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Research paper



Urban Catalyst Element Impact on the Pattern of Spatial Distribution in Semarang City Border Area

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Abstract

In recent decades the urban growth in Indonesia is likely to follow a global urban trend, characterized by peripheral urbanization. This phenomenon has potentially encouraged the growth of urban physical area to be very broad and unlimited, and often exceeds the city administrative boundary. The urban catalyst development in the eastern city accelerates the growth of settlement in the border area; while the visually of both amongst the border area and the urban area are similar. This research was conducted in Sendang Mulyo village located in the administrative area of Semarang City and in Pucang Gading village located in, Demak Region. This study aims to determine the effect of urban catalyst element on the pattern of spatial distribution in the border area of Semarang City and Demak Region. Based on literature study that has been done, this research uses a quantitative approach with descriptive method under of rationalistic paradigm. Statistical data analysis is done by regression test using software SPSS 16.0. The results of this study indicate the growth and development of urban catalyst elements in the eastern part of Semarang city, significantly has impact to the pattern of spatial distribution in the border area of the Semarang city significantly.

Keywords: *Catalyst; Peripheral; Border; Spatial; Scatter*

1. Introduction

In recent decade the growth of urban areas in Indonesia tends to follow a global urban trend characterized by peripheral urbanization. This phenomenon has the potential to encourage the growth of the urban area to be very broad and unlimited [1]. Morphology of the city was changed dramatically, from inside to outside, causing the role of border area increases, while the urban core decreases [2]. The penetration of urban growth into the border area is a process driven by the change of structure of agrarian society into a community characterized by urbanity [3]. Visually the difference between the border area and the urban area is blurred. At the next stage of urban development, there was a mix between planned settlements and unplanned settlements, both physically and socially [4]. For the urban dwellers, the administrative boundaries of the city are no longer used as a reference in determining the selection of settlement location. But the municipal government in arranging its spatial structure always considered the administrative boundaries to be the main reference. The concerns of two government authorities both city and Region to consider the existing conditions in the border area are very low. So many problems arise in the utilization of municipal facilities.

2. Literature Review

2.1. Urban Growth in Border Area

Contemporary border research debate clearly reflects more general shifts away from spatial fixity. According to this way of thinking borders are divided by transitional spaces where a perceived set of unifying attributes is gradually replaced by another one. From the perspective of city growth, the definition of border area is essentially similar to the peripheral area. But if viewed from the perspective of sovereignty institutions that make it possible for states to use and manage their human, economic, natural and other resources and claim exclusive rights to the territorial authority, is quite differ [5]. This paper discusses the border area as a temporary area, which sooner or later will change.Spatial expression in the border area in Indonesia is generally chaotic. This is due to the political, social and economic processes that create socio-spatial distinctions between places, individuals and groups. One of several reasons caused of socio-spatial distinctions is the weak of urban management policy. Municipal government always gives priority to the urban core, while border area neglected. With the increasing participation and role of the community in urban development, the growth of the border area becomes uncontrollable. The development of this area is often done without reference to a coherent macro policy and often does not follow the previously prepared plan. The issue of urban development in the border area is more complicated caused by the increasing high demand for housing and urban facilities due to excessive urbanization. To fulfill it as well as to capture business opportunities, many developers build housing estate at neighboring areas, in order to take advantage of existing urban facilities which originally only intended to meet the needs of city dwellers.

The phenomenon of Indonesia city development is basically an extension of the concept of cities in the regional constellation that was originally limited in the scope of municipal areas. Nevertheless the border area still leaves the problem because the boundary of the area is rambling extent and indistinct.

Fast growth in border areas brings difficulties for the administration to make uniform plans, regulations or designs.

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Border area is an area that is in the process of transformation from rural to urban areas prone to social and spatial segregation. In the border area is also prone to the occurrence of space deconstruction with symptoms of pattern changes, hierarchy, and inter-cluster linkage as the main component forming the city. Cities Development in Indonesia provides an opportunity for developers to play an important role and tend to have the ability to develop huge housing estate and form new urban space. Developers are allowed freely to select the desired area as long as there are no illegal constraints. The border area is created without coherent urban development policies and often does not follow regional master plans. The growth of element urban catalyst; some initiated by private sector; have triggered off massive housing development in border area. The main purpose of urban catalyst is to provide the continuity of the regeneration of the existing urban fabric. Element of urban catalyst does not act as a single or end product; it forces the environmental factors to accelerate the advanced development. Urban catalysts that trigger the growth of the region not only arise from physical artifacts, but also from government policies such as subsidies, social assistance and community culture [6]. The phenomenon of morphological development at city border area in Indonesia will still last long and generally dominated by unplanned settlement power. Therefore, understanding of the above phenomenon becomes strategic in searching for an important foundation in building theories of urban planning and design [7].

2.2. Locus of the Research

This research conducted in Semarang city; the capital of the Central Java Province. It is located in the North Coast of Java Island. Since 2010 until 2015, along with 0.97% average population growth, the total population of Semarang was 1.723.988 inhabitants. The percentage of population growth in Semarang is considered low compared to other metropolitan cities. Meanwhile, the most populous sub-district is Pedurungan whereas the least populated sub-district is Tugu. In 1986, 62% of Semarang population was still concentrated in the city center, but in 2005 the population concentration shifted to sub-district areas by 64% [8]. The population data indicated that there was a population shift from the city center to the fringe and border areas. This tendency is predicted to continue since the gross density level of population and building in fringe areas is indeed low. The increasing interest of people to live in fringe areas is motivated by several factors, including the increasing number of real estates which build various types of new settlements [Fig. 1]. Sendang Mulyo village and Pucang Gading village are the locus of this research, located in the border area of Semarang municipal area and Demak region [Fig. 2, Fig.3].

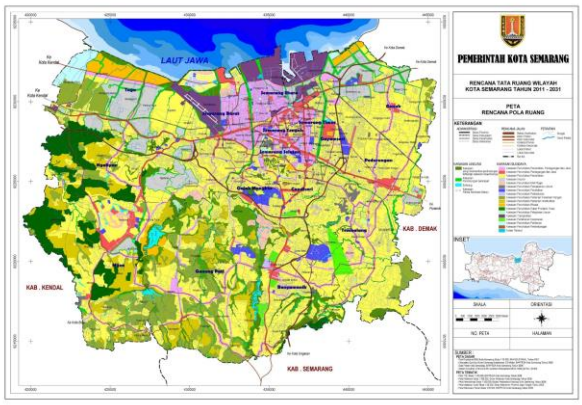


Fig. 1: Master Plan of Semarang City
Source: Semarang Local Planning Development Agency

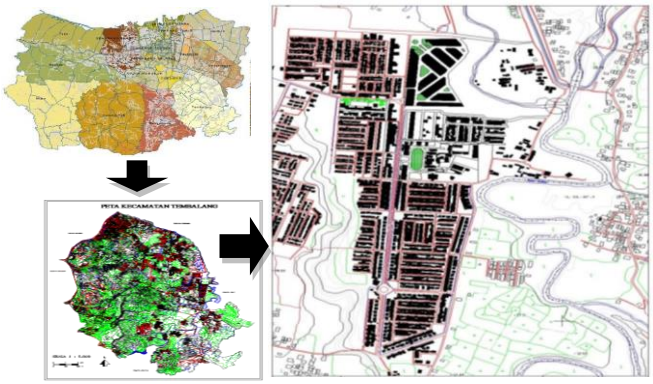


Fig. 2: Map of Sendang Mulyo and Pucang Gading Settlements
Source: Field Survey



[a] planned settlement,



[b] unplanned settlement

Fig. 3: Settlement Characteristics in Sendang Mulyo Village and Pucang Gading Village;
Source: Field Survey

3. Methodology/Materials

The intent of this paper is tried to make clear the impact of urban catalyst element to the pattern of spatial distribution in border area of Semarang City. The research process begins by conducting regression analysis using SPSS 16.0 for Windows software. Then proceed with spatial analysis by overlaying two locus maps of the 2000 and the 2016. Random sampling is done by distributing 100 questionnaires on the planned settlement and unplanned settlement in the locus of research.

4. Results and Findings

4.1. Statistical Analysis and Discussion

4.1.1. Research Population and Respondent [Sampling]

The number of respondents is 100 [level 90% confidence interval].

4.1.2. Regression Analysis Method

Table 1: SPSS: Reliability Statistics of Urban Catalyst Element

Reliability Statistics		
Cronbach's Alpha	**Cronbach's Alpha Based on Standardized Items**	**N of Items**
.911	.914	12

Table 2: SPSS: Reliability Statistic of Spatial Settlement Distribution

Reliability Statistics		
Cronbach's Alpha	**Cronbach's Alpha Based on Standardized Items**	**N of Items**
.687	.680	32

Based on Cronbach's Alpha [table 1 and table 2] it can be seen that Cronbach's Alpha on variable X is 0,914 and Cronbach's Alpha on variable Y is 0,680, therefore variable X and variable Y base on Nunnally Criteria [1960] have reliable predicate.

Table3: SPSS: Analysis of Variance

ANOVA[b]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	79.362	1	79.362	66.566	.000[a]
	Residual	1428.304	1198	1.192		
	Total	1507.667	1199			

a. Predictors: [Constant], X
b. Dependent Variable: Y

Analysis of Variance Results can be seen in the ANOVA table 3, in the sig column. If the probability value < 0.05, then it can be said there is a significant influence between independent variables on the dependent variable. Conversely if the value > 0.05, then there is no very significant influence together between independent variables to the dependent variable.

Based on table 3 above the value of F arithmetic [F test] equal to the probability of 0.00. This value indicates that all urban catalyst variables have very significant influence to the spatial distribution of settlements because the value of sig obtained < 0.05

Table 4: SPSS: Determination Analysis

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.229[a]	.053	.052	1.092
a. Predictors: [Constant], X				

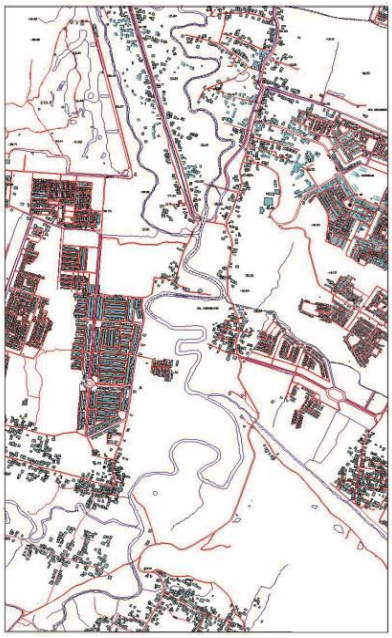
The output of SPSS in table 4 according to all respondents Sendang Mulyo and Pucang Gading Kelurahan can be seen in the correlation coefficient [ry]. The value according to the correlation coefficient level indicates a moderate and positive relationship between the variables of the provision of urban catalyst [x] and the dispersion settlement variable [y]. While the R square score shows 53%, in this case means the provision of urban catalyst has an impact of 52% on the distribution of settlements and the remaining 48% influenced by other factors outside the model.

Table 5: Summary Urban Catalyst and Settlement Spatial Distribution Cross Tabulation

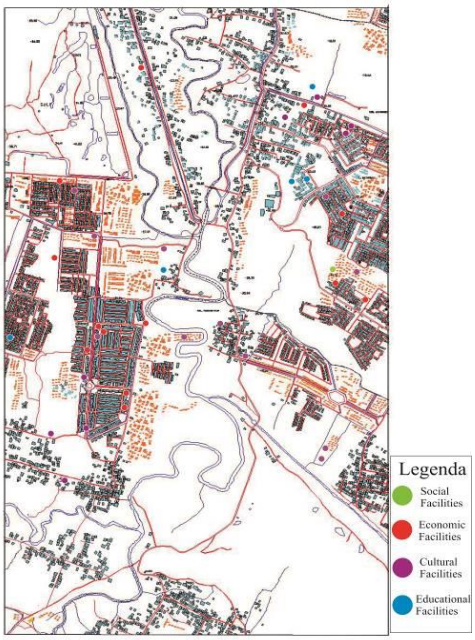
X	**Y**	**R square**	**X**	**Y**	**R square**
X1	Y1	40 %	X3	Y1	0 %
	Y2	10 %		Y2	0 %
	Y3	30 %		Y3	16 %
	Y4	22 %		Y4	41 %
	Y5	7 %		Y5	70 %
	Y6	9 %		Y6	4 %
	Y7	12 %		Y7	10 %
X	**Y**	**R square**	**X**	**Y**	**R square**
X2	Y1	46 %	X4	Y1	86 %
	Y2	5 %		Y2	26 %
	Y3	42 %		Y3	36 %
	Y4	49 %		Y4	1 %
	Y5	0 %		Y5	1 %
	Y6	39 %		Y6	44 %
	Y7	17 %		Y7	22 %

From the above table 5, it can be seen that the provision of social facilities [X1] influences the pattern of compact distribution [Y1] by 40%, the provision of economic facilities [X2] affects the accessibility [Y4] by 49%, the provision of cultural facilities [X3] affects the hierarchy of settlements Y4 by 70%, and municipal government activities programs [X4] affect the pattern of centralized settlement distribution [Y1] by 86%.

4.2. Mapping Analysis



[Year 2000]



[Year 2016]

Fig. 4: Settlement Spatial Distribution Pattern of Sendang Mulyo and Pucang Gading Settlements

Source: Field Survey

Based on the overlay mapping analysis, it can be seen that there is a change in the pattern of settlement distribution, either the plan settlement or the unplanned settlement [Fig.4]. In the year of 2000 settlement growth distinguished by leaping frog, scatter and linear pattern, while by 2016 change to compact and centralize. Majority both the planned settlement and unplanned settlement agglomerate surrounding the urban element catalyst locations.

5. Conclusion

Based on the results of analyzing and interpreting the meanings that have been described above it can be summarized as follows:

The spatial pattern on the border area has been changed due to the impact of urban catalyst growth. Some locus factors that change are: accessibility, hierarchy, composition and distribution of settlements. Some social programs have been done by municipal

government have contributed significantly to the formation of a centralized pattern. The growth of planned settlement led by the developers, accelerate the process of spatial pattern changes from scatter to a centralized pattern.

Acknowledgement

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