

## Easing the Tourism Burden in Kawasan Kota Tua Jakarta (Jakarta's Old City Area) through Carrying Capacity Studies and Activity Mapping

Fajar Aditya Nugroho<sup>1\*</sup>, Silvia<sup>2</sup>, Putra Aripinur<sup>3</sup>, Shafira Nurul Izzah<sup>4</sup>, Raisya Shelbina<sup>5</sup>,  
Nurmala Aulia Wulandari<sup>6</sup>

Universitas Negeri Jakarta, Indonesia<sup>1,2,3,4,5,6</sup>

Email: [fajar.aditya@unj.ac.id](mailto:fajar.aditya@unj.ac.id)

### Abstract

As one of the sites that are vulnerable to damage, historical areas, especially heritage sites, need special attention in their utilization, especially for tourism. In finding a middle ground between conservation needs and tourism utilization efforts, this study presents a scientific breakthrough by combining the concept of urban heritage tourism with tourism carrying capacity. Taking a case study in the Old City Area of Jakarta and an exploratory qualitative-quantitative approach armed with a tourism carrying capacity calculation formula, this study found the fact that the actual perspective is more heavily directed towards tourism interests than conservation. This is indicated by the finding that the number of tourist visits per day exceeds the Effective Carrying Capacity (ECC). Therefore, efforts are needed to spread tourism activities to other points in the destination as in the recommended tourism activity map generated with the help of the Cadmapper software application.

**Keywords:** Urban Heritage Tourism; Carrying Capacity; Tourism Burden; Historical Sites; Heritage Tourism Activity.

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### A. INTRODUCTION

The long history that formed the forerunner of the founding of the Indonesian state has made all corners of the country rich in heritage resources as a legacy of the historical phases. From the prehistoric phase, the phase of the emergence of ethnicity and culture after being influenced by religion, the colonialism phase, the independence movement period, to the post-independence turmoil phase (Hardanti, 2021).

Of the many uses of historical heritage resources, one developing rapidly is making it a tourist attraction, especially in the type of heritage tourism development. One that is quite legendary and iconic is the existence of the former historic city center, a legacy of the colonial era across generations that is spread across several large areas in Indonesia, including Jakarta, as the largest metropolitan city in Indonesia. (Armitawati, 2024). The Old City area is a witness to how colonial nations such as the Dutch and Japanese occupied Jakarta (formerly called Batavia) and made it the capital of Indonesia at that time (the Dutch East Indies). Until now, the area is still filled with buildings with typical "Indische" architectural style and blended with Betawi culture as the native culture of the local people.

The existence of historical resources such as Jakarta's Old Town which still stands strong until now shows the extraordinary values of a location. In its utilization, this heritage resource becomes multifunctional, one of which is an interesting tourist attraction point. However, it should be underlined that this heritage resource has a specific character, where it is related to its age which tends to be very old and has a long historical value, making heritage resources vulnerable to damage and extinction. Moreover, if we talk in the context of utilization as a tourist attraction, of course, we will face the presence of humans in large numbers and various activities.

\* Fajar Aditya Nugroho

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This is a threat that is sometimes not visible because the managers are lulled by the profits obtained from tourism activities themselves

Therefore, the conservation of heritage resources is an obligation to maintain the preservation of the historical, cultural, and natural values contained therein. (Erdogan, 2025). With a sustainable approach, conservation can include the restoration and maintenance of sites, training local people to become competent tour guides, and educating visitors to raise awareness of the importance of preserving cultural and natural heritage. In addition, good management will ensure that tourism that relies on heritage not only provides economic benefits to local people but also contributes to the preservation of the noble values contained therein. (Otero, 2022).

To accommodate the need for conservation in the setting of heritage tourism attractions, one approach that can be taken is through the concept of tourism carrying capacity. The concept of tourism carrying capacity is an approach that emphasizes the importance of a balance between tourism potential and the ability of the environment and cultural heritage to support tourism activities without being damaged. This concept emphasizes the understanding that each tourist destination has a certain capacity to accommodate tourists without damaging the ecosystem or existing cultural values. This includes regulating the optimal number of visitors, controlling tourism activities that can have negative impacts, and implementing sustainable practices that minimize damage to local historical and cultural sites. By implementing this concept of carrying capacity, heritage conservation can be carried out effectively, where tourism is not only a source of income but also maintains the sustainability of the heritage for future generations. This approach ensures that tourists, local communities, and cultural and natural heritage can support each other in sustainable harmony.

## **B. RESEARCH METHOD**

### **Developing Heritage Tourism**

Heritage tourism uses historical and cultural assets to draw tourists (Zhu, 2021). She contend that rigorous conservation regulations and community involvement are essential for the successful growth of heritage tourism to avoid over-commercialization. Additionally, heritage tourism must integrate education and interpretation to enhance visitors' appreciation and understanding of cultural and historical significance. When well-managed, heritage tourism can contribute to local economies and foster a sense of pride among residents, strengthening their connection to historical landmarks

Arumugam, et al. (2023) further assert that heritage tourism must strike a balance between conservation efforts and commercial gains, emphasizing the potential risks of uncontrolled tourism development on fragile historical sites. Cultural heritage can be degraded by over tourism and improper commercial exploitation, which can harm historical buildings and customs permanently. Sustainable planning techniques, such as restricting the number of visitors, creating heritage protection zones, and putting cultural heritage rules into place, are crucial to reducing such dangers. Heritage tourism can help sustain long-term preservation initiatives while maintaining economic viability by carefully regulating the relationships between visitors, local populations, and historical places.

## Applying Carrying Capacity on Heritage Tourism Attraction

It is generally recognized that carrying capacity is an essential framework for sustainable management in the tourism industry. Carrying capacity, as defined by Butler (2020), is the highest volume of visitors that a site can accommodate without causing significant environmental or cultural degradation. This idea is supported by Zekan, et al. (2022), who emphasize that to reduce negative consequences, heritage sites must establish visitor control measures which involve rotational access and regulated entry systems. Santos (2023) expand about how carrying capacity evaluations might support the development of sustainable tourism plans while preserving historical authenticity at urban heritage sites.

### Theoretical Framework

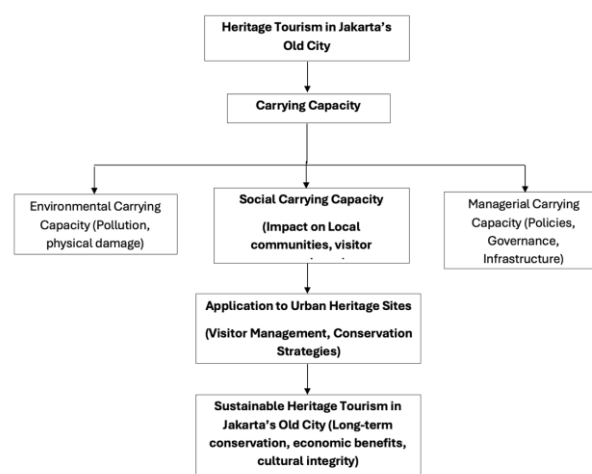


Figure 1. Theoretical Framework

which includes waste management, emissions control, and natural resource conservation. To achieve the management of protection, utilization, and development of the area as a sustainable tourism destination, Indonesian Minister of Tourism and Creative Economy Regulation No. 9 of 2021 requires to establish a comprehensive reference regarding the management of tourism destinations in a sustainable manner at the national policy level. The following substantive contents of this regulation govern the requirements for sustainable tourism destinations: 1). Sustainable management, which includes stakeholder engagement, management structures and frameworks, and stress and change management; 2). Socio-economic sustainability, which includes local economic benefits and social welfare and impacts; 3). Cultural sustainability, which includes cultural heritage protection and site visits; and 4). Environmental sustainability,

One of the most important concepts in sustainable tourism management is carrying capacity in urban heritage sites. A theoretical framework for comprehending how heritage sites change under the influence of tourism is provided by Butler's (2006) tourism area life cycle model. The progression of destinations through phases of discovery, development, stagnation, and possible decline if improperly managed is depicted in this model. The Old City of Jakarta, which is seeing a sharp increase in tourists, needs to take proactive steps to prevent deterioration and guarantee sustainability.

Carrying capacity assessments must be incorporated into urban heritage management, according to Liu, et al. (2022), who contend that cultural sites run the risk of being overused in the absence of defined boundaries and visitor management plans. In order to strike a compromise between preservation and financial gains, Coccossis & Mexa (2016) also support a comprehensive strategy that considers managerial carrying capacities, social carrying capacities, and environmental carrying powers. This supports the claim made by He et al. (2023) that heritage tourism planning should include adaptive conservation techniques to guarantee that places are preserved and accessible for future generations. This study aims to discover how carrying capacity encourages sustainable tourism development in Jakarta's Old City area.

### **C. RESEARCH METHOD**

This study uses a mixed-method approach to comprehensively analyse tourism pressure in Jakarta's old city. The research incorporates both qualitative and quantitative data collection methods. A qualitative library/desk study method (Pulansari, et al., 2022), the data used in this research is secondary data derived from selected literature, including journals, books, study reports, statistical reports, and laws and regulations.

The quantitative component involves visitor flow analysis and carrying capacity assessments. Data will be analyzed using thematic analysis for qualitative insights and statistical methods for quantitative measurements. CAD Mapping software is employed to conduct zoning and activity mapping to visualize high-traffic areas and propose suitable management interventions. The findings are then synthesized to develop recommendations for managing tourism burden through carrying capacity enforcement, improved zoning regulations, and sustainable visitor management policies.

### **D. RESULTS AND ANALYSIS**

Kota Tua Jakarta Area is an area that has strategically developed into a center of civilization and the forerunner of the establishment of the current city of Jakarta. This area has been the center of government and the center of economic activities across history, starting from the reign of Prince Jayakarta, the Portuguese occupation, to the Dutch occupation.

Until now, the remains of buildings and architectural/ monumental sites from the historical path mostly still exist and most of them show the concentration of heritage resources themselves along the Kali Besar (De Groote Rivier) (Rusata & Hamidah, 2024). To conserve and utilize them, these heritage resources have developed into a famous urban heritage tourist destination and have become the flagship of the DKI Jakarta Provincial Government. If we look at its utilization as an urban heritage tourist attraction, these resources can be described in detail according to the model of Nugroho, et al. (2023) as follows:

**Table 1.** The Implementation of Urban Heritage Tourism in Kota Tua Jakarta

Dimensions	Implementations	Notes
Historical buildings and monuments	<p>Many of these buildings still retain the distinctive features of Dutch colonial architecture, with elements such as large windows, arched entrances, and the use of brick and white plaster. However, some of the historic buildings have deteriorated due to their age, air pollution, and lack of adequate maintenance.</p> <p>Although some buildings have been restored and repaired, many still require more attention to maintain the sustainability of this cultural heritage. The Indonesian government and related parties continue to strive to preserve the Kota Tua area, but major challenges remain in funding, careful planning, and public awareness of the importance of preserving historical heritage.</p>	<p>Monumental Buildings:</p> <ul style="list-style-type: none"> <li>• Fatahillah Museum Building (<i>Stadhuis</i>)</li> <li>• Bank Indonesia Building</li> <li>• Sunda Kelapa Harbor</li> <li>• Toko Merah</li> </ul> <p>Conservation Challenges:</p> <ul style="list-style-type: none"> <li>• Limited funds</li> <li>• Changes in building function</li> <li>• Density of development, especially skyscrapers</li> </ul>
Sites of historic events	<ul style="list-style-type: none"> <li>• Fatahillah Museum (<i>Stadhuis</i>). This building, which is now the Jakarta History Museum, used to be the Batavia City Hall during the Dutch colonial era. Established in 1710, this place was the center of Dutch government administration in Batavia.</li> <li>• Gedung Toko Merah. This building is a witness to the economic life during the colonial era. In the early 20th century, this building was used by the Dutch government for various administrative purposes.</li> <li>• Benteng Batavia (Fort Batavia). During the Dutch colonial era, this fort was the center of Dutch military power in Batavia. This fort also witnessed important events during the rebellion and conflicts that occurred during the Dutch colonial era.</li> <li>• Gereja Sion. This church was used by the Dutch community in Batavia and was also a place of worship for Chinese Christians. During the colonial era, this church was also often a meeting place for Dutch officials and Batavia residents.</li> <li>• Kali Besar Street. Kali Besar is one of the important roads in the Old Town area of Jakarta which used to be the main route for the distribution of goods in Batavia. Surrounded by typical colonial buildings, Kali Besar was the center of economic and social activity at that time.</li> </ul>	
Cultural sites and/ or natural landscapes	<p>With geographical conditions located in the lowland area towards the coastal area, the Old City area from time to time does not have significant cultural and natural environmental appearances. Most of the</p>	<p>The cultural products that emerge are mostly not physical culture but performing arts.</p>

Language, literature, music, and art	<p>natural resources have been covered by historical sites and less striking acculturation cultures.</p> <p>Fatahillah Park and the surrounding area of Kota Tua are often the venues for spontaneous art performances. Many street artists or local art groups often appear in open spaces to showcase their performing arts, including acoustic music, dance, or mini theater that involves direct interaction with visitors.</p> <p>In addition, formally, there are several art, culture, and language performances held in Kota Tua which are a combination of colonial history, Betawi culture, with other cultures that influence. The forms of performances include Modern and Fusion Music Arts, Performances at the Wayang Museum, Colonial Theater, and Lenong Betawi.</p>
Local lifestyle: art, culinary, and sports.	<p>Various activities that can be done based on the characteristics of the local lifestyle in the Old Town Area include:</p> <ul style="list-style-type: none"> <li>• Doing culinary tours with a focus on Traditional Betawi Food, visiting Cafe Batavia (European Colonial style), as well as Markets and Culinary Kiosks.</li> <li>• 2. Health and sports activities such as Walking or Cycling around the Old Town, Jogging in Fatahillah Park (the area is quite large), and Gymnastics and Aerobics (only on weekends).</li> </ul>

The data in the table above shows that the heritage resources in the Kota Tua Jakarta Area are very qualified to be developed as an urban heritage tourism destination. with a very high historical value, as well as a vital position in the development process of the City of Jakarta and even the State of Indonesia, the clustered and integrated relics into an area that is now conserved and has been managed by a special tourism authority body make tourism development quite qualified and support policies that will be born from the results of strategic studies and critical academics can be implemented comprehensively.

### Carrying Capacity Analysis

Following the theory put forward by Cifuentes (1992) in Santos & Brilha (2023) that to determine the carrying capacity of an area to become a tourist destination, the approach taken is through the process of comparing the initial capacity of the area (area and geographical conditions of the area) with the aggravating factors that make the carrying capacity of tourism in the area smaller (number of tourist visits, number of human resources, existence of buildings, land slope, rainfall, and many others). This makes the calculation process require many factors that need to be reviewed in quantitative data. The analysis and calculation process is never a fixed thing because it must be adjusted to the characteristics of the tourist destination itself. Sequentially, the tourism carrying capacity analysis process goes through 3 main analysis processes, namely:

- a. Physical Carrying Capacity (PCC)
- b. Real Carrying Capacity (RCC), and
- c. Effective Carrying Capacity (ECC).

After the ECC figure is obtained, this figure is the maximum limit for the number of daily visits that can be accepted by the tourist destination in question. When compared to the actual condition (the actual average number of daily visits), it can be assessed whether there is over-capacity or not. In this regard, the assessment standards are as follows:

**Table 2.** Carrying Capacity Result Classifications

No	Classifications			Status	Recommendations
1.	PCC > AV	RCC > AV	ECC > AV	Big CC	Can be further developed
2.	PCC < AV	RCC < AV	ECC < AV	Exceed CC	Must be organized and controlled
3.	PCC = AV	RCC = AV	ECC = AV	Optimal CC	Effective and efficient

Source: Modified from Muta'ali (2015)

#### Notes

CC: Carrying Capacity

PCC: Physical Carrying Capacity

RCC: Real Carrying Capacity

ECC: Effective Carrying Capacity

AV: Actual Visit (per day)

After elaborating the theory, then by considering the type of urban heritage tourism development in the Old City Area, the calculation of tourism carrying capacity is as follows:

#### a. Physical Carrying Capacity

$$PCC = A \times \frac{V}{a} \times Rf$$

A = land area = 67,5 ha

V/a = space required per individual for tourism activities = 1/65 m<sup>2</sup> (Więckowski, 2014)

Rf = Rotation Factor = 5,981

**PCC : 67.5 × 1/65 × 5,981 = 6,211**

#### b. Real Carrying Capacity

$$RCC = PCC - Cf_1 - Cf_2 - Cf_3 - Cf_4$$

Cf<sub>1</sub> = average rainfall = 0,5

Cf<sub>2</sub> = average land slope area = 0

$$RCC : 6.211 - 0,5 - 0 = 6.210,5$$

**c. Effective Carrying Capacity**

$$ECC = RCC \times MC$$

Where

$$MC = \frac{Rn}{Rt} \times 100\%$$

Rn = Daily active HR = 250 (rounding)

Rt = Total HR = 500 (rounding)

$$ECC : 6,210.5 \times 0.5 = 3,105.25 \text{ (rounding: 3,105)}$$

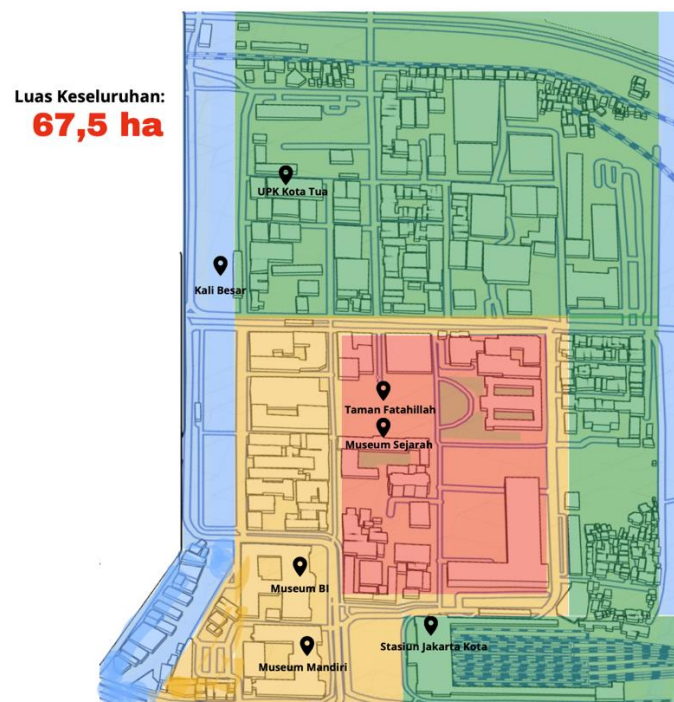
From the calculation results, it is known that the PCC, RCC, and ECC of the Old City area of Jakarta exceed the actual daily visits. The findings show that the effective carrying capacity (ECC) that can be applied in the Kota Tua Jakarta Area 3,105 tourists per day, while the number of daily tourist visits (AV) in the area according to data is 5,981 per day. In accordance with the classification of the calculation results as described above, it can be concluded that the tourism carrying capacity for urban heritage tourism in the Kota Tua Jakarta Area has been exceeded and control and control strategies are needed.

In this regard, referring to Nugroho et al. (2023) that if there is excess capacity in one tourist destination, one of the wisest steps is to spread activities away from the core zone of the destination accompanied by diversification of activities. For this reason, to optimize these findings, the next section will formulate a mapping of urban heritage tourism activities by considering the capacity of the core zone and the potential of the supporting zone and development zone in the Kota Tua Jakarta Area.

### **Mapping Tourism Activity Recommendation**

Before mapping sporadic tourism activities that can reduce the burden in the core area of Jakarta's Old Town, it is necessary to determine the tourism zoning of the area itself. Referring to the standard theory of Cooper (1993) which was updated by himself in Cooper (2025) that the discussion of tourism zoning is scientifically conceptualized in a model called the Tripartite Concept where a tourism destination consists of a core zone, a buffer zone, and a transition zone. However, in its development, these three zones can change according to the needs and developments of conditions. Therefore, to zone the Kota Tua Jakarta Area, the concept approach of Kim & Kim (2021) was adopted which is set in an urban area. The following are the results of the zoning of the Kota Tua Jakarta Area:





**Figure 2.** Destination Zoning of Kota Tua Jakarta Area  
Source: Researcher's work results (2025)

From the map, it is known that the core of current tourism activities, which is also the area that is the center of tourist visits, is in the core area (the area around Fatahillah Park) which is marked in red. Meanwhile, several tens of meters extending from this area is a buffer area (yellow) which is a potential for spreading tourist activities if optimized through diversification and innovation of tourism activities with many alternative tourist attractions such as the Bank Indonesia Museum, Bank Mandiri Museum, and many iconic old buildings). Finally, there is a supporting zone (green) which is indeed outside the core zone as a zone that supports tourism activities through the provision of amenities and accessibility, as well as a development zone marked with a blue block which should be the main focus in solving the crowds in the core zone, especially in the development of the Kali Besar area and rows of historic shopping buildings such as Toko Merah.

From the zoning of the tourist destination area, the next step is to formulate a recommendation for a tourist activity map that has considered the zoning and tourism carrying capacity in the Kota Tua Jakarta Area, which is stated in the following map:



**Figure 3.** Recommendation of Kota Tua Jakarta Area Urban Tourism Activity  
 Source: Researcher's work results (2025)

## E. CONCLUSION

Based on the results of the study on the actual conditions of the implementation of urban heritage tourism activities, analysis of carrying capacity, and mapping of tourism activities in the Kota Tua Jakarta Area, the results of the study were obtained where if we talk about development potential, Kota Tua Jakarta Area is an area that is very supportive and ideal for developing urban heritage tourism. There are many iconic heritage resources and meet the principles of urban heritage tourism development. However, on the other hand, the findings regarding the calculation of tourism carrying capacity show that currently the effective carrying capacity has been exceeded with the number of daily tourist visits exceeding the ECC value so that it is necessary to spread activities outside the core zone, which is the center of tourism activities as well as the center of visit accumulation. Therefore, with the steps needed, a zoning map of the area has also been put forward as well as a map of tourism activity designs that can be applied as a result of the findings in this study. In the future, further studies will be needed on travel patterns and preference tendencies from the perspective of tourists so that technically a meeting point can be found between the wishes of tourists, tourism development policies, and the needs of heritage area conservation.

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