

The Visual Impact of Modern Constructions on the Old Cities in Indonesia: The Lawang Sewu Building in Semarang

Hassan Gbran*¹ & Suzanna Ratih Sari

Faculty of Architecture Engineering, University of Diponegoro,
Semarang, Indonesia

Email: gbranhassan882@gmail.com

Abstract

One of the top tourist destinations in the Semarang City is the historic building known as Lawang Sewu. The 1918 completion of this structure started in 1904 and has seen several changes in the use and ownership. Nederlands-Indische Spoorweg Maatschappij's administrative headquarters was first located at Lawang Sewu (NIS). NIS is a private corporation working in the railroad industry. This paper aims to investigate the visual impact assessment of the public of this representative historic building and its surrounding urban landscapes. It examines how tall buildings affect the historical buildings in the old cities, and how they affect the visitors as well as the horizon and distort the nearby historical environments.

This study chose one newly built high-rise building in the surroundings of Lawang Sewu as a research object and set its height, top, and color as the physical properties. Meanwhile, the height limit data in the current government regulations were set as the reference object of the height. Simulation experiments were conducted on the respondents of different demographic characteristics, randomly selected around the Lawang Sewu building. Statistical data were collected, including the sources rated by the interviewers. The demographic characteristics of the interviewers were analyzed.

The results indicate that the height, top, and color of the newly built high-rise building are influential factors on the visual impact assessment of Lawang Sewu by the public. People of different demographic characteristics assess this historic district landscape differently. This study could be of valuable reference for the future planning of historic buildings and their surroundings.

Keywords: Historic buildings; high-rise buildings; Lawang Sewu; Tugu Muda; Visual impact; Semarang.

1. Introduction

Since ICOMOS adopted the Heritage Impact Assessment (HIA) Guidelines, heritage and impact assessment has developed into a significant research method for city planning and urban design (Ashrafi, Kloos, & Neugebauer 2021; Yahampath 2014; Rodgers & Bandarin, 2019). In various Indonesian cities, there are two completely different approaches to urban planning applied for the development of neighborhoods around the historic buildings. One approach is to over-develop the area around the historic structures in an effort to increase their commercial values. However, this method would completely engulf the old building in the

surrounding skyscrapers, which would lessen the function of the historic structure, as the visual focal point in the environment.

The opposite method is overprotection of the historic structures, which imposes stringent limitations on the surrounding architectural forms in an effort to enhance aesthetic and visual qualities of the building. However, this practice does not develop its economic values adequately.

Nevertheless, it has become necessary for the old buildings to blend with the contemporary urban environments as globalization in Indonesia has progressed. However, concurrently, historic structures are now more in danger than ever due to insufficient protection methods and increasing urban expansion (Najid et al., 2015). According to Sirisrisak (2009), proposals for urban planning and development should be built on the foundations of historic buildings. The public input should never be disregarded while creating an urban planning strategy (Yuen, 2005). Therefore, it is important to research how the public perceives urban landscapes that have the old buildings with nearby recently constructed high-rise structures.

1.1 Evolution of Dutch Architecture in Indonesia

Lawang Sewu is an old Dutch colonial building located in the central Java island's North coast city of Semarang in Indonesia and occupies a total space of 23m x 77m. In the Javanese language, one of the many languages in Indonesia, Lawang Sewu can be directly translated as "A Thousand Doors." It was built on February 27th, 1904 and was completed in 1907 by the Dutch. The building was initially designed for and functioned as the head office for the Nederlandsch-Indische Spoorweg Maatschappij, or the Dutch Indies Rail Company PT. Indonesian Railways (2014).

1.2 The Lawang Sewu Building

This was built in phases on an area of 18,232 square meters. The main building was started on February 27, 1904, and was completed in July 1907, while the additional buildings were built around 1916 and were completed in 1918.

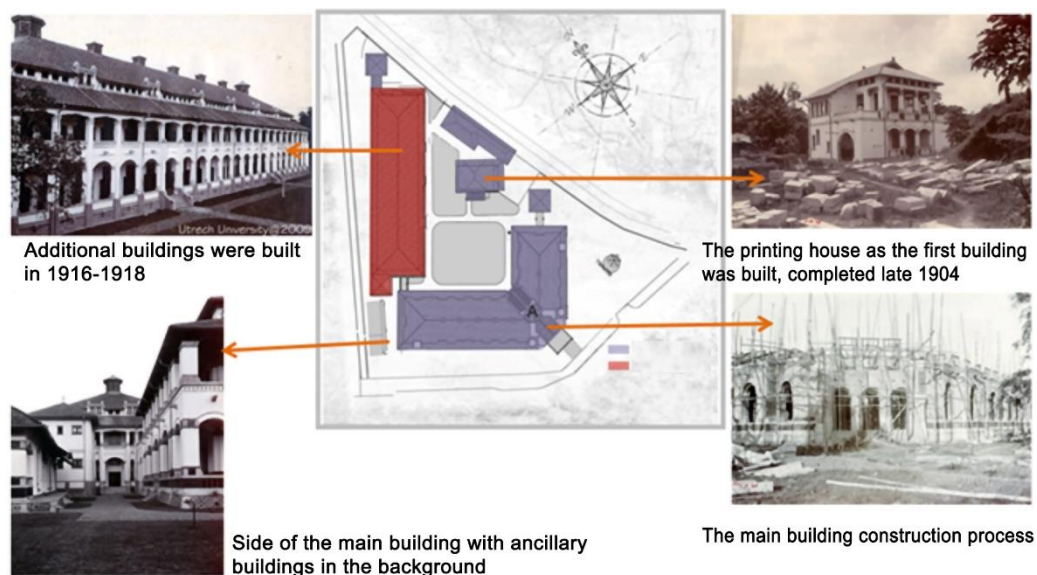


Fig. 1: Stages of developing the Lawang Sewu Building

Source: (A1) <https://heritage.kai.id/page/lawang-sewu>

1.3 The Design

Lawang Sewu was designed by the Dutch architect Cosman Citroen in the New Indies Style which is a modern architectural style used in the Dutch East Indies between the late 19th century through pre-World-War II in the 20th century. As common with the Dutch colonial architecture in Indonesia at the time, the building was constructed with materials imported straight from the Netherlands. Although the name signifies a building with a thousand doors, only 928 remain today due to the looting that has occurred during the war (EDIATI, Murni. 2009).

1.4 Western Building Style and Its Impact on Other Cultures

Buildings constructed using the western building typologies can be found in many towns from Africa, and Asia, to America. Wherever the Europeans went, they had the intention of bringing with them the building technologies, materials, and design philosophies to places they settled. However, what they often brought were not compatible with the local conditions of the place be it due to culture or climate. Over time, the resulting buildings were adjusted to the local conditions and thus unique local typologies emerged. Such was the case with the Dutch Buildings in Indonesia as they gradually evolved over the many centuries mainly in response to the tropical climate. Therefore, as seen in the Fig. 1, Dutch buildings in Indonesia can be categorized broadly into four periods of style: Masonry European Style, The Indies Empire Style, The New Indies Style, and the Art Deco Style. Furthermore, Table 1 and Table 2 below specify the differences in materials as well as the construction systems between the four periods of styles.

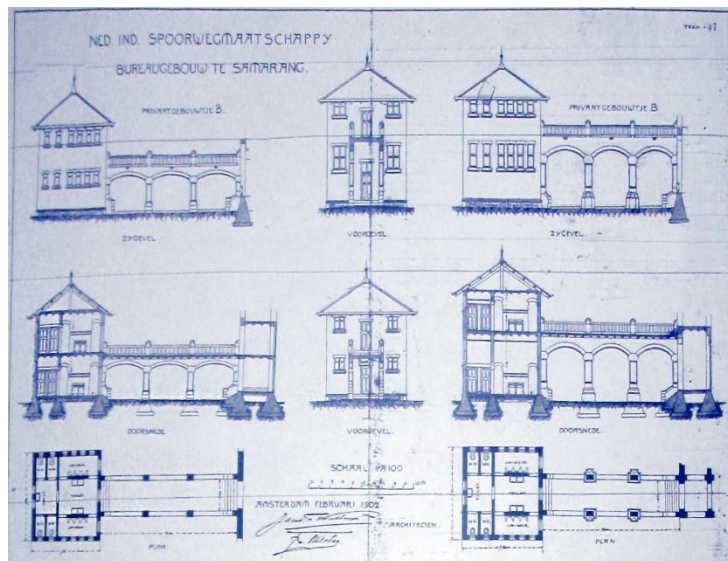


Fig. 2: A detail drawing of Lawang Sewu.(B)

Source: https://id.wikipedia.org/wiki/Berkas:Blueprints_for_Lawang_Sewu.jpg

The stylistic choices of the Dutch in Indonesia, especially in the early 20th century were not simply for aesthetic reasons but functioned mainly to adapt to the extreme Indonesian tropical climate. As Netherlands, from where the Dutch originated, has a completely different climate than Indonesia, it should then stand to reason that the architects importing their building skills ought to iterate their buildings to be suitable for the local climate. As a point of fact, a direct one to one replica could result in unfavorable living conditions for their inhabitants. Therefore, the stylistic evolution of Dutch architecture as categorized earlier is simply a by-product of the centuries of problem-solving in accordance with the Indonesian climate. This very reason also makes the Dutch architecture in Indonesia unique in the western stage as no other countries share the exact weather conditions as Indonesia.

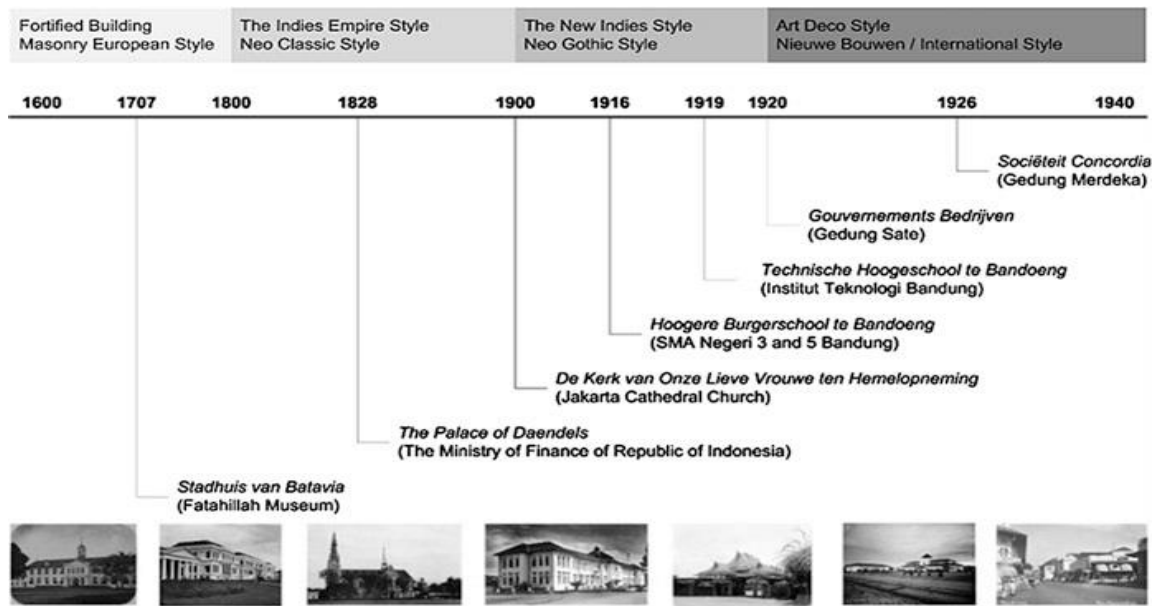


Table 1: Dutch Architecture Evolution in Indonesia

1.5 The Current Use of Lawang Sewu

From Indonesia's independence, until 1994, the building had been owned by the PT Kereta Api Indonesia to be primarily used as their main office as well as other agencies like the Java Ministry of Transportation. However, the building was left empty and neglected in 1994. After the building has been vacant for many years, the PTKA's Heritage and Conservation Department, or Indonesia's major operator of public railways, decided to renovate it in the hope of revitalizing it. Although the building had been renovated and now in a pristine condition, the use does not extend beyond simply being a museum for the tourists. It also has now become popular as a wedding venue. It is currently owned by the PTKA: Indonesia's public railway company, and the primary use of it is to display the history of trains and not much of colonialist history (Desain Tropis Dan Eropa, August 17, 2016).

Table 2. Elements of Building Materials

Indische empire (18 th -19 th Century)	Transitional architecture (1890-1915)	Modern colonial architecture (1915-1940)
Bricks on columns and walls	Bricks on columns and walls	Concrete building materials
The main material of wood on truss, sills, and doors	The main material of wood on the truss. Frames and door	The use of glass material is wide enough (especially on windows)
Not much use of glass	The use of glass on windows is still very limited	

Table 3: Elements of the Construction System
Source: (Table 2-3) Kumurur and Tampi, 2018
Ariani Mandala, 2018

Indische empire (18th-19th Century)	Transitional architecture (1890-1915)	Modern colonial architecture (1915-1940)
Bearing wall, with column rows on the front and back porch	Bearing wall with prominent front gevels	The frame construction system, so the wall only serves as a cover
Using a column and beam construction system	Roof: the shape of the saddle roof and the shield by using roof tile coverings	Roof: still dominated by gable roof with roof tile or shingle roof material
Construction of roof shield with roof tile coverings.	There is an effort to use additional construction as a vent on the roof	There are parts of the building using concrete construction, using a flat roof of concrete material, which has never existed

The initial design process for Lawang Sewu was started by Ir. P. de Rieu. However, the construction process has been postponed until 1903. Prof. J. Klinkhamer, B. J. Oundag, and his assistant C. G. Citroen were then appointed by the Dutch government to continue the work of the Lawang Sewu with the adaptation of European architectural styles to the tropical climate in Indonesia. Working drawings were made in the Netherlands and most of the materials relied on the construction processes in Europe.

Construction had started on the 24th February 1904 and has been completed in July 1907. During this period, the building A was built first with the shape of the letter "L" on the floor plan, and then the building C. As the NIS business grew, the room in the building A could not afford anymore to accommodate the activities in it. For that reason, an outbuilding was erected in the Northeast side of the site.

The construction process of the building which was later referred to as the building B started in 1916, and ended in 1918. There are differences in the constructions of buildings A and B. In A and C, most of the materials such as granite, marble, and ceramics, were imported from Europe. Materials obtained from the local environment were only brick and wood. In the construction of the building B, this is not the case. Riyuku Sokyoku is the name of the Japanese transportation agency office which occupied Lawang Sewu from 1942 to 1945. In 1945, Lawang Sewu was used by DKARI (Djawatan Kereta Api of the Republic of Indonesia) as an office. However, in 1946, the Dutch recaptured Lawang Sewu from the Japanese and used it as a military base.



The drawing consists of two parts. The top part, titled 'SITUATIE', shows a site plan with a compass rose, a north arrow, and a scale bar. It includes labels for 'Schal 0:100', 'Schal 1:100', 'Schal 2:100', 'Schal 3:100', 'Schal 4:100', 'Schal 5:100', 'Schal 6:100', 'Schal 7:100', 'Schal 8:100', 'Schal 9:100', 'Schal 10:100', 'Schal 11:100', 'Schal 12:100', 'Schal 13:100', 'Schal 14:100', 'Schal 15:100', 'Schal 16:100', 'Schal 17:100', 'Schal 18:100', 'Schal 19:100', 'Schal 20:100', 'Schal 21:100', 'Schal 22:100', 'Schal 23:100', 'Schal 24:100', 'Schal 25:100', 'Schal 26:100', 'Schal 27:100', 'Schal 28:100', 'Schal 29:100', 'Schal 30:100', 'Schal 31:100', 'Schal 32:100', 'Schal 33:100', 'Schal 34:100', 'Schal 35:100', 'Schal 36:100', 'Schal 37:100', 'Schal 38:100', 'Schal 39:100', 'Schal 40:100', 'Schal 41:100', 'Schal 42:100', 'Schal 43:100', 'Schal 44:100', 'Schal 45:100', 'Schal 46:100', 'Schal 47:100', 'Schal 48:100', 'Schal 49:100', 'Schal 50:100', 'Schal 51:100', 'Schal 52:100', 'Schal 53:100', 'Schal 54:100', 'Schal 55:100', 'Schal 56:100', 'Schal 57:100', 'Schal 58:100', 'Schal 59:100', 'Schal 60:100', 'Schal 61:100', 'Schal 62:100', 'Schal 63:100', 'Schal 64:100', 'Schal 65:100', 'Schal 66:100', 'Schal 67:100', 'Schal 68:100', 'Schal 69:100', 'Schal 70:100', 'Schal 71:100', 'Schal 72:100', 'Schal 73:100', 'Schal 74:100', 'Schal 75:100', 'Schal 76:100', 'Schal 77:100', 'Schal 78:100', 'Schal 79:100', 'Schal 80:100', 'Schal 81:100', 'Schal 82:100', 'Schal 83:100', 'Schal 84:100', 'Schal 85:100', 'Schal 86:100', 'Schal 87:100', 'Schal 88:100', 'Schal 89:100', 'Schal 90:100', 'Schal 91:100', 'Schal 92:100', 'Schal 93:100', 'Schal 94:100', 'Schal 95:100', 'Schal 96:100', 'Schal 97:100', 'Schal 98:100', 'Schal 99:100', 'Schal 100:100'. The bottom part, titled 'PLAN VERDIEPING', shows a floor plan with a scale bar and a north arrow. It includes labels for 'Schal 0:100', 'Schal 1:100', 'Schal 2:100', 'Schal 3:100', 'Schal 4:100', 'Schal 5:100', 'Schal 6:100', 'Schal 7:100', 'Schal 8:100', 'Schal 9:100', 'Schal 10:100', 'Schal 11:100', 'Schal 12:100', 'Schal 13:100', 'Schal 14:100', 'Schal 15:100', 'Schal 16:100', 'Schal 17:100', 'Schal 18:100', 'Schal 19:100', 'Schal 20:100', 'Schal 21:100', 'Schal 22:100', 'Schal 23:100', 'Schal 24:100', 'Schal 25:100', 'Schal 26:100', 'Schal 27:100', 'Schal 28:100', 'Schal 29:100', 'Schal 30:100', 'Schal 31:100', 'Schal 32:100', 'Schal 33:100', 'Schal 34:100', 'Schal 35:100', 'Schal 36:100', 'Schal 37:100', 'Schal 38:100', 'Schal 39:100', 'Schal 40:100', 'Schal 41:100', 'Schal 42:100', 'Schal 43:100', 'Schal 44:100', 'Schal 45:100', 'Schal 46:100', 'Schal 47:100', 'Schal 48:100', 'Schal 49:100', 'Schal 50:100', 'Schal 51:100', 'Schal 52:100', 'Schal 53:100', 'Schal 54:100', 'Schal 55:100', 'Schal 56:100', 'Schal 57:100', 'Schal 58:100', 'Schal 59:100', 'Schal 60:100', 'Schal 61:100', 'Schal 62:100', 'Schal 63:100', 'Schal 64:100', 'Schal 65:100', 'Schal 66:100', 'Schal 67:100', 'Schal 68:100', 'Schal 69:100', 'Schal 70:100', 'Schal 71:100', 'Schal 72:100', 'Schal 73:100', 'Schal 74:100', 'Schal 75:100', 'Schal 76:100', 'Schal 77:100', 'Schal 78:100', 'Schal 79:100', 'Schal 80:100', 'Schal 81:100', 'Schal 82:100', 'Schal 83:100', 'Schal 84:100', 'Schal 85:100', 'Schal 86:100', 'Schal 87:100', 'Schal 88:100', 'Schal 89:100', 'Schal 90:100', 'Schal 91:100', 'Schal 92:100', 'Schal 93:100', 'Schal 94:100', 'Schal 95:100', 'Schal 96:100', 'Schal 97:100', 'Schal 98:100', 'Schal 99:100', 'Schal 100:100'.

Source: (C).. <https://jejakkolonial.blogspot.com/2017/04/lawangsewu-adikarya-arsitektur-kolonial.html>

2.1. The main objectives of the research

It is based on the view that new constructions will pose threats to the preservation of the urban landscape dominated by the historic buildings as cities throughout the world have become more urbanized. In addition to the straightforward requirement for height, Fig., 2 shows the layout of Lawang Sewu, often known as "a thousand doors," and the area around it. This demonstrates the effect of the high-rise buildings on the visual horizon of the building.

2-2. The goal of this study is to determine whether there are any alternative guidelines for the surrounding structures that could prevent irreparable harm to the architectural heritage and strike a balance between its protection and the urban developments.

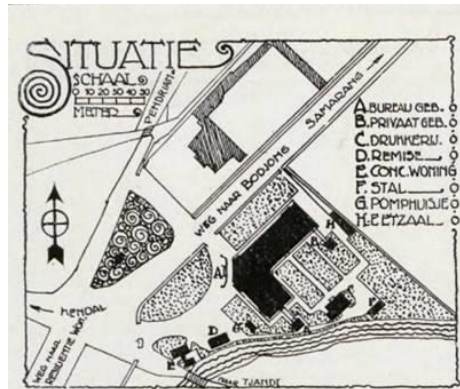


Fig. 5: (Left) Masterplan Early Development Lawang Sewu, 1916

Source: (C) Norberg, 1963

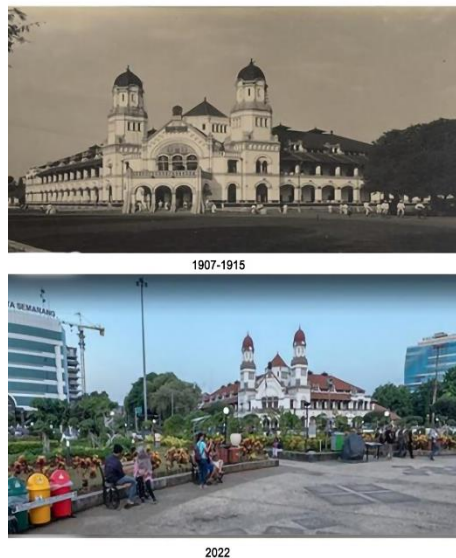


Fig. 6: Images from different time periods, from almost the same direction, show the extent to which the skyline of the ancient building has been affected by the modern buildings.

Source: (C)1- <https://jejakkolonial.blogspot.com/2017/04/lawangsewu-adikarya-arsitektur-kolonial.html>; 2- Author



Fig.7: Flow of visits to Lawang Sewu. The arrangement of the buildings in Lawang Sewu

Source (H):1- <http://ekioula.blogspot.co.id/2013/08/lawang-sewu.html>

2- <https://cadmapper.com/pro/home>



Fig. 8: Two views from the same direction, the first was taken in 1915 and the second in 2022. The two images show the impact of the adjacent building on the character of the building

Sources: 1-<https://jejakkolonial.blogspot.com/2017/04/lawangsewu-adikarya-arsitektur-kolonial.html>
2- 10.14710/teknik.v30i1.1820

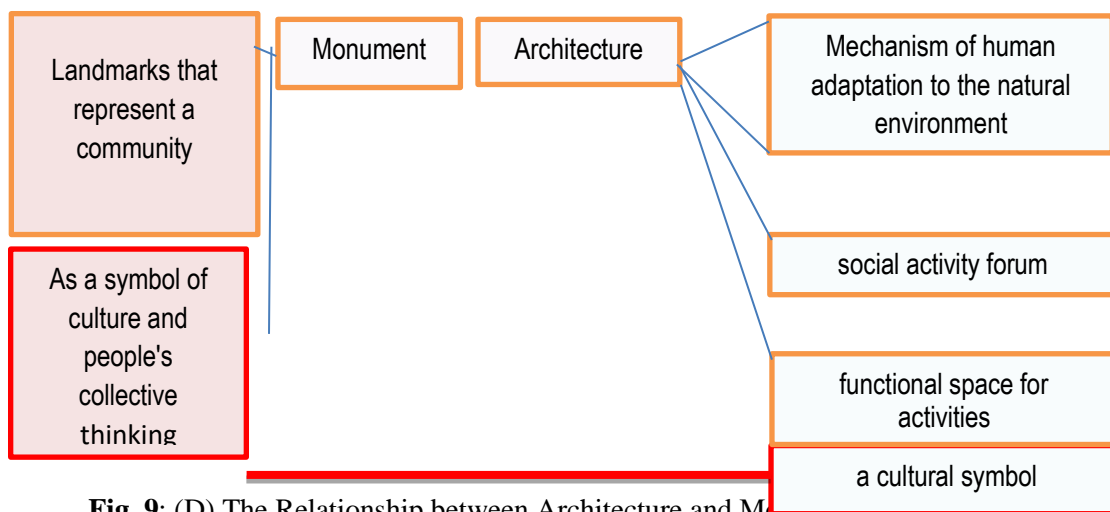


Fig. 9: (D) The Relationship between Architecture and Monuments in the Context of Monumentality

Sources: 1- Felix Levenson. Archaeology, Monumentality, Monuments, Architecture and Public Spaces. Publication Name: Size Matters - Understanding Monumentality Across Ancient Civilizations <https://doi.org/10.14361/9783839445389>
2- Monuments and Monumentality – different perspectives- Felix Levenson

3. Research Method

3.1. The research method used

In early May of 2022, the researcher visited the location several times, day and night. This is in an area called Tugu Muda in Semarang, Indonesia. The building being close to my residence gave a good opportunity for the research and I had no difficulty finding the place. I went there to see the site from the inside and outside, and remember the round front yard and the monument which is the historical symbol of the site. The historical building opposite is a very important tourist attraction in the city of Semarang.

It was the basic methodology to study the site throughout: visit and make observations.

A questionnaire, was created which is a collection of images. The 27 as-prepared images in Fig. 11 depict the various heights, volumes, tops, and colors of the neighboring structures. These images were reproduced in full color, randomly ordered into a volume, and then presented to the respondents. The 27 images were printed on nine sheets of A4 paper with three images each for the respondents' to score (Fig. 11). The respondents, who were chosen at random from the street, were then shown these images and asked to rate the overall scene of

Lawang Sewu and the nearby buildings as depicted in the images. In order to prevent the respondents' demographic traits from becoming overly single, the study was carried out in the weekend. The practice of employing images to undertake visual impact evaluation is justified by the fact that in earlier relevant research, images have frequently been used to replace genuine landscapes.

The respondents of this study were first required to complete a questionnaire that asked about their gender, age, educational attainment, and place of residence. Types of influences and problems directly affecting were identified, as well as conclusions and recommendations. In addition, it was noted that the continual change in the function of the building and the existence of several restoration interventions have affected the original decoration and building materials. Through studies of construction developments and continuous interventions in changing the function of building, and most importantly, the rapid urbanization that has occurred around the buildings has had a negative impact on these historic buildings.

The photographs of Lawang Sewu's overall setting and the nearby structures serve as the study resources for this project. The high-rise building is situated about 300 meters (m) away from the tower, in the South corner of Lawang Sewu. It is a building for a four-star hotel currently in the early stages of planning and research. There are four avenues in its East, West, North, and the South. The Lawang Sewu building is located at the confluence of five avenues. High-rise structures can be found in close proximity to Lawang Sewu to the Southwest, Southeast, and Northeast. As a result, there isn't enough visual distance to see Lawang Sewu from any angle.

3.2. The physical characteristics of surrounding high-rise buildings

The goal of the study was to investigate how Lawang Sewu and the visual impact of the nearby buildings was affected by the height, volume, top, and the color of the observed buildings. However, it was found that the volume change of the structures to be assessed for this study was determined by their height change due to the site area and plot ratio restrictions of the construction project. As a result, this trait was not taken into account in the study. In the meantime, the height, top, and the color were divided into three levels using the control variable approach (Table 1). The Hotel structure is located approximately 300m from Lawang Sewu. The maximum height for the structures on this lot is 28 m, in accordance with the regulations governing the height limitations.

Thus, using 36 m (the height of Lawang Sewu) as a benchmark, the height of the nearby structures may be identified at three levels:

1. Equivalent to Lawang Sewu's height 28 m.
2. Relatively higher than Lawang Sewu's height, the height ratio is 54 m.
3. Twice as high as Lawang Sewu, the height ratio is 72 m.

Top: In order to describe several building tops, this study chose the tops of the most prevalent buildings in Tugu Muda-Semarang city. In this study, three different building tops were used: red domes, modern flat roofs, and Indonesian sloping roofs.

Table 5: Statistics of Physical Characteristics

Source: Author

Physical characteristics	Levels
Physical properties	Resistance to heat, humidity, climatic changes, and earthquake resistance
Heights	28 m; 54 m; 72 m
Top	Indonesia slop roof; Modern flat roof; European pitched roof
Color	White; Yellow; Red

Table 6. Statistics of Physical characteristics

Sources:

1 - Altitude (Springer verlag Singapore, 2018).

2- https://www.wikiwand.com/en/New_Indies_Style#Architecture

3- The author

Value	implication
1	dislike very much
2	dislike somewhat
3	Neutral
4	Somewhat like
5	like very much

Table 7. The demographic characteristics of respondents.

Source: Author

Demographic characteristics	Variable	Number of respondents	Percentage of respondents
Gender	Female	172	46.4
	male	222	59.6
Age	Between 18 and 34	150	40.3
Education	Over 60	100	27.3
	Receive higher education	170	45.5
Place of residence	Lawang sewu	170	70
		120	31.1

In the above table, the demographic characteristics were studied, taking into account the age difference for all races, and taking into account the opinion of the respondents on the site in making a comparison between the ratios and the opinions.

3.4. Method of Data Analysis

Statistical analysis was performed on the average scores of the gathered photos using the SPSS 22.0 program. First, the impact of the three physical features on the respondents' preferences was examined using one-way ANOVA. The quantitative links between the three physical features and the demographic factors as well as the qualitative relationships between the three physical properties and the respondents' preferences were both investigated using stepwise multiple linear regression analysis. In related investigations, these analytical techniques have been frequently employed.

4. Analysis: Architecture of the Lawang Sewu Building

4.1. The shape of the Building.

The architecture of the Lawang Sewu building has a style of the Indisch Empire (Kennedy, 2012). The style is identified from the characteristics of the building such as the presence of gables on the front facade, heads on columns, balustrades and dormers. On the Lawang Sewu building complex, there are 5 building masses. The mass of building A which is directly adjacent to Jalan Pemuda represents the face of Lawang Sewu.

4.2. Spatial layout

The spatial arrangement shows how the spaces in the building complex in Lawang Sewu are composed. The division of spaces can be seen horizontally from the floor plan and

vertically from the sections. Horizontal division of space applies the principle of double banking where there are two rows of spaces separated by a central corridor. However, there is a corridor that surrounds the building. Vertically, the rooms are divided into layers of floors. The relationships between the layers of spaces can be in the form of void spaces and stairs.

4.3. The origin of the name Lawang Sewu

PT Kereta Api Indonesia Conservation and Cultural Heritage Unit in its publication “Lawang Sewu in Watercolor” stated, “The name Lawang Sewu is derived from the Javanese dialect used by the locals of Semarang. Lawang means door, and Sewu is one thousand, the name has been used for many decades to describe a building that has many doors. The numerous doors that line along the entire structure had made it impossible to count their exact number. As a result, many assume it to have a thousand doors (Sopyan & Widiyanto, 2015).

4.4. The architectural monumentality of Lawang Sewu

Monumental Architecture.

Generally, architecture and monuments are two different things. In fact, both are realized through a design process, and there are fundamental differences between them. According to Schulz (1963), architecture accommodate human activities and needs. A monument is a marker of a significant situation. Specifically, Giedion says that a monument is a sign of the achievement of culture (Jive & Larkham, 2003)

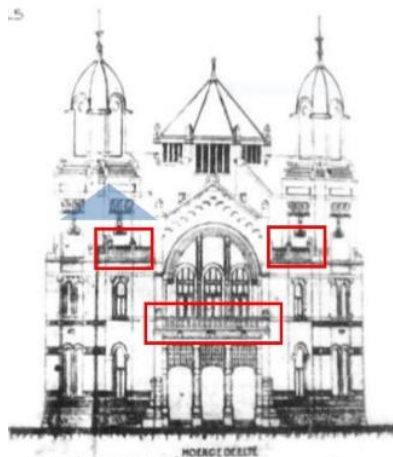


Fig. 9: Balustrade and gable in the Western wing Meeting of the building aAt Lawang Sewu, 1916

Source:(E) https://issuu.com/arsitekturundip2017/docs/pelestarian_arsitektur

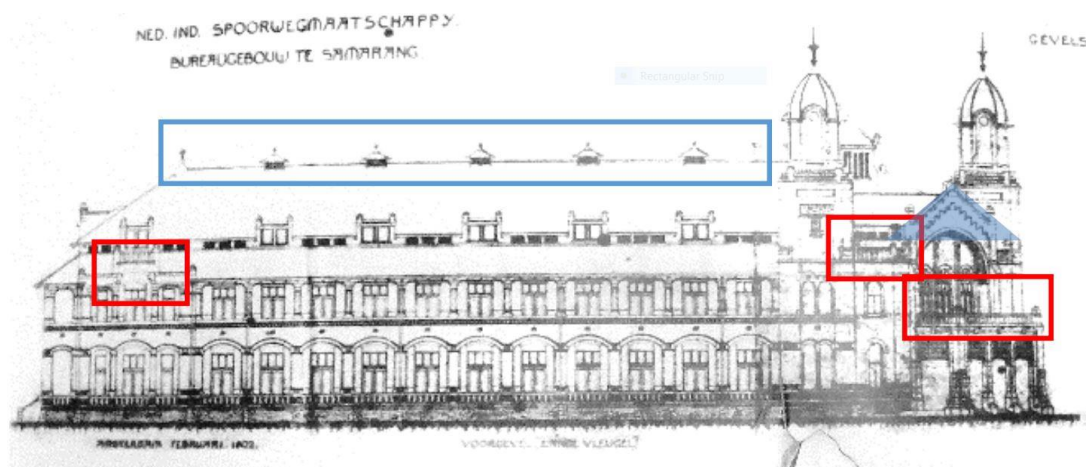


Fig.10: Balustrade, Gable, and Dormer on the Western Façade of the building A Lawang Sewu, 1917

Source:(E) https://issuu.com/arsitekturundip2017/docs/pelestarian_arsitektur

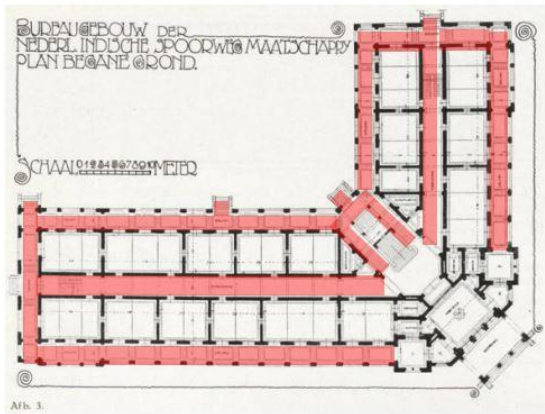


Fig.11: Model lantai dasar Gedung

Lawang Sewu 1916

Source:(E) https://issuu.com/arsitekturundip2017/docs/pelestarian_arsitektur

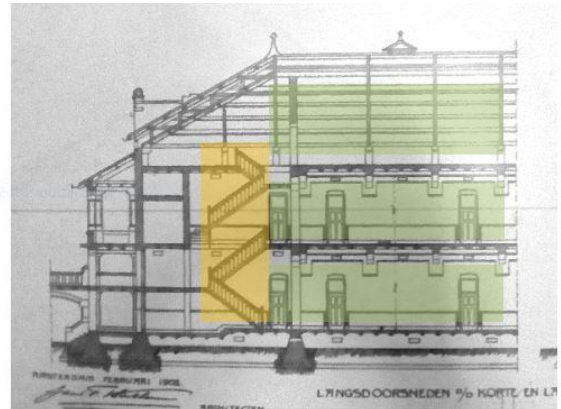


Fig.12: (Right) Schematic Space and Void Layers on the longitudinal section of the Wing Ladder Area: North of the building A Lawang Sewu, 1916

Source (E)

5. Findings

The inter-group dependability of the 27 images was evaluated. These images, as previously said, depict the numerous building heights, volumes, tops, and color combinations in the vicinity. The reliability was estimated using SPSS 22.0 and was at 0.757, which is a strong internal reliability. Therefore, it can be said that the questionnaire survey and the information gathered were trustworthy for the subsequent in-depth study. *S* stands for the mean score for each image. The average scores of the images ranged from 1 to 5, with 3.79 being the highest and 2.63 being the lowest. All of the images had an average rating of 3.36.

5.1. Relationship Between Visual Impact Assessment and Height, Top, and Colour

The association between the opinions of the respondents about the visual impact and the height, top, and the color of the neighboring buildings was investigated using multifactor variance analysis. To be more precise, *H* stood for height, *T* for top, and *C* for the color of the buildings in the area. The average score of each photo *S* was then established as the dependent variable and they were set as the factors. Multifactor variance analysis in Table 5 demonstrates that the model ($F = 153.972$, $P = 0.000$) is significant in the total coherence. The model is suitable for the data acquired from the questionnaire survey, as indicated by the model fitting number (denoted by *R* square), which is equal to 0.615. Therefore, the initial hypothesis is refuted by SPSS analysis. In other words, at least one of the three components exhibits a significant difference (namely, *H*, *T*, and *C*). With *H* ($F = 474.218$, $P = 0.000$), *T* ($F = 27.221$, $P = 0.000$), and *C* ($F = 2.412$, $P = 0.035$), additional calculations and analysis demonstrate that there is a substantial difference in all the three factors. Accordingly, it can be inferred from the multifactor variance analysis that there are noticeable differences in the height, top, and color of the neighboring buildings when the average score is assigned as the dependent variable. In other words, the top, height, and color of the surrounding structures are the variables that affect the overall grade an image.

5.2. Demographic Characteristics of the Respondents and Visual Impact Assessment

To start, a one-way ANOVA was used to investigate the connection between the demographic data and the visual effect evaluation. The computation shows that there is a considerable disparity between the average ratings provided by To start. A one-way ANOVA was used to investigate the connection between the demographic data and the visual effect evaluation. According to the calculations, there is a significant difference between the average scores provided by the respondents whose demographic characteristics are as follows: gender difference ($F = 8.652$, $p = 0.000$), age difference ($F = 4.128$, $p = 0.020$), place of residence difference ($F = 7.215$, $p = 0.042$), and education difference ($F = 5.211$, $p = 0.000$). The link

between the demographic traits and the evaluation of the visual impact was then re-examined using the Kendall correlation analysis. The average score *S* and gender (negative correlation), age (positive correlation), education (negative correlation), and place of residence are significantly correlated, as shown in the Table 6 (positive correlation).

Finally, a multiple linear regression model was used to further examine the data. In the model, gender, age, educational background, and place of residence are taken as independent variables whereas the average score of the images is set as the dependent variable. The analysis indicates that gender, age, educational background, and place of residence exert significant influence on the assessment of the images. Further analysis was conducted to explore whether there is a reciprocal effect among the demographic characteristics. Collinearity analysis was done on the independent variables with the results of multiple linear stepwise preferred term here. It is suggested that this theory is complex and the concepts have become muddled. The particular genius arises from the experiences of those who use places rather than intentional 'place-making'. Conservationists and urban designers in particular need to re-examine the theoretical underpinnings of the terms and concepts they use, in order to fully understand the potential contributions of a sense of place, authenticity and personality (Norberg. 1963).

5-3. The impression of the unity of the building from the environment of the Tugu Muda area study was done by looking at the contrast between the Lawang Sewu building, the surrounding environment and the image of what came next. This test refers to the formulation of Yoshinobu Ashihara regarding primordial monumentality. Based on testing using foreground and background images, there is an image of Lawang Sewu that consistently emerges. The image is of two towers in the building A. From these results, it is clear that there is a monumental value contained in the visibility of Lawang Sewu.



Fig. 13: Exterior Image Capture Map of Lawang Sewu
Source: Author,

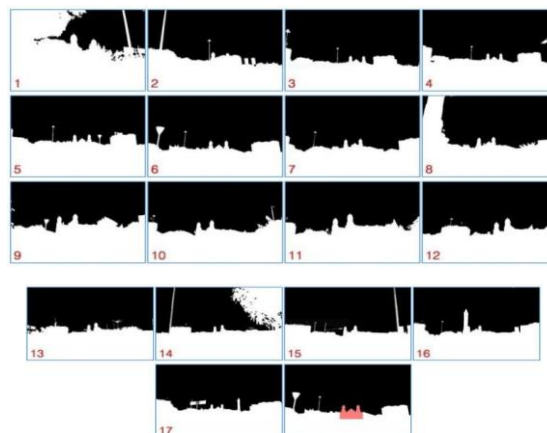


Fig. 14: Testing with Foreground and Background Images
Source: Author

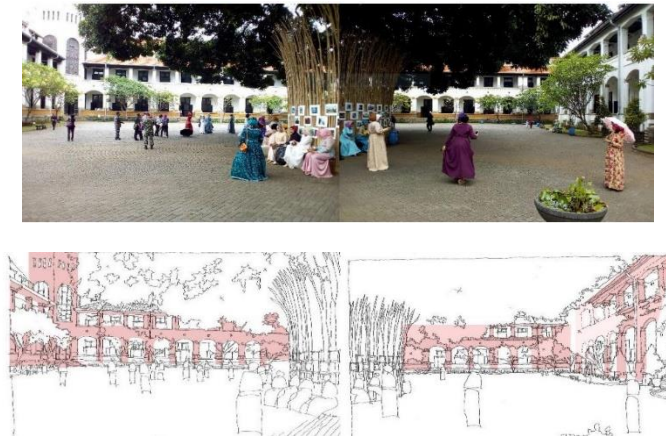


Fig. 15: A Photographic Image of the Central Court

Source: Author

By observing the space and identifying its architectural and structural elements through comparison of the image of the atmosphere of space, the observer range limits are used to sharpen the discussion where only observable spaces are representations of monumentality. Architectural elements can include structural elements. The structure also forms the boundaries and expressions of space (Hernández,2004). Comparison results can show how the relationship between the two elements is related to the monumentality of space. Redrawing of the photographic images aims to break the outline of the atmosphere-captured space. At the same time, the outline imagery helps identify the structural elements of the scene-captured space.

Table 8: Kendall correlation analysis

Source: Source: Author.

		Score	Sex	Age	Educational Background
Gender	Coefficients	-.22			
	Significance				
Age	Coefficients	.000	.5.2		
	Significance	.2			
Educationa	Coefficients	.32	.4	-.22	
	Significance	.44	.3	.1	
Place of residence	Coefficients	.5	.12	-.3	.6
	Significance	.04	.4	.4	.4

Table 10: Multiple linear regression analysis of the physical characteristics of the images for various gender groupings.

	B	Std. error	Beta	t	Sig.	Tolerance	VIF
(Constant)	3.581.1	0.042		25.962	0.000		
Age	0.36	0.0282	0.752	4.992	0.031	0.84	1.269
Gender	-0.52	0.0183	-1.578	-7.157	0.000	0.482	3.589
Educational background	-0.698	0.080	-0.496	-3.69	0.026	0.466	3.212
Residence	0.61	0.0221	-1.70	-7.613	0.003	0.982	7.235

Dependent		Unstandardized coefficients		Standardized coefficients		t	Sig.	Collinearity statistics	
		B	Std. Error	Beta				Tolerance	VIF
Scores for male	Constant	2.789	0.253			4.221	0		
(R2 = 0.52,	H	0.442	2.712	0.491		2.822	0.00	0.712	4.313
N = 219)	T	1.552	1.821	0.471		2.321	0.03	1.39	0.821
Scores for female	Constant	8.531	1.381			5.939	0		
(R2 = 0.53,	T	0.953	0.318	0.931		4.121	0.001	0.5918	3.134
N = 158)	C	2.012	0.5922	0.539		1.532	0.000	0.541	5.291
18-35 years old	(Constant)	5.982	0.325			5.029	0		
R2 = 0.538, n = 148	T	0.351	0.598	0.4598		5.851	0.001	0.459	3.158
	C	1.298	0.254	1.321		3.985	0.005	0.914	4.528
35-59 years old	(Constant)	5.9492	0.3595			4.802	0		
R2 = 0.518, n = 135.9	C	5.8594	1.325	2.599		4.985	0.008	0.525	5.253
50 years old or older	(Constant)	8.982	0.518			5.054	0		
R2 = 0.591, n = 102	H	0.592	1.553	0.5915		4.595	0.001	0.541	4.209
With higher education	(Constant)	3.598	0.2859			5.128	0		
R2 = 0.5859,	H	0.355	2.559	0.598		4.148	0.000	0.521	3.428
n = 153	T	0.305	1.858	0.584		3.852	0.001	0.493	3.588
	C	0.259	2.503	0.505		4.509	0.025	0.558	3.455
Without higher education	(Constant)	4.554	0.354			5	0		
R2 = 0.582, n = 214	T	0.258	0.541	0.458		4.325	0.000	0.454	3.524
Semarang	(Constant)	5.158	0.352			5.982	0		
R2 = 0.598,	H	0.425	2.598	0.312		4.021	0.02	0.355	5.258
n = 255	T	0.554	1.482	-0.398		4.812	0.01	0.521	4.528
	C	0.428	1.559	0.521		3.859	0.01	0.355	4.552
Other places	(Constant)	5.812	0.493			5.932	0		
R2 = 0.539, n = 120	H	0.451	1.052	0.428		4.545	0.000	0.582	3.125
	C	0.548	1.324	0.555		4.820	0.010	0.583	4.158

Source: Author's field studies, the general opinions of citizens of all ages.

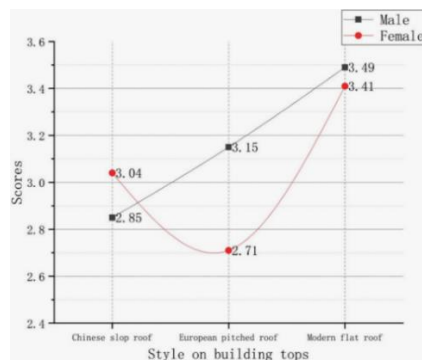


Fig. 16: Preferences of different gender groups for building top.

Source: author's field studies, the general opinions of citizens of all ages.

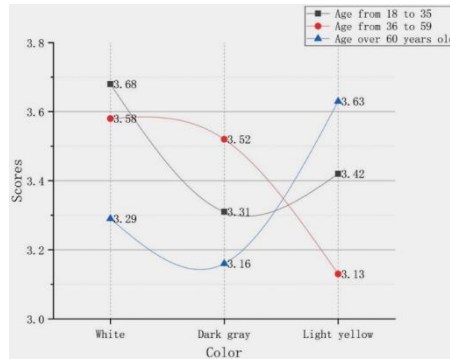


Fig. 17: Preferences of different age groups for building top.

Source: author's field studies, the general opinions of citizens of all ages.

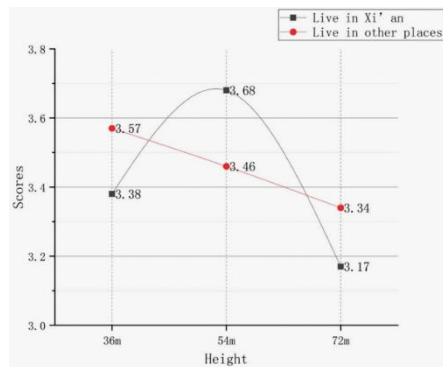


Fig. 18: Preferences of groups with different places of residence for building height.

Source:(G) Author's field studies, the general opinions of citizens of all ages.

Analyzing the multiple linear regression of the physical characteristics of the images of the different sex groups, the study was conducted with different age levels, in order to compare the vision of the elderly and the young.

6. The Weaknesses

It is one of the tangible manifestations of architecture students in their scientific field. This activity is carried out to study a building in an area using interviews, observations, and documentation techniques.

This is the method used in conducting this investigation. Culture focuses on heritage buildings in Semarang. There are different types of Dutch monuments present there, such as Lawang Sewu, Marabunta Building, Spiegel Bar & Bistro, Blenduk Church, Benlang Vastenburg. Lawang Sewu Semarang is one of the buildings designated as part of the city symbols of Semarang.

By studying the methods used in the process of preserving the historical heritage and the Indonesian Law No. (11) issued in 2011, *Arsitekturundip* (2017), and in view of the reality, the full preservation of historical buildings has not been achieved. By looking at the physical condition of the buildings, the presence of large gaps and excesses are clearly noticed. The changing functions of the buildings and the use of materials for restoration are not compatible with the architectural character or with the original materials. Through the investigation that was carried out, the questionnaire, and the collection of opinions of citizens of different ages, it was found that the cultural understanding of the citizens and the visitors plays a role in the preservation of the historical buildings.

In view of the governing authority responsible for managing the construction, it did not consider preserving the historical building as an important element in the city that represents the basic symbolism of the region. In fact, it is considered an attraction for the tourists from different regions, but the function of the building is changed from time to time according to the need to use the building and make some renovations from the inside. Some of them are considered extraneous, such as colors that contrast with the character, or an attempt to plant fountains or aesthetic elements in the building that differ in character and essence.

These are considered weaknesses that affect the historical heritage when thinking about building as a means of material income, and not respecting the originality and the ancient culture that established this building. In addition to urbanization and residential neighborhoods that have become dominant over the old building, the outlets surrounding the old building are used as parking lots or as pedestrian traffic to the modern buildings.

7. Discussion

According to the findings, gender, age, educational background, and the area of residences all have significant impact on the evaluation of the images, as per the multiple linear regression model to examine the relationship between demographic characteristics and visual impact rating. It was noted that the four demographic factors included in this study—gender, age, education, and place of residence—don't have any reciprocal effects (Table 7).

According to Zube, Pitt, and Evans (1983), even for the same collection of images, various demographic factors might result in varying visual effect assessments. Additionally, they found that as the ages of the respondents rose, the average score would fall. However, this study had a different outcome: the middle-aged group's average score was the lowest (Table 6). This outcome is primarily due to the older respondents giving more attention to Lawang Sewu itself, which lessens the impact of changes in the physical characteristics of the nearby structures.

In this instance, the older group's average score is typically greater than the scores provided by the other two groups. Younger responders are more likely to accept the various architectural forms as a result of witnessing the rising urbanization of Indonesia.

As a result, the youthful responders' average score is generally higher. According to Howley, Donoghue, and Hynes (2012), persons of various ages would come up with various visual affect ratings. The several influences of the respondents' living environments and experience were the cause of this disparity. This holds for the study findings as well. Therefore, rather than making conclusions when analyzing the visual effect evaluation of different age groups, it is advised to take into account the cultural background and living environment of the respondents. According to Wang and Zhao (2017), gender differences would result in differing assessments of the visual impact, which is consistent with the findings of this investigation. Gender differences will result in differing visual preference evaluations for urban green plant landscapes, according to the observations of Abello and Bernáldez (1986).

Howley (2011) has discovered comparable outcomes in their research. In addition, it was found that male respondents had a higher opinion of the scenery than female respondents. In particular, female respondents gave an average score of 3.24, whereas male respondents gave an average score of 3.65. This may be explained by the fact that the building being evaluated makes up a very minor fraction of the entire image of Lawang Sewu and the surrounding structures, as well as the fact that males place more emphasis on the overall impact of the scene.

López-Martínez (2017) has argued that schooling had some bearing on how people evaluated the visual impact of landscapes. According to Lindemann-Matthies, Junge, and Matthies (2010) and Molnarova et al. (2012), those with less education would score higher than those with more education, which is consistent with the findings of this study. This tendency is most likely brought on by the possibility that educated individuals place a higher value on preserving historic structures. They would therefore be harsher while evaluating the entire scene of the Lawang Sewu and its surrounding structures out of utmost respect. In this

instance, their evaluation of the visual effect is lower than those of people without higher education.

8. Conclusions

Urban development and the preservation of old buildings have always been at odds. The preservation of the ancient buildings that dominate the urban environment will be threatened by new constructions. In this age of globalization, it is crucial for emerging countries to prevent any irreparable harm to historic buildings and to strike a balance between urban expansion and the preservation of historic structures.

Trials have been carried out for this investigation on Lawang Sewa and the nearby structures to ascertain these. The findings suggest that a number of variables affect how high new high-rise structures should be in the area around Lawang Sewa and that these variables can interact to alter the rule that newly constructed high-rise structures should not exceed 25 m. Despite the fact that this result was unexpected, the actual data shows that these issues exist and could have an impact on how well the landscape around historic structures is maintained (Palmer, and Hoffman, 2001)

Numerous elements need to be taken into account while designing a building. For the architectural style in a historic district, the situation is more difficult. This study demonstrates the aesthetic trend brought on by demographic differences and the public expectations for the growth of adjacent structures around Lawang Sewa, even though the final design cannot be determined by a single study.

Wendel, Zarger, and Mihelcic (2012) has found that people's perceptions of space varied depending on where they lived. This research supported this finding. The natives of Semarang City graded the images far worse than people from other locations did in this study. Additionally, preferences of the residents of Semarang for the building height were significantly different from the residents of the neighboring cities. To be more precise, visitors favored buildings that did not exceed the present height restriction, whereas residents of Semarang wanted structures that were twice as tall as the Lawang Sewu.

Overall, this study found that although there is still no agreement on how different demographic features affect visual impact evaluations, particular attention should be paid to factors like individual variations, historical characteristics, respondents' experience, and the regional environments. This study discovered that there was no reciprocal relationship between the four demographic parameters used for this study—gender, age, education, and place of residence—by using a multi-linear regression model (Table 7).

To better safeguard and emphasize the value of historic buildings, various factors (such as color and roof form) should be fully taken into account. Public participation should be fully recognized, and related urban planning and urban design guidelines should be developed. It is proposed that visual impact assessments must be taken into account as a significant method of public participation and used in future urban planning so that the public preferences can be more accurately reflected.

The scope of this investigation has several restrictions. The area surrounded Lawang Sewu has new architecture, which is slowly changing the history of the surrounding environmental elements as Indonesia's urbanization progresses. There might be certain restrictions in the research for new high-rise public buildings in such a contemporary cityscape with an aesthetic preference between the architectural heritage evaluation and a research outcome. The application of this study to some small and medium-sized cities that experience slower rates of urbanization is still debatable. Its focus is on the fast urbanization of large cities. Observers may be influenced differently by various architectural legacies of various scales and types. Additionally, the single viewpoint (just one ideal observation position) images used in this study may contribute to some limitations in the research methodology. Given that the surroundings of the majority of Indonesia's historic buildings have lost their original historical appearances, this study is still relevant because it gives future decision-makers new information about how to strike a balance between urban development and the preservation of historic buildings.

References

- Abello, R. P., and Bernáldez, F. G. (1986) "Landscape Preference and Personality." *Landscape and Urban Planning* 13: pp. 19–28. doi:10.1016/0169-2046(86)90004-6.
- Ashishara, Yoshinobu. (1970) *Exterior Design in Architecture*. New York: Van Nostrand Reinhold.
- Ashrafi, B, M. Kloos, and Neugebauer. C. (2021) "Heritage Impact Assessment, beyond an Assessment Tool: A Comparative Analysis of Urban Development Impact on Visual Integrity in Four UNESCO World Heritage Properties." *Journal of Cultural Heritage* 47: pp. 199–207. doi:10.1016/j.culher.2020.08.002.
- Howley, P. (2011) "Landscape aesthetics: Assessing the general public's preferences towards rural landscapes, *Ecological Economics* 72: pp. 161–169
- PT. Indonesian Railways. (2014) *Heritage: Lawang Sewu Building, Semarang*. <http://heritage.keretaapi.co.id/?p=1233>
- EDIATI, Murni. 2009. *Ikon Kota Semarang*. Jurnal TEKNIK volume 30 no.1
- Lindemann-Matthies, P., X. Junge, and D. Matthies (2010) "The Influence of Plant Diversity on People's Perception and Aesthetic Appreciation of Grassland Vegetation." *Biological Conservation* 143 (1): 195–202. doi:10.1016/j.biocon.2009.10.003.
- HARIADI, Dwi (2011) *Efforts to Protect Lawang Sewu Cultural Conservation Objects* Semarang. Bangka.
- Belitung: University of Bangka Belitung.
- INDONESIA. Conservation and Cultural Conservation Unit. (2013) *Lawang Sewu in Watercolor*. Bandung: PT.
- Kubota Tetsu, *Sustainable Houses and Living in the Hot-Humid Climates of Asia* (Springer verlag Singapore, (2018) pp. 13-23
- Protschky, Susie (2011) *Images of the Tropics: Environment and Visual Culture in Colonial Indonesia* Brill.
- Pitoko, R, A (2016), "Lawang Sewu, Ikon Arsitektur Semarang Kombinasi Desain Tropis Dan Eropa" <https://properti.kompas.com/read/2016/08/17/144423321/lawang.sewu.ikon.arsitektur.semarang.kombinasi.desain.tropis.dan.eropa?page=all>
- Molnarova, K., P. Sklenicka, J. Stiborek, K. Svobodova, M. Salek, and E. Brabec. (2012). "Visual Preferences for Wind Turbines: Location, Numbers and Respondent Characteristics." *Applied Energy* 92: 269–278. doi:10.1016/j.apenergy.2011.11.001.
- Niya, M. D. (2015) "Visual Preference Dimensions of Historic Urban Areas: The Determinants for Urban Heritage Conservation." *Habitat International* 49: pp. 115–125. doi:10.1016/j.habitatint.2015.05.003.
- Sirisrisak, T. (2009) "Conservation of Bangkok Old Town." *Habitat International* 33 (4): 0–411. doi:10.1016/j.habitatint.2008.12.002.
- Wang, R., J. Zhao, M. J. Meitner, Y. Hu, and X. Xu (2019) "Characteristics of Urban Green Spaces in Relation to Aesthetic Preference and Stress Recovery." *Urban Forestry & Urban Greening* 41: 6–13. doi:10.1016/j.ufug.2019.03.005.
- Wang, R., and J. Zhao. (2017) "Demographic Groups' Differences in Visual Preference for Vegetated Landscapes in Urban Green Space." *Sustainable Cities and Society* 28: pp. 350–357. doi:10.1016/j.scs.2016.10.010.
- Wendel, H. E. W., Zarger, R. K. and Mihelcic, J. R. (2012) "Accessibility and Usability: Green Space Preferences, Perceptions, and Barriers in a Rapidly Urbanizing City in Latin America." *Landscape and Urban Planning* 107 (3): pp. 272–282. doi:10.1016/j.landurbplan.2012.06.003.
- Sopyan, S., & Widiyanto, I. (2015). *Anteseden Minat Berkunjung Ulang (Studi pada Cagar Budaya Bedung Lawang Sewu Semarang)*. *Diponegoro Journal of Management*, pp. 677-685.

- Yahampath, P. (2014) "Integrating Heritage Impact Assessment (HIA) into Environmental Impact Assessment (EIA) as a Part of Environmental Management; Case study- Northern Expressway of Sri Lanka." *NIDA Case Research Journal* 6 (2): pp. 86–130.
- Zube, E. H., Pitt, D. G. and Evans, G. W. (1983) "A Lifespan Developmental Study of Landscape Assessment." *Journal of Environmental Psychology* 3 (2): pp. 115–128. doi:10.1016/S0272-4944(05)80151-3.
- Svobodova, K., Sklenicka, P., Molnarova, K., and Salek, M. (2012) "Visual Preferences for Physical Attributes of Mining and Post-mining Landscapes with respect to the Sociodemographic Characteristics of Respondents." *Ecological Engineering* 43: pp. 34–44. doi:10.1016/j.ecoleng.2011.08.007.
- Abello, R. P., and Bernáldez, F. G. (1986) "Landscape Preference and Personality." *Landscape and Urban Planning* 13: pp. 19–28. doi:10.1016/0169-2046(86)90004-6.
- Lindemann-Matthies, P., Junge, X. and Matthies, D. (2010) "The Influence of Plant Diversity on People's Perception and Aesthetic Appreciation of Grassland Vegetation." *Biological Conservation* 143 (1): pp. 195–202. doi:10.1016/j.biocon.2009.10.003.
- Jive'n, G., & Larkham, P. J. (2003) Sense of place, authenticity and character: A commentary. *Journal of urban design*, 8 (1), pp. 67-81.
- Wibawa, Bebet Adi. (2015) Changes in the function of the Lawang Sewu building and the image of Semarang City years 1904 – 2009. Semarang: State University of Semarang.
- Twombly, Robert. (2003) Louis Kahn, Essential Texts. New York: W. W. Norton Company.
- Palmer, J. F., and R. E. Hoffman (2001) "Rating Reliability and Representation Validity in Scenic Landscape Assessments." *Landscape and Urban Planning* 54 (1–4): 149–161. doi:10.1016/S0169-2046(01)00133-5.
- Hernández, J., García, L. and Ayuga, F. (2004) "Assessment of the Visual Impact Made on the Landscape by New Buildings: A Methodology for Site Selection." *Landscape and Urban Planning* 68 (1): pp. 15–28. doi:10.1016/S0169-2046(03)00116-6.
- Arsitekturundip, (2017) https://issuu.com/arsitekturundip2017/docs/pelestarian_arsitektur
<https://heritage.kai.id/page/lawang-sewu>

Sources of the figures

- A1- <https://heritage.kai.id/page/lawang-sewu>
- A- (IEEE): M. Ediat, "IKON KOTA SEMARANG," *TEKNIK*, vol. 30, no. 1, pp. 72-78, Feb. 2012. <https://doi.org/10.14710/teknik.v30i1.1820>
- B- https://id.wikipedia.org/wiki/Berkas:Blueprints_for_Lawang_Sewu.jpg
- C- .1- <https://jejakkolonial.blogspot.com/2017/04/lawangsewu-adikarya-arsitektur-kolonial.html>
<https://jejakkolonial.blogspot.com/2017/04/lawangsewu-adikarya-arsitektur-kolonial.html>
- D- 1- Felix Levenson. *Archaeology, Monumentality, Monuments, Architecture and Public Spaces*. Publication Name: *Size Matters - Understanding Monumentality Across Ancient Civilizations*
<https://doi.org/10.14361/9783839445389>
 2- *Monuments and Monumentality – different perspectives*- Felix Levenson
- E- INDONESIA. Pusat Studi Urban. 2009. *Kerusakan Bangunan Cagar Budaya Gedung Lawang Sewu Semarang*. Semarang: Pusat Pelestarian Benda Bersejarah PT. Kereta Api Indonesia (persero).
https://issuu.com/arsitekturundip2017/docs/pelestarian_arsitektur
- F- Author, Paper Questionnaire Form.
- G- https://issuu.com/arsitekturundip2017/docs/pelestarian_arsitektur
- H- <https://cadmapper.com/pro/home>