Building conservation base on assessment of facade quality on Basuki Rachmat Street, Malang

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Abstract. Visual quality covers aspects of imageability which is associated with visual system and the element of distinction. Within a visual system of specific area, the physical quality may lead to a strong image. Here, the physical quality is one of important that make urban aesthetic. Build a discussion toward visual system of urban area, this paper aim is to identify the influencing factors in defining the façade’s visual quality of heritage buildings at Jend. Basuki Rahmat Street, Malang City, East Java-Indonesia. This Street is a main road of Malang city center that was built by Dutch colonial government. It was designed by IR. Thomas Kartsten. It was known as one of Malang area that have good visual quality. In order to identify the influencing factors, this paper conducts Multiple linear regression as a tools of analysis. The examined potential factors are resulted from of architecture and urban design expert’s assessment to each building’s segment at Jend. Basuki Rahmat. Finally, this paper reveals that the influencing factors are color, rhythm, and proportion. This is demonstrated by the results model: Visual quality (Y) = 0.304 + 0.21 Colors(X5) + 0.221 rhythm (X6) + 0.304 proportion (X7).
Furthermore, the recommendation of the building facade will be made based on this model and study of historical and typology building in Basuki Rachmat Street.

1. Introduction
Lynch asserts that physical quality provided by a visual system in a region may give rise to a strong image of the region [1]. It further said that the visual quality is a special attribute of a visual system and determined by cultural values and essential physical properties. Vining and Stevens in Smardon, explained that visual quality of aesthetic quality, covers aspects such as proportion, composition, patterns, and structure; imageability is a quality associated with the image of visual system and elements of distinction on a view [2]. While the visual quality is related to how the street can shape positive perception of the pedestrian through visual elements so it will give pedestrian a good psychic impact of leisure and enjoyable visual experience. With the visual quality, the path has an important role in shaping a person's perception of the structure or the image of a city.

The façade is the cultural circumstances it conveying when the building built. The façade is a representation or expression of various aspects that appear and can be observed visually. In the context of the architecture of the city, the façades of the building is not only just but two dimensions are three-dimensional that can represent each of the buildings in the public interest (City) or vice versa [3]. Basuki Rahmat Street is one of the main streets in Malang City which is developed during the Dutch Colonialism era. This street is a part of Kayutangan, the old city centre of Malang. During the colonial
period, the main land use of Kayutangan was of commercial and public service uses. This old city centre is located in strategic area of city centre, especially in the North-South axis.

Basuki Rahmat street is one of the road axis in the Kayutangan city of Malang. The Kayutangan runs from the intersection of the square until the T-junction of Oro-oror Dowo. Before the advent of the colonial city of Malang to the Netherlands, then the Kayutangan and surrounding areas with the ancient village which is in it is part of the Karisidenan town of Pasuruan on the 1100’s which is still led by Hindu and Muslim Kingdoms [4].

Basuki Rahmat Street is the main street in Malang Central which has been used since the existence of the colonial Government of Netherlands. In present, there are several heritage building residing in this location. Basuki Rahmat Street that is part of area named Kayutangan is a special area which was formed at the beginning of the colonial period. During the colonial period, the main function of this area is as a commercial zone and public services. The strategic location of Kayutangan, which is located in the North-South axis and many skipped making Kayutangan as the center of the crowd. At the time of colonial settlement, there are several Office and shopping complex.

Kayutangan developed into a line that is often impassable since the construction of the bridge concrete Tjelaket (now the bridge in front of the Syaiful Anwar Hospital). In addition due to the layout of the Kayutangan which is adjacent to the square with all its activities and the Kayutangan since the beginning of the existence of Malang Regency has become a fast-growing region.

The existence of commercial activity and services advanced enough that also led to the construction of the Kayutangan corridor to get facilities and infrastructure priority compared to other areas such as Chinatown, Kauman, especially when compared with the native settlements tend to be overlooked. The development of the region which resulted in the value of land in the area of Kayutangan and has increased the price when compared to other areas during the time.

The characteristics of land use in Basuki Rahmat street currently dominated by commercial functions in the form of trade. However, some land use also has a significant effect on existing activities, namely building which is not used. Architectural characteristic of Jend Basuki Rahmat Street is dominated by image of heritage buildings reside in the corridor. However, due to uncontrolled Indonesian economy development by sufficient urban development system, many historic buildings were changed into the new-style buildings of modern architecture (Johana, 2004).

In 2009, Malang City Spatial Plan (RTRW) defines Kayutangan Area was developed as a tourist and socio-cultural area because of heritage values of the area. Unfortunately, this definition gives serious problems for the practical development of the area. By municipal government’s policy in spreading the urban economy development, the commercial activities of the city center are declining over the time. In this case, Kayutangan Area are experienced by the increment number of vacant and abandoned buildings, especially the heritage.

Building’s physical character of Basuki Rahmat corridor are dominated by the form of a square and rectangle with a flat roof, except for Mega Banks, Telkom Office, herbal medicine shops Kidang. The existing building on the study have a horizontal effect because its existence lining connect into one with a fairly massive nature feels because of the use of the element is not transparent on every building in the form of a wall, aluminum and glass that reflect sunlight with an average altitude of between 6 to 30 metres.

Recently, the building underwent into some changes, such as replacement and addition of some elements. It was done without reducing the colonial’s heritage impression. Some of building are experienced with major changes. Therefore defining the actual factors that influence on the building characters changes, particularly the building façade, is important in order to develop theoretical formula in designing the Basuki Rahmat corridor in future as the heritage area of Malang City.

2. Literature Review
Visual quality in difficult enough to be declared objectively but measurable by the human responses. visual quality cannot be measured with measuring, but it could be a quality result from the human perspective, the measuring should be involed by human being. Visual content refers to the structure and
the space of one area giving an infomation to the each individu such a perception in used as purpose of developing the environment [3] Several variables assessment in this research has chosen based on several literature [5] [6] [7] [3] and modified to the needs of this research (table 1).

| Variable | Sub variable | Selected Variables | Basic Considerations |
|----------|--------------|---------------------|----------------------|
| Balance  | -            | Balance             | The balance will show the value of the alignment of the object being studied by involving feelings of each respondent. |
| Unity    | 1. Texture   | Unity               | Unity will give a clear image about the visual studies because he explained variable. However, in this study a variable tone sub not used with the consideration that the tone has become part of the assessment component of the sub color variables. In addition to that subsection as well as Solid and Void variables Form also is not used because it is considered by the researcher has been variable and can be explained by other variable sub being used. |
|          | 2. Color     |                     |                      |
|          | 3. Tone      |                     |                      |
|          | 4. Direction |                     |                      |
|          | 5. Proportion|                     |                      |
|          | 6. Solid     |                     |                      |
|          | and Void    |                     |                      |
|          | 7. Form      |                     |                      |
| Density  | -            | Density             | To see the density of the façade as well as the façade of the components within a segment. |
| Rhythm   | 1. Line      | Rhythm              | Rhythms would indicate a segment. Sub variables used only the lines, shapes and space. |
|          | 2. Form      |                     |                      |
|          | 3. Texture   |                     |                      |
|          | 4. Space     |                     |                      |
|          | 5. Color     |                     |                      |

3. Methods
The research method begins with a survey of primary and secondary, where the primary survey covers (1) Observation and documentation; which collects data through field observations to impose limits on each of the segments (1 segment = ± 100 meters) and make a photo montage that will be used as a reference in the assessment of the facade; (2) the interview; interviews were conducted to 5 persons expert in urban design by providing assessment form for each segment based on seven variables assessment, in terms of balance, texture, color, direction, proportion, density and rhythm.

In this research, both sides of the street divided into 16 segments (figure 1). Where the division is based on the division of long segments of approximately 100 meters with the physical limitations of the building. So in the photo montage segments there are no buildings are truncated.

According to Agus [5] to complete a more detailed technical side of design architecture and cities, need input from a range of experts relevant to the design. A range of expert opinion that he should be able to form a single unified draft. This research involve the 5 person of experts as a Experts Group of Urban Heritage (table 2).

Experts were asked to give rate value of each segment using a likert scale. Results of the assessment from experts will be continued using the calculation method of multiple linear regression analysis. It was expected to provide a model equation which will indicate the influential variable. However, prior to the calculation of multiple linear regression, data will be transformed using Sequential Interval Method.

The next process was the analysis of the history of the building to get typology forms of existing buildings along the Basuki Rachmad Street. Based on the model equation and the typology of the building, it will be compiled on facade recommendation for conservation in each segment.
Figure 1. (a) Divisions of the Segments (b) Building façade at several segment

Table 2. Experts description.

| Respondents Name                  | Description                                                                 |
|-----------------------------------|-----------------------------------------------------------------------------|
| Prof. Ir. Antariksa Sudikno, M.Eng., Ph.D | Professor Of Department Of Architecture, Faculty Of Engineering University Of Brawijaya |
| Drs. Ismail Lutfi                  | Practitioners and observers of cultural heritage Buildings of Malang |
| Ir. Diah Ayu Kusumadewi, MT       | Head of Planning Regional Development Of Malang Goverment                   |
| Prof. H. Repati Wikantiyoso, ST., MSA., Ph.D | Lecturer Department Of Architecture-Independent University Of Malang – Vice-chancellor Of the Merdeka University Malang |
| Agung Murti Nugroho ST., MT., Ph.D | Head Of The Department Of Architecture, Faculty Of Engineering University Of Brawijaya |

4. Results
The visual assessment done based on segment 6 independent variables (balance, density, direction, texture, color, rhythm, and proportion) and 1 dependent variable (visual quality). From the results of calculation of regression analysis using SPSS 14.0.

Table 3. ANOVA

| Model | Sum of Squares | df | Mean Square | F       | Sig. |
|-------|----------------|----|-------------|---------|------|
| 1     | Regression     | 40,708 | 7 | 5,815 | 14,520 | .000(a) |
|       | Residual       | 28,836 | 72 | .401  |        |      |
|       | Total          | 69,544 | 79 |       |        |      |

a Predictors: (Constant), Proportion, Color, Texture, Density, Direction, Balance, Rhythm
b Dependent Variable: Segment’s Visual quality

ANOVA results demonstrate that the value of significance 0.05 < which means that the data that will produce a good model. This means Ho accepted (table 3).
Model summary table that the value Adjusted R Square is equal to 54.5% (table 4). Determination of the coefficient indicates how well a regression model is formed by the interaction of the independent variables and dependent variable (table 4).

Table 5. Coefficients

| Model  | Unstandardized Coefficients | Standardized Coefficients | t  | Sig. |
|--------|-----------------------------|---------------------------|----|------|
|        | B                           | Std. Error                | Beta|  |
| 1      | (Constant)                  | .304                      | .330 | .921 | .360 |
|        | Balance (X1)                | .050                      | .104 | .051 | .480 | .633 |
|        | Density (X2)                | .140                      | .102 | .141 | 1.368 | .175 |
|        | Direction (X3)              | .119                      | .097 | .121 | 1.226 | .224 |
|        | Texture (X4)                | -.034                     | .098 | -.034 | -.344 | .732 |
|        | Color (X5)                  | .210                      | .083 | .213 | 2.522 | .014 |
|        | Rhythm (X6)                 | .221                      | .108 | .225 | 2.053 | .044 |
|        | Proportion (X7)             | .304                      | .125 | .311 | 2.427 | .018 |

Coefficient tables shows the value of each variable. The resulted value shows that each variable is free of proprietary variable (B), as well as the estimated error rate variable to the model so that the test results be population (Sig). If the value is “Sig” less than 0.05 so it can be assumed that the value of B can describe a model that was later produced with 95% degree of truth (table 5).

From the results above, it can be concluded that the regression equation model is formed are as follows: Visual quality(Y) = 0.304 + 0.21 colors(X5) + 0.221 rhythm(X6) + 0.304 proportion(X7). This Model formed by the variable selection criteria have a calculation result of significance of 0.05, which means < possible errors is 5%. However, in this case the variable Density can be made into consideration in the formulation of directives, because the value of their significance is 17.5% which means it has an 82.5% probability for a valid.

Furthermore, it will perform an analysis of the history and the building typology (Fig. 2). According Hadinoto [4], Basuki Rachmad Street area characterized by colonial building with *neuw bowen* type. The characteristics of the building are:

- Flat roof
- Gevel or long horizontal fasade
- Cubical building mass
- White color
- Tower ornament in the corner of the building
- Used of concrete and steel frame
- Flexible space pattern (wider space, rich of light and open air)
- Have a lot of windows and door
- Color not only for decorative element, but also for element of expresion

After identifying a typology of the facade of the building, then made recommendations for improvement in every segment of the building facade. Based on the model equations that have been generated previously, the repaired item are color, rhythm and proportion (Fig. 3 and Fig. 4) It becomes part of the building conservation directives with the aim of building facade characteristic was maintained.
Figure 2. Typology of building façade at Basuki Rachmad Street

Figure 3. (a) Existing Facade at Segment XI (b) Recommendation Facade at segment XI.
5. Conclusion
The results of calculations indicate multiple linear regression models is Visual Quality Color = 0.304 + 0.21Color + 0.221 Rhythm + 0.304 Proportion. So that the visual factors that affect the building facade is of color, rhythm and proportion. The results of the identification of the history and typology of the building states that this area dominated by characteristic of *neuw Bowen* style.

Recommendations that will be given are repaired of old and new building facade related to color, rhythm and proportion. The colors used for old buildings are neutral colors that give the impression of a colonial building that are white or beige. For new buildings can adapt to the old buildings or provide an attractive color but still soft color as light blue, and add glass elements no more than 30%. It also could provide a green color on the top line of the first floor which will give the impression of horizontal line. Panel shop no more than 30% of the area of building facade appearance.

Successful public spaces are characterised by the presence of people, in an often self-reinforcing process. The place would be created by the element of activity, image, and form, Carmona [8]. Research on visual quality directly affect the form elements, and indirectly will affect the image of the area. On perceptual dimension that will create a place.

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