ISSN 2354-9114 (online), ISSN 0024-9521 (print)
Indonesian Journal of Geography Vol 55, No 2 (2023): 320-329
DOI: 10.22146/ijg.65987 website: https://jurnal.ugm.ac.id/ijg

INDONESIAN JOURNAL OF GEOGRAPHY

RESEARCH ARTICLE

The Role of City Spatial Plan (RTRW) on Regional Development in Depok City (West Java Province)

Fikhi Luthfiah[1], Guswandi Guswandi[2], Hayuning Anggrahita[1]*
1Department of Geography, Faculty of Mathematics and Natural Sciences, Universitas Indonesia, Indonesia
2 Faculty of Economics and Business, Universitas Sultan Ageng Tirtayasa, Indonesia

Received: 2021-05-20
Revised: 2023-05-10
Accepted: 2023-07-23

Keywords: urban planning, regional development index, infrastructure, population, accessibility

Correspondent email: hayuninganggrahita@sci.ui.ac.id

Abstract Depok City plays a crucial role as one of the buffer cities in the Jakarta Metropolitan Area (JMA). Therefore, it has been designated as a residential area and an inter-city connection point, leading to development and subsequent land conversion. However, unchecked land conversion can pose environmental threats and significantly impact economic and social conditions, such as reducing food security capacity as well as augmenting exclusion and marginalization of the urban poor. To manage this situation, the Depok City Government implemented a local regulation known as the City Spatial Plan (RTRW). This was specifically carried out to control land resource allocation, serve as a reference for spatial planning and regional development, as well as integrate and guide all activities related to development within the city. This study aimed to analyze the current development level in Depok City and assess the impact of RTRW on this development. To achieve this, a composite index was used to determine the regional development level, while a chi-square test was employed to explore the correlation between RTRW regulations and the regional development level. The development of Depok was evident in its growth towards the north, south, and southeast. Although the implementation of RTRW played a significant role in encouraging regional development in the city, disparities were still observed in development levels throughout the region.

1. Introduction

Urban land uses within the economic market are determined by the stakeholders and other institutions involved in urban activities. The availability of land is crucial to support these activities. However, the existence of capital-holding activities that utilize the land for non-agricultural purposes causes competition in land use between both agricultural and non-agricultural sectors, encouraging changes in land use (Sampeliling, et al., 2019). Uncontrolled and continuous land use changes can result in environmental risks and profoundly impact the economic, social, and environmental sectors of the community (Prihatin, 2015). Consequences may include reduced food security capacity and increased exclusion or marginalization of the urban poor (Leitner and Sheppard; 2018), indirectly influencing various social, political, economic, demographic, ethnological, cultural, and biophysical variables (Azimi et al., 2012).

To address these challenges, a policy is required to control and prevent excessive land use changes, namely City Spatial Plan/Rencana Tata Ruang Wilayah (RTRW). This plan served as a controller and guidance tool, providing a reference for organizing spatial planning and regional development. However, a phenomenon of incompatibility can still arise between the existing land use and the planned spatial arrangements in the RTRW due to limited land availability and increasing land demands. Consequently, this creates problems in allocating space due to conflicts of interest among stakeholders (Khaerani et al., 2018).

Conceptually, regional development aims to promote balanced development on social, economic, and technical aspects while considering the availability of natural resources to bridge welfare gaps and foster equitable growth across regions with varying natural dimensions (Mahi, 2016; Rustiadi & Junaidi, 2011; Riyadi, 2022). Moreover, Mahi (2016) emphasized that regional development was an effort to empower stakeholders, enabling them to utilize natural resources efficiently through technology. This consequently increased the region's value with the help of administrative or functional regions and improved the quality of life of the residents.

According to the perspective of the Ministry of Public Works, Government of Indonesia (GoI), regional development seeks to achieve integration by leveraging various resources, promoting harmony between regions, and integrating development sectors through the spatial planning process. This approach facilitates the accomplishment of sustainable development goals and strengthens the unity of the Republic of Indonesia (Hadjisarosa, 1982; Haryanto and Tukidi, 2007). In addition, regional development emphasizes the "development of regions to the formation of units of development areas," making it a tangible outcome (Hadjisarosa, 1988). This perspective was also supported by Tjokroamidjojo (as cited in

Muta'ali, 2005), emphasizing that regional development was a consequence of developmental efforts.

The implementation of regional development in Indonesia draws on various economic geography and development theories. Firstly, the modern diffusionist paradigm theory proposes establishing growth poles in core regions (Perroux, 1955) as a development priority. This approach is expected to have a positive impact known as the spread effect (Myrdal, 1957) or trickle-down effect (Friedmann, 1966), fostering hinterland development. Facilitating growth in the core region is critical within the development system. This theory helps explain why certain areas within a city are more prosperous than others. Considering that Indonesia is an archipelagic country comprising numerous multi-level-multi-government regions and limited available resources (Akil as cited in Van Roosmalen, 2004), the core-periphery theory can serve as a guiding framework.

Secondly, from the perspective of New Economic Geography by Krugman (1991), "*Regions with relatively large non-rural populations are attractive locations for producing goods and services due to the presence of a substantial local market and the availability of produced goods and services*." Humans are naturally inclined to reside close to economic resources in order to meet basic needs. Therefore, workers prefer proximity to their workplaces and companies to their customers, resulting in the creation of concentrated living areas (Krugmann, 1991; Sodik & Iskandar, 2007, Ehnts & Trautwein, 2012). This concentration of economic activities also impacts regional development, leading to a higher concentration of economic activities (economies agglomeration) and regional development compared to their surroundings (Siagian, 2005; Mauleny, 2016). The role of the city spatial plan (both in documents and practices) is to encourage regional development, specifically in facilitating the growth and development of the region. Based on the theory of regional development, where resources (financial, human, and natural) are limited, effective and efficient allocation is crucial, and not all places can serve as growth centers. Therefore, Friedman's concept of cores and periphery expects that growth in the core will stimulate a trickle-down effect in the periphery region (hinterland).

The spatial structure refers to the interconnection of space allocation activities, encompassing elements such as infrastructure networks, transportation facilities, flow of objects, the volume of flow, the objective aspect of the intended interaction, and the structure of residential activity centers. Understanding the capacity or hierarchy of these centers and linkages has implications for facilities and infrastructure needs (Rustiadi et al., 2018). The spatial structure is a critical element in city development, as infrastructure planning needs to align with the pre-established spatial structure to avoid regional disparities within the city. The city's spatial structure can be realized through a central place system designed according to the population's goods and services needs and organized in a hierarchy manner from the highest to the lowest level of service (Imah, 2018).

Depok City has experienced remarkable physical and non-physical progress in recent times, serving as one of the buffer cities in the Jabodetabek area. Its development focuses on providing settlements or residences and liaison between cities in the region (Aryanti et al., 2017). Along with the city's development, the population has steadily increased yearly, with figures from the Central Statistics Agency of Depok City indicating a population of 1,736,565 people in 2010, 2,033,508 in 2015, and 2,330,333 in 2019. This rapid urban population growth necessitated substantial land expansion to accommodate housing needs (Zhu et al., 2020).

The development also posed challenges for the city itself, particularly the impact on the global environment, with enormous land consumption being one of the concerns (Kotter, 2004). Soetomo (2009) argued that the city's dynamic development led to increased demands for space, specifically for residential needs.

Previous studies on spatial planning in Depok mainly focused on discussing spatial patterns and their alignment with the City Spatial Plan (RTRW) 2012-2032, while the spatial structure had experienced limited exploration. Therefore, this study aimed to analyze the development level in Depok City in 2019 and assess the role of the spatial structure outlined in RTRW in shaping this development. The COVID-19 pandemic originated in China in 2019 and rapidly escalated into a global outbreak. Its rapid spread began in Indonesia in early March 2020, leading to a significant increase in death, and encouraging the government to periodically stipulate a Large-Scale Social Restrictions Policy (PSSB) and the Enforcement of Restrictions on Community Activities (PPKM) from 2020 to 2022.

This situation slowed economic growth and hindered regional development (Hidayadi and Niam, 2022). Depok City likewise experienced a decrease in its Gross Regional Domestic Product (GRDP) from 49 billion in 2019 to 48 billion rupiahs in 2020, resulting in a negative growth rate (-1.92%) (Local Central Agency of Statistics, 2021). Therefore, this period was chosen for evaluation as it provided a baseline unaffected by the measurement biases induced by the adverse effects of the pandemic.

2. Methods

Research Location

Depok City is astronomically located between 6 ° 19 "00" - 6 ° 28 "00" south latitude and between 106 ° 43 "00" - 106 ° 55 "00" east longitude, covering a total area of 200.29 km^2. Originally designated as a municipality according to Government Regulation No. 43 of 1981, Depok was officially inaugurated on March 18, 1982, comprising 3 districts and 17 villages. Over time, with the city's development, villages evolved into sub-districts, leading to an expansion to 23 sub-districts. Subsequently, in 1999, through Law No. 15 of 1999, the city was established as a Level II Regional Municipality, comprising six districts. As the population continued to grow and demanded increased services, it underwent further sub-district expansion in 2009 based on Depok City Regulation No. 8 of 2007 and is currently organized into 11 districts and 63 sub-districts (Figure 1).

As part of Jabodetabek, Depok served as one of the buffer cities in the Jakarta Metropolitan Area (JMA), projecting its role as a residential area and inter-city connection (Aryanti et al., 2017). Based on Presidential Decree No. 60 of 2020 concerning the Spatial Plan of Urban Areas of Jakarta, Bogor, Depok, Tangerang, Bekasi, Puncak, and Cianjur, the city was categorized into zones B1, B2, and B3 as high to low-density settlements. Zone B1 was characterized by high environmental carrying capacity, high levels of service infrastructure and facilities, potentially developed for high-intensity buildings both vertically and horizontally. Zone B2 was characterized by moderate environmental carrying capacity and a moderate

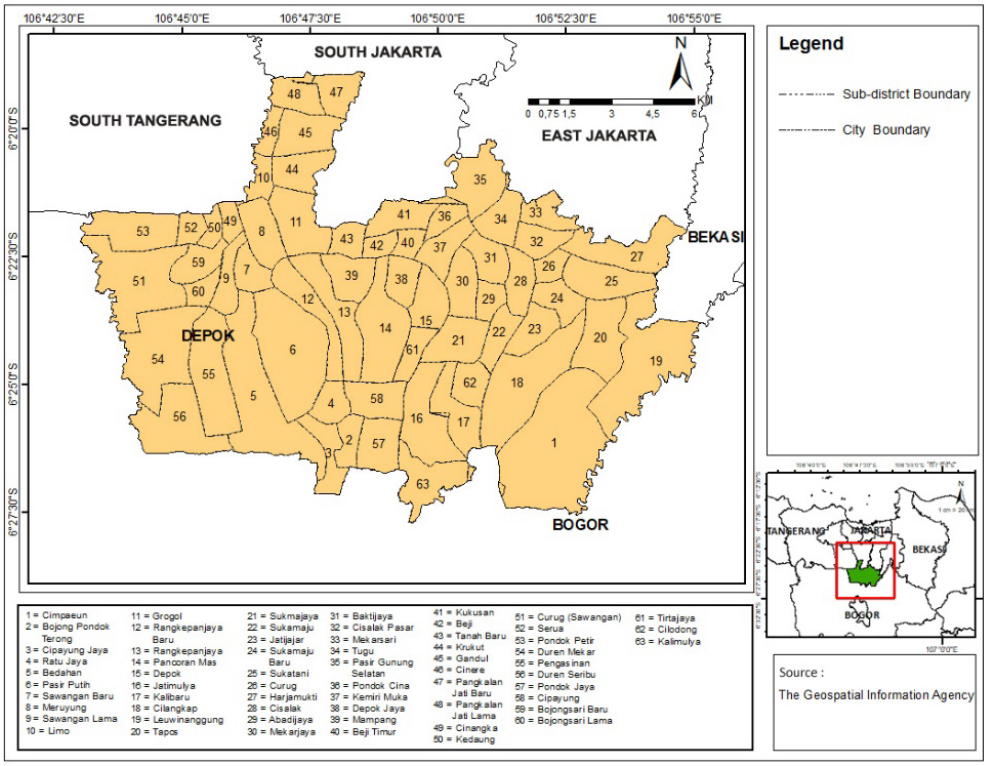

Figure 1. Map of Depok Administrative Boundary
Source: Data Processing, 2020

level of service infrastructure and facilities. Zone B3 was identified as an area with medium to low environmental carrying capacity, low level of service for infrastructure and facilities, and potentially developed as a water catchment area.

Research Design

This study employed quantitative methods, including descriptive, statistical, and spatial analysis. The secondary data were collected from various sources, such as literature studies, city spatial planning documents, long-term city development plans (Rencana Pembangunan Jangka Panjang Daerah, abbreviated RPJPD), medium-term city development plans (Rencana Pembangunan Jangka Menengah Daerah, abbreviated RPJMD), and statistical data from the Depok City Central Agency of Statistics.

A descriptive quantitative analysis was conducted to identify the development level of each sub-district in Depok City, utilizing a composite index known as the regional development index (*Indeks Pengembangan Wilayah*, abbreviated IPW). This composite index was assumed to represent the rank or rate of regional development since its score could define the rate of regional development in a single value (De Muro et al., 2009; Dolge et al., 2020). In addition, the calculation of composite indices provided an overview of the main components by summing the scores of various constituent variables in each unit of analysis to generate a scale or composite index (Giyarsih and Kurniawan, 2001; Dolge et al., 2020). Infrastructure development was considered a crucial factor in assessing regional development, as regional economic problems and disparities could be influenced by the unequal distribution of infrastructure (Van Roosmalen, 2004; Noviyanti et al., 2020). Therefore, the regional development index model by Kusuma and Muta'ali (2019) was employed, consisting of 3 main variables, namely the number of social and economic facilities, population, and accessibility (Table 1). The availability of social and economic facilities was selected as a variable, as it related to the physical aspect of spatial planning (Rustiadi et al., 2018), and indicated the convenience level for inhabitants in accessing services (Hadjisarosa, 1988).

Population growth was considered a driving force behind infrastructure and regional development, as it influenced the spatial dimensions and facilities within a region. The rise in population growth could also impact the deviation of the spatial structure and utilization planned in the RTRW (Wahid, 2009; Khaerani et al., 2018). Urban areas with high economic opportunities and population sizes, coupled with migration, experienced a significant population growth rate, leading to an increased demand for infrastructure. The cities consequently received greater investment in infrastructure and socio-economic facilities (Poku-Boansi and Amoako, 2015). According to Tiebout (1956), the availability and quality of socio-economic facilities were crucial factors influencing the decisions in choosing a place of residence, contributing to the phenomenon of migration.

Accessibility played a vital role in regional development, as it pertained to the distance between one region and another, particularly the distance to the center of public services (Farida, 2013). The function of distance or accessibility was an assumption of interactions between regions, where contiguous regions tended to have higher interactions compared to distant ones. This interaction could also be influenced by factors such as distance, relative position, and the functional relationship between the related regions (Rustiadi, 2009).

To ensure comparability among the indicators in Table 1, data normalization was conducted, transforming all the different scales into one standardized scale (Krajnc and Glavic, 2005; Dolge et al., 2020). This process eliminated the ambiguity and allowed for more consistent results (Dolge et

al., 2020). Several techniques could be used in this regard, including standardization (z-score), ranking, rescaling (min-max transformation), and indicization (distance-based normalization) (Muta'ali, 2005; Mazziotta and Pareto, 2013; Dolge et al., 2020). The current study specifically employed standardization (z score), as it facilitated 'relative' comparisons over time, using the mean and the variance of the indicators at the reference time (Maziatto and Pareto, 2013). This technique was deemed suitable since this study did not intend to measure the absolute comparison of development levels in each region but to identify the relative comparison among regions with high, medium, and low levels of regional development. The z-score formula is as follows (Muta'ali, 2005):

$$\text{Z-score} = \frac{(x-\mu)}{\sigma}$$

Description:

Z-score: z-value

X: indicator value

μ: mean of variable data

σ: standard deviation

Each indicator in the regional development index was assigned equal weight after data normalization, in line with Muta'ali (2005). The final calculation step was the aggregation of all normalized indicators to obtain the IPW (Regional Development Index) using the formula:

$$IPW = X1 + X2 + X3 + ... + Xn$$

Description:

IPW: Regional development index

X1, X2, X3, ... Xn: regional development indicators

Subsequently, the IPW of each sub-district was classified into three levels, namely high, medium, and low, based on the average value and standard deviation, using the following formula:

1. High class = composite index value> μf + δf / 2
2. Medium Class = index value between> μf + δf / 2 and> μf - δf / 2
3. Low Class = index value <μf - δf / 2
   (Giyarsih & Kurniawan, 2001)

Description:

μf: mean of an index value

δf: standard deviation of an index value

Spatial analysis was conducted to examine the role of the spatial structure in city spatial planning, specifically RTRW, in relation to the development level of sub-districts in Depok City. The development level was compared with the direction for spatial structure development based on the RTRW Policy of Depok City for 2012-2032 (Figure 2).

The comparison was carried out by overlaying the spatial structure based on RTRW with the regional development level of each sub-district. This spatial structure consisted of the city's central place (Pusat Pelayanan Kota, abbreviated PPK) and sub-city central places (Sub Pusat Pelayanan Kota, abbreviated SPK). The spatial structure plan comprised Margonda city central place (PPK) as well as Cinere, Sawangan, Cipayung, Tapos, and Cimanggis sub-cities central places (SPK). The role of RTRW towards the level of development was assessed by aligning the suitability of the spatial structure direction in RTRW with the level of regional development in each sub-district. Higher functionality assigned by RTRW to each sub-district's central place indicated a higher rate of regional development. The suitability of the direction for spatial structure in 2012-2032 with the rate of regional development in Depok City was categorized as follows:

Lastly, a rigorous statistical analysis was conducted to evaluate the relationship between the regional development rate and the spatial structure direction. The chi-square statistic, a method for comparing counted data, was utilized, where individual observations were assigned to categories (Hammond and McCullagh, 1978). This method was employed to test the statistical significance of the observed association in a cross-tabulation between two variables (Malhotra, 2004). The formulated hypotheses are as follows:

- Null hypothesis (H0): there is no relationship between spatial structure direction in RTRW and the regional development level,
- Alternative hypothesis (H1): there is a relationship between spatial structure direction in RTRW and the regional development level.

The Chi-Square Test was conducted using IBM SPSS Statistics 20 software, with a significance level (α) of 5%. The decision to reject or retain H0 was based on the comparison between the p-value (Sig. 1-tailed) and the level of significance (α). H0 would be rejected when p-value > α, whereas H0 would be retained when p-value < α.

Table 1. Variables and Descriptive indicators

Variables	Indicators	Source
Number of Social and Economic Facilities	Educational Facilities	Local Central Agency of Statistics, 2019
	Health Facilities	Local Central Agency of Statistics, 2019
	Economic Facilities	Local Central Agency of Statistics, 2019
Population	Total Population	Local Central Agency of Statistics, 2019
	Population Density	Local Central Agency of Statistics, 2019
Accessibility	Total Area	Local Central Agency of Statistics, 2019
	Distance to Government Center	Local Central Agency of Statistics, 2019

Source: Giyarsih and Kurniawan, 2001; Muta'ali 2005; Rustiadi et al., 2018; Kusuma and Muta'ali, 2019

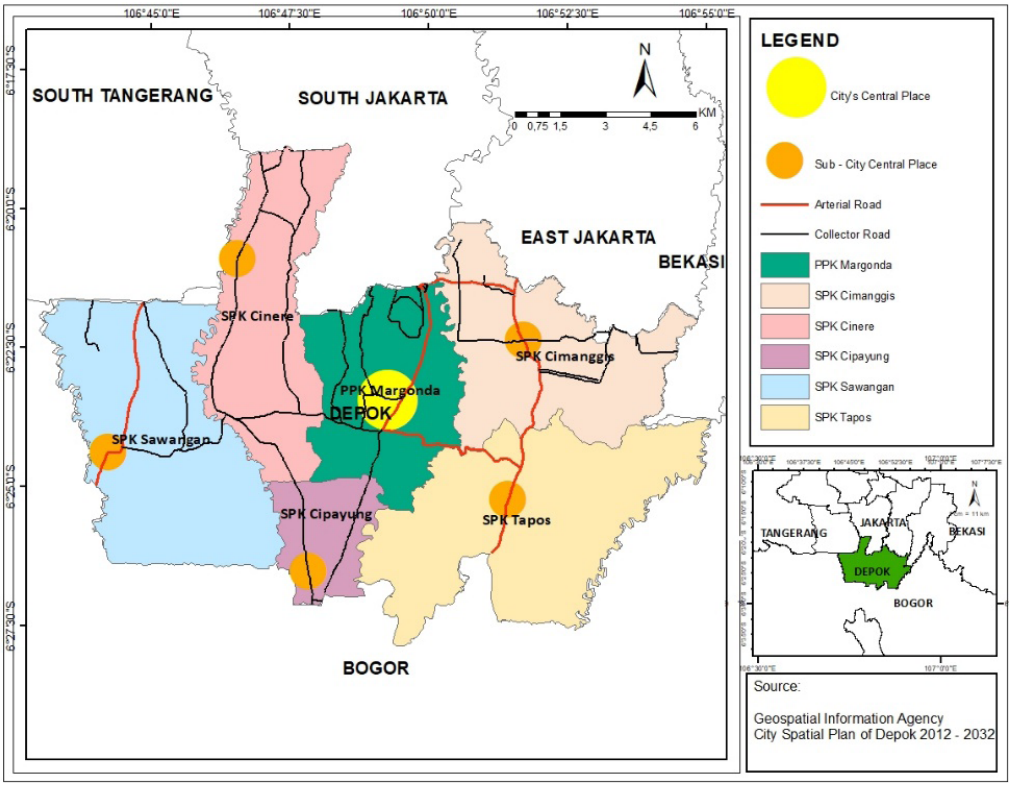

Figure 2. Map of City Spatial Plan of Depok 2012-2032
Source: Local Regulation No. 1 Year 2015, 2015

Table 2. Suitability of the direction for spatial structure in 2012-2032 with the rate of regional development in Depok City in 2019

Spatial Structure	Regional Development Rate		
	High	Moderate	Low
City Central Place (PPK)	Suitable	Sufficient	Unsuitable
Sub-City Central Place (SPK)	Suitable	Sufficient	Unsuitable

3. Result and Discussion

Development Rate in Depok City on 2019

High Regional Development Rate

In 2019, there were 14 sub-districts (22%) in Depok with a high level of development, predominantly located in the city center, except for the Tugu sub-district, situated in the north and directly adjacent to DKI Jakarta. These sub-districts were well connected by secondary arterial roads, including Margonda Road (Kemirimuka sub-district, Depok sub-district, Pancoran Mas sub-district), Tole Iskandar Road (Mekarjaya sub-district, Abadijaya sub-district, Sukamaju sub-district), Siliwangi Road (Depok sub-district), Dewi Sartika Road, Raya Sawangan Road (Rangkapan Jaya Baru sub-district), and Akses UI Road (Sub-district Tugu). The road network pattern in 2018 revealed that 64% of the sub-districts were traversed by these roads (64%). This indicated that accessibility, specifically through secondary arterial roads, facilitated the movement of people from residential areas to the downtown service and trade zones. The areas mainly had a population concentration ranging from 39,429 to 85,164 people.

The sub-districts with high regional development rates experienced a concentration of economic activities, also known as agglomeration, particularly those transversed by Margonda Raya Road, such as Kemiri Muka, Depok, and Pancoran Mas sub-districts. The economic activities mainly involved trade and services, with seven shopping centers located in four sub-districts, namely Kemiri Muka, Pancoran Mas, Baktijaya, and Tugu. These shopping centers could be categorized based on their central place hierarchy as district and regional shopping centers, meeting specific criteria such as shopping center surface area ≥ 10.000 m, total area ≥ 24 ha, number of shops ≥ 40 units, range of service ≥ 4,5 km, and the threshold of the population served ≥ 40.000 (White and Grey, 1996). In 2018, a new shopping center called Pesona Square was inaugurated in Baktijaya, qualifying as a regional-scale shopping center with facilities such as markets, shops, cinemas, banks, and two or more department stores. This indicated that the sub-districts with district-to-regional scale shopping centers had a higher level of regional development compared to the surrounding areas.

Moderate Regional Development Rate

In 2019, there were 25 sub-districts (40%) in Depok City with moderate levels of development, spread across the north, south, west, and east of the city. Four of these sub-districts were adjacent to DKI Jakarta Province, while eight were adjacent to Bogor Regency. Among these sub-districts, 11 (44%) were transversed by secondary arterial roads, while the remaining 14 (56%) were not. In terms of economic facilities, only Depok

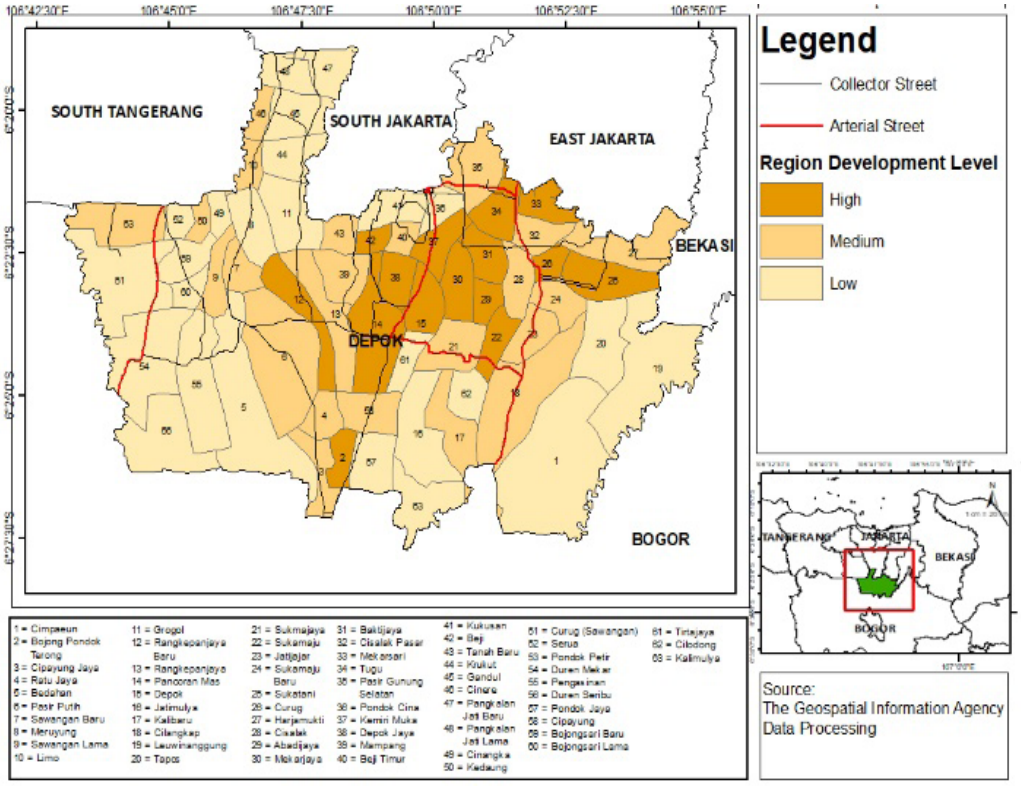

Figure 3. Map of Depok Region Development in 2019
Source: Data Processing, 2020

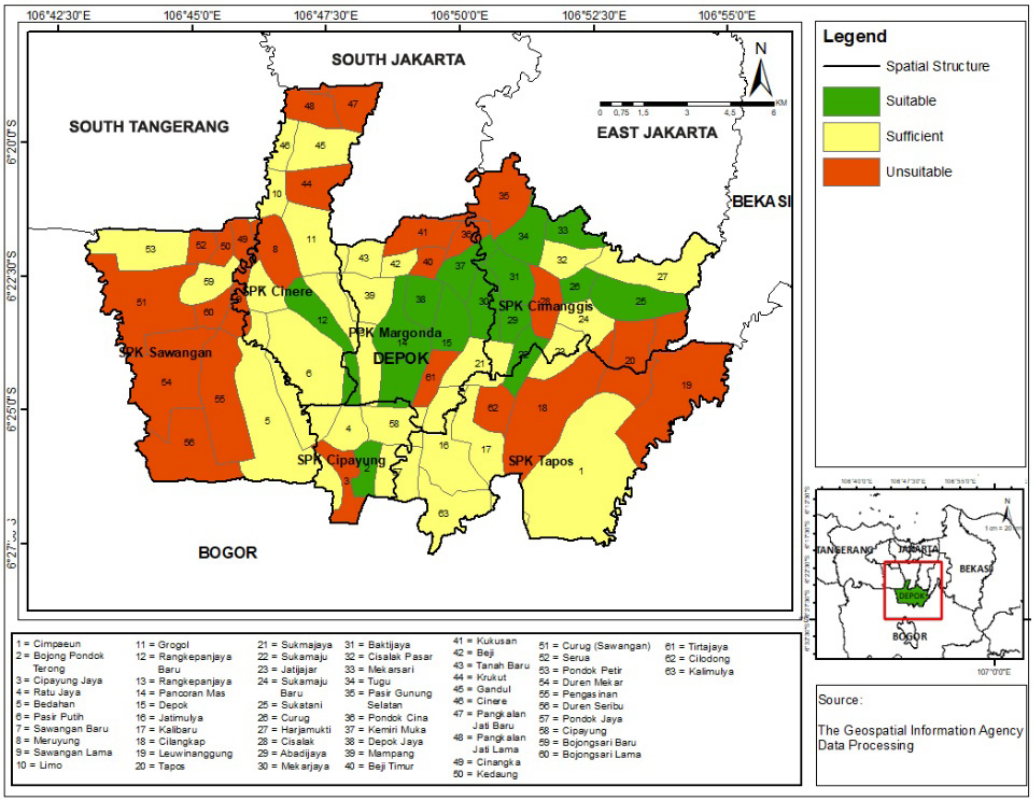

Figure 4. Map of Suitability Location of The Spatial Structure Planning with The Rate of Regional Development in Depok 2019
Source: Data Processing, 2020

Town Center and Cinere Mall, both classified as local and district-scale services, were available in the Rangkapan Jaya and Cinere, respectively. Sub-districts with a moderate rate of development typically had a relatively lower population, ranging from 22379 to 39428 people.

Certain areas experienced a concentration of economic activities, particularly in the form of trade and services corridors observed in Pondok Petir, Harjamukti, and Limo. Meanwhile, some others were concentrated on industries, namely Cisalak Pasar, Jatijajar, and Sukamaju Baru.

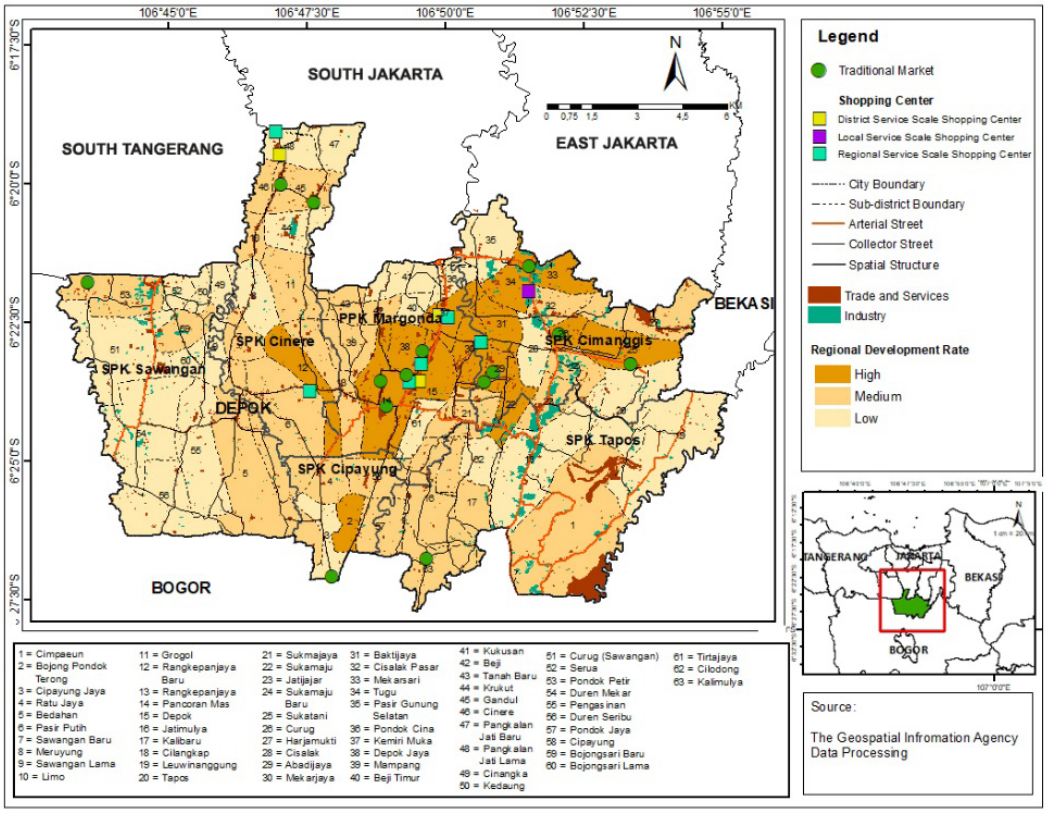

Figure 5. Map of Comparison Spatial Structure Planning with Existing Conditions in 2019
Source: Data Processing, 2020

Low Area Development Rate

In 2019, there were 24 sub-districts (38%) in Depok with low levels of development, dispersed across the northern, southern, western, and eastern suburbs of the city. Five of these sub-districts were adjacent to DKI Jakarta Province, seven to Bogor Regency, and three to South Tangerang City. The majority of these sub-districts (71%), were not transversed by secondary arterial roads, although seven (29%) were. The population was also relatively low, ranging from 12682 to 17750 people.

Within these sub-districts, there were concentrations of economic activities in trade and services, specifically in Pondok Cina, Pangkalan Jati, Krukut, Curug, and Cimpaeun. One notable service trade activity was Cinere Bellevue shopping center, which was situated in the Pangkalan Jati, and reopened in 2018 with a regional-scale service. Some other sub-districts, namely Krukut, Bojongsari Baru, and Duren Mekar, also experienced similar concentrations of economic activities in the form of industry.

The Role of Spatial Structure in City Spatial Planning (RTRW) 2012-2032 towards the Level of Development of Sub-districts in the Depok City in 2019

Among the sub-districts in Depok, 14 (22%) showed a suitable match between the spatial structure direction and the rate of development. Another 25 (40%) were considered quite suitable in this regard, while 24 (38%) were unsuitable (Figure 4).

The role of the spatial structure plan RTRW towards the rate of development in Depok in 2019 was considered suitable when the sub-districts aligned with the spatial structure development direction based on the 2012-2032 RTRW policy. The city central place area should naturally exhibit a high level of regional development. As a service center serving the entire regional area, the city's central role held the highest hierarchy.

The sub-districts with high and moderate development rates predominantly occupied the city's central place, which had been designated as the highest hierarchy functioning as a service center for the entire city and regional areas. Consequently, the city central place featured several mayors and government offices, higher education establishments, higher order of trade and services on a regional scale, integrated terminals and rail stations, concentration of population and high-density housing, cultural conservation, and green open spaces, all of which contributed to accelerating regional development rates in these areas. However, a few sub-districts with low development rates were located farther away from the downtown area of Depok (particularly along Margonda Raya Street). As a result, infrastructure development (service and trade centers, schools and universities, hospitals, government offices, transportation hubs, etc.) was not adequately prioritized or facilitated in these sub-districts, leading to a low rate of regional development, which did not align with the spatial structure direction in the city's spatial planning (RTRW).

The sub-districts designated as sub-city central places tended to have a moderate and low rate of development. These areas were classified as lower hierarchy and functioned as central places for industrial areas, tourism development, new trade center (SNADA), cultural activities and preservation, medium and low-density housing, agriculture, agribusiness, and green open spaces. Due to the relatively limited availability of socio-economic facilities, these areas were less attractive to inhabitants and investors, resulting in a tendency towards moderate to low levels of regional development.

Some districts were classified as sufficiently appropriate, fulfilling the spatial structure development direction based on the 2012-2032 RTRW policy, except for one indicator related

Table 3. Cross Table of Level of Regional Development and The Spatial Structure Direction

Spatial Structure	Regional Development Rate			Total
	High	Moderate	Low	
City Central Place (PPK)	6	3	3	12
Sub-City Central Place (SPK)	8	22	21	51
Total	14	25	24	63

Source: Data Processing, 2020

Table 4. SPSS Output Chi-square Test Calculation

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.620[a]	2	.037
Likelihood Ratio	5.798	2	.055
Linear-by-Linear Association	4.217	1	.040
N of Valid Cases	63		

Three cells (50.0%) have an expected count of less than 5. The minimum expected count is 2.67.
Source: Data Processing, 2020

to the number of social and economic facilities, accessibility, or population, whose index value was insufficient. Most of these sub-districts were located in the sub-city central places. On the other hand, the sub-districts considered unsuitable did not fulfill the spatial structure development direction based on the central place function. The sub-city central place was designated as a service center for the sub-regions. However, a low regional development rate in these areas could hamper the function of the sub city central service.

The areas designated as city central place (PPK) and sub-city central place (SPK) classified as unsuitable, did not align with the spatial structure plan direction. The unavailability of infrastructure (education and health facilities) and relatively local or low-range trade and service activities distinguished these areas from other sub-districts. Despite the development of new trade centers like the SNADA in the Cipayung sub-city central place, the progress was relatively insignificant as economic activities tended to be concentrated locally.

This situation highlighted the development polarization caused by the stipulation of PPK Margonda Raya as a growth pole to encourage economic growth, which theoretically should be able to have a trickle-down effect on surrounding areas. However, this led to notable disparities, specifically in the initial area of Depok, including Pancoran Mas and Beji, as well as Sukmajaya Districts. The presence of Margonda Raya Street, a main arterial road that connects Jakarta and Bogor City, had driven this area to become the starting point for Depok's development (Irsyam, 2017). An examination of the spatial patterns of Margonda Raya by Van den Berg (2020) found exceptional development intensity, with various functions and roles. This included trade and services activities, large-scale residential centers (such as Perumnas and several real estates built by private developers), multi-level educational activity centers, primarily Universitas Indonesia, community transportation centers with terminals and commuter line stations, as well as government centers. Consequently, the concentration of population, capital and investment flows, skilled labor and professional flows, economic activity, as well as infrastructure development resulted in a significant back-wash effect outweighing the spread effect regarding economic growth. This further fostered regional development disparities in Depok City.

The chi-square test results (Tables 3 and 4) showed that H0 was rejected and H1 was accepted because the critical value (0.037) was less than the significant level value (0.05). This indicated a relationship between the level of regional development and the direction of the spatial structure in RTRW.

4. Conclusion

In conclusion, the sub-districts with a high level of regional development in Depok City were concentrated in the central and northeast areas, while those moderate regional development levels were spread throughout the north, west, south, southeast, and central regions. The sub-districts with a low level of regional development were found in the north, west, and east regions, whereas those with a high regional development rate were traversed by arterial or collector roads and experienced a wider concentration of economic activities. These areas were occupied by shopping centers with regional service scales and high population densities. The sub-districts with moderate regional development rates were mainly transversed by arterial roads, although some were not. They also experienced a concentration of economic activities, such as service, trade, and industry, and were occupied by shopping centers with district or local service scales. The population density in these areas varied from medium to high. Conversely, those with a low regional development rate, specifically located on the border adjacent to DKI Jakarta Province, Bogor Regency, and South Tangerang City, were mostly not traversed by arterial roads. These sub-districts were characterized by lower population densities and only one shopping center with a regional service scale.

The rate of regional development in Depok City was relatively in accordance with the spatial structure development direction in the RTRW, which played a role in encouraging regional development. However, it was essential to acknowledge that this development direction also led to

development polarization due to the back-wash effect being more pronounced than the spread effect, as posited by Myrdal (1957).

It is also worth noting that the spatial structure described a system of functional linkages between components in a region, manifested through infrastructure networks, such as transportation facilities, flows of goods and population, the amount and intensity of the flow, and the nature of the interaction (Rustiadi et al., 2018). Therefore, obtaining data regarding the functional region at each level of the spatial structure hierarchy was crucial. The current study was limited by data availability and relied on index analysis acquired from aggregated macro-scale data at the sub-district administrative level. Consequently, future studies are recommended to conduct regional development analysis at the functional region level and emphasize regional development concerning the dynamic interactions among spatial structure hierarchy.

Acknowledgment

The authors are grateful for the financial support received for publication from Bantuan Publikasi FMIPA UI. The authors are also grateful to Dr. Hafid Setiadi for providing valuable feedback and helpful suggestions throughout the development of this study.

References

Aryanti, O., Yuniar R., Toruli G., & Haris., A. (2017). *Identifikasi Kota Depok dalam peranannya di Wilayah Jabodetabek*. Surabaya: Institut Teknologi Sepuluh Nopember.

Azimi, N., Rafieian, M., & Pooyan, S. (2012). Land Use Change and its Implications on the Spatial Structure of City, the Case of Rasht, Iran. *Journal of Basic and Applied Scientific Research, 2*(5), 4861-4870.

National Standardization Agency. Land Cover Classification. Indonesian National Standard

De Muro, P., Mazziotta, M., & Pareto, A. (2009). Composite indices for multidimensional development and poverty: An application to MDG indicators. https://www.researchgate.net/publication/227113176_Composite_Indices_of_Development_and_Poverty_An_Application_to_MDGs/link/55d332f408aec1b0429f30fb/download

Dolge, K., Kubule, A., & Blumberga, D. (2020). Composite index for energy efficiency evaluation of industrial sector: sub-sectoral comparison. *Environmental and Sustainability Indicators*, 8, 100062.

Ehnts, D., & Trautwein, H. M. (2012). From new trade theory to new economic geography: a space odyssey. *OEconomia - History, Methodology, Philosophy*, *2-1*, 35-66.

Farida, U. (2013). Pengaruh aksesibilitas terhadap karakteristik sosial ekonomi masyarakat pedesaan Kecamatan Bumijawa Kabupaten Tegal. *Jurnal Wilayah dan Lingkungan, 1*(1), 49-66.

Giyarsih, S. R., & Kurniawan, A. (2001). Regionalisasi Wilayah Kabupaten Bantul (Suatu Kajian untuk Kepentingan Perencanaan Pengembangan Wilayah). *Jurnal Perencanaan Wilayah dan Kota, 12*(4), 189 - 199.

Hadjisarosa, P. (1982). *Konsepsi dasar pengembangan wilayah di Indonesia*. Jakarta: Badan Penerbit Pekerjaan Umum.

Hammond, R., & McCullagh, P. S. (1978). Quantitative techniques in geography: an introduction (2nd ed.). London: John Wiley.

Haryanto, & Tukidi. (2007). Konsep Pengembangan Wilayah dan Penataan Ruang Indonesia di Era Otonomi Daerah. *Jurnal Geografi, 4*(1): 1-10.

Hidayadi, T., & Niam, A.M. (2022). Analysis of Economic Disparities in the Jabodetabek Region during the COVID-19 Pandemic. *Iltizam Journal of Shariah Economic Research, 6*(1): 117-130

Hirschman, A.O. (1958). *The Strategy of Economic Development*. New Haven: Yale University Press.

Imah, A.I. (2018). *Mengkaji Tata Ruang Kota Malang dengan Teori Konsentris dan Teori Sektoral (Relevansi Tata Ruang Kota dengan Membandingkan Teori-Teori Kota)*. Malang: Universitas Negeri Malang.

Irsyam, T.W.M. (2017). Berkembang dalam Bayang-Bayang Jakarta: Sejarah Depok 1950–1990an. Jakarta: Yayasan Pustaka Obor Indonesia

Khaerani, R., Sitorus, S. R., & Rusdiana, O. (2018). Analisis Penyimpangan Penggunaan Lahan Berdasarkan Rencana Tata Ruang Wilayah Kabupaten Sumedang. *TATALOKA*, *20*(4), 399 - 409.

Kötter, T. (2004). Risks and opportunities of urbanization and megacities. Proceedings of the FIG Working Week, Athens, Greece. Retrieved from: http://www. fig. net/pub/athens/papers/ps02/ps02_2_kotter. pdf.

Krajnc, D., & Glavic, P., (2005). A model for integrated assessment of sustainable development. *Resources Conservation and Recycling., 43*(2), 189–208. https://doi.org/10.1016/j.resconrec.2004.06.002.

Krugman, P. (1991). *Geography and Trade*. Leuven: Leuven University Press.

Kusuma, M. E., & Muta'ali, L. (2019). Hubungan Pembangunan Infrastruktur dan Perkembangan Ekonomi Wilayah Indonesia. *Jurnal Bumi Indonesia, 8*(3).

Leitner, H., & Sheppard, E. (2018). From Kampung to Condos? Contested Accumulation through Displacement in Jakarta. *Environmental and Planning A: Economy and Space, 50*(2), 437–456.

Local Central Agency of Statistics. (2019). Produk Domestik Regional Bruto (PDRB) Atas Dasar Harga Berlaku. Retrieved from: https://www.bps.go.id/subject/52/produk-domestik-regional-bruto--lapangan-usaha-.html. Accessed on 18 March 2020.

Local Central Agency of Statistics. (2021). Produk Domestik Regional Bruto 2010 menurut Penegeluaran Tahun 2018–2020. Retrieved from https://depokkota.bps.go.id/indicator/52/48/1/pdrb-seri-2010-menurut-pengeluaran.html.

Local Regulation Nº 1 Year 2015 on Depok City Spatial Plan Year 2012–2032. (2015, March 16). Retrieved from https://peraturan.bpk.go.id/Home/Details/162858/perda-kota-depok-no-1-tahun-2015.

Malhotra, N.K. (2004). *Marketing Research An Applied Orientation* (4th ed.). New Jersey, Pearson Prentice Hall

Muta'ali, L. (2005). Potensi Perkembangan Wilayah Dan Kaitannya Dengan Tata Ruang Di Kawasan Lereng Merapi Propinsi Daerah Istimewa Yogyakarta. *Majalah Geografi Indonesia*, *19*(1), 63-88.

Mazziotta, M., & Pareto, A. (2013). Methods for constructing composite indices: one for all or all for one?. *Rivista Italiana di Economia e Statistica, 68*(2), 67–80

Myrdal, G. (1957). *Economic Theory and Underdeveloped Areas*. London: Duckworth.

Mahi, I. A. K. (2016). *Pengembangan Wilayah: Teori & Aplikasi*. Jakarta: Kencana

Mauleny, A. T. (2016). Aglomerasi, Perubahan Sosial Ekonomi, dan Kebijakan Pembangunan Jakarta. *Jurnal Ekonomi & Kebijakan Publik, 6*(2), 147-162.

Noviyanti, K., Pravitasari, A.E., & Sahara, S (2020). Analisis Perkembangan Wilayah Provinsi Jawa Barat untuk Arahan Pembangunan Berbasis Wilayah Pengembaangan. *Jurnal Geografi, 12*(01), 57–73.

Poku-Boansi, M., & Amoako, C. (2015). Dimensions of spatial inequalities in Ghanaian cities. *Journal of Geography and Regional Planning*, *8*(5), 131-142

Prihatin, R. B. (2015). Alih Fungsi Lahan di Perkotaan (Studi Kasus di Kota Bandung dan Yogyakarta). *Jurnal Aspirasi*, *6*(2), 105-118.

Riyadi, D. S. (2002). Pengembangan Wilayah Teori dan Konsep Dasar dalam Pengembangan Wilayah dan Otonomi Daerah

Kajian Konsep dan Pengembangan. *P2KTPW-BPPT (Regional Development Theory and Basic Concepts in Regional Development and Regional Autonomy Concept and Development Review).* Jakarta: Pusat Pengkajian Kebijakan Teknologi Pengembangan Wilayah.

Rustiadi, E., Saefulhakim, S., & Panuju, D. R. (2018). *Perencanaan dan Pengembangan Wilayah* (4th ed.). Jakarta: Yayasan Pustaka Obor Indonesia.

Rustiadi, E., & Junaidi, J. (2011). *Transmigrasi dan Pengembangan Wilayah*. https://www.researchgate.net/publication/275714959_Transmigrasi_dan_Pengembangan_Wilayah/link/5544ee9e0cf23ff716869759/download

Sampeliling, S., Sitorus, S.R.P., Nurisyah, S., & Pramudya, B. (2019). Kebijakan Pengembangan Pertanian Kota Berkelanjutan: Studi Kasus di DKI Jakarta. *Analisis Kebijakan Peetanian, 10*(3), 257–267.

Siagian, M. (2005). Aglomerasi dan kemiskinan perkotaan. *Jurnal Wawasan, 11*(2), 41-46.

Sodik, J., & Iskandar, D. (2007). Aglomerasi dan Pertumbuhan Ekonomi: peran karakteristik regional di Indonesia. Jurnal Ekonomi & Studi Pembangunan, 8(2), 117-129.

Soetomo, S. (2009). Urbanisasi dan Morfologi. Yogyakarta: Graha Ilmu

Tiebout, C. M. (1956). A pure theory of local expenditures. *Journal of political economy*, *64*(5), 416-424

Van den Berg, K., Herlambang, S., & Rahardjo, P. (2020). Studi Perkembangan Pola Ruang Kawasan Margonda Raya. *Jurnal Stupa, 2*(2), 2657–2672

Van Roosmalen, P. K. (2004). Awal penataan ruang di Indonesia. Hardjatno, NJMT, Harta, F.(eds.) Sejarah Penataan Ruang Indonesia 1948-2000. Beberapa Ungkapan, p. 9-42

Wahid, A. (2009). Identifikasi Penyimpangan Tata Ruang Wilayah Provinsi Sulawesi Selatan. *SMARTek, 7*(2), 99–112

White, John R., & Kevin D. Gray. (1996). *Shopping Centers and Other Retail Properties*. New York : John Wiley and Sons.

Zhu, S., Kong, X., & Jiang, P. (2020). Identification of the human-land relationship involved in the urbanization of rural settlements in Wuhan city circle, China. *Journal of Rural Studies, 77*, 75-83.