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[Manuel Saba](#)\*, [Gabriel Elías Chanchí Golondrino](#), Leydy Karina Torres-Gil

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*Article*

# A Critical Assessment of the Current State and Governance of the UNESCO Cultural Heritage Site in Cartagena de Indias, Colombia

Manuel Saba \*, Gabriel Elías Chanchí G. and Leydy K. Torres-Gil

Faculty of Engineering, Universidad de Cartagena, Avenida del Consulado, Calle 30 No. 39B - 192, 130001, Cartagena de Indias, Colombia.; msaba@unicartagena.edu.co; gchanchig@unicartagena.edu.co; ltorresg1@unicartagena.edu.co

\* Correspondence: msaba@unicartagena.edu.co; Tel.: +57 035 6756900

**Abstract:** Since 2017 Cartagena UNESCO World Heritage has threatened to be categorized as "in Danger" by UNESCO. This research analyzes two main critical aspects, Governance and Current state of the Site. Regarding Governance, the study aims to identify strengths, weaknesses, opportunities and treats in the UNESCO Site. Exemplary heritage management systems are studied to propose an adaptable management approach specifically for Cartagena. On the other hand, a comprehensive analysis is conducted utilizing a photographic report that highlights the major issues arising from inadequate heritage management. Hyperspectral images obtained from a previous study are employed to identify vegetation and asbestos-cement roofs within the cultural heritage Site. The study reveals that the ambiguity surrounding decision-making authority for heritage management, distributed between the Mayor's Office and the Ministry of Culture, is a primary challenge. This fragmentation has resulted in duplicated efforts and a lack of coordinated action, significantly compromising the conservation and protection of the cultural heritage Site. Moreover, twelve current shortcomings of cultural heritage in Cartagena are identified through authors' five-year on-site regular visits, photographic reports and observation. To address the prevailing concerns, a new line of command for cultural heritage management is proposed as the most effective means of tackling these challenges. Additionally, general recommendations are presented to mitigate the existing problems and prevent the classification of Cartagena's heritage as "at risk" by UNESCO in the near future. This research provides a scientific perspective, drawing upon years of experience studying heritage and residing in the city, devoid of political influences or conflicts of interest.

**Keywords:** Latin America heritage; reform in cultural heritage management; UNESCO site at risk

## 1. Introduction

Cultural heritage (CH) plays a vital role in shaping the identity, history, and traditions of societies around the world. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), Cultural heritage encompasses a wide array of tangible and intangible elements of human civilization, such as artifacts, monuments, architectural ensembles, and museum collections. These elements possess a multitude of values, including symbolic, historical, artistic, aesthetic, ethnological, anthropological, scientific, and social significance. Tangible Cultural Heritage (TCH) comprises movable, immovable, and underwater artifacts, sites, and monuments, while Intangible Cultural Heritage (ICH) is embedded within the cultural and natural heritage, encompassing practices, expressions, knowledge, and traditions, [1–3]. The present paper will focus primarily on TCH. The significance of TCH extends beyond its inherent value, as it possesses the capacity to foster sustainable development, enhance social cohesion, and drive economic growth, [4]. TCH sites are often considered as symbols of national identity and pride, attracting millions of visitors every year, [5–7].

However, cultural heritage is facing numerous threats worldwide such as climate change, vehicular pollutant emissions and in general human activities such as urbanization, industrialization, and modernization have profound impacts on tangible cultural heritages causing decay of patrimonial monuments, [8]. Furthermore, natural disasters, wars, and conflicts are some of the factors that have led to the destruction, looting, and illicit trafficking of cultural heritage objects and sites, [9]. Furthermore, armed conflicts and acts of warfare jeopardize cultural heritages by directly targeting or inadvertently damaging historic sites and artifacts. Conflict zones often witness the intentional destruction of cultural symbols, erasing significant historical narratives and identities.

Some symbolic cases are represented by the ancient city of Palmyra, Syrian, involved by the Civil War which led to the destruction of numerous cultural heritage sites, [23]. The City of Potosí, Bolivia, characterized for its high deterioration of historical structures, mining activities, environmental impact, urban development and population pressure, [24,25]. The Fortifications on the Caribbean Side of Panama: Portobelo-San Lorenzo, which has been variably compromised by environmental factors, unregulated urban expansion, and insufficient maintenance and management practices, [12,26]. Furthermore, natural disasters, including earthquakes, floods, and hurricanes, pose a substantial risk to tangible cultural heritage. Such calamities can result in structural damage, erosion, or complete destruction of cultural sites, artifacts, or traditional practices.

Furthermore, cultural heritage governance has been marred by issues such as inadequate funding, lack of community participation, the absence of a comprehensive legal framework and skilled management especially in developing countries, [10–12], where heritage sites are often plagued by a poor state of conservation. The focus of the literature on TCH has predominantly been on a scientific approach on deterioration problems, new restoration techniques, architectural or engineering analyses, and material science advancements, with limited attention given to the underlying governance issues that contribute to the deteriorating state of TCH. Understanding the governance problems in TCH management is vital for developing effective strategies to ensure its preservation and sustainable development. Governance encompasses the processes and institutions involved in decision-making, planning, implementation, and monitoring of TCH conservation efforts.

According to the literature, the protection, preservation, and promotion of cultural heritage requires a multidisciplinary approach that involves archaeologists, historians, anthropologists, architects, engineers, planners, policymakers, and local communities. Effective cultural heritage management should be based on the principles of sustainability, inclusiveness, and authenticity, ensuring that the cultural heritage remains relevant and meaningful to current and future generations, [13–16]. However, the panorama varies significantly between developed and undeveloped countries, [17,18].

In developed countries, cultural heritage management often benefits from strong legal frameworks, skilled professionals, and adequate funding, resulting in better preservation and promotion of cultural heritage sites. For example, the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage list in developed countries such as the United States, France, Italy among others, are generally well-maintained, with extensive visitor facilities and educational programs. In addition, cultural heritage management in these countries often involves the highest skilled professionals on cultural heritage and community participation, ensuring that local voices are heard in decision-making processes. Community active participation of these countries fosters a sense of ownership, promotes sustainable practices, preserves cultural traditions, enhances social cohesion, and facilitates knowledge transmission. Additionally, their intimate connection with the heritage site ensures its continued relevance and resilience within the community fabric, [19–21].

On the other hand, in undeveloped countries, cultural heritage sites are often underfunded and understaffed, leading to inadequate preservation and promotion. In addition, community participation in cultural heritage management is often limited, resulting in a lack of local ownership and engagement, [21].

In addition, the international community has a critical role to play in supporting cultural heritage management in undeveloped countries. This support can take the form of funding, technical assistance, and capacity building. For example, UNESCO's World Heritage Centre provides technical assistance to countries in developing management plans for cultural heritage sites and offers capacity-building programs for professionals and communities. Raising public awareness about the value of cultural heritage and its preservation is essential. This can be achieved through educational programs, public campaigns, and cultural tourism. By promoting cultural heritage as a valuable resource for sustainable development, social cohesion, and economic growth, it can be ensured that future generations will enjoy and learn from the richness of our shared cultural heritage.

**Error! Reference source not found.** shows the location of World Cultural Heritage List Sites in Danger, highlighting their high concentration in the Middle East and Africa, while 95% of them are in underdeveloped countries, [22]. UNESCO employs the "Danger" categorization to draw attention to the precarious state of various tangible cultural heritages. This classification serves as a mechanism to safeguard and raise awareness about their imperiled conditions. Several factors contribute to the inclusion of cultural heritages in the "Danger" list.

The "Danger" designation by UNESCO aims to mobilize international support and resources to mitigate these risks. It highlights the urgent need for conservation efforts, raising awareness among governments, organizations, and communities. Through this classification, UNESCO prompts global cooperation, technical assistance, and financial aid to ensure the protection and preservation of endangered cultural heritages for future generations.



**Figure 1.** Location of World Cultural Heritage Sites in Danger.

### 1.1. Case of study

Cartagena de Indias is a historic port city located on the Caribbean coast of Colombia, Founded in 1533, by the Spanish crown (**Error! Reference source not found.**).

The city quickly became a strategic center for trade and commerce in the Spanish colonial empire. Its prime location made it a target for attacks by pirates and foreign powers, leading to the construction of a system of fortifications that would transform the city's landscape into a partially anthropized cultural landscape.

Throughout its history, Cartagena de Indias has been a melting pot of different cultures and peoples, including indigenous, African, European, and Caribbean influences. This diversity has contributed to the development of a unique cultural heritage that is reflected in its architecture, music, cuisine, and traditions.

The city's rich cultural heritage has been recognized by UNESCO, which declared the historic center and surrounding fortifications of Cartagena de Indias as a World Heritage Site in 1984. The

site encompasses a 100-hectare area that includes 4 km of fortification system, the defensive fortifications of the Cartagena Bay, and the San Felipe Castle.

The TCH of Cartagena de Indias is subject to both natural and anthropic factors, rendering it vulnerable and necessitating urgent conservation efforts. UNESCO official reports [27,28], shed light on the state of conservation and highlight the challenges faced by this historic site. Natural factors pose significant threats to the tangible cultural heritage of Cartagena de Indias, [29]. The city is situated in a seismically active region, making it susceptible to earthquakes. These seismic events can cause structural damage to historic buildings and monuments, compromising their integrity, [30]. Additionally, the city is exposed to coastal erosion and rising sea levels, which contribute to the deterioration of its fortifications and other coastal structures.

Anthropic factors, primarily driven by urban development and tourism, also endanger the cultural heritage of Cartagena de Indias. Rapid urbanization and inadequate planning have resulted in encroachments on historic areas, leading to the destruction or alteration of significant architectural elements. Tourism, while vital for the local economy, can exert pressure on heritage sites through increased foot traffic, inadequate management, and improper visitor behavior. According to UNESCO official reports, [27,28], it is emphasized the urgency of addressing these conservation challenges. They highlight the need for comprehensive strategies that encompass risk preparedness, site management, and sustainable development.

### *1.2. Research aim*

In this study, a novel, interdisciplinary approach combining empirical and scientific methodologies is employed to assess the governance of Cartagena's heritage and its implications on the current state of the heritage area. The scientific community focuses primarily on material deterioration, and other punctual problems rather than delving into their root causes.

Hence, this study aims to comprehensively analyze and discuss the existing state of tangible cultural heritage (THC) governance in Cartagena, adopting an approach grounded in scientific rigor and utilizing publicly available information. Furthermore, the investigation encompasses a comprehensive exploration of various critical aspects of the heritage, involving material deterioration, vehicular traffic, environmental factors, urban fabric, and architectural integrity among others. By holistically examining these interconnected facets, the present study aims to provide a comprehensive portrayal for the scientific community, which is often lacking a full view of the Cartagena's TCH. Instead of exclusively focusing on isolated problems and solutions, this research endeavors to present a broader and more nuanced understanding of the intricate reality within which these issues exist.

Ultimately, the findings and proposals of this critical analysis are expected to contribute to the ongoing efforts to enhance cultural heritage in Cartagena de Indias and provide experiences for other cities and developing countries facing similar challenges.



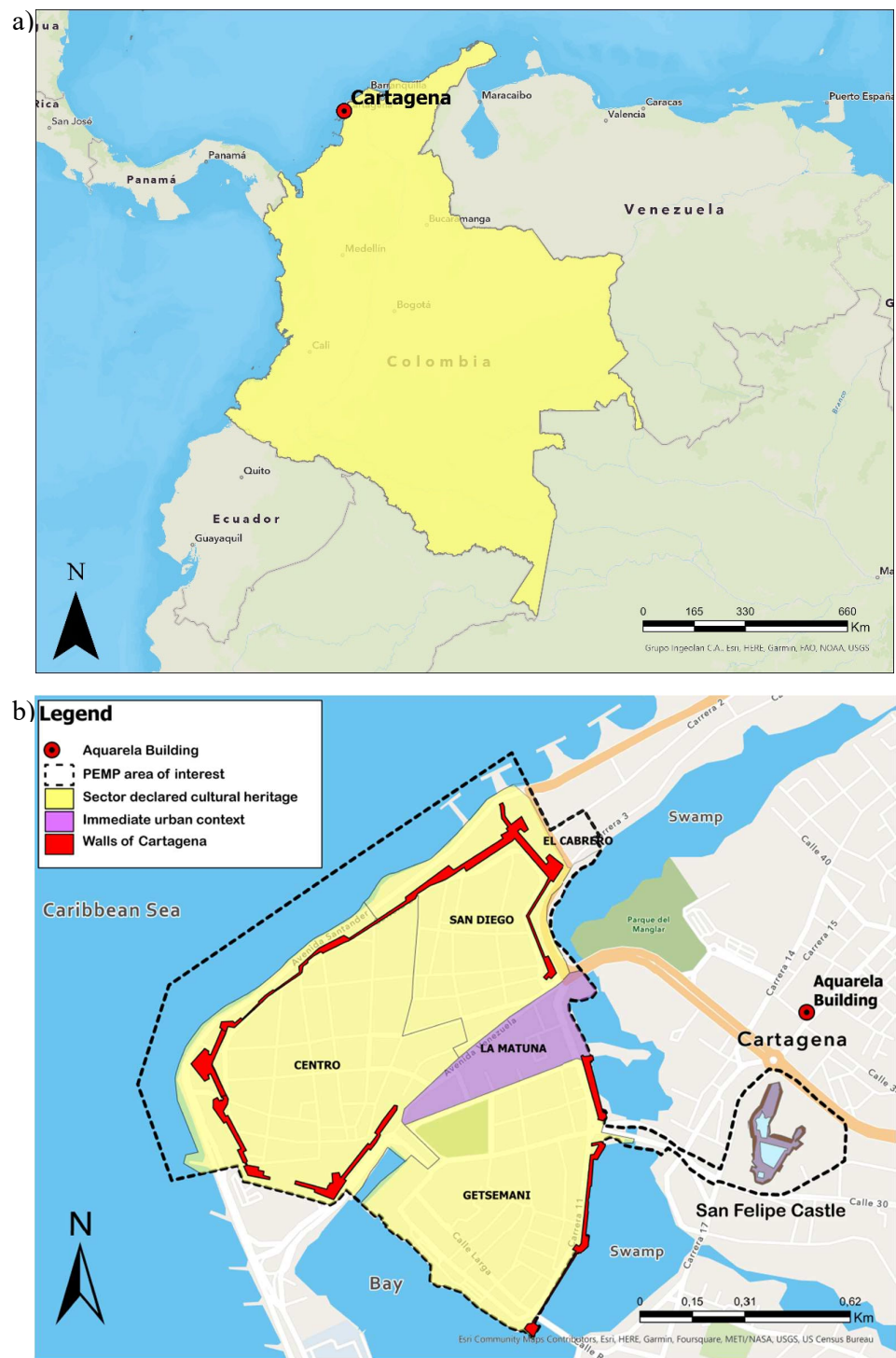


Figure 2. a) General localization of Colombia; b) Location of the Cartagena World Heritage Sites.

2. Materials and Methods

The first phase of the methodology focuses on understanding the governance of the Cartagena TCH through secondary information, information available on the websites of the entities involved, [31–33], and legislation available on the subject in Colombia, [34]. In addition, information from UNESCO's periodic reports on Cartagena [27], and the experience of having studied the heritage of Cartagena and interacted with these entities from 2015 to date were used, [35–38]. This has led

respectively to make a diagnosis of the current situation and to show general criticalities. Conversely, insights from international literature and the legislative frameworks adopted by proficient nations in the field of tangible cultural heritage management offer valuable guidance on the ideal trajectory for heritage governance in Cartagena. Thus, this phase integrates the acquired international knowledge from literature with the specific context of Colombia, culminating in the proposal of a tailored governance reform strategy for the case of Cartagena.

In the second part (chapter 3.2) the methodological approach is different. The authors carried out systematic inspections in the historic center, on weekdays and holidays, during day, afternoon and night hours and in high and low seasons of tourism flow. This led to having an extensive photographic record, which served as the basis for qualitatively analyzing and identifying different problems.

On the other hand, certain phases of the methodology adopted a quantitative approach to facilitate the measurement and quantification of variables under investigation. For example, for the identification of vegetation and asbestos-cement roofs in the cultural heritage site, hyperspectral images were used, available from a previous study using a Mjolnir VS-620 sensor, capable of recording wavelength data from 400nm to 2500nm in 480 spectral bands. The study used ENVI® Version 5.6 software to classify the images. The Spectral Angle Mapper (SAM) tool was used for supervised classification, taking roofs positive for the presence of asbestos fibers and vegetation as training points. This methodology has been proved to be 90%-95% effective in the identification of vegetation [39–43], and asbestos-cement roofs in urban areas [39,44–47], although, it is very rarely used in cultural heritage sites. In this case the main objective is not to deepen in the hyperspectral classification methodology and results discussions in this matter. Further details can be found in the literature in this regard for the reader interested in this specific topic, [45,48–50]. The aim of using this methodology is to have accurate data updated to 2023 on the presence of vegetation in the historic center and the presence of a highly dangerous material for human health, such as asbestos fiber, on the roofs of heritage structures and areas of interest nearby.

By employing this mixed-methods research design, the study aimed to provide a comprehensive understanding of the epistemology of heritage management in Cartagena. The combination of quantitative and qualitative approach allowed for a more nuanced exploration of the governance, practices and current state of deterioration. The research findings contribute to the existing body of knowledge and provide evidence-based recommendations for enhancing the effectiveness and resilience of heritage governance in Cartagena.

### 3. Results and Discussion

The following section presents a systematic account of the existing TCH governance framework in Cartagena, elucidating the involved stakeholders, their respective roles, and responsibilities. An exclusive segment addresses overarching challenges, while suggestions for potential management reorganization based on successful models employed in other nations are proffered. Additionally, twelve significant factors negatively impacting Cartagena's TCH are identified and deliberated upon. While offering general recommendations to alleviate prevailing issues, it is acknowledged that each problem necessitates a tailored approach, thorough study, and bespoke solutions as deemed appropriate by the authors.

#### 3.1. Current Cultural Heritage Governance in Cartagena de Indias

Heritage management in Cartagena de Indias, Colombia, faces challenges that endanger its very existence. As mentioned above, since 1984, the city is considered a UNESCO World Heritage Site, which has led to a significant increase in tourism and pressure on historical sites. Tourism being the second source of income in the city after industry, [51].

Heritage governance in Cartagena is the responsibility of the Cartagena Heritage and Culture Institute (IPCC, for its initials in Spanish), a public entity in charge of the protection, conservation, research and dissemination of the city's cultural heritage. The IPCC works in collaboration with other

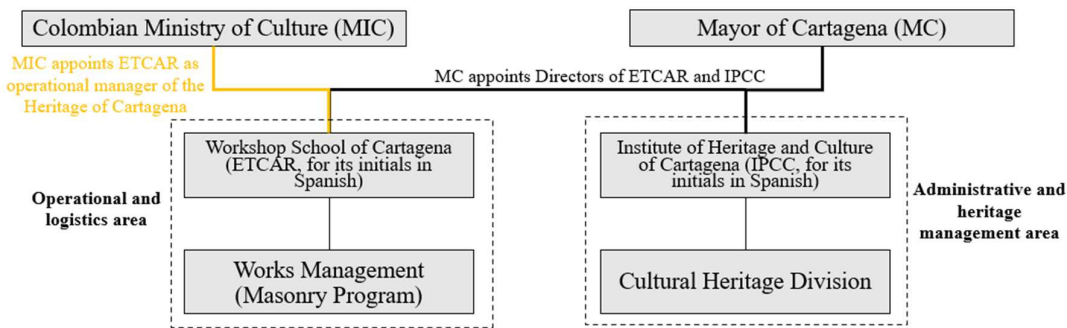
government entities and non-governmental organizations to develop restoration and conservation projects and promote cultural tourism.

Conversely, the Workshop School of Cartagena (ETCAR, for its initials in Spanish) is an educational establishment that operates on a non-profit basis and concentrates on providing technical and vocational education to young students hailing predominantly from low-income backgrounds. ETCAR's Masonry Program, titled "Labor Technician in masonry for new construction and restoration," equips students with practical expertise in various domains, including the preservation and restoration of cultural heritage. Since 2016, ETCAR has been designated by the Ministry of Culture of Colombia (MIC) to manage, preserve and value the fortified complex of the city by offering its tools, logistics and the labor of its young students.

The general director in charge of the ETCAR is appointed by the mayor of Cartagena de Indias, as well as the general director of the IPCC. Both entities, ETCAR and IPCC have a specific and independent division dedicated to cultural heritage.

The IPCC and the Escuela Taller de Cartagena are institutions that work together for the management and preservation of the cultural heritage of Cartagena de Indias. The IPCC is the entity in charge of managing, supervising and financing any activity related to material cultural heritage. However, it does not have an operational division of restorers or workers who can effectively carry out activities in the field of ordinary or extraordinary maintenance, consequently, this service is provided by the young people of ETCAR.

In addition, the MIC is the entity at the national level in charge of the promotion and protection of cultural heritage in Colombia. In this sense, it works together with the IPCC and ETCAR for the management and conservation of the cultural heritage of Cartagena de Indias, supporting projects for the restoration and conservation of heritage assets, as well as training programs in traditional trades, (**Error! Reference source not found.**).



**Figure 3.** Current organization chart of the cultural heritage governance in Cartagena.

3.1.1. A Critical Overview of the Current Cultural Heritage Governance in Cartagena

A comprehensive evaluation of the cultural heritage administration in Cartagena de Indias, Colombia, under the purview of the Ministry of Culture (MIC), IPCC, and ETCAR, is imperative to ascertain their merits and shortcomings. Below, the authors highlight certain areas within wealth management that exhibit particular vulnerabilities, according to the information found in the webpages of this entities, and legislation available in Colombia regarding TCH, [34].

The chain of command between MIC, IPCC and ETCAR is unclear. There is a certain ambiguity and overlapping of roles and functions regarding who controls the TCH, who proposes ideas and projects and who makes the decisions. Particularly, the IPCC and the MIC exhibit overlapping roles, leading to frequent conflicts and a diffusion of responsibility between the entities during critical situations necessitating prompt decision-making. Furthermore, it is found a notable absence of engagement from academic institutions, including faculties of architecture, engineering, heritage observatories, and research groups focused on heritage and restoration, in the governance process. Their involvement is conspicuously absent in project formulation, establishing scientific benchmarks



for routine and exceptional maintenance interventions, as well as in the organization of spatial arrangements, traffic management, and the utilization of the heritage sites and their surroundings.

The IPCC and the MIC do not engage in ongoing monitoring of structural, architectural, archaeological, deterioration, and climatic variables surrounding Cartagena's TCH. This prevents the implementation of an efficient and effective management plan. Monitoring is essential to detect changes in heritage conditions and take preventive measures on time. The lack of funding to carry out this type of monitoring also makes it difficult to make decisions based on scientific data and the implementation of protection measures. Therefore, there is a paucity of exceptional restoration and maintenance initiatives and schemes, which restricts the ability to acquire funding from public entities, private corporations, and foreign investment funds to improve the present state of Cartagena's heritage.

Furthermore, the lack of training for the personnel involved in the structure is worrying. The workers in charge of heritage maintenance and restoration do not have an undergraduate degree in civil engineering or architecture or a postgraduate degree in restoration of heritage real estate to carry out interventions that guarantee the protection and conservation of heritage. The lack of education and training of personnel can have extremely negative consequences on the quality of interventions and the preservation of heritage.

On the other hand, the Special Management and Protection Plans (PEMPs, for its initials in Spanish) in Colombia are an essential planning and management instrument crucial to territorial organization. They were established under the General Law of Culture (1185 of 2008) to ensure the preservation, maintenance, and sustainability of cultural heritage. This legal framework specifies a unique regulatory framework for the safeguarding, protection, sustainability, dissemination, and promotion of the Nation's cultural heritage assets, specifically for those designated as Assets of Cultural Interest (BIC, for its initials in Spanish) with respect to tangible assets, in accordance with the valuation criteria and the regulations established by the Ministry of Culture. A preliminary version of the PEMP of the historic center of Cartagena is available on the website of the Mayor's Office of Cartagena. It is a complex and articulated document that should have the objective of complying with the requirements of the Ministry of Culture of Colombia, [52]. Despite 15 years of effort by the authorities, the completion of this document has proven elusive. However, no judgment can be expressed in this regard since it is a version subject to changes, so it is currently not an official document. Therefore, it can be said that the city does not have an active PEMP.

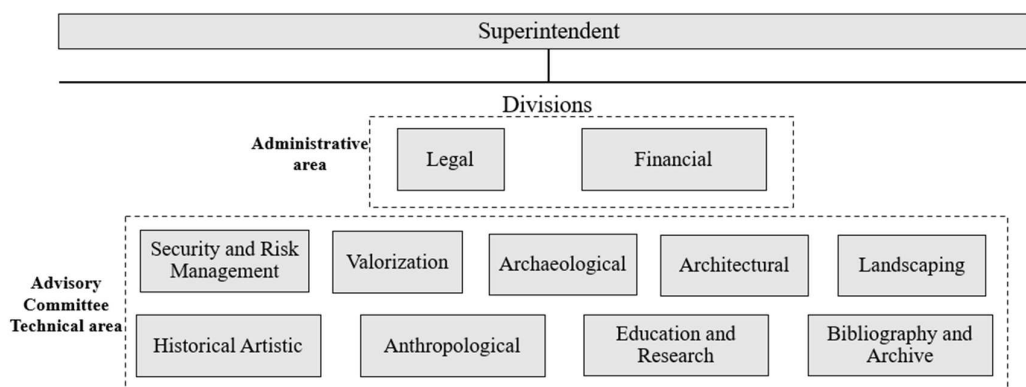
The opinion of the authors is that heritage Governance in Cartagena is predominantly driven by political motives rather than technical factors. The prevailing governance approach appears passive, while the productive sectors, particularly the tourism and construction industries, assert an influential role by actively shaping heritage management to align with their economic requirements.

### 3.1.2. Proposing a Reform Framework for Tangible Heritage Conservation Governance in Cartagena

This section has a purposeful nature in order to improve the current state of governance and management of tangible heritage in Cartagena. The proposed approach is grounded in the heritage management practices implemented in the world's most developed countries possessing extensive cultural heritage [53–55], with the aim of bringing Colombia's management practices in line with the most advanced global standards. These guidelines could potentially be integrated into Colombia's national heritage management framework.

**Error! Reference source not found.** shows the proposed management scheme. The Ministry of Culture of Colombia should create a Superintendence of Cultural Assets at the National level. The Superintendency would be a peripheral body of the Ministry of Culture, made up of state offices distributed throughout the Colombian territory. Indicatively, each Superintendency could cover a department (region of Colombia). The superintendent and his advisory committee should be public officials who have won a public merit contest conducted by the National Civil Service Commission of Colombia. The profiles of each official must be defined by the Ministry of Culture according to its current guidelines. Regarding the Superintendent, her/his profile must include at least a bachelor's degree in architecture/civil engineering/cultural heritage, or similar, a master's degree and PhD in

topics related to cultural heritage, and significance experience studying and managing cultural heritage.



**Figure 8.** This study suggests a heritage management scheme specifically tailored to the case of Cartagena, which could serve as a model for the entire country of Colombia, as well as for other developing nations.

The local superintendents in the development of their functions respond directly to the Ministry of Culture. The functions that the IPCC currently has would pass completely to the Superintendence of the Department of Bolívar according to the scheme proposed above. Although it is called the Superintendence of the Department of Bolívar, it answers only to the Ministry of Culture.

The Superintendency would have various tasks, the most important of which are reported below:

- Verification and declaration of the cultural interest of real estate in the area.
- Cataloging of goods of cultural interest
- Inspection activity in the field of competence
- Authorization of building interventions in buildings or areas declared of cultural interest.
- Imposition of conservation interventions on cultural heritage
- Granting of contributions and facilitations for interventions for expenses caused by interventions for conservation and restoration of cultural heritage.
- Supervise the design and management of conservation interventions in tangible heritage.
- Concession for the use of cultural assets/concession of filming and audiovisual and photographic reproductions of cultural assets
- Carry out research on cultural heritage in order to know its current state and plan its ordinary and extraordinary maintenance.

This organization would have countless advantages over the current organization. To mention a few, the Superintendence will have available a group of expert, public officials, in charge of the Risk Management, Valuation, Archaeology, Architecture, Landscape, Artistic, Anthropological, Education and Research, and library and archive sections. Each area will have its coordinator who will express his opinions to the Superintendent on the projects presented from his perspective and expertise. Currently, there is only a generic Heritage Division in the IPCC Technical Advisory Committee, so it is not clear if and how each expert has a voice on the projects regarding cultural heritage.

Additionally, the Superintendent and the members of the Technical Advisory Committee would not be freely removable and appointed officials, as is the case now in the IPCC, so their expertise and independence will strengthen their action. The continuity of the position, because they are public officials, will guarantee continuity in the management of the patrimony and thus it will be possible to propose long-term projects to generate significant improvements to the cultural heritage.

Any action that includes a material intervention in the heritage of Cartagena or any material asset of the Nation, including ordinary and extraordinary maintenance, should be carried out within the framework of projects or programs financed by the state or by external entities. It must be ensured

that the contracted companies or universities have sufficient experience in the specific work and the workforce is qualified with a bachelor's degree in architecture/civil engineering/cultural assets, or similar, and a master's degree in restoration of tangible assets or similar.

In the case of Cartagena, ETCAR could participate in open calls to carry out the interventions programmed by the superintendency, complying with the aforementioned requirements to be able to intervene on the heritage or on the green areas and areas of interest around the heritage.

Finally, construction and/or restoration licenses for heritage assets will continue to be subject to the approval of the Planning Secretariat of the Mayor's Office of Cartagena, which may make observations from the point of view of land use and administration, but not from merit on the ordinary and extraordinary restorations and maintenance that may take place. Both the Mayor's Office of Cartagena and the Governor's Office of Bolívar, the Universities, the other state entities and private companies and foundations may present specific projects that involve heritage. These will be reviewed and evaluated by the Superintendency according to pre-established criteria and their feasibility will depend on the priorities defined by the Superintendency.

Finally, the authors highlight that the proposed structure is an example of how Heritage could be managed in Cartagena and Colombia. There may be other, more efficient and better organized structures, however, what the authors want to convey is that a paradigm shift is needed in heritage management. Those responsible for the heritage cannot be officials of free removal and appointment by mayors or governors who pursue political interests. It is necessary to subtract political power and add technical capacities to guarantee the care of the cultural heritage since it is about goods of National interest and of humanity.

### *3.2. A Critical Examination of the Contemporary Challenges in Cartagena's Tangible Cultural Heritage*

The management of tangible cultural heritage in Cartagena faces significant challenges, such as a lack of adequate funding, the lack of a specialized management and protection plan, and an unclear chain of command with role ambiguities.

In the last decade, the tangible cultural heritage of Cartagena de Indias, Colombia, has been the subject of concern due to a series of problems that affect its conservation and preservation. In the literature there are several calls for attention to the competent authorities of Cartagena by the International Council on Monuments and Sites (ICOMOS) and UNESCO, [28,56,57]. In particular, the authors, who studied cultural heritage for many years, knowing and living in the city, identified at least 12 problems that must be critically analyzed to understand their impact on the cultural heritage of Cartagena. These problems are briefly described below with some photographic records.

The first problem is related to the lack of regulation of vehicular traffic in the narrow streets of the historic center, a heritage area with tens of thousands of tourists and residents who travel daily, (Error! Reference source not found.).



**Figure 4.** Typical situation of vehicular traffic in the historic streets of Cartagena, in non-peak hours. Furthermore, cars parked in the city center without any type of restriction (neither payment nor time control) are noted on the left side. This situation is widespread all over the city.

The circulation of vehicles in the narrow streets of the historical district not only engenders noise and congestion but also poses a significant hazard to the structural integrity of heritage buildings and monuments. Furthermore, this situation leads to an unpleasant experience for visitors and locals and exacerbates the decay of heritage components such as pavements, facades and walls, frequently composed of delicate and fragile materials. The issue of total or partial pedestrianization of the historical center, which has received inadequate attention to date, is interrelated with this problem. Moreover, the absence of parking regulations in the heritage zone results in residents, employees, tourists, and the general populace parking inappropriately, thereby restricting the already-limited space available for vehicular traffic or loading and unloading goods for commercial activities. This often triggers long queues of honking vehicles in the downtown streets, contributing to significant noise pollution.

The second problem refers to the mismanagement of rainwater and residual water drainage, which causes frequent flooding and unpleasant odors. The lack of an adequate drainage system affects the stability of heritage buildings and monuments, as well as the health and safety of residents and tourists. In addition, the accumulation of water and waste generates a proliferation of microorganisms that favor the deterioration of heritage, insects and rodents, which increases the risk of vector-borne diseases. This problem is associated with the generally poor condition of the pedestrian platforms and a lack of management of the transversal profile of the historic streets. In the upper part of the wall, the drains do not have adequate slopes, so that in the end the water remains stagnant, favoring its infiltration into the embankment behind the wall. This can generate an increase in the lateral thrust on the walls, leading the structure to behave unpredictably under this new load.

The third problem pertains to the deficiency of sufficient public lighting surrounding the fortifications, which encourages improper utilization of the fortifications, such as acts of public urination and the occupation of homeless individuals who seek shelter in the drains of the structure. Proving this issue with scientific rigor presents a challenge; nevertheless, it is noteworthy that it is rarely addressed in the existing literature. The consequences of this situation extend beyond the city's image and reputation, as it also exerts a detrimental influence on the health and well-being of both citizens and tourists. The absence of adequate public lighting poses difficulties in establishing concrete evidence that supports the negative impacts associated with the inappropriate use of the fortifications. The lack of scientific studies or comprehensive investigations focusing on this specific issue contributes to its underrepresentation in the literature. Consequently, the profound effects on

public health and well-being, as well as the tarnishing of the city's image, remain largely unexplored and undocumented.

Recognizing the significance of shedding light on this problem, further research should be conducted to gather empirical data and employ scientific methodologies that can substantiate the claims made regarding the adverse consequences of inadequate public lighting. By addressing this research gap, a more comprehensive understanding of the detrimental effects on both the physical and social aspects of the city can be achieved, thereby facilitating informed decision-making and enabling effective interventions to enhance the well-being and preserve the cultural heritage of Cartagena de Indias.

The fourth problem revolves around the absence of regulation pertaining to street vendors and informal businesses that have established themselves in close proximity, and in some cases, directly on top of monuments and historic buildings. This issue poses a unique challenge in terms of scientific proof, as the direct causal relationship between the presence of these vendors and the specific damage caused to heritage elements is difficult to establish with rigorous scientific rigor. Nonetheless, it is noteworthy that this problem is rarely acknowledged or extensively discussed in the existing literature. The impact of unregulated street vendors and informal businesses on the integrity of heritage elements and the overall tourist experience is a crucial concern. The lack of proper guidelines and control measures allows for potential damage to occur, both physically and aesthetically, to the cherished architectural and cultural assets. Moreover, the presence of these vendors can significantly affect the experience of national and international tourists who visit the city, diminishing the authenticity and historical ambiance they seek.

Although scientific investigations that conclusively establish the exact extent of damage caused by unregulated street vendors and informal businesses are limited, anecdotal evidence and observations highlight their potential adverse effects. To address this research gap, further studies are warranted, combining empirical data collection, qualitative analysis, and stakeholder engagement. By shining a scientific spotlight on this issue, a more comprehensive understanding can be achieved, facilitating evidence-based policies, regulations, and interventions that strike a balance between preserving the cultural heritage of Cartagena de Indias and supporting sustainable economic activities.

The fifth problem encompasses the mismanagement of solid waste by both citizens and tourists. Authors have substantiated this issue through on-field observations, underscoring the direct evidence available regarding its occurrence. However, it is noteworthy that despite its practical significance, this problem is seldom mentioned in the literature. The mismanagement of solid waste contributes to the accumulation of refuse in the streets and heritage areas, leading to a multitude of detrimental consequences. From a health perspective, the presence of accumulated waste poses risks such as the spread of diseases, attracting pests and vermin, and causing environmental contamination. Furthermore, the visual pollution created by these unsightly waste piles negatively impacts the aesthetic appreciation of the surrounding heritage elements, detracting from the overall experience of both locals and visitors.

Despite the evident impact and tangible presence of this problem, its inclusion and discussion in scholarly literature remain scarce. The lack of attention given to this issue in scientific research may stem from the difficulty in quantifying and measuring the precise effects of mismanaged solid waste. Nonetheless, the significance of addressing this problem cannot be undermined, necessitating further research efforts to bridge the existing gap.

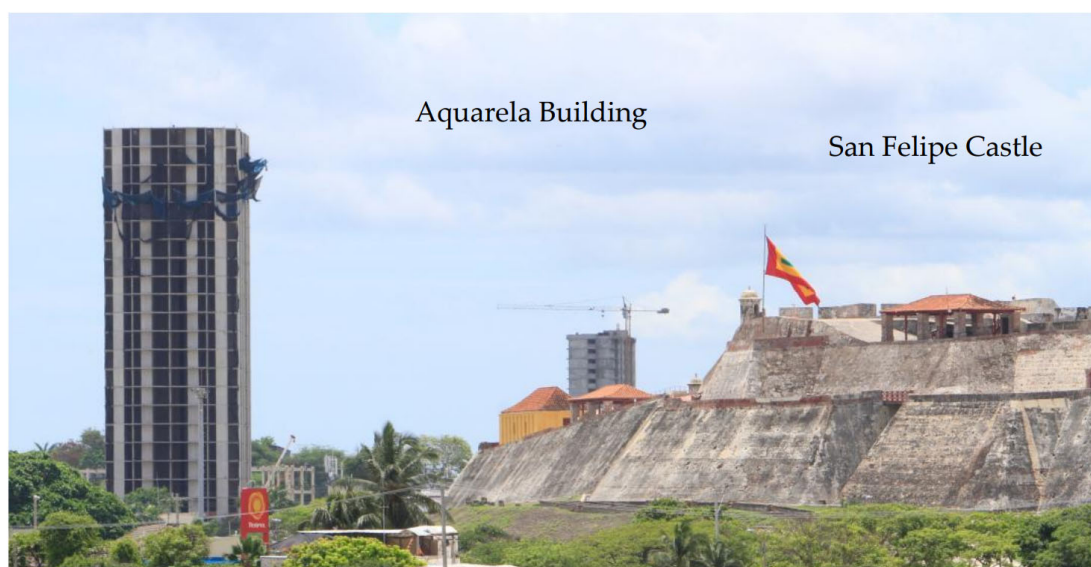
The sixth problem relates to the presence of horse-drawn carriages. The horses are often in an evident state of precarious health, in fact, on several occasions they have died in full service in the streets of the historic center. News of this kind are common in the local newscasts of Cartagena and Colombia [58,59]. This type of practice is not only cruel to animals, but it can also cause damage to pavements and affect the integrity of heritage elements, in addition to generating bad odors due to the excrement of these animals.

The seventh problem is related to the lack of control of environmental pollutants in the historic center. The emission of gases and particles by vehicles and the tourism industry, as well as the lack



of regulation of commercial processes, can have a negative impact on the health of citizens and on heritage in general. Currently there is no departmental or national meteorological station in the historic center and there is no control of air and acoustic pollutants by the competent environmental authorities.

The eighth problem refers to the construction of the Aquarela project located less than 200 meters from the San Felipe de Barajas Castle in the area of heritage interest. This real estate project initially included five towers between 31 and 32 floors (approximately 100 meters high) each. It is worth mentioning that the Castle at its highest point is 40 meters high. This would disturb and destroy the historical-visual and symbolic relationship between the castle and its surroundings, jeopardizing one of the attributes that support the property's Outstanding Universal Value. The construction of this real estate project stopped when the first tower under construction had barely 20 floors (60 meters high, which is its current state). The competent authorities and the public realized only at that moment that this project was going to alter the image of the historic urban landscape, creating a visual interruption in the horizon line. In addition, its height and its modern design contrast with the colonial architecture of the city, which negatively affects the aesthetics and cohesion of the historic center. This situation was generated due to the lack of a comprehensive heritage management plan and the lack of effective regulation by the competent authorities in heritage preservation. As mentioned above, UNESCO in one of its recent committees on the heritage of Cartagena expresses its strong concern, in line with the evaluation of the ICOMOS advisory mission of 2017 [28,56,57], on the impact of the Aquarela project on the values that support the Outstanding Universal Value (OUV) of the property. Similar conclusions are underlined by the National Council for Cultural Affairs on this point. However, 7 years after the ICOMOS report on the subject, and countless legal proceedings, the building is still there as shown in **Error! Reference source not found..**



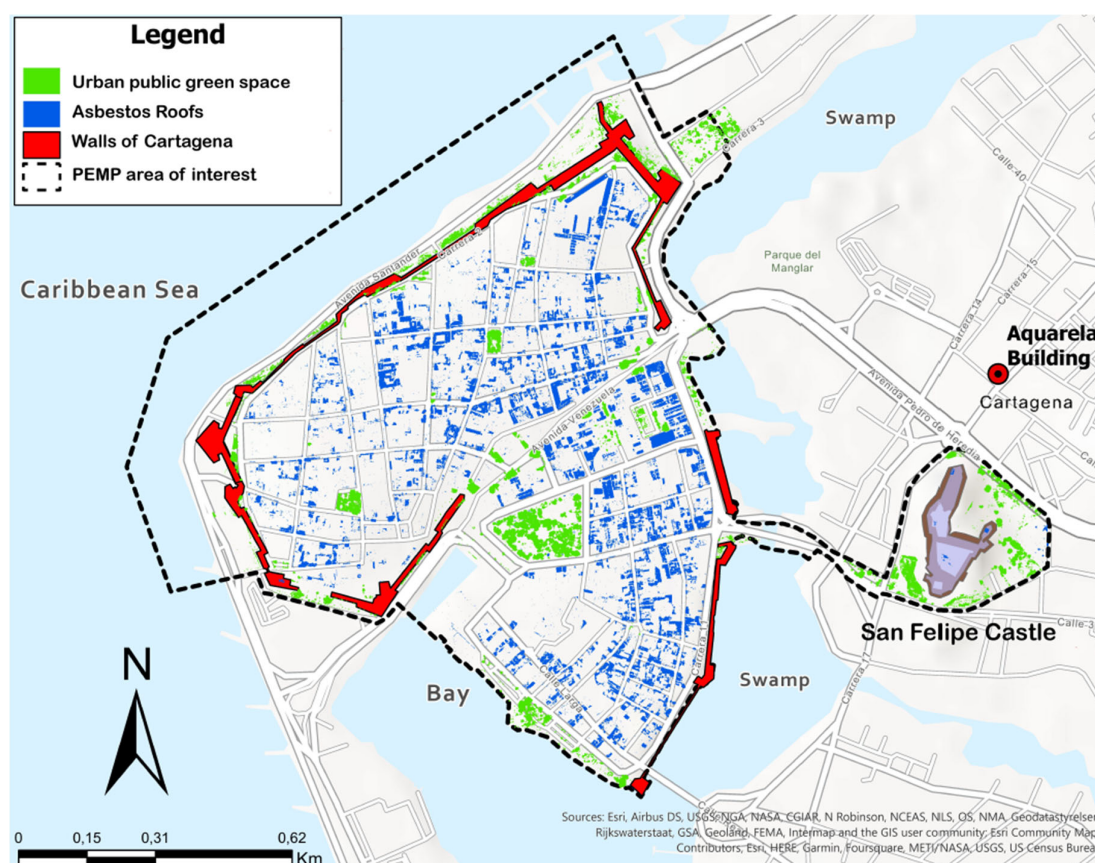
**Figure 5.** Aquarela Building breaks the horizon in the heritage area of interest at less than 200 meters from San Felipe Castle, [60].

The ninth problem relates to the lack of public green in the historic center of Cartagena de Indias. The area of interest of the PEMP is 147.16 hectares. The classification of hyperspectral images shows that only 3.7% are public green areas that are actually usable by citizens and tourists, (Figure 6). This may be common in some historical centers around the world. However, it is also accompanied by a tendency in the city to have a shortage of green spaces. As found in the literature, [61–63], the scarce presence and care of green areas affects the quality of the air and the health of residents and tourists, in addition to being an important factor in the regulation of temperature and humidity in the

environment. The lack of green areas also affects the quality of life, since these areas provide spaces for recreation, rest and relaxation, essential elements for people's physical and emotional well-being.

The tenth problem is the presence of asbestos-cement roofs in the study area. Asbestos, a carcinogenic mineral according to the World Health Organization (WHO), is commonly found embedded in roofs, [64]. Its presence around the historical heritage has been scarcely studied, since it does not directly affect the heritage itself. However, when the cement matrix deteriorates, it releases asbestos fibers into the air in areas with a large flow of citizen tourists and workers in the tourism industry sector, [65]. This brings to the fore the need to quantify and mitigate the problem, starting with the most frequented areas. Hyperspectral images shown that of the 1,597 properties in the study area, around 696 have asbestos-cement roofs, being almost 44% of the total, with a total asbestos-cement roof area of 10.5 hectares, (Figure 6). This substantial quantity raises concerns for the first time within the historical and cultural context of Cartagena.

These two problems (vegetation and asbestos-cement roofs) are graphically evidenced in Figure 6. Their impact is mainly reflected in more than 300,000 regular and irregular workers in the tourist area, and in the hundreds of thousands of tourists who spend their vacations in the historic center of the city each year, [66,67], since the residents in the tourist zone are a fraction of these, in continuous decrease.



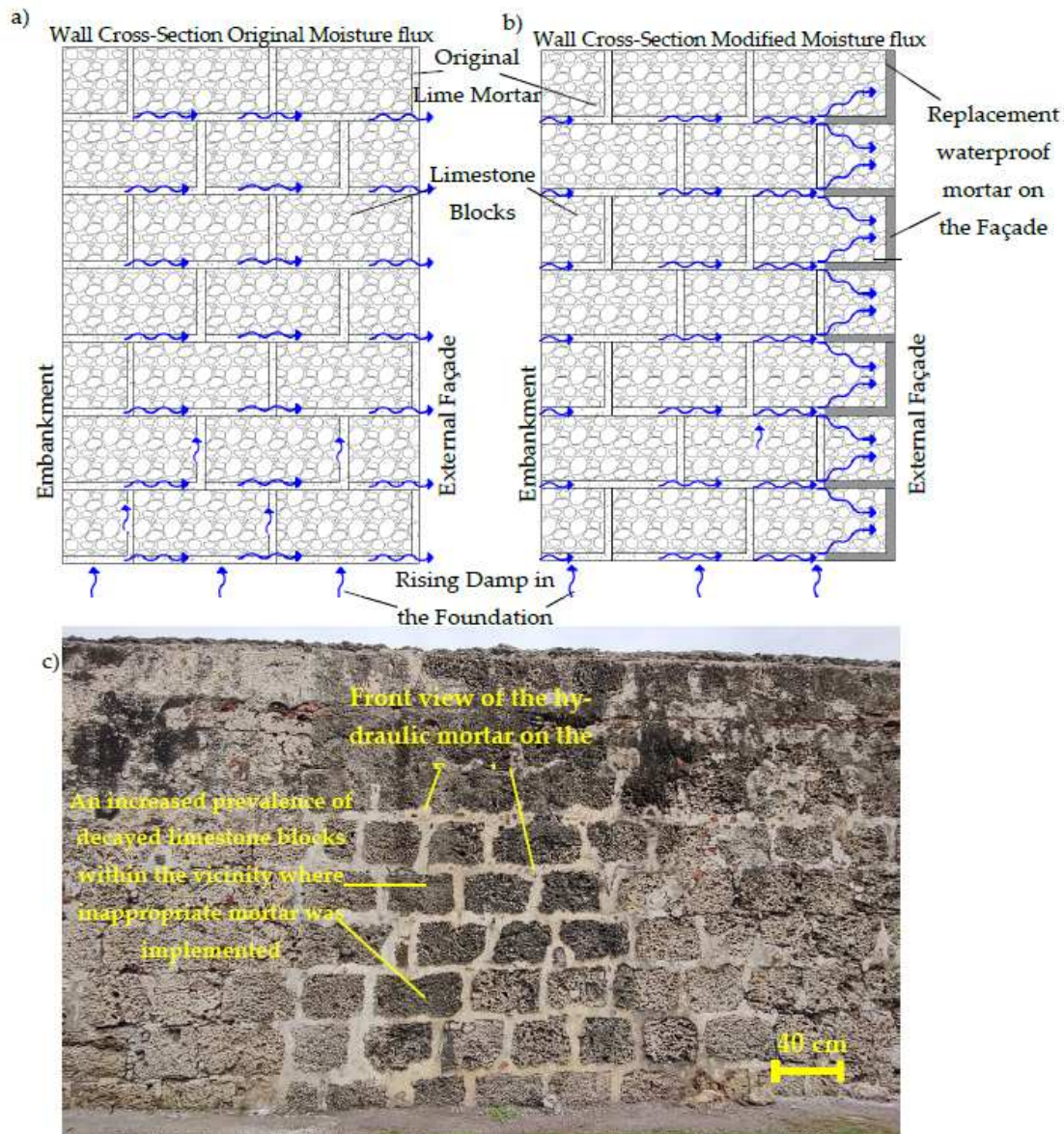
**Figure 6.** Green areas and asbestos-cement roofs found in the study area.

Continuing, the problematic eleventh is represented by the lack of a clear methodology to choose replacement materials when there are deteriorated blocks or mortars. The lack of a clear methodology to select replacement materials can have negative consequences on structural integrity and heritage preservation. In fact, this is already reflected in the current state of deterioration of the fortifications, with an inadequate replacement of deteriorated stone blocks and the use of hydraulic mortars that have contributed to worsen the state of deterioration of the structure, [29,35,37,68]. The permeability of limestone blocks and mortars is an important factor in the durability of the masonry of the

structure. Initially, rising damp and moisture from the embankment behind the wall, could escape mainly through the original lime-based mortars of the structure, being a more porous and permeable material than the limestone, [38,69]. Once the original mortars deteriorated, due to weathering or biodeterioration, they were progressively replaced by common hydraulic mortars, used in modern buildings. This generated a change in the pattern of moisture output, since now the most porous material is the limestone of the masonry blocks. **Error! Reference source not found.** a) and b) show the original flow and the modified flow of moisture before and after the inappropriate mortar replacement. Therefore, a greater lateral hydraulic thrust can be generated in the structure. An image taken in-situ, in the Bastion of Santo Domingo (**Error! Reference source not found.** c), allows to identify a pattern of greater deterioration in the limestone blocks in the area concerned by the replacement of inappropriate mortar. This bad practice in restoration generates an acceleration of the deterioration of the limestone blocks around the intervened areas in sectors of the Cartagena fortifications.

In this regard, it is worth mentioning the "Paradox of Theseus", which is a concept of the philosophy of identity that refers to the problem of determining the identity of an object over time. [70,71]. If all the parts of a ship are replaced over time, is it still the same ship? This problem arises when restorations and repairs are carried out on heritage assets. How much of the original structure must be preserved and how much can be replaced? At what point is the authenticity of heritage lost? It is a dilemma that arises in the management of tangible cultural heritage and one that requires a careful and well-informed approach. How do the competent authorities over the tangible heritage of Cartagena face this paradox?





**Figure 7.** a) Cross section of the wall: Moisture flow with original mortars; b) Cross section of the wall: Modified moisture flow with hydraulic mortars; c) Front Image of the Santo Domingo bastion wall section, example of inappropriate restauration with an evident state of deterioration around the area where original lime-based mortar was replaced with hydraulic mortar.

Finally, the twelfth refers to the presence of prostitution and intensive sexual tourism in the historic center of Cartagena. This has negative effects on the tangible historical heritage of the city and on the perception of the city as a cultural destination, as well as on the quality of life of residents. In addition, sex tourism can generate a demand for accommodation infrastructure and services that do not meet heritage conservation standards. As a result, these activities may contribute to the degradation and deterioration of the city's cultural heritage.

It is evident that the competent authorities must undertake prompt and decisive measures to ensure the safeguarding and conservation of Cartagena's cultural heritage and to transform its management paradigm. This is imperative not only for the citizens' sense of identity and belonging but also because it constitutes a crucial source of income and economic development for both the city and the nation.

### 3.2.1. General Recommendations to Mitigate Existing Problems

To address the issues mentioned in section 3.2. of this document requires a multidisciplinary approach and coordinated action among the different actors involved, including competent authorities, universities and research groups, restoration experts, civil organizations, residents, and tourists.

Some recommendations are proposed below in the same order as the 12 problems mentioned above. This section does not intend to be exhaustive in analyzing the problem or in proposing the solution, since for this it would be necessary to carry out a specific research work for each problem with a general direction that points to the safeguarding of the city's heritage. Some of the solutions proposed below in this section are well known by heritage experts and have been theorized and implemented in literature and case studies in other cities around the world for at least 4 decades. However, in developing countries, such as Colombia, they continue to present alarming concern.

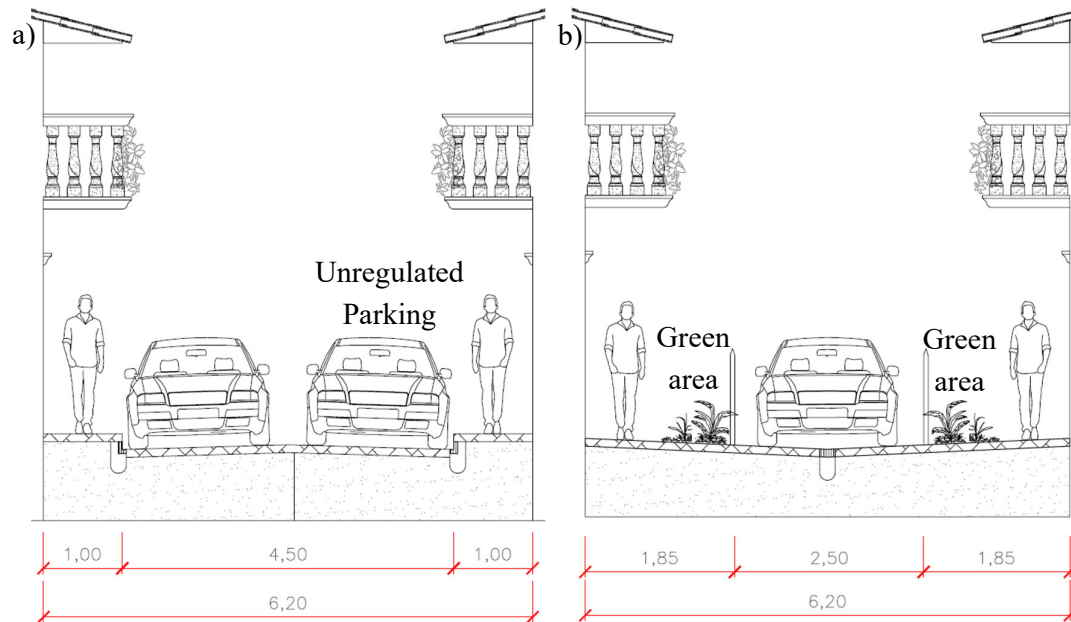
Regarding the first problem, lack of regulation of vehicular traffic, the implementation of restricted traffic zones can be considered, which limit the movement of vehicles in the historic center and promote the use of more sustainable means of transport, such as bikes, public transport and electric transport, [72]. In addition, the implementation of measures to reduce the speed of vehicular traffic and the promotion of road safety education for drivers and pedestrians can be considered. Technical solutions can also be implemented, such as pavements that are more resistant to traffic and the implementation of loading and unloading areas for commercial purposes. The smart city concept should be applied in Cartagena as in other cities in the world, [73,74]. In the literature, there are investigations that relate urban merchandise transport and land use planning, as in the case of the center of the city of Salvador, Bahia, Brazil, [75]. The study uses geoprocessing techniques to analyze the spatial concentration of Freight Trip Generation Centers and GIS Multi-Criteria Assessment to identify suitability maps for urban logistics activities and land use compatibility. City Logistic strategies are established to support land use planning and the organization of logistics flows, considering the efficiency required by urban freight transport and the social costs involved in traffic congestion, environmental impacts and conservation of resources. energy. These City Logistic strategies and measures aim to support the improvement of urban logistics in the study area and could be useful in the case of Cartagena, as well as an identification of stakeholders and agreement on traffic limitation measures supported by statistical studies and comparison with other similar case studies worldwide.

**Error! Reference source not found.** a) shows the typical cross-sectional profile of the historic streets of Cartagena. Its classic profile is observed, with more than 70% of the space dedicated to vehicular lanes, which thus become abusive parking lots, generating an oversaturation of vehicles in the center in search of parking. On the other hand, **Error! Reference source not found.** b) proposes a reduction in the space for the vehicular lane, eliminating the possibility of parking in the narrow streets of the center, in order to reduce the vehicular flow. Additionally, the space for pedestrians is expanded. It is suggested to create a green space in the streets, now completely absent. The change in slope of the street profile will allow optimizing the maintenance of rainwater drainage. Spaces for unloading and loading goods should be identified in the city with a specific study on the concentration of commercial activities that have the greatest demand. There is currently no strategy to deal with this problem, whereby loading and unloading vehicles enter, exit and park without any restrictions of any kind.

Regarding the second problem, it requires the implementation of adequate drainage systems and the construction of infrastructures for the collection and treatment of wastewater. This may include the construction of cisterns and storage tanks, as well as the construction of storm drainage systems that integrate with the city's drainage system. It is also necessary to carry out adequate maintenance of the sidewalks and pavements to ensure that water flows into the drainage systems and does not accumulate in the streets. The Historic Center of Cartagena is located in some sectors below sea level, with a shallow water table, consequently, the drainage system requires a specific study and design that is beyond the scope of this work. To address the first two problems a reorganization of the transversal profile of the streets of the historical center is crucial. Figure 9 shows



a typical current section and a possible alternative to improve current conditions. A reconfiguration of urban spaces ought to involve a reduction in the width of the roadway to accommodate motor vehicle transit, while simultaneously eliminating any opportunities for unlawful parking within the street. Such measures should facilitate a greater human presence within the city's urban spaces and prioritize the expansion of public greenery wherever feasible. In addition, the operation of urban drainage would be simplified, with a single grid in the cross section instead of two, with lower management and maintenance costs.



**Figure 9.** a) Current Street transversal section scheme; b) Improved Street transversal section scheme proposed.

Regarding the third problem, an improvement in public lighting is required, especially in the areas close to the fortifications. This may include the implementation of energy efficient LED lighting systems, which minimize the impact on the environment and reduce operating costs. Security measures may also be implemented to prevent unauthorized access to fortifications, which may include hiring security guards and installing surveillance cameras. These are security measures suggested by common sense, however, in the historic center of Cartagena they are not implemented.

The fourth problem is related to the lack of regulation of street vendors and informal businesses in areas close to monuments and historic buildings. To address this problem, measures can be implemented such as the creation of a registration and control system for informal vendors, as well as the delimitation of specific areas for their location, to reduce their presence in heritage areas. In addition, awareness and education campaigns can be established to promote the importance of heritage conservation and respect for regulations. In the literature [76–79] a discussion on the subject is found, analyzing the importance of street food vending in developing countries as a socioeconomic activity that provides prepared meals and employment opportunities. However, the informal nature of the street food trade can lead to unsanitary practices and health risks. Policies and regulations for the safe trade of street food are weak and poorly enforced in most developing countries. A security approach to the street food trade is recommended that starts with good agricultural practices and permeates the entire business chain. They also suggest the implementation of Hazard Analysis Critical Control Points, raising awareness through the dissemination of information, educating vendors and consumers on hygiene and safe food practices, and involving all stakeholders in the trade. The proper management of street food trade would guarantee safe practices and generate a safer and healthier society.

The fifth problem refers to the mismanagement of solid waste. It is a common complex problem among developing countries, which does not involve only the patrimonial part of the city but the entire city and almost the entire country. Again, the solutions are well known in the professional world, thus some general suggestions will be included here. Awareness and education campaigns on proper waste management and the importance of separation and recycling can be implemented. This would at least avoid having waste in the patrimonial streets. In addition, control measures and sanctions can be established for those who do not comply with the established regulations and creating selective waste collection programs in these heritage areas, to clean up the image of the city, a showcase for Colombia in the world.

To address the sixth problem, regarding horse-drawn carriages in the historic center, regulations and norms can be established to restrict the use of animals for this purpose in the historic center and promote sustainable transportation alternatives, such as bikes or electric vehicles. In some cities of the world such as Prague in the Czech Republic, starting from 1 January 2023, horse-drawn carriages were no longer permitted due to concerns about animal welfare and public safety, [80]. The move is part of the city's efforts to reinvent itself as a destination for culture and gastronomy, moving away from its previous image as a city of cheap beer and strip clubs. While supporters argue that the carriages provide a romantic link to history and provide jobs, critics say the practice is cruel to the horses and can lead to accidents. Other cities, such as Budapest, Kraków, Palma de Mallorca, Chicago, New York, Melbourne, Montreal, are also either in process or already forbidden horse-drawn carriages, [81,82].

The seventh problem is related to the lack of control of environmental pollutants in the historic center, which can generate negative impacts on health and heritage, as well as in other historic centers around the world, [83–85]. To monitor this problem, weather stations and pollutant measurement stations can be installed in the historic center that can be consulted in real time, with early warning systems that allow, together with the vehicular traffic restrictions addressed in point 1, to control and reduce the contaminants. In the literature, studies of environmental monitoring both outdoors and indoors are common in historic city centers, [85,86]. In addition, permanent noise control meters can be added, generating a monitoring and early warning system to prevent negative impacts on public health, and thus avoid conflicts between residents, tourists and commercial activities, [87].

The eighth problem refers to the construction of the Aquarela Building, which has altered the image of the historic urban landscape and has generated a visual interruption in the horizon line. To solve this problem, the building should be demolished with the highest priority, to prevent UNESCO from inserting Cartagena's heritage among the assets at Risk. According to UNESCO regulations, this is the first step towards removing heritage from its list, with incalculable negative impacts on the tourism industry, employment, and the image of the city and the country.

The ninth problem refers to the lack of green areas in the historic center. Cartagena in general is one of the cities in Colombia with the least green areas per inhabitant, due to high building speculation and lack of application of urban regulations, [88,89]. To solve this problem, initiatives for reforestation and restoration of green areas in the historic center can be promoted, as well as the creation of parks and gardens that promote biodiversity and recreation. These spaces have been conceived, designed and implemented on several occasions in Cartagena, however, the problem is that resources are not budgeted to monitor the trees planted, so in the end, these activities are often only propaganda with little impact on the city and the historic center. The Superintendency should be in charge of caring for these green areas since they are included in the area of heritage interest.

The tenth problem, related to the presence of asbestos-cement roofs in the heritage area, requires a comprehensive, complex and articulated strategy between environmental authorities, heritage management authorities, including companies and private construction companies, to minimize the dispersion of fibers in the environment during maintenance work, and removal. As well as establishing specific guidelines for the safe disposal and removal of the material. In developed countries in Europe or Australia, among others, there are strict regulatory frameworks on this problem, [46,90]. However, in developing countries, such as Colombia, this problem is still unknown

or in the regulatory phase. Consequently, long awareness campaigns should be carried out, as well as pressure on the competent authorities to propose regulations that aim to solve the problem.

Regarding the problematic eleventh, the materials used for the replacement should be selected based on physicochemical, mechanical and aesthetic parameters to avoid affecting the mechanical behavior of the structure. There are methodologies in the literature that propose selecting replacement blocks based on mass, porosity, even using non-destructive techniques such as ultrasound, or making thin sections of the stone to evaluate and compare the petrographic characteristics of the stone of the structure and of quarry stone, [37,91,92]. On the other hand, with respect to replacement mortars, non-hydraulic lime-based mortars are required, with dosages that must be custom formulated through physicochemical and mechanical analyzes of the original mortars in-situ. The hydraulic mortars widely used in the structure and shown in **Error! Reference source not found.** c), must be entirely replaced, since their permanence in the structure generates damage that spreads and worsens each year.

Finally, the presence of prostitution and intensive sexual tourism in the historic center, [93]. It is a complex and morally relevant issue. Therefore, Colombian regulations should be followed in this regard without tolerance zones. Constant monitoring of social workers and health authorities could help mitigate the problem. In addition, national and international advertising campaigns should show the cultural value of Cartagena's heritage and discourage prostitution.

In the context of Cartagena's Tangible Cultural Heritage, the concept of resilience becomes vital due to the city's governance issues and the potential threat of UNESCO classifying it as heritage in danger. Urban resilience, pertaining to tangible cultural heritage, pertains to the city's capacity to adapt, endure, and recover from shocks and stresses while safeguarding its cultural heritage assets, [94,95]. It necessitates the implementation of strategies and measures that preserve, protect, and sustainably manage the cultural heritage despite challenges like natural disasters, climate change, urbanization, and social disruptions. By integrating tangible cultural heritage into urban planning and development processes, urban resilience ensures the preservation of Cartagena's cultural identity, social fabric, and historical significance during crises. Additionally, leveraging cultural heritage assets as resources for community building, economic development, and sustainable tourism plays a vital role. Engaging local communities and stakeholders in the planning, decision-making, and implementation of resilience strategies empowers them to actively contribute to the enhancement of tangible cultural heritage resilience. This comprehensive approach enables Cartagena to withstand disruptions while simultaneously safeguarding and celebrating its cultural heritage, contributing to the city's overall well-being and vibrancy.

As mentioned above, the problems of Cartagena's heritage are complex and articulated among themselves. The objective of this paper is not to propose a specific solution to each of them, but rather to highlight the problems and propose conceptual solutions. This, although it seems basic in the context of developed countries, in Colombia and in developing countries is of primary importance and relevance, since they are problems that tourists and citizens experience daily and that have been there for many decades without a solution.

#### 4. Conclusions

This study employs an original interdisciplinary approach that merges empirical and scientific methodologies to evaluate the governance of Cartagena's heritage and its impact on the current state of the tangible cultural heritage. Unlike traditional approaches, the research embraces a unique perspective by delving into the root causes rather than merely addressing superficial issues like material deterioration. By comprehensively analyzing and discussing the existing governance of tangible cultural heritage (THC) in Cartagena, this study introduces an innovative approach to understanding the complex dynamics at play. The investigation encompasses a wide range of critical aspects, including material deterioration, vehicular traffic, environmental factors, urban fabric, and architectural integrity, forming an interconnected web of analysis. This holistic examination of Cartagena's THC aims to present a fresh and nuanced understanding, filling the gap in the scientific

community's knowledge. Going beyond isolated problems and solutions, this research offers a broader perspective that takes into account the intricate reality in which these challenges exist.

The present work proposed a reorganization of the governance of the cultural heritage of Cartagena, to centralize decisions to a state official, and a merit-winning support team, which responds only to its manual of functions and to the Ministry of Culture of Colombia. This would avoid crossovers between technical knowledge and political interest at the mayoral level, as is the case today, significantly improving heritage management. The consequences of today's poor heritage management were highlighted with 12 serious problems that today affect the historic center of Cartagena. Among them, the most significant are considered the traffic and water drain problems, which make the center often inaccessible for risk of vehicular collision, and for malodorous scent. This is projecting a bad image of the country in the world with devastating negative consequences for the growth prospects especially of the tourism sector, which however is a sector of primary importance in the city.

The solutions mentioned are not meant to be exhaustive, since they require detailed studies with practical solutions adjusted to the environment, but they are solutions of principle that are rarely mentioned and theorized by the competent authorities in the city.

For all these reasons, the city of Cartagena is under threat from UNESCO to transfer the heritage of Cartagena to the list of Heritage in "Danger". Hence, it is vitally important to act quickly and without more indulgences.

Ultimately, the study intends to contribute to ongoing efforts to enhance cultural heritage management in Cartagena de Indias and provide insights for other cities and developing countries, especially in Latin America, facing similar challenges.

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## References

1. M. Díaz-Andreu and A. Pastor Pérez, "Archaeological Heritage Values and Significance," in *Reference Module in Social Sciences*, Elsevier, 2023.
2. J. Otero, "Heritage Conservation Future: Where We Stand, Challenges Ahead, and a Paradigm Shift," *Glob. challenges (Hoboken, NJ)*, vol. 6, no. 1, p. 2100084, Jan. 2022, doi: 10.1002/gch2.202100084.
3. UNESCO, "Cultural heritage," 2023, 2023. <https://uis.unesco.org/en/glossary-term/cultural-heritage> (accessed May 31, 2023).
4. I. Rizzo and L. C. Herrero Prieto, "Economics and Archaeological Heritage," in *Reference Module in Social Sciences*, Elsevier, 2023.
5. D. Scarpi and F. Raggiotto, "A construal level view of contemporary heritage tourism," *Tour. Manag.*, vol. 94, p. 104648, 2023, doi: <https://doi.org/10.1016/j.tourman.2022.104648>.
6. E. Park, B.-K. Choi, and T. J. Lee, "The role and dimensions of authenticity in heritage tourism," *Tour. Manag.*, vol. 74, pp. 99–109, 2019, doi: <https://doi.org/10.1016/j.tourman.2019.03.001>.

7. H. Yan, "Cultural Heritage Tourism: Five Steps for Success and Sustainability," *Tour. Manag.*, vol. 70, pp. 153–154, 2019, doi: <https://doi.org/10.1016/j.tourman.2018.08.007>.
8. R. Ruiz-Ruiz *et al.*, "Environmental Decay of Ignimbrite Patrimonial Monuments in the Dry, Urban, and Non-Industrial Atmosphere of Morelia (México)," *Heritage*, vol. 6, no. 3, pp. 3137–3158, 2023, doi: [10.3390/heritage6030167](https://doi.org/10.3390/heritage6030167).
9. K. N. Nguyen and S. Baker, "Climate Change and UNESCO World Heritage-Listed Cultural Properties: A Systematic Review, 2008–2021," *Heritage*, vol. 6, no. 3, pp. 2394–2420, 2023, doi: [10.3390/heritage6030126](https://doi.org/10.3390/heritage6030126).
10. H. Kim, H. Kim, and K. M. Woosnam, "Collaborative governance and conflict management in cultural heritage-led regeneration projects: The case of urban Korea," *Habitat Int.*, vol. 134, p. 102767, 2023, doi: <https://doi.org/10.1016/j.habitatint.2023.102767>.
11. H. Wang, B. Zhang, and H. Qiu, "How a hierarchical governance structure influences cultural heritage destination sustainability: A context of red tourism in China," *J. Hosp. Tour. Manag.*, vol. 50, pp. 421–432, 2022, doi: <https://doi.org/10.1016/j.jhtm.2022.02.002>.
12. UNESCO, "Fortifications on the Caribbean Side of Panama: Portobelo-San Lorenzo," 2023. [Online]. Available: <https://whc.unesco.org/en/list/135>.
13. R. J. van Lanen, R. van Beek, and M. C. Kosian, "A different view on (world) heritage. The need for multi-perspective data analyses in historical landscape studies: The example of Schokland (NL)," *J. Cult. Herit.*, vol. 53, pp. 190–205, 2022, doi: <https://doi.org/10.1016/j.culher.2021.11.011>.
14. Y. Li, L. Zhao, Y. Chen, N. Zhang, H. Fan, and Z. Zhang, "3D LiDAR and multi-technology collaboration for preservation of built heritage in China: A review," *Int. J. Appl. Earth Obs. Geoinf.*, vol. 116, p. 103156, 2023, doi: <https://doi.org/10.1016/j.jag.2022.103156>.
15. L. Guerriero, M. Guadagnuolo, I. Titomanlio, and G. Faella, "An integrated approach for the conservation of archaeological buildings: The 'Re Barbaro' Palace in Sardinia," *Digit. Appl. Archaeol. Cult. Herit.*, vol. 27, p. e00244, 2022, doi: <https://doi.org/10.1016/j.daach.2022.e00244>.
16. E. Lucchi, "Multidisciplinary risk-based analysis for supporting the decision making process on conservation, energy efficiency, and human comfort in museum buildings," *J. Cult. Herit.*, vol. 22, pp. 1079–1089, 2016, doi: <https://doi.org/10.1016/j.culher.2016.06.001>.
17. H. Mekonnen, Z. Bires, and K. Berhanu, "Practices and challenges of cultural heritage conservation in historical and religious heritage sites: evidence from North Shoa Zone, Amhara Region, Ethiopia," *Herit. Sci.*, vol. 10, no. 1, p. 172, 2022, doi: [10.1186/s40494-022-00802-6](https://doi.org/10.1186/s40494-022-00802-6).
18. M. Cao, S. Zhang, J. Zhao, and Y. Hong, "The Current Status, Problems and Integration of the Protection and Inheritance of China's World Cultural Heritage in the Context of Digitalization," in *IOP Conference Series: Earth and Environmental Science*, 2018, vol. 199, no. 2, pp. 1–8, doi: [10.1088/1755-1315/199/2/022061](https://doi.org/10.1088/1755-1315/199/2/022061).
19. L. J. Durrant, A. N. Vadher, and J. Teller, "Disaster risk management and cultural heritage: The perceptions of European world heritage site managers on disaster risk management," *Int. J. Disaster Risk Reduct.*, vol. 89, p. 103625, 2023, doi: <https://doi.org/10.1016/j.ijdr.2023.103625>.
20. F. Carbone, L. Oosterbeek, C. Costa, and A. M. Ferreira, "Extending and adapting the concept of quality management for museums and cultural heritage attractions: A comparative study of southern European cultural heritage managers' perceptions," *Tour. Manag. Perspect.*, 2020, doi: [10.1016/j.tmp.2020.100698](https://doi.org/10.1016/j.tmp.2020.100698).
21. J. Li, S. Krishnamurthy, A. Pereira Roders, and P. van Wesemael, "Community participation in cultural heritage management: A systematic literature review comparing Chinese and international practices," *Cities*, vol. 96, p. 102476, 2020, doi: <https://doi.org/10.1016/j.cities.2019.102476>.
22. UNESCO, "List of World Heritage in Danger," 2023, 2023. .
23. UNESCO, "Site of Palmyra," 2017. <https://whc.unesco.org/en/list/23/> (accessed Apr. 08, 2023).
24. E. Orche, M. P. Amaré, M. P. Orche, L. Mansilla Plaza, J. M<sup>a</sup>, and M. Perelló, "Turismo en ciudades Patrimonio Mundial de la Unesco: Ciudad minera de Potosí y su Cerro Rico (Bolivia)," in *El patrimonio geológico y minero: Identidad y motor de desarrollo*, vol. 29, Potosí, Bolivia: Instituto Geológico y Minero de España, 2019, pp. 775–792.
25. UNESCO, "City of Potosí," 2023, 2023. <https://whc.unesco.org/en/list/420> (accessed Jun. 06, 2023).
26. M. A. de Newbil, "Patrimonio, territorio y memoria: análisis desde el Distrito Histórico de Panamá," *PatryTer Rev. Latinoam. e Caribenha Geogr. e Humanidades*, vol. 2, no. 3, pp. 37–48, 2019, doi: <https://doi.org/10.26512/patryter.v2i3.9313>.
27. UNESCO, "UNESCO Documents and Reports on 'Port, Fortresses and Group of Monuments, Cartagena,'" 2023, 2023. <https://whc.unesco.org/en/list/285/documents/> (accessed May 31, 2023).
28. ICOMOS, "Final ICOMOS Advisory mission report in Port, Fortresses and Group of Monuments, Cartagena (Colombia) from 12-15 December 2017," Cartagena de Indias, Colombia, 2017. [Online]. Available: <https://whc.unesco.org/document/168091>.
29. M. Saba, E. Quiñones-Bolaños, and F. Martínez-Batista, "Impact of environmental factors on the deterioration of the Wall of Cartagena de Indias (In press, Corrected Proof)," *J. Cult. Herit.*, 2019, doi: <https://doi.org/10.1016/j.culher.2019.03.001>.



30. M. Saba, J. Lizarazo-Marriaga, and E. Quiñones-Bolaños, "Overstress analysis of the Cartagena de Indias walls under different scenarios of masonry mechanical strength," *Case Stud. Constr. Mater.*, vol. 13, p. e00410, Dec. 2020, doi: 10.1016/J.CSCM.2020.E00410.
31. Culture Minister of Colombia, "Inter-administrative loan agreement between the Ministry of Culture of Colombia and the Workshop School of Cartagena de Indias," Cartagena de Indias, Colombia, 2012.
32. Escuela taller de Cartagena - Workshop School of Cartagena, "Escuela taller de Cartagena ETCAR - Workshop School of Cartagena," 2023. <https://escuelatallerctg.gov.co/> (accessed May 31, 2023).
33. IPCC – Instituto de Patrimonio y Cultura de Cartagena, "IPCC – Instituto de Patrimonio y Cultura de Cartagena," 2023, 2023. <https://ipcc.gov.co/> (accessed May 31, 2023).
34. Culture Ministry of Colombia, *Law 1185 of 2008 of Colombia - Legislation and general rules for the management, protection and safeguarding of cultural heritage in Colombia*. Colombia, 2008, pp. 1–81.
35. M. Saba, J. Lizarazo-Marriaga, N. Hernandez-Romero, and E. Quiñones-Bolaños, "Physico-mechanical characterization of the limestone used in Cartagena walls and a proposal for their restoration process.," *Constr. Build. Mater.*, vol. 214, pp. 420–429, 2019, doi: 10.1016/j.conbuildmat.2019.04.170.
36. E. E. Quiñones-Bolaños, M. Saba, and H. F. Martínez-Batista, *Effect of Environmental factors on the cartagena Walls Deterioration*. Madrid, Spain: Editorial Academica española, 2018.
37. M. Saba, N. Hernandez-Romero, E. Quiñones-Bolaños, and J. Lizarazo-Marriaga, "Petrographic of Limestone Cultural Heritage as the Basis of a Methodology to Rock Replacement and Masonry Assessment: Cartagena de Indias Case of Study," *Case Stud. Constr. Mater.*, 2019.
38. M. Saba, E. Quiñones-Bolaños, and F. Martínez-Batista, "Impact of environmental factors on the deterioration of the Wall of Cartagena de Indias (In press, Corrected Proof)," *J. Cult. Herit.*, 2019, doi: <https://doi.org/10.1016/j.culher.2019.03.001>.
39. L. K. Torres Gil, D. Valdelamar Martínez, and M. Saba, "The Widespread Use of Remote Sensing in Asbestos, Vegetation, Oil and Gas, and Geology Applications," *Atmosphere (Basel)*, vol. 14, no. 1, p. 172, 2023, doi: 10.3390/atmos14010172.
40. X. Han, X. Huang, H. Liang, S. Ma, and J. Gong, "Analysis of the relationships between environmental noise and urban morphology," *Environ. Pollut.*, vol. 233, pp. 755–763, 2018, doi: 10.1016/j.envpol.2017.10.126.
41. T. A. G. Smyth, R. Wilson, P. Rooney, and K. L. Yates, "Extent, accuracy and repeatability of bare sand and vegetation cover in dunes mapped from aerial imagery is highly variable," *Aeolian Res.*, vol. 56, p. 100799, 2022, doi: <https://doi.org/10.1016/j.aeolia.2022.100799>.
42. R. F. Kokaly, D. G. Despain, R. N. Clark, and K. E. Livo, "Mapping vegetation in Yellowstone National Park using spectral feature analysis of AVIRIS data," *Remote Sens. Environ.*, vol. 84, no. 3, pp. 437–456, 2003, doi: 10.1016/S0034-4257(02)00133-5.
43. L. D. Pedrali, N. Borges Júnior, R. S. Pereira, J. Tramontina, E. Alba, and J. Marchesan, "Multispectral remote sensing for determining dry severity levels of pointers in Eucalyptus spp.," *Sci. For.*, no. No.122, pp. 224–234, 2019.
44. M. Tommasini, A. Bacciotini, and M. Gherardelli, "A QGIS Tool for Automatically Identifying Asbestos Roofing," *ISPRS Int. J. Geo-Information* 2019, Vol. 8, Page 131, vol. 8, no. 3, p. 131, Mar. 2019, doi: 10.3390/IJGI8030131.
45. F. Frassy *et al.*, "Mapping asbestos-cement roofing with hyperspectral remote sensing over a large mountain region of the Italian western alps," *Sensors (Switzerland)*, vol. 14, no. 9, pp. 15900–15913, 2014, doi: 10.3390/s140915900.
46. F. Paglietti, S. Malinconico, B. C. della Staffa, S. Bellagamba, and P. De Simone, "Classification and management of asbestos-containing waste: European legislation and the Italian experience," *Waste Manag.*, vol. 50, pp. 130–150, Apr. 2016, doi: 10.1016/J.WASMAN.2016.02.014.
47. C. Lorenz *et al.*, "Remote sensing for risk mapping of Aedes aegypti infestations: Is this a practical task?," *Acta Trop.*, vol. 205, no. January, p. 105398, 2020, doi: 10.1016/j.actatropica.2020.105398.
48. L. Vinet and A. Zhedanov, "A 'missing' family of classical orthogonal polynomials," *El Univers.*, 2010, doi: 10.1088/1751-8113/44/8/085201.
49. G. Bonifazi, G. Capobianco, and S. Serranti, "Asbestos containing materials detection and classification by the use of hyperspectral imaging," *J. Hazard. Mater.*, 2018, doi: 10.1016/j.jhazmat.2017.11.056.
50. F. Frassy, G. Dalla Via, P. Maianti, A. Marchesi, F. R. Nodari, and M. Gianinetto, "Minimum noise fraction transform for improving the classification of airborne hyperspectral data: Two case studies," *Work. Hyperspectral Image Signal Process. Evol. Remote Sens.*, vol. 2013-June, no. June, 2013, doi: 10.1109/WHISPERS.2013.8080626.
51. Ministerio de Industria Comercio y Turismo de Colombia, "Informe mensual del turismo \_ Diciembre 2022 - Enero 2023," Bogota, Colombia, 2023. [Online]. Available: <https://www.mincit.gov.co/getattachment/estudios-economicos/estadisticas-e-informes/informes-de-turismo/2022/diciembre/oe-yv-turismo-diciembre-2-03-2023.pdf.aspx>.

52. D. M. O. of C. de Indias, "Special Management and Protection Plan for the historic center of Cartagena (PEMP CH, for its initials in Spanish)," Cartagena de Indias, Colombia, 2022. [Online]. Available: [https://pemp.cartagena.gov.co/index.php?option=com\\_content&view=article&layout=edit&id=147](https://pemp.cartagena.gov.co/index.php?option=com_content&view=article&layout=edit&id=147).
53. C. Shen and H. Chen, "Cultural Heritage Management in China: Current Practices and Problems," in *Cultural Heritage Management: A Global Perspective*, P. M. Messenger and G. S. Smith, Eds. University Press of Florida, 2010, pp. 70–81.
54. Ministerio de Cultura y Deporte de España, "Instituto del Patrimonio Cultural de España," 2023. <https://www.culturaydeporte.gob.es/cultura/patrimonio/informacion-general/gestion-en-el-ministerio/instituto-del-patrimonio-cultural-de-espana.html> (accessed Apr. 08, 2023).
55. Official Gazette of the Italian Republic, "Article 32: Superintendencies of Archaeology, fine arts and landscape," Roma, Italy, 2019. [Online]. Available: <https://www.gazzettaufficiale.it/eli/gu/2019/08/07/184/sg/pdf>.
56. UNESCO, "43COM 7B.99 - Port, Fortresses and Group of Monuments, Cartagena (Colombia) (C 285)," Bakú, Azerbaiyán, 2019. [Online]. Available: <https://whc.unesco.org/en/decisions/7551>.
57. UNESCO, "44COM 7B.167 - Port, Fortresses and Group of Monuments, Cartagena (Colombia) (C 285)," Paris, France, 2021. [Online]. Available: <https://whc.unesco.org/en/decisions/7883>.
58. Semana, "La triste historia del caballo que murió en una calle de Cartagena," 12-05-2015, Cartagena de Indias, Colombia, p. 1, May 12, 2015.
59. El Espectador, "Carruajes en Cartagena, cuestionados tras muerte de caballos," 10-09-2014, Cartagena de Indias, Colombia, p. 1, Sep. 10, 2014.
60. Opinión Caribe, "Se acerca demolición de la torre 'Aquarela' en Cartagena," 2020, Cartagena de Indias, Colombia, p. 1, 2020.
61. N. Sezavar, M. Pazhouhanfar, R. P. Van Dongen, and P. Grah, "The importance of designing the spatial distribution and density of vegetation in urban parks for increased experience of safety," *J. Clean. Prod.*, vol. 403, p. 136768, Jun. 2023, doi: 10.1016/J.JCLEPRO.2023.136768.
62. A. Diener and P. Mudu, "How can vegetation protect us from air pollution? A critical review on green spaces' mitigation abilities for air-borne particles from a public health perspective - with implications for urban planning," *Sci. Total Environ.*, vol. 796, p. 148605, Nov. 2021, doi: 10.1016/J.SCITOTENV.2021.148605.
63. W. Mueller, J. Milner, M. Loh, S. Vardoulakis, and P. Wilkinson, "Exposure to urban greenspace and pathways to respiratory health: An exploratory systematic review," *Sci. Total Environ.*, vol. 829, p. 154447, Jul. 2022, doi: 10.1016/J.SCITOTENV.2022.154447.
64. WHO, "Asbestos," Geneva, Switzerland, 2020. [Online]. Available: [https://www.who.int/ipcs/assessment/public\\_health/asbestos/en/](https://www.who.int/ipcs/assessment/public_health/asbestos/en/).
65. M. Peña-Castro, M. Montero-Acosta, and M. Saba, "A critical review of asbestos concentrations in water and air, according to exposure sources," *Heliyon*, vol. 9, no. 5, p. e15730, May 2023, doi: 10.1016/J.HELİYON.2023.E15730.
66. Corporación Turismo Cartagena de Indias, "Retos y Realidades: El sector turístico en Cartagena de Indias," Cartagena de Indias, Colombia, 2015. [Online]. Available: <https://observatorio.epacartagena.gov.co/wp-content/uploads/2016/06/sector-turistico-de-cartagena.pdf>.
67. MitCIT, "Boletín Mensual Turismo Febrero de 2023 - Ministerio de Comercio Industria y Turismo," Bogotá, 2023. [Online]. Available: <https://www.mincit.gov.co/getattachment/estudios-economicos/estadisticas-e-informes/informes-de-turismo/2023/febrero/oe-e-yv-turismo-febrero-24-04-2023.pdf.aspx>.
68. M. Saba, J. M. Lizarazo-Marriaga, and E. Quiñones-Bolaños, "Overstress analysis of the Cartagena de Indias walls under different scenarios of masonry mechanical strength," *Case Stud. Constr. Mater.*, vol. 13, p. e00410, 2020, doi: <https://doi.org/10.1016/j.cscm.2020.e00410>.
69. M. Saba, N. Hernandez-Romero, E. Quiñones-Bolaños, and J. Lizarazo-Marriaga, "Petrographic of Limestone Cultural Heritage as the Basis of a Methodology to Rock Replacement and Masonry Assessment: Cartagena de Indias Case of Study," *Case Stud. Constr. Mater.*, 2019, doi: <https://doi.org/10.1016/j.cscm.2019.e00281>.
70. T. (J. H. F. . Bloemers, H. Kars, A. van der Valk, and M. Wijnen, Eds., *The Cultural Landscape & Heritage Paradox*. Amsterdam University Press, 2010.
71. F. Farrelly, F. Kock, and A. Josiassen, "Cultural heritage authenticity: A producer view," *Ann. Tour. Res.*, vol. 79, p. 102770, 2019, doi: <https://doi.org/10.1016/j.annals.2019.102770>.
72. K. Leyendecker and P. Cox, "Cycle campaigning for a just city," *Transp. Res. Interdiscip. Perspect.*, vol. 15, p. 100678, Sep. 2022, doi: 10.1016/J.TRIP.2022.100678.
73. A. A. Kutty, T. G. Wakjira, M. Kucukvar, G. M. Abdella, and N. C. Onat, "Urban resilience and livability performance of European smart cities: A novel machine learning approach," *J. Clean. Prod.*, vol. 378, p. 134203, Dec. 2022, doi: 10.1016/J.JCLEPRO.2022.134203.
74. M. Dhingra, M. K. Singh, and S. Chattopadhyay, "Macro level characterization of Historic Urban Landscape: Case study of Alwar walled city," *City, Cult. Soc.*, vol. 9, pp. 39–53, Jun. 2017, doi: 10.1016/J.CCS.2016.10.001.

75. M. Sgura Viana and J. P. M. Delgado, "City Logistics in historic centers: Multi-Criteria Evaluation in GIS for city of Salvador (Bahia – Brazil)," *Case Stud. Transp. Policy*, vol. 7, no. 4, pp. 772–780, Dec. 2019, doi: 10.1016/j.cstp.2019.08.004.
76. B. A. Alimi, A. T. Oyeyinka, and L. O. Olohungbebe, "Socio-economic characteristics and willingness of consumers to pay for the safety of fura de nuni in Ilorin, Nigeria," *Qual. Assur. Saf. Crop. Foods*, vol. 8, no. 1, pp. 81–86, 2016, doi: 10.3920/QAS2014.0494.
77. Z. Liu, G. Zhang, and X. Zhang, "Urban street foods in Shijiazhuang city, China: Current status, safety practices and risk mitigating strategies," *Food Control*, vol. 41, pp. 212–218, 2014, doi: <https://doi.org/10.1016/j.foodcont.2014.01.027>.
78. I. Proietti, C. Frazzoli, and A. Mantovani, "Identification and management of toxicological hazards of street foods in developing countries," *Food Chem. Toxicol.*, vol. 63, pp. 143–152, Jan. 2014, doi: 10.1016/j.fct.2013.10.047.
79. N. Badrie, A. Gobin, S. Dookeran, and R. Duncan, "Consumer awareness and perception to food safety hazards in Trinidad, West Indies," *Food Control*, vol. 17, no. 5, pp. 370–377, 2006, doi: <https://doi.org/10.1016/j.foodcont.2005.01.003>.
80. Prague Morning, "As of January 2023, Prague Will Ban 'Cruel' Horse-Drawn Carriages," 20-12-2021, Prague, Czech Republic, p. 1, Dec. 20, 2021.
81. People for the Ethical Treatment of Animals (PETA), "Palma City Council Signs Off on Horse Carriage Ban, Will Replace Animals With Electric Vehicles," 2023. <https://www.peta.org/features/horse-drawn-carriage-bans/> (accessed Apr. 19, 2023).
82. The New York City Council, *Operation of horse drawn carriages and to replace the horse drawn carriage industry with a horseless electric carriage program*. United States of America, 2022, p. 1.
83. N. Rovella *et al.*, "The environmental impact of air pollution on the built heritage of historic Cairo (Egypt)," *Sci. Total Environ.*, vol. 764, p. 142905, 2021, doi: <https://doi.org/10.1016/j.scitotenv.2020.142905>.
84. M. L. S. Oliveira, A. Neckel, D. Pinto, L. S. Maculan, M. R. D. Zanchett, and L. F. O. Silva, "Air pollutants and their degradation of a historic building in the largest metropolitan area in Latin America," *Chemosphere*, vol. 277, p. 130286, 2021, doi: <https://doi.org/10.1016/j.chemosphere.2021.130286>.
85. A. Spagnuolo, C. Vetromile, A. Masiello, M. F. Alberghina, S. Schiavone, and C. Lubritto, "Climate and Cultural Heritage: The Case Study of 'Real Sito di Carditello,'" *Herit. 2019, Vol. 2, Pages 2053-2066*, vol. 2, no. 3, pp. 2053–2066, Jul. 2019, doi: 10.3390/HERITAGE2030124.
86. F. Vidal, R. Vicente, and J. Mendes Silva, "Review of environmental and air pollution impacts on built heritage: 10 questions on corrosion and soiling effects for urban intervention," *J. Cult. Herit.*, vol. 37, pp. 273–295, 2019, doi: <https://doi.org/10.1016/j.culher.2018.11.006>.
87. C. S. Rêgo and J. Almeida, "A framework to analyse conflicts between residents and tourists: The case of a historic neighbourhood in Lisbon, Portugal," *Land use policy*, vol. 114, p. 105938, 2022, doi: <https://doi.org/10.1016/j.landusepol.2021.105938>.
88. R. Fortich, "Parques urbanos y recreación: un inventario en Cartagena," Cartagena de Indias, Colombia, 2003. Accessed: May 06, 2023. [Online]. Available: [https://www.researchgate.net/publication/306013197\\_Parques\\_urbanos\\_y\\_recreacion\\_un\\_inventario\\_en\\_Cartagena](https://www.researchgate.net/publication/306013197_Parques_urbanos_y_recreacion_un_inventario_en_Cartagena).
89. R. Blanco-Bello and K. Victoria-Cogollo, "Los espacios públicos en sectores populares de Cartagena: lugares de encuentro y desencuentro," *Entramado*, vol. 9, no. 2, pp. 176–190, 2013.
90. L. P. Thives, E. Ghisi, J. J. Thives Júnior, and A. S. Vieira, "Is asbestos still a problem in the world? A current review," *J. Environ. Manage.*, vol. 319, p. 115716, Oct. 2022, doi: 10.1016/j.jenvman.2022.115716.
91. T. De Kock, J. Dewanckele, M. Boone, G. De Schutter, P. Jacobs, and V. Cnudde, "Replacement stones for Lede stone in Belgian historical monuments," *Geol. Soc. London, Spec. Publ.*, vol. 391, no. 1, pp. 31–46, 2014, doi: 10.1144/SP391.9.
92. T. De Kock *et al.*, "Replacement stones for Lede stone in Belgian historical monuments," *Geol. Soc. Lond. Spec. Publ.*, vol. 391, no. 2011, pp. 31–46, 2013, doi: 10.1144/SP391.9.
93. Caracol Cartagena, "Prostitución está alejando turismo familiar en centro de Cartagena," Cartagena de Indias, Colombia, p. 1, Sep. 07, 2022.
94. K. Fabbicatti, L. Boissenin, and M. Citoni, "Heritage Community Resilience: towards new approaches for urban resilience and sustainability," *City, Territ. Archit.*, vol. 7, no. 1, 2020, doi: 10.1186/s40410-020-00126-7.
95. A. Santangelo, E. Melandri, G. Marzani, S. Tondelli, and A. Ugolini, "Enhancing Resilience of Cultural Heritage in Historical Areas: A Collection of Good Practices," *Sustain.*, vol. 14, no. 9, 2022, doi: 10.3390/su14095171.

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