioned above. Moseley [21] stated that accessibility consists of socio-economic and spatial dimensions in which important relationships occur.

2.4. Distribution as a Determinant Factor of Spatial Justice
Spatial and non-spatial accessibility can be assessed through the demographics of a population such as income, the number of people with disabilities, sex, and the spatial distribution of public service facilities [16][17][18][19]. These two sets of data (spatial and non-spatial) need to be combined to have a more in-depth spatial justice evaluation. The combined data will produce a visual map showing the variation in facilities in an area, which can then be evaluated for the level of fairness in terms of distribution. The variations obtained by regions will show the imbalance that occurs in the distribution of public service facilities.

There are 2 methods for measuring distance; the radius and the road network method [17][22]. Because it focuses on the distribution for disadvantaged people, walking is used as a measure to calculate spatial accessibility [22][23]. Both of these methods are used to view accessibility in a spatial manner. By measuring the distance using these two methods, we can find the coverage area that is facilitated by each public service facility. In addition to distance, we can see the potential coverage or area for a facility. After that, we can calculate the possible number of users in an area and minimize the shortage or excess of public service facilities in an area.

The use of the radius method is considered ineffective because users do not just walk in a straight line [17]. The radius method can only provide an approximate representation of the service area of the facility because it assumes a straight movement. In reality, users of the facility cannot travel in a straight line. Users must move along available public roads and must avoid obstacles such as railways, rivers, buildings, and other boundaries. Therefore, the actual travel distance is almost always greater than the
distance calculated using the radius method. Differences in the distance can lead to significant increases in time, cost, and effort for those with limited means and mobility and for those who are a vulnerable group such as persons with disabilities, the elderly, and young children. This method also shows that the building can be accessed from all directions. Unfortunately, in reality, not all buildings can be accessed from all directions because the buildings only have a few entrances, so the user has to walk further to reach the point of entry. The last disadvantage of this method is how it does not take into account the shape of a facility. The more irregular the shape of the facility, the higher the level of inaccuracy and misrepresentation of the service area.

Accessibility analysis using the network method has realistic distance and route specifications because it is measured from each access point along the available roads around the residence to the destination [16]. This network analysis approach appears to respond to all the disadvantages of the radius method. The network approach is based on measuring the distance along the path that is passed from one's residence to the intended facility so that users can see the actual route taken by the user from their place of residence to the designated access point for the facility. With the network method, the distance can be measured to or from each public service facility to its coverage of an area. When the planner involved uses this kind of technique to assess the level of accessibility to the facilities they want to provide, they must use network analysis techniques so that the results of the coverage calculations are more accurate. If they continue to use the radius calculation method, they must recognize the degree of inaccuracy that might result.

![Figure 1. Literature Synthesis Diagram (Source: Author’s personal drawing).](image)

3. Conclusion
Spatial justice is the idea that justice has an influence on space and vice versa. The injustice that is influenced by economic, political, and social issues has a spatial expression. Thus, spatial inequality will lead to inefficient spatial structure. This in turn can lead to an increase in the distance between individuals, jobs, and public services which result in reduced environmental quality and can jeopardize the quality of life of the unsettled group. The location of public services and the location of different places of residence will create different opportunities. This then will be directly related to the accessibility of each object and subject and whether supporting facilities are available to connect these two elements (users and facilities). The distance to public facilities also has an impact on external costs such as transportation costs that must be paid. In order to fulfill the notion of social justice, public
services must be distributed in such a way as to facilitate the needs of socially disadvantaged communities.

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