Open Space Pattern of Kotagede Settlement

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Abstract. Yogyakarta is a city with high urban development and rapid urbanisation stream. Those phenomena affected the dwelling process in urban-rural settlement in Kotagede heritage area. Previously Kotagede is old capitol city of Mataram with Keraton characters and organic traditional settlement. However recent developments showed transformation in Kotagede open public space. Some factors such internal and external might be involved in the transformation. This study aimed brief explanations about open space pattern in heritage area of Kotagede Yogyakarta using qualitative and quantitative methods in demand. The research object is the public open space in Kotagede. The methods are quantitative and qualitative in demands with deductive analysis in rationalistic frame. The Deductive used in analyzing the identification results with the several theories to explain the phenomenon. The quantitative method will be used to simplify the initial procedure of transformation factors. The qualitative method will be used to enhance the factors power and relate with the pattern changes. The results showed that internal and external factors bring impact to the open space pattern in Kotagede and the patterns of open space were transformed in demands. The findings give warning to the further development of Kotagede settlements.

Keywords: open space, factors,transformation, settlements, statistic, descriptive

1. Introduction

City is group of architect's artifacts from multiple era. Every cities has unique articulation and inhabitant pattern (Aldo, 1984). One of city which having unique pattern is Yogyakarta. Urban development was affected by interaction of community type alteration and dynamic causality with in (Zahdn, 1999) Furthermore the development processes were conducted by design or and by natural (Koztof, 1997)

City was imagined as huge scale of settlement (Doxiadis,1968). In aims to understand city, there are dual perspectives to read it, as : contents and containers. The contents of the city were consisted from group of settlements (clusters) and others element such : public space which connected each other as hierarchy (Koztof, 1997)

Rapoport (1977) coined the transformation of public space in the city has been focused at interaction between human and their environments. The built environment in this case were considered as setting for human activities. Therefore every transformation on human activities might resulted the transformation on environment settings. The settings can be private and public space. According to Hakim (1987) the public space is a space for man or group of man do their activities. The public space can be accessed by many communities and can be shared for any reasons and users.

Kotagede is one of the conservation area in Yogyakarta which having dialogue with past present and future situations on it. This study purpose is to identify the public space pattern on Kotagede as result of those dialogue. In early study, author found that open space pattern, settlement morphology, organic transformation and cultural demand change are

having connections and simultaneous relation. Regarding those phenomena, this study aimed brief explanations about open space pattern in heritage area of Kotagede Yogyakarta using qualitative and quantitative methods in demand.

New settelements were built and housings were erected in everyplace at Kotagede. The changes in area morphology were unavoided. The changes can be found in visible physical development and intangible culture modifications. The development of new settlement not only in the center of Kotagede but also in fringe area of the ancient capitol of Mataram Islam. However the development were not spreaded in line and the significant changes in culture was not appeared yet. This discussion about the heritage settlement and the open public space are this study result and analysis especially on the pattern changes.

2. Methods

The identification and explanation about the public open space pattern on heritage settlement Kotagede will be structured as follows. The research object is the public open space in Kotagede. The methods are quantitative and qualitative in demands with deductive analysis in rationalistic frame. The Deductive used in analyzing the identification results with the several theories to explain the phenomenon. The quantitative method will be used to simplify the initial procedure of transformation factors. The qualitative method will be used to enhance the factors power and relate with the pattern changes.

This study using stratified procedures as mentioned. Firstly is data collections, then as follow data compilations, data analysis, discussion and intepretations before the conclusion.

3. Discussion
3.1. Method procedure

The settlement of Kotagedhe was centralized into four spots (see figure 1). On those spots were identified some open space which being proceed into study object as mentioned in the title. Later on, the openspace being focused on Kotagede market and Karang park.
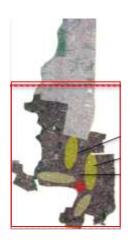

Figure 1. Kotagede settlement area (source : satelite images,2016)

3.1.1. Data Collection procedure
This process consist of two steps, as : primary data collection and secondary collection . For further explaination will be explained as :
a.   Secondary data collection
This step was performed after the primary. The data sources are : literature study, institution survey, document tracing .

b.   Primary data collection

This step will be conducted in direct observation in Kotagede to feel the vibes. There some methods being used were : questionare, physical documentation and inhabitant interviews. Data compilation : This process will be performed as data compilating, and data coding

3.1.2. Data Analysis procedure

There several statistic analysis after the compiling and coding, as :

a.   Data validity test

        Validity test was aimed to measure the validity of quesionaire parameters and variables (Gozali,2006). Product Moment Pearson was used to measure the validity in this study. This test give validation of r product moment value compare to r table, in clause :

• r product > r table (on signification 5%) showed that the item has valid value

• r product < r table (on signification 5%) showed that the item has invalid value

b.   Data Reliability test

        Reliability test was aimed to measure the indicators value to the variables in quesionaire. The reliable questionnaire has consistency and stability in surveyee statement from time to time (Singarimbun,1985) In this study, the cronbach alpha formula will be used to perform the reliability test and the value was set on 0.6 scale on Cronbach Alpha. The test use clause of :

• the value ≥ 0.60 showed that the tools have internal alpha consistency in reliability

• the value < 0.20 showed that the tools didnt have internal alpha consistency in reliability

• the value reach the highest reliability on 1

Data analysis also simplify the data form for easy reading and straight interpretation (Singarimbun,1985).The factor analysis and qualitative analysis on descriping statistic were used in this study. The factor analysis showed the hierarchy of factor impacts and the statistic descriptive showed the explaination about results in research purpose and phenomenon to make generalization (Sugiyono,2011)

3.2. Kotagede transformation trigger factor

Carr (1992] explain that the trigger factor in transforming a public open space are : 1)origin, 2) openspace function ,3) activities,4) building setback,5 building massing. In addition, he also mentioned that form transformations were internal effects of : 1) people activities, 2) people perception, 3) other transformation impact. The variables derived from the theories were detailed as :

        X1 : crowd spot (1,function)
        X2 : supporting the settlement and housing (3, function)
        X3 : culinairy tourism (2, function)
        X4 : traditional settlement (3, function)
        X5 : traditional and modern interaction(3, impact)
        X6 : heritage tourism (1, function)
        X7 : heritage into modern place transformation (5, impact)
        X8 : people demand settlement addition (4, perception)
        X9 : disaster adaptation (5, impact)
        X10: people demand open space addition(4, persepsi)

The ten openspace transformation trigger factors in Kotagede later on will be structured into 10 questions. The questions will be answered by 100 Kotagede citizens as sample with margin error of 5%. Conducting to the criteria, the minimum datas are 95 respondents with r table value of 0.1946

3.2.1. Data validity test

As mentioned on previous chapter, This test give validation of r product moment value compare to r table, in clause :

        • r product > r table (on signification 5%) showed that the item has valid value

- • r product < r table (on signification 5%) showed that the item has invalid value
- • the r table value is 0.1946

result show that r product less than 0.1946 shall be removed from the list. From 10 variables, just 4 factors which are having value more than the r table (table 1). They were :

X2 : supporting the settlement and housing (3, function)
X8 : people demand settlement addition (4, perception)
X9 : disaster adaptation (5, impact)
X10: people demand open space addition(4, perception)

Table 1. Validity test (SPSS 2018)

		X1	X2	X3	X4	X5	X6	X7	X8	X9	X10
X1	Pearson Correlation	1	-.112	.508**	.138	-.056	.318**	.236*	.189	.049	-.030
	Sig. (2-tailed)		.281	.000	.181	.593	.002	.021	.067	.638	.770
	N	95	95	95	95	95	95	95	95	95	95
X2	Pearson Correlation	-.112	1	.118	.273**	.282**	.053	.104	-.135	.065	-.318**
	Sig. (2-tailed)	.281		.254	.007	.006	.611	.318	.192	.534	.002
	N	95	95	95	95	95	95	95	95	95	95
X3	Pearson Correlation	.508**	.118	1	.026	.077	.318**	.210*	.165	-.014	-.088
	Sig. (2-tailed)	.000	.254		.800	.457	.002	.041	.109	.896	.397
	N	95	95	95	95	95	95	95	95	95	95
X4	Pearson Correlation	.138	.273**	.026	1	.046	-.026	.099	.087	.181	-.048
	Sig. (2-tailed)	.181	.007	.800		.657	.806	.341	.402	.079	.646
	N	95	95	95	95	95	95	95	95	95	95
X5	Pearson Correlation	-.056	.282**	.077	.046	1	-.263**	.146	-.150	.089	-.070
	Sig. (2-tailed)	.593	.006	.457	.657		.010	.158	.146	.390	.500
	N	95	95	95	95	95	95	95	95	95	95
X6	Pearson Correlation	.318**	.053	.318**	-.026	-.263**	1	.163	.058	.064	-.009
	Sig. (2-tailed)	.002	.611	.002	.806	.010		.113	.574	.541	.930
	N	95	95	95	95	95	95	95	95	95	95
X7	Pearson Correlation	.236*	.104	.210*	.099	.146	.163	1	.133	.105	-.081
	Sig. (2-tailed)	.021	.318	.041	.341	.158	.113		.199	.311	.437
	N	95	95	95	95	95	95	95	95	95	95
X8	Pearson Correlation	.189	-.135	.165	.087	-.150	.058	.133	1	.295**	.311**
	Sig. (2-tailed)	.067	.192	.109	.402	.146	.574	.199		.004	.002
	N	95	95	95	95	95	95	95	95	95	95
X9	Pearson Correlation	.049	.065	-.014	.181	.089	.064	.105	.295**	1	.497**
	Sig. (2-tailed)	.638	.534	.896	.079	.390	.541	.311	.004		.000
	N	95	95	95	95	95	95	95	95	95	95
X10	Pearson Correlation	-.030	-.318**	-.088	-.048	-.070	-.009	-.081	.311**	.497**	1
	Sig. (2-tailed)	.770	.002	.397	.646	.500	.930	.437	.002	.000	
	N	95	95	95	95	95	95	95	95	95	95

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

3.2.2. Data Reliability test

Raliability value from the 10 questions were 0.562 or can be explained by Ghozali [7] as moderate value (table 2). He mentioned that :

- the alpha> 0.70 showed that the tools have internal alpha consistency in reliability
- the 0.5<alpha < 0.70 showed that the tools have moderate reliability
- alpha <0.5 showed that the tools have low reliability so they need to be partialy removed.

Table 2. Reliability test (SPSS 2018)

Cronbach's Alpha	N of Items
.562	10

The test showed that this tools weren't strong enough to explain about the trigger factors of public open space transformation in Kotagede. There are still many factors out there which not being considered in this study.

3.2.3. KMO and Bartlett test

First test to measure the factors were using Kaiser Meyer Olkin (KMO) and Bartlett test (table3). The tests resulted 0.504 value on KMO value, Chi-square 55.667 and 6 on Bartlett. The value indicated that this datas are reliable for further studies. Since The minimum value of reliability in researches is 0.5000 which explained as this study was reliable but not significant enough.

Table 3. Table Uji KMO dan Bartlett

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.504
Bartlett's Test of Sphericity	Approx. Chi-Square	55.677
	df	6
	Sig.	.000

After cleaned from six factors, The variables continued to be processed in matrix anti image. In this step showed that X8 and X10 can be processed in next step with Measures of Sampling Adequacy(MSA) value more than 0.500 (4). The X2 and X9 will be removed on the next steps.

Table 4 Matrix anti image

		X2	X8	X9	X10
Anti-image Covariance	X2	.826	.077	-.210	.274
	X8	.077	.870	-.144	-.108
	X9	-.210	-.144	.673	-.324
	X10	.274	-.108	-.324	.616
Anti-image Correlation	X2	.344[a]	.091	-.282	.385
	X8	.091	.756[a]	-.188	-.148
	X9	-.282	-.188	.479[a]	-.504
	X10	.385	-.148	-.504	.513[a]

a. Measures of Sampling Adequacy(MSA)

Since only two reliable factors being found, In next test of communalities can be predicted the impact of each factors. However the impact will be even and same since no dominations on trigger factors for transforming the public open space at Kotagede heritage area. (table5). Therefore we can assumed until now, the trigger factors in transforming the pattern of public open space at Kotagede are people demand and opinions. .

Table 5. Factor of Communalities

Initial	Extraction
1.000	.656
1.000	.656

Extraction Method: Principal Component Analysis.

3.3. Openspace Transformation pattern

Girouard (1985]mentioned that the form of openspace can be detailed as :

1. landscaping

2. water surface,

3. stage

4. relaxation zone

5. restaurant

6. architecture details

7. inner circulation.

Previous research shown that openspace in Kotagede can be splitted into three scales of micro mezzo and macro. The open spaces in Kotagede are landscaping, relaxation zone, restaurant, and architecture details. In Macro scale, openspace of Kotagede are Kotagede market and Karang park. In mezzo scale, the school yard and public building lawn were able to be functioned as openspace in demand, however the fences and gates will be the borders. At the last scale of micro, the house yards without fences are the openspace. Related to the openspace pattern of Kotagede settlement, the object will be focused on Karang park as pure open space. The Kotagede market was removed by the function as enclosed rigid building rather than openspace without any further development since it surrounded by block of buildings and street (figure 2).

Carmona & Magalhaes (2006] stated that the transformation of public openspaceshape are :

1. Angling,

2. Addition,

3. Regular,

4. Irregular,

5. Closed,

6. Open.

The pattern of Karang park was unique. The irregular shape as result of angling and openings at several edge. There some addition of park segments across the main park which functioned as playground, garbage collectors and transportation terminus. (figure 3).

Figure 2. Kotagede market enclosement (source: googlemap.com, 2018)

Ching (1979) said transformation in 3 criterias can be detailed as:
- Dimensional : change in length, width, thicks dimensions
- Substractive : reduction in volume
- Additive : addition in form

Figure 3. Karang park shape (source: googlemap.com, 2018)

The Karang park has transformed several times as result of Kotagede cemetary and housing settlement developments.There were found substractive transformation by cemetary walls development, pedestrian way installment and street widenings. In other hands. The additive transformation clearly noticed by Bigletter style signage of LAPANGAN KARANG across the street. The additive of Karang park showed by recognition acrossarea as part of Karang park itself and not other park eventhough were separated by street. This condition similar to Karang park expansion defeat the street area. The expansion potentialy bring scenario of removal of street or detour through the backside of park to reduce the crossing activiry on park traffic accidents.

3.4. Openspace pattern in heritage settlement of Kotagede

Mentioned on previous chapter of trigger factor analysis, the people demand settlement (X8) and openspace additions(X10) were the main factors of public open space transformations. Therefore the people demands more area to be functioned as openspace quite growed with the needs of settlement developments. In this situation, Karang park is the best choice to be case study, since it become the communal space of settlement and cemetary activity around it. Furthermore some culinary activity of food stalls were found on it. The potential culinary tourism of Kotagede can be started also form Kotagede.

Figure 4. Multiple pattern on Karang Park (source : googlemap.com, 2018)

The commercial space has habit of converting and expanding other space into commercial space (Harsritanto,2018]. Those potential activities of commercial will be expanded and convert the Karang park into more commercial space. Ching (1979) also emphasise that enclosure degree were built by the enclosement elements and opening patterns. Therefore the more opening can be found, the less enclosement be made and the more complicated visual character brought more enclosement. The open space bring great potential to be commerical area and will be expanded to other area because it attracts more commercial the activities.

Kotagede settlement characters were described as : planned settlement, unplanned settlement,and otonomous settlement. The existing settlement condition and transformation trigger factors will process the pattern of openspace more dynamics as people demands.The potential activities in Karang park such : culinary tourism, commerical area supports, parking area, local transportation terminus (motorbike, trike, cabs) and small hotel or temporal residence are still developing in the area.

Ching (1979) said that corner area can be manage as : a) two plane joint, b) angle articulations, c) corner opening at some points, d) space in the corners , e) corner removal by cuving the sharp angle.However in Karang park was having corner opening, space in the corner and corner removal. (figure 4)

The corner opening at some points were functioned as access entry to the soccer field in the Karang park. Ching (1979) also mentioned that the access entry can be approached by :

- direct access : from outside directly to the field

- un-direct access : from out side need to step up the pedestrian ways

- Rotating access: circulating the park first before enter the spot

Figure 5. Karang park opening corner situation (source : googlemap.com)

The location of space in the corners for culinary stall or commercial area was a perfect spot as the spot will have a good visual/ visible from both side of the street (figure 3 and figure 4). This condition already being used by the food sellers in Karang park, Kotagede. Some of culinary menu already identified as local brand such : sate lapangan karang (Pusporetno,2014) .

The corner removal by curving the sharp angle was made to simplify the motorbike circulation and shorten the pedestrian way to turn and rotate. Those several conditions were told as people demand in openspace shaping (figure 5).

The people demands were dominant factors in triggering and shaping the pattern of openspace in Kotagede eventhough the area is a heritage area which preserved and protected by law. The phenomenon of transformation in settlement and openspace pattern by people demands in some point will meet the regulation of conservation itself. Furthermore this study already show the trigger and impact in openspace pattern as described. However the haritage area of Kotagede are still under wing of SK Gubernur DIY No. 186/KEP/2011 about heritage area on Yogyakarta not yet UNESCO World Heritage which having more detailed criteria to be followed [Prabowo & Harsritanto, 2018].

4. Conclusion

The pattern of openspace in Kotagede settlement was identified as landscaping, relaxation zone restaurant and architecure details. The openspaces of Kotagede at macro scale are Kotagede markets and Karang park. The mezzo scale openspaces are school yards and public buildings. The micro scale is the house courtyards with no fences. The openspaces pattern transformed by the factors of : people demands in settlement and openspace additions. The transformations were irregular by angling, opening at several corners, corner removal as curve and area additions at the across area for playing ground. The addition was unique since it separated by street but emphasized by big letter signage that shown "Lapangan Karang" area.

Acknowledgments

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