

# Preserving History in a Modern Setting "An Adaptive Redesign of Lawang Sewu for Sustainable Development and Architectural Heritage Conservation"

Hassan Gbran<sup>\*1</sup> , Suzanna Ratih Sari<sup>1</sup> , Siti Rukayah<sup>1</sup> , Bangun ir Harsritanto<sup>1</sup> 

<sup>1</sup>Architecture, Semarang, 53411, Indonesia

\*Corresponding Author: [gbranhassan882@gmail.com](mailto:gbranhassan882@gmail.com)

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## ABSTRACT

This study focuses on the adaptive redesign of Lawang Sewu, a prominent landmark in Semarang, Indonesia. Since it was first built in the early 20th century, the structure has seen several historical developments and occurrences. Interest has been seen in keeping Lawang Sewu as a cultural heritage site and rejuvenating it in recent years. Degradation, functional obsolescence, aesthetic dissonance, and societal resistance are some of the difficulties that the adaptive redesign must overcome. The study paper looks at Lawang Sewu's adaptive redesign from a number of angles and suggests ways to meet sustainability and energy-efficiency goals. The essay is divided into chapters that include an introduction, a review of related literature, an analysis of a case study, a discussion of historical and socioenvironmental factors, a look at the visual impact, and a conclusion. The study also offers a design suggestion for Lawang Sewu's acoustic improvement and addresses the idea of authenticity in heritage protection. The case study analysis's findings demonstrate the adaptive redesign project's intricacy as well as its cultural setting and Semarang project site.

**Keywords:** adaptive, architectural, efficiency, sustainable development



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## 1 Introduction

Lawang Sewu is a prominent landmark in Semarang, the capital city of Central Java province in Indonesia. The building was constructed in 1904-1919 by the Dutch colonial government as the central office for the East Indies Railway Company (NISM). The building has a distinctive neo-Gothic style with a symmetrical layout and a large central dome. The name Lawang Sewu means "thousand doors" in Javanese, referring to the numerous windows and arches that adorn the building [1].

Lawang Sewu has witnessed many historical events and changes in its long existence. During World War II, it was occupied by the Japanese army and used as a transportation headquarters and a prison. The basement was converted into torture rooms where many Indonesian freedom fighters were killed. After Indonesia's independence, Lawang Sewu was taken over by the state railway company Djawatan Kereta Api (DKA), later renamed as Kereta Api Indonesia (KAI). The building suffered from neglect and deterioration over the years, and was also damaged by several natural disasters such as floods and earthquakes [1].

In recent decades, there has been a growing interest and awareness in preserving and revitalizing Lawang Sewu as a cultural heritage site. Several initiatives have been undertaken by various stakeholders, such as the

government, KAI, local communities, and private investors, to restore and reuse the building for different purposes. Some of the proposed or implemented functions include a museum, a hotel, an office, a convention center, and a public park [1].

However, the adaptive redesign of Lawang Sewu is not without challenges and controversies. The building faces several issues such as structural instability, environmental degradation, functional obsolescence, aesthetic discordance, and social resistance. Moreover, the building has to balance between preserving its historical authenticity and meeting the contemporary needs and expectations of its users and visitors. Therefore, this research essay aims to explore the adaptive redesign of Lawang Sewu from various perspectives and propose some strategies for achieving energy efficiency and sustainability objectives.

The essay is organized as follows: Chapter 1 provides an overview of the background, purpose, significance, methodology, problem context and scope, thesis statement, research questions, and dissertation structure of this study. Chapter 2 reviews the relevant literature on Lawang Sewu's history and current state, adaptive redesign approaches and strategies for sustainable development and energy efficiency objectives, and illustrative cases from other countries. Chapter 3 presents a case study analysis of Semarang as the cultural context and project site for Lawang Sewu's adaptive redesign. Chapter 4 discusses the historical context and socio-environmental aspects of Lawang Sewu's adaptive redesign. Chapter 5 examines the visual impact of modern architecture on heritage structures in relation to Lawang Sewu's adaptive redesign, "ascertain the impact of the modern and high-rise buildings on the Lawang Sewu building in the old city,"[2]. Chapter 6 concludes the essay with a summary of findings, implications, recommendations, limitations, and directions for future research.

## **2 Method**

This study adopts a mixed-methods approach that combines qualitative and quantitative data collection and analysis techniques to address the research questions and objectives. The study employs three main methods: literature review, case study analysis, and interview-based data collection.

### *2.1 Literature Review*

The literature review is conducted to provide a theoretical and conceptual framework for the study, as well as to identify the gaps and challenges in the existing knowledge and practice of adaptive redesign of historic buildings. The literature review covers four main topics: Lawang Sewu's historical overview and current state, evolution from use and adaptive reuse to adaptive redesign, redesign approaches and strategies for sustainable development and energy efficiency objectives, and illustrative cases from other countries [2][3]. The sources of literature include books, journal articles, reports, websites, and other relevant publications that are retrieved from various databases such as Google Scholar, Scopus, Web of Science, and ProQuest. The literature review follows a systematic and critical approach that evaluates the quality, relevance, and validity of the sources, as well as synthesizes and compares the findings and arguments from different perspectives [4][5][6].

### *2.2 Authenticity*

The term "authenticity" has been defined by the Oxford Dictionary, incorporating notions such as reliability, originality, and indisputable origin. Another dictionary definition expands on this, describing authenticity as being true, original, or a credible statement of fact. The word "authenticity" has its roots in Greek and Latin, where it conveys the meanings of being authoritative and original. In medieval Europe, authenticity was utilized to demonstrate political power, the trustworthiness of religious texts, and the efficacy of magical practices. Subsequently, the term found application in the context of museums, where experts sought to ascertain the true identity of artworks. Thus, the traditional understanding of authenticity revolves around genuineness, reality, and uniqueness. The concept of authenticity, as outlined in the Venice Charter of 1964, pertains to revealing the aesthetic and historical value or the true nature of an asset based on original and authentic documentation. Authenticity stands in opposition to mere copying or reconstruction devoid of creative input. Alivizatou (2012) argues that authenticity does not imply a blind adherence to traditions, but rather a more creative engagement with how past traditions can be made relevant in the present. Authenticity can be understood in two ways: it can exist in an object, place, event, or industry, or it can be related to the attributes of an individual that are intended to be true to one's essential nature. Drawing on Heidegger's theory, Wang (1999) proposes a distinction between the authenticity of an object and the

authenticity of an experience, introducing the concept of "realistic authenticity." According to Wang, an individual's authentic experience is derived from personal origins, such as feelings of enjoyment, relaxation, and self-construction, as well as interpersonal interactions with friends and family.

International conventions reflect a widespread consensus on the significance of authenticity in the preservation of heritage buildings, as evidenced by Table 1.

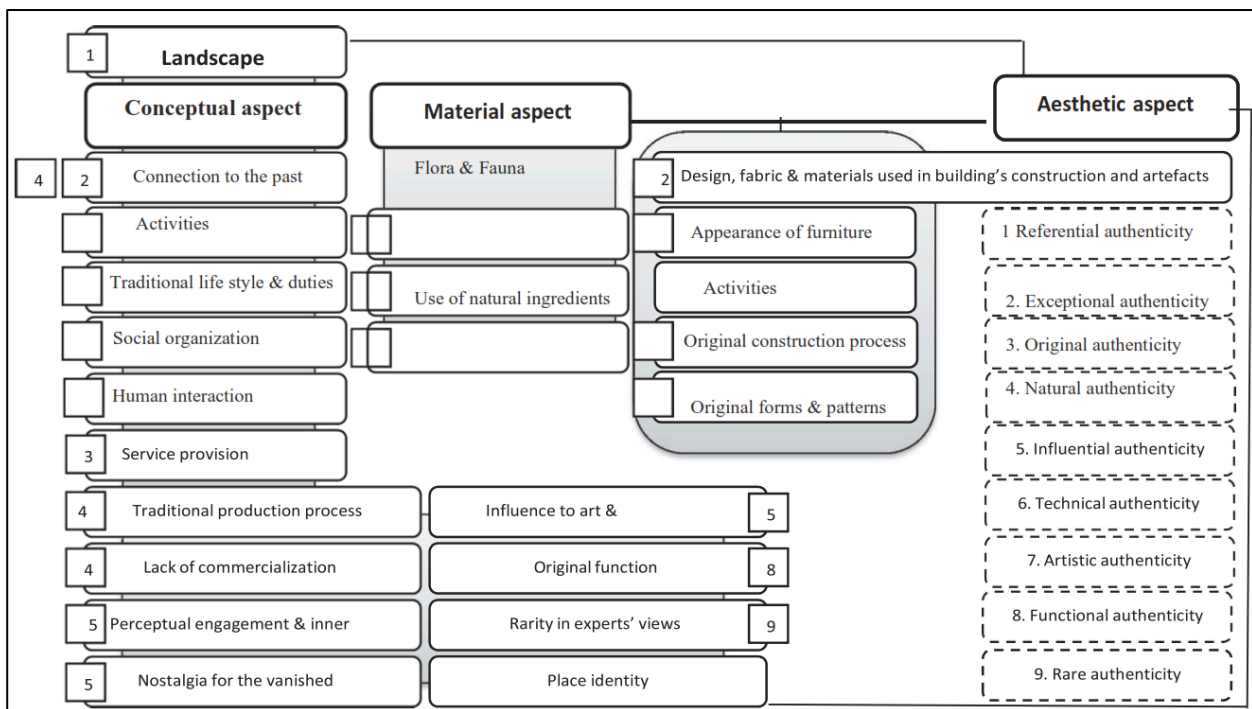
**Table 1** Authenticity in the view of international conventions (Authors).

The event		
Date	Main content	Place
1964 The Venice Charter	Historic values as the concept of authenticity Italy Expansion of the conservation scope from one building to surrounding space indicating the concept of integrity	France
1978 The First Session of the World Heritage Committee in Paris	Authenticity based on the four criteria of design, material, workmanship,	Japan
1994 The Nara Charter	Authenticity based on tangible and intangible expressions	The United States
1998 The San Antonio Declaration	Authenticity as the key factor in determining value	Sweden
1987 The Stockholm Declaration	Assessment of authenticity based on reflection of the true value, integrity, context, identity, and use and function. Emphasizing on the authenticity of cultural landscape and its significance in conservation	Australia
1999 The Burra Charter	Respecting authenticity and cultural diversity of communities.	Australia
2000 The Zimbabwe Expert Meeting	Authenticity in African context The importance of intangible authenticity specifically management system	Sothorn
2000 The Zimbabwe Expert Meeting	The importance of recognition and conservation of intangible heritage	Africa
2003 Convention for the Safeguarding of the Intangible Heritage	The importance of authenticity and integrity in conservation of Bam Cultural Landscape.	Iran
2004 The International Declaration of Bam	The importance of authenticity and integrity in conservation of Bam Cultural Landscape.	France
2005 The International Declaration of Seoul	The conservation of authenticity in historic environments	Iran
2005 Vienna Memorandum on 'World Heritage and Contemporary Architecture Managing the Historic Urban Landscape'	The importance of authenticity and integrity in well-balanced approaches of conversation in the management system of Historic Urban Landscape	Korea
2006 The International Declaration of Jerusalem	The values of tangible and intangible heritage The significance of 'Sense of Place' in conservation process;	Austria
2011 ICOMOS Charter on the Preservation of the Spirit of Place (Quebec Charter)	The values of tangible and intangible heritage Canada The role of historical-evidential, aesthetic and socio-cultural values in authenticity.	Israel
2011 UNESCO Draft Recommendation on Historic Urban Landscape	The role of authenticity and integrity in controlling the effects of development The significance of authenticity in conservation of urban landscap	Canada

### 2.3 Overview of the Process

There are three steps to this investigation. A framework for the post-evaluation of architectural heritage adaptive reuse is established in three categories through these four processes (Figure 1). **Step 1:** 25 criteria, 9 indicators, and 3 goal values pertaining to the adaptive reuse of architectural heritage were identified based on a literature search (Table 1). **Step 2:** Expert scoring, the analytical hierarchy process (AHP), and fuzzy assessment determine the weight of each element and index (Tables 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15). **Step 3** involved conducting a questionnaire to assess the Lawang Sewu building's eligibility for adaptive reuse within the context of architectural heritage.

In compliance with local rules and regulations, the survey was approved. Twenty professionals, comprising scholars from diverse fields like urban planning, urban history, architectural heritage, landscape architecture, and cultural tourism, took part in the study. They used a scoring system that went from 1 to 9, representing different levels of importance, from least favorable to most favorable, to assess 25 elements. The wide range of backgrounds held by these specialists enhanced the thorough evaluation.



**Figure 1** Interaction of conceptual, material and aesthetic aspects with genres of authenticity (Authors)

**Table 2** The AHP's standard judgment matrix

B1 ...	Bj ...	Bn	Bn
B1	B11	B1j	B1n
Bi	Bi1	Bij	Bin
Bn	Bn1	... Bn	j ... 1

**Table 3** displays the average RI for random consistency.

n	1	2	3	4	5	6	7
RI	0	0	0.52	0.89	1.12	1.26	1.36

**Table 4** Target classification weight and the judgment matrix

	A1	A2	A3	Weight	$\lambda_{\max}$	CR value
A1	1	1	1.5	0.375	3	0
A2	1	1	1.5	0.375		
A3	1/1.5	1/1.5	1	0.25		

**Table 5** Judgement matrix and weight of existing fabric

	B1	B2	B3	Weight	$\lambda_{\max}$	CR value
B1	1	1/4	5	0.2311	3.0713	0.0686
B2	4	1	9	0.7085		
B3	1/5	1/9	1	0.0603		

**Table 6** Spatial character weight and the judgement matrix

	B4	B5	Weight	$\lambda_{\max}$	CR value
B4	1	1/5	0.1667	2	0
B5	5	1	0.8333		

Their familiarity with Indonesia's historical and cultural legacy stems from their more than five years of involvement in related projects. The acquired data is transformed into the percentage system for calculating the score and score for each adaptive reuse of architectural heritage by multiplying it by the weight of the indicators. Common quantitative research techniques for evaluating the adaptive reuse of architectural heritage include the fuzzy evaluation approach, the analytical hierarchy process, and the structural model equation. The Analytical Hierarchy Process (AHP) breaks down decision-making components into goals, standards, plans, and other layers. Combining qualitative and quantitative methodologies, it is a hierarchical weight decision analysis method . But that's a downside.

**Table 7** Judgement matrix and weight of policy and value

	B6	B7	B8	B9	Weight	$\lambda_{\max}$	CR value
B6	1	1/3	1/2	1/5	0.0838	4.0511	0.0191
B7	3	1	2	1/3	0.2323		
B8	2	1/2	1	1/4	0.1377		
B9	5	3	4	1	0.5462		

**Table 8** Judgement matrix and weight of physical condition

	u1	u2	u3	u4	u5	Weight	$\lambda_{\max}$	CR value
u1	1	4	3	7	5	0.4932	5.2622	0.0585
u2	1/4	1	1/2	3	2	0.1418		
u3	1/3	2	1	4	2	0.2083		
u4	1/7	1/3	1/2	1	1/2	0.0630		
u5	1/5	1/2	1/2	2	1	0.0938		

**Table 9** Judgement matrix and weight of function

	u6	u7	u8	Weight	$\lambda_{\max}$	CR value
u6	1	3	2	0.5396	3.0092	0.0088
u7	1/3	1	1/2	0.1634		
u8	1/2	2	1	0.2969		

**Table 10** Judgement matrix and weight of update part

	u9	u10	u11	Weight	$\lambda_{\max}$	CR value
u9	1	3	1/3	0.2583	3.0385	0.0371
u10	1/3	1	1/5	0.1047		
u11	3	5	1	0.6370		

**Table 11** Judgement matrix and weight of spatial form

	u12	u13	u14	u15	Weight	$\lambda_{\max}$	CR value
u12	1	1/2	2	1/2	0.1818	4	0
u13	2	1	4	1	0.3636		
u14	1/2	1/4	1	1/4	0.0909		
u15	2	1	4	1	0.3636		

**Table 12** Judgement matrix and weight of space quality

	u16	u17	Weight	$\lambda_{\max}$	CR value
u16	1	1/3	0.25	2	0
u17	3	1	0.75		

The generated data statistics are often substantial when working with a large number of indicators. Based on fuzzy mathematics, the fuzzy comprehensive evaluation method provides a thorough way to assess items or things while taking into account a variety of criteria. It successfully tackles issues related to hazy and challenging-to-quantify difficulties and produces solutions that are systematic and obvious. Furthermore, this study uses the structural equation model to statistically analyze the interactions between different variables. Taking use of the large number of indicators and post-evaluation data available, this study uses a six-step process to translate qualitative evaluation into quantitative assessment.

Building the evaluation factor set, which consists of 25 factors in total, computing the weight vector, identifying the evaluation description set, building the membership matrix, creating the fuzzy comprehensive evaluation vector, and measuring the adaptive reuse of architectural heritage are some of the steps involved in this process. This procedure will convert the post-use evaluation of adaptive reuse for architectural heritage from a qualitative to a quantitative assessment of the 25 contributing criteria.

**Table 13** Judgement matrix and weight of related policy

	u18	u19	u20	Weight	$\lambda_{\max}$	CR value
u18	1	1/3	1/3	0.1429	3	0
u19	3	1	1	0.4286		
u20	3	1	1	0.4286		

**Table 14** Judgement matrix and weight of economic value

	u22	u23	Weight	$\lambda_{\max}$	CR value
u22	1	1/2	0.3333	2	0
u23	2	1	0.6667		

**Table 15** Memorial value weight and judgment matrix

	u24	u25	Weight	$\lambda$	CR value
u24	1	1/3	0.25	2	0
u25	3	1	0.75		

#### 2.4 Case Study Analysis

The case study analysis is conducted to provide an in-depth and contextualized understanding of Lawang Sewu's adaptive redesign project in Semarang, Indonesia. The case study analysis follows a descriptive and explanatory design that aims to describe the phenomenon of interest and explain its causes and effects[7]. The case study analysis consists of six steps: rationale for selecting Semarang as the cultural context and project site, methodology for interview-based data collection, project overview, intentions and objectives, implemented actions and interventions, and lessons gleaned from the case study[8]. The sources

of data include primary data from semi-structured interviews with key stakeholders such as government officials, KAI representatives, architects, engineers, contractors, consultants, local communities, and visitors; and secondary data from documents, reports, plans, drawings, photographs, videos, and other media that are obtained from various sources such as KAI's website, newspapers, magazines, blogs, social media platforms, etc. The data analysis follows a thematic approach that identifies, codes, categorizes, and interprets the main themes and patterns that emerge from the data[9][10][11].

### *2.5 Interview-Based Data Collection*

The interview-based data collection is conducted to obtain first-hand information and insights from the key stakeholders involved in or affected by Lawang Sewu's adaptive redesign project. The interview-based data collection follows a semi-structured format that allows flexibility and adaptability in asking questions and probing responses. The interview questions are designed based on the research questions and objectives of the study, as well as the literature review and case study analysis findings[12]. The interview questions cover four main aspects: background information of the interviewees, their roles and responsibilities in or relation to Lawang Sewu's adaptive redesign project, their opinions and perceptions on Lawang Sewu's historical significance, current state, adaptive redesign challenges and opportunities, visual impact on heritage structures, sustainability and energy efficiency objectives; their suggestions and recommendations for improving Lawang Sewu's adaptive redesign project. The interviews are conducted face-to-face or online depending on the availability and preference of the interviewees. The interviews are recorded with consent from the interviewees and transcribed for data analysis purposes[13].

### *2.6 Site Analysis and Assessment*

The site analysis and assessment is conducted to provide an in-depth and contextualized understanding of Lawang Sewu's existing building conditions, potentials, and constraints for acoustic enhancement[14]. The site analysis and assessment follows a descriptive and evaluative design that aims to describe the physical, functional, aesthetic, cultural, and environmental aspects of Lawang Sewu, as well as to evaluate its viability for renovation or demolition. The site analysis and assessment consists of four steps: design objectives and rationale, site visit and observation, data collection and measurement, and data analysis and interpretation. The sources of data include primary data from site visit and observation such as photographs, sketches, notes, maps, plans, sections, elevations; and secondary data from documents, reports, plans, drawings, photographs, videos, and other media that are obtained from various sources such as KAI's website, newspapers, magazines, blogs, social media platforms etc. The data analysis follows a SWOT approach that identifies the strengths, weaknesses, opportunities, and threats of Lawang Sewu's existing building for acoustic enhancement[14][15][16][17].

### *2.7 Conceptual Sketching*

The conceptual sketching is conducted to generate preliminary design ideas for Lawang Sewu's acoustic enhancement based on the literature review and site analysis findings. The conceptual sketching follows a creative and exploratory design that aims to stimulate imagination and innovation in adaptive design solutions. The conceptual sketching consists of three steps: methodology for conceptual sketching based on design principles such as form follows function; function follows form; contrast; harmony; balance; rhythm; hierarchy; proportion; scale; unity; variety etc., generation of conceptual sketches based on design objectives such as establishing a novel music center and restaurant within Lawang Sewu; infusion of new architectural elements for longevity and aesthetics such as corridor and lighting etc., selection of conceptual sketches based on design criteria such as feasibility; suitability; adaptability; sustainability; energy efficiency etc. The sources of data include primary data from conceptual sketches such as drawings; diagrams; models etc., and secondary data from literature review such as design principles; design objectives; design criteria etc. The data analysis follows a comparative approach that evaluates the advantages and disadvantages of different conceptual sketches based on the design criteria.

### *2.8 Design Proposal*

The design proposal is conducted to present the final adaptive design solution for Lawang Sewu's acoustic enhancement based on the selected conceptual sketch. The design proposal follows a persuasive and communicative design that aims to justify and demonstrate the adaptive design solution in terms of its form and function. The design proposal consists of three steps: methodology for designing the novel addition based on design strategies such as tailored approaches for the novel addition aligned with form and function etc., development of design drawings based on design specifications such as plans; sections; elevations;

perspectives etc., presentation of design proposal based on design outcomes such as visual impact on heritage structures; acoustic performance; user satisfaction etc. The sources of data include primary data from design drawings such as drawings; diagrams; models etc., and secondary data from literature review such as design strategies; design specifications; design outcomes etc. The data analysis follows a reflective approach that assesses the strengths and weaknesses of the adaptive design solution based on the design outcomes.

### **3 Results and Discussion**

The results of the case study analysis reveal that Lawang Sewu's adaptive redesign project is a complex and multifaceted phenomenon that involves various stakeholders, objectives, actions, and outcomes. The discussion of the results is organized into four main themes: cultural context and project site, project overview, intentions and objectives, and implemented actions.

#### *3.1 Cultural Context and Project Site*

The cultural context and project site of Lawang Sewu's adaptive redesign project are Semarang, a coastal city in Central Java, Indonesia, that has a rich and diverse history and heritage. Semarang is one of the oldest cities in Indonesia, dating back to the 15th century, and has been influenced by various cultures such as Hindu, Buddhist, Islamic, Chinese, Dutch, and Japanese. Semarang is also known for its historic buildings that reflect its colonial past, such as the Old City (Kota Lama), the Blenduk Church, the Lawang Sewu, and the Sam Poo Kong Temple. However, Semarang also faces many challenges such as urbanization, population growth, environmental degradation, land subsidence, flooding, and heritage conservation.

Lawang Sewu is one of the most iconic and controversial historic buildings in Semarang. It was built in 1904 by the Dutch colonial government as the headquarters of the Dutch East Indies Railway Company. It is a four-story building with a neo-classical style and a distinctive feature of having a thousand doors (lawang sewu means "thousand doors" in Javanese). Lawang Sewu has witnessed many historical events such as the Japanese occupation during World War II, the Indonesian independence struggle, and the communist purge in 1965. Lawang Sewu has also been associated with many myths and legends such as being haunted by ghosts and spirits. Lawang Sewu was declared as a cultural heritage site in 1992 by the Indonesian government and was transferred to PT Kereta Api Indonesia (KAI), the state-owned railway company, in 2003.

#### *3.2 Project Overview*

The adaptive redesign project of Lawang Sewu was initiated by KAI in 2011 as part of its corporate social responsibility program to revitalize and rebrand Lawang Sewu as a tourist attraction and a cultural asset. The project was completed in 2017 with a total cost of about 40 billion rupiah (about 2.8 million US dollars). The project involved various stakeholders such as KAI as the owner and manager of Lawang Sewu, local government agencies such as the Semarang City Culture and Tourism Office and the Central Java Cultural Heritage Conservation Center, local communities such as heritage activists and residents, professional consultants such as architects and engineers, contractors, suppliers, and visitors.

#### *3.3 The project consisted of three main phases:*

Restoration, renovation, and addition. The restoration phase aimed to preserve and restore the original features and functions of Lawang Sewu such as the façade, the roof, the doors, the windows, the floors, the walls, the ceilings, and the furniture. The restoration phase followed the principles of authenticity, integrity, compatibility, reversibility, and minimum intervention. The renovation phase aimed to improve and modernize the facilities and services of Lawang Sewu such as the electrical system, the plumbing system, the lighting system, the air conditioning system, the fire protection system, the security system, the information system, and the accessibility system. The renovation phase followed the principles of functionality, safety, comfort, and efficiency. The addition phase aimed to create and integrate new functions and spaces for Lawang Sewu such as a museum, a café, a souvenir shop, a library, a meeting room, a gallery, a theater, and a garden. The addition phase followed the principles of adaptability, sustainability, harmony, and innovation.

#### *3.4 Intentions and Objectives*

The intentions and objectives of Lawang Sewu's adaptive redesign project were manifold and interrelated. The main intention was to revitalize and rebrand Lawang Sewu as a tourist attraction and a



cultural asset that could contribute to the economic development, the social welfare, and the environmental quality of Semarang. The main objectives were to: (1) Preserve and promote Lawang Sewu's historical value and significance as a witness of Semarang's colonial past and Indonesia's national history; (2) Enhance Lawang Sewu's architectural value and quality as a representative example of neo-classical style and Dutch colonial heritage; (3) Improve Lawang Sewu's functional value and performance as a multifunctional space that could accommodate various activities such as education.

### *3.5 Stakeholder Perspectives*

The stakeholder perspectives on Lawang Sewu's acoustic enhancement are diverse and sometimes conflicting. The interview-based data collection involved 15 participants from different groups such as KAI managers, local government officials, heritage activists, architects, engineers, contractors, suppliers, visitors, and residents. The interviews were conducted using a semi-structured format that allowed flexibility and adaptability in asking questions and probing responses [18] [19]. The main findings from the interviews are:

- a) The KAI managers are supportive of the adaptive redesign project and see it as an opportunity to revitalize Lawang Sewu as a cultural and tourist attraction. They are interested in improving the acoustic quality of the building for hosting events and exhibitions. They are also concerned about the budget, timeline, and approval process of the project [18] [19] [20].
- b) The local government officials are also supportive of the project and see it as a way to promote Semarang's heritage and identity. They are willing to provide funding, permits, and guidance for the project. They are also keen on preserving the historical and architectural value of Lawang Sewu and ensuring its compatibility with the surrounding urban context.
- c) The heritage activists are passionate about protecting Lawang Sewu's cultural significance and authenticity. They are opposed to any major alterations or interventions that would compromise the original character or integrity of the building. They are also skeptical about the feasibility and necessity of the acoustic enhancement project [21].
- d) The architects, engineers, contractors, and suppliers are professional and experienced in working with historic buildings. They are aware of the technical challenges and constraints of the project [22]. They are also creative and innovative in proposing adaptive design solutions that would meet the acoustic requirements and respect the heritage aspects of Lawang Sewu.
- e) The visitors and residents are curious and enthusiastic about Lawang Sewu's adaptive redesign project. They are interested in learning more about the history and culture of Lawang Sewu and experiencing its acoustic transformation. They are also hopeful that the project would improve Lawang Sewu's attractiveness and accessibility for the public [22] [23].

### *3.6 Site Conditions*

The site conditions of Lawang Sewu's acoustic enhancement are complex and varied. The site analysis and assessment involved four steps: design objectives and rationale, site visit and observation, data collection and measurement, and data analysis and interpretation. The main findings from the site analysis and assessment are the design objectives and rationale for Lawang Sewu's acoustic enhancement are based on the research questions and objectives of the study, as well as the literature review.

### *3.7 Investigation*

Lawang Sewu, a historic building located in Semarang, Indonesia, is in need of rehabilitation and redesign of its interior and exterior spaces. The current situation of the building is one of neglect and decay, as years of inadequate maintenance have taken a toll on its structural integrity and aesthetic appeal [24].

#### *Analyze the current situation*

A thorough analysis of the building's condition reveals the urgent need for restoration to preserve its historical significance and attract visitors. According to a study conducted by Yulianto et al. (2018), the building's interior spaces suffer from water leakage, crumbling walls, and damaged flooring, which not only compromises the safety of the structure but also diminishes the overall experience for visitors. Similarly, the exterior spaces of Lawang Sewu are marred by graffiti, overgrown vegetation, and the absence of proper lighting, deterring potential visitors from exploring the building [24][25][26].

### *Provide proposes*

To address these issues, it is proposed that a comprehensive rehabilitation plan be implemented, focusing on both the interior and exterior spaces. This plan should include structural repairs, waterproofing, and restoration of the building's original architectural elements. Additionally, the proposal suggests the installation of modern amenities such as proper lighting, signage, and seating areas to enhance the visitor experience. By utilizing sustainable design principles and incorporating green spaces, Lawang Sewu can become a vibrant cultural destination that attracts both locals and tourists. The success of such a project can be seen in the rehabilitation of other historic buildings, such as the Raffles Hotel in Singapore, which experienced a significant increase in visitor numbers after its restoration. With the support of government funding and collaboration with architectural and preservation experts, the rehabilitation and redesign of Lawang Sewu's interior and exterior spaces can revitalize the building and contribute to the cultural and economic development of Semarang[27]. "Revitalizing the lawn sewu building: preserving history in a modern setting".

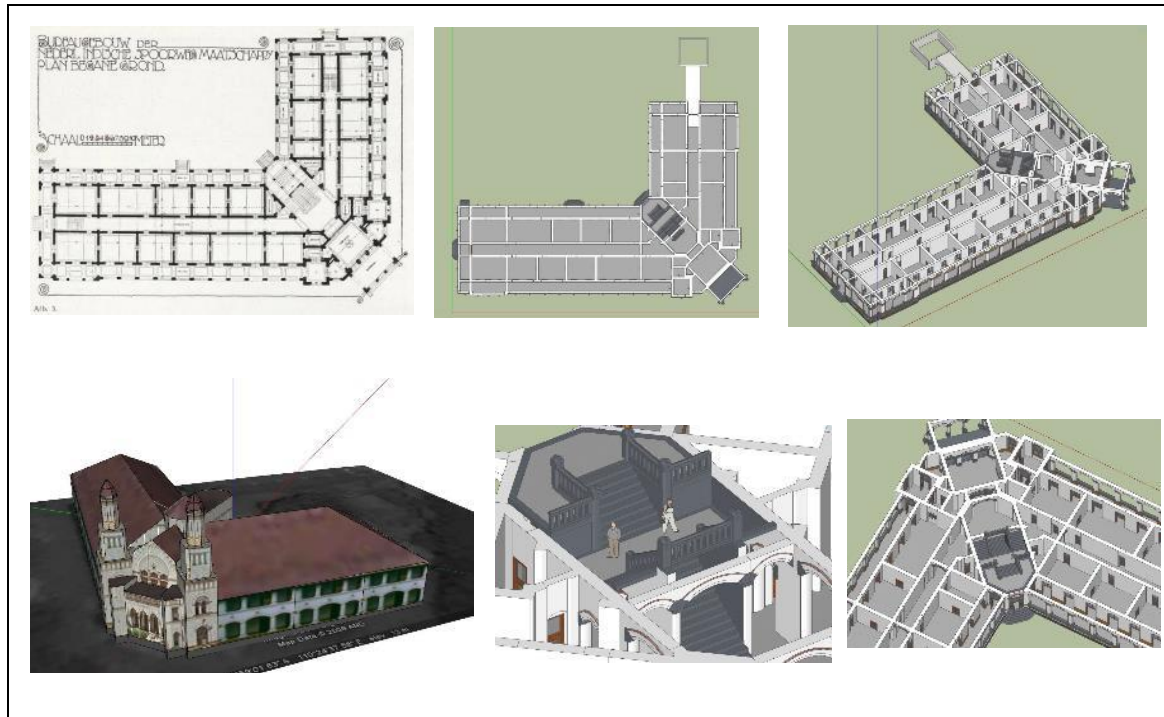
The rehabilitation of the interior design of the Lawang Sewu Building as a hotel building for cultural events, international forums, and tourists is crucial in bringing the building back to life and conveying its value and importance to all visitors. To achieve this, a comprehensive study and analysis of the building's historical significance should be undertaken. This would involve understanding the architectural style, materials used, and the building's cultural and historical context. It is essential to preserve the building's historical character by adhering to its original design and not modifying it extensively [28][29][30]. By doing so, the interior design can serve as a connecting point between the past and the present, allowing visitors to experience the building's rich history while enjoying modern amenities. The restoration process should focus on maintaining the original features, such as intricate carvings, ornate ceilings, and historical artifacts, while incorporating contemporary elements that enhance the functionality and comfort of the hotel. This approach will not only honor the building's heritage but also create a unique and memorable experience for guests, showcasing the importance of historical preservation [30].

In rehabilitating the interior design of the Lawn Sewu Building as a hotel building for cultural events, international forums, and tourists, it is crucial to uphold the integrity and historical character of the building while revitalizing its purpose. Here are some key points to consider:

- a). Study and Analysis: Conduct a thorough study and analysis of the historical significance, architectural elements, and cultural context of the Lawn Sewu Building. Understand its original design intent and the values it represents[30].
- b). Preservation of Historical Character: Emphasize the preservation of the building's historical character by restoring and maintaining original architectural features, such as ornate ceilings, intricate woodwork, and decorative motifs. This will help visitors appreciate the building's rich heritage and promote a sense of authenticity[31][32].
- c). Integration of Modern Amenities: Integrate modern amenities seamlessly into the interior design to ensure the building's functionality as a hotel and event space. Carefully select materials, furniture, and lighting that complement the historical elements while offering comfort and convenience to guests.
- d). Creating Connection: Use design elements that establish a connection between the past and the present. Showcase historical artifacts, photographs, or art installations that tell the story of the building's evolution over time, highlighting its importance in the local and global contexts.
- e) Education and Awareness: Incorporate educational displays, guided tours, or interactive exhibits that inform visitors about the value and importance of the Lawn Sewu Building. Foster an appreciation for cultural heritage and encourage visitors to become ambassadors for its preservation[33][34].

By adhering to the previous design and preserving the historical character, the rehabilitation of the Lawn Sewu Building can successfully bring it back to life, serving as a vibrant cultural hub that honors the past while embracing the present [35][36][37].

The First-floor plan and the horizontal section of the interior design, as well as a perspective of the building, and a section of the staircase in front of the main entrance can be seen in Figure 2.

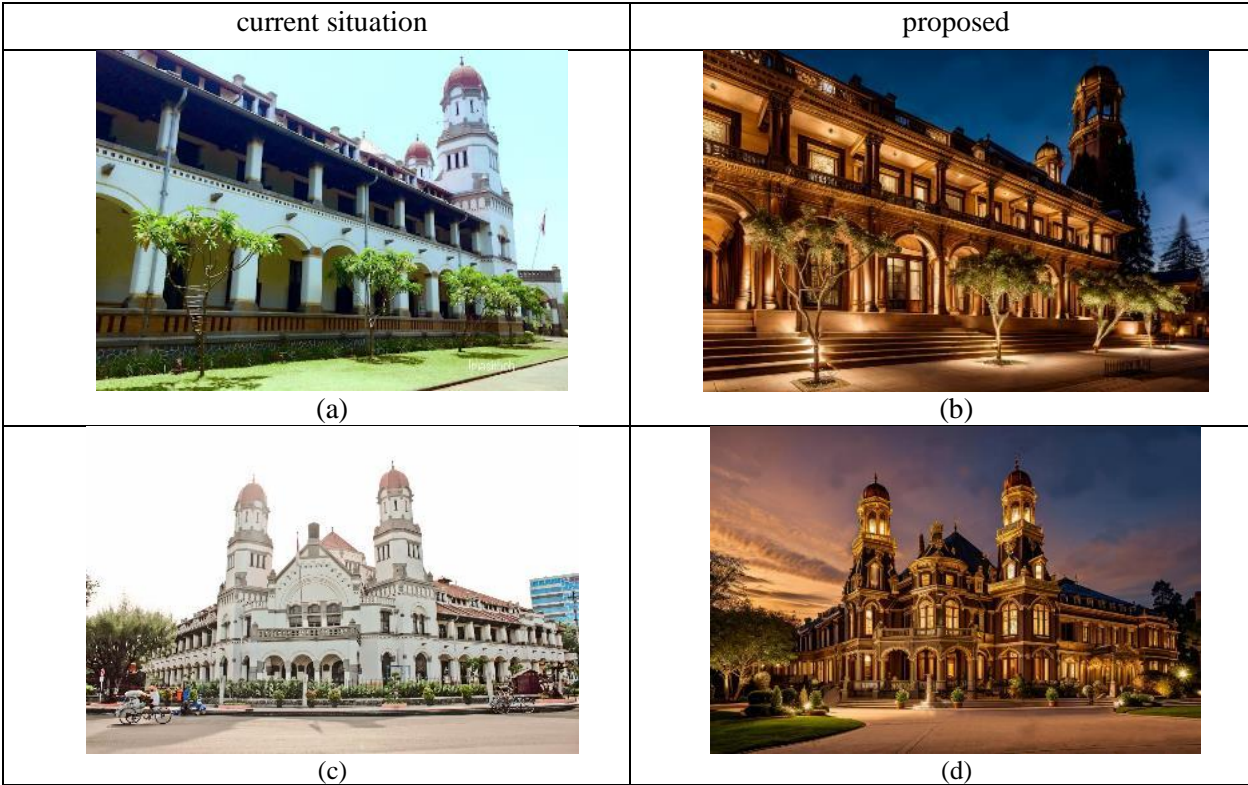


**Figure 2** A plan and a horizontal section of the building showing details of the rooms on the first floor

Proposal for the rehabilitation and adaptation of lawang sewu building into a cultural and hotel building for tourists and scientific missions.

The Lawang Sewu Building, a significant historical landmark in Indonesia, possesses considerable cultural and architectural importance, yet its current condition necessitates rehabilitation and adaptation to ensure its conservation and enhance its cultural value. This proposal seeks to delineate a comprehensive plan for the transformation of the Lawang Sewu Building into a cultural and hotel establishment catering to tourists and scientific endeavors, offering a distinctive fusion of cultural immersion and contemporary amenities. The objectives of this proposal include the preservation and restoration of the building's architectural character and style, the creation of a cultural and hotel space appealing to tourists and scientific missions, the integration of modernization while upholding historical significance, the attraction of visitors to explore and appreciate ancient Indonesian culture, and the provision of areas for cultural performances, scientific conferences, and the sale of traditional foods and crafts. The proposed activities encompass rehabilitation and restoration, cultural exhibitions and displays, music and performance halls, scientific conference facilities, and hotel accommodation. The envisioned rehabilitation and adaptation of the Lawang Sewu Building into a cultural and hotel venue is poised to not only safeguard its historical eminence but also draw global visitors. By incorporating traditional products, music, performances, and scientific conference facilities, the building will function as a nexus for cultural exchange and scientific collaboration, thereby promoting Indonesian culture and bolstering local artisans, businesses, and scientific pursuits [39][40][41][42][43][44][45][46][47].

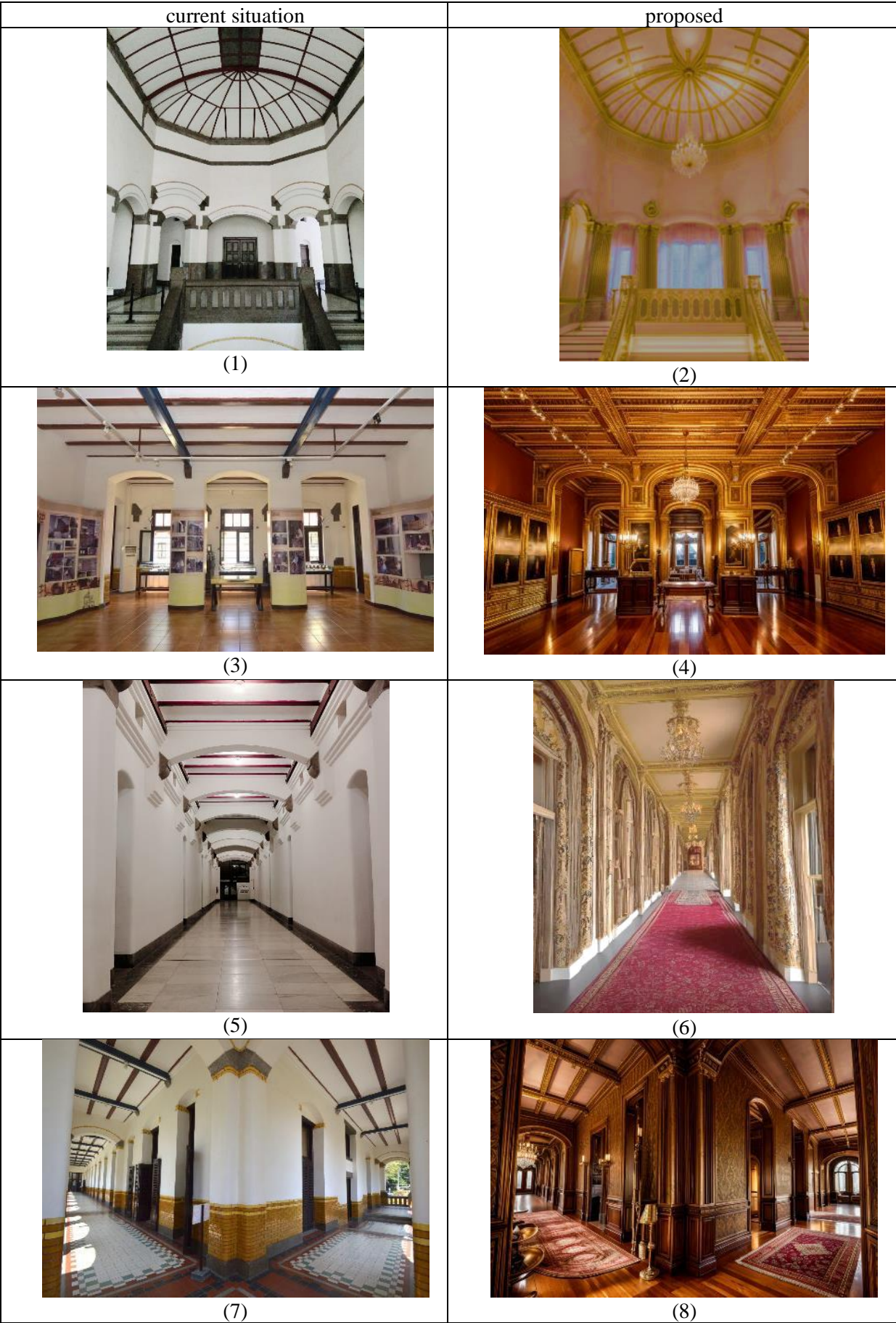
Figure 2 shows (a) the side of the western side of the main building next to the director [48], (b) the proposed rehabilitation process. (c) a full image of the main construction interface from the outside [48], and the (d) the rehabilitation structure.



**Figure 3** A comparison between reality and the proposal to re-adapt and rehabilitate the external appearance  
(Source: [48])

Figure 4 shows the internal qualification process. Picture No. 1 shows the main staircase to ascend to the second floor, Picture No. 2 shows the proposal, Picture No. 3 shows a room for displaying archaeological manuscripts, and Picture No. 4 shows a proposal to rehabilitate the exhibition. As Picture No. 5 shows the main corridor on the second floor, Picture No. 6 the proposal, and Picture No. 7 the corridors on the first floor, Picture No. 8 the proposal.





**Figure 4** A comparison between reality and the proposed re-adaptation and rehabilitation of some interior spaces  
(Source: [48])

#### **4 Conclusion**

The adaptive redesign of Lawang Sewu presents numerous challenges and opportunities for preserving its historical significance while meeting the contemporary needs and expectations of its users and visitors. This research essay has explored the adaptive redesign of Lawang Sewu from various perspectives and proposed strategies for achieving energy efficiency and sustainability objectives.

The study has highlighted the complexity of the adaptive redesign project, taking into consideration factors such as structural instability, environmental degradation, functional obsolescence, aesthetic discordance, and social resistance. These challenges require careful planning and collaboration between various stakeholders, including the government, railway company, local communities, and private investors.

Through a mixed-methods approach involving a literature review, case study analysis, and interview-based data collection, this study has provided insights into the historical and socio-environmental aspects of Lawang Sewu. The case study analysis of Semarang as the cultural context and project site has shed light on the unique cultural heritage and historical context that Lawang Sewu represents. One of the key findings of this study is the importance of preserving the historical character and architectural elements of Lawang Sewu. By restoring and maintaining original features such as ornate ceilings, intricate woodwork, and decorative motifs, the building can convey its rich heritage and promote a sense of authenticity. At the same time, the integration of modern amenities and sustainable design practices can enhance the functionality and comfort of the building to cater to the needs of contemporary users. Furthermore, the study has emphasized the significance of creating a connection between the past and the present through the adaptive redesign. By incorporating educational displays, guided tours, and interactive exhibits, visitors can learn about the value and importance of Lawang Sewu, fostering an appreciation for cultural heritage and encouraging visitors to become ambassadors for its preservation. In proposing the rehabilitation and adaptation of Lawang Sewu into a cultural and hotel building for tourists and scientific missions, this study has outlined several activities and objectives. These include the rehabilitation and restoration of the building, the creation of cultural exhibitions and displays, the provision of music and performance halls, the establishment of scientific conference facilities, and the transformation of a section of the building into a hotel accommodation. Overall, this research essay has provided a comprehensive understanding of the adaptive redesign of Lawang Sewu, emphasizing the need to balance historical preservation with contemporary functionality and sustainability. The proposed strategies and activities aim to not only preserve the architectural heritage but also promote cultural exchange, tourism, and scientific collaboration. By effectively addressing the challenges and opportunities presented by Lawang Sewu, this project can contribute to the preservation and revitalization of this iconic landmark in Semarang, Indonesia. In conclusion, the adaptive redesign of Lawang Sewu presents numerous challenges and opportunities for preserving its historical significance while meeting the contemporary needs and expectations of its users and visitors. This research essay has explored the adaptive redesign of Lawang Sewu from various perspectives and proposed strategies for achieving energy efficiency and sustainability objectives.

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## **5 Acknowledgements**

Dear supervisors and teaching members at Depingoro University. I hope this message finds you all in good health and high spirits. I am writing to express my deepest thanks and appreciation for the invaluable guidance and support that you have provided throughout my time at Depingoro University.

### **Conflict of Interest:**

The authors declare that there is no conflict of interest regarding the publication of this research study.

### **Interest:**

The authors have a keen interest in the preservation and adaptive redesign of historical and cultural landmarks, with a specific focus on achieving sustainability and energy efficiency goals. This study reflects our dedication to exploring innovative strategies for revitalizing heritage sites while addressing contemporary needs and challenges.

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