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Revitalizing Heritage: Challenges and Opportunities for Sustainable Urban Development in Old Cities

إحيـــاء التـــراث: التحديـــات والفـــرص للتطوير الحضري المستدام فـي المـــدن القديمـــة

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K E Y W O R D S

Heritage Preservation, Sustainable Urban Development, Old Cities, Adaptive Reuse, Urban Planning, Cultural Conservation, Policy Innovation.

A B S T R A C T

Old cities embody rich cultural and architectural heritage but face challenges in balancing preservation with sustainable urban development. This study examines common challenges and opportunities in achieving sustainability in historic cities through a comparative thematic analysis, synthesizing insights from global literature and expert interviews. A qualitative approach was employed, consisting of a systematic literature review and semi-structured interviews with several experts in urban planning, conservation, and policy. The findings identify four key challenges: restrictive preservation policies, financial constraints, social tensions from tourism-driven gentrification, and environmental vulnerabilities. However, opportunities include adaptive reuse of heritage buildings, community-led sustainability initiatives, and policy innovations that integrate modernization with conservation. The study emphasizes the need for flexible governance frameworks that align sustainability with the integrity of heritage. By offering a comprehensive comparative analysis, this research provides policymakers, urban planners, and conservationists with valuable insights for developing effective and sustainable revitalization strategies for historic urban environments worldwide.

الكلمات المفتاحية

الحفاظ على التراث، التطوير الحضري المستدام، المدن القديمة، إعادة الاستخدام التكيفي، التخطيط الحضري، الحفاظ الثقافي، الابتكار في السياسات الحضرية.

الملخص

تجسد المدن القديمة تراثاً ثقافياً ومعمارياً غنياً، لكنها تواجه تحديات في تحقيق التوازن بين الحفاظ على التراث والتطوير الحضري المستدام. تستكشف هذه الدراسة التحديات والفرص المشتركة لتحقيق الاستدامة في المدن القديمة من خلال تحليل موضوعي مقارن، يجمع بين رؤى الأدبيات العالمية ومقابلات الخبراء. تم اعتماد منهجية نوعية شملت مراجعة منهجية للأدبيات وإجراء مقابلات شبه منظمة مع عدة خبراء في التخطيط الحضري، والحفاظ على التراث، والسياسات. حددت النتائج أربع تحديات رئيسة: سياسات الحفاظ التقييدية، القيود المالية، التوترات الاجتماعية الناجمة عن التحول العمراني المدفوع بالسياحة، والهشاشة البيئية. ومع ذلك، تتوفر فرص مثل إعادة الاستخدام التكيفي للمباني التراثية، والمبادرات المجتمعية للاستدامة، وابتكارات السياسات الحضرية التي تدمج التحديث مع الحفاظ على التراث. تؤكد الدراسة على الحاجة إلى أطر حوكمة مرنة تتماشى مع متطلبات الاستدامة وسلامة التراث. ومن خلال تقديم تحليل مقارن واسع، توفر هذه الدراسة رؤى قيّمة لصانعي السياسات والمخططين الحضريين والمتخصصين في الحفاظ على التراث، لدعم تطوير استراتيجيات فعالة ومستدامة لإحياء البيئات الحضرية القديمة على مستوى العالم.

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1. Introduction

Old cities are not merely remnants of history; they are living legacies that encapsulate the social, cultural, and architectural heritage of past civilizations. Such cities represent physical manifestations of their distinctive collective memory and embody intergenerational continuity — core characteristics that foster a unique urban identity (Said et al., 2013; Kahachi, Ehsan, and Abreu, 2025). In the disciplines of architecture and urban planning, old cities are distinguished by three primary characteristics: historical significance, preservation of the urban fabric over extended periods, and continuity of collective memory across generations. These characteristics imbue old cities with irreplaceable cultural value, but they also present inherent challenges in aligning preservation efforts with future sustainable development goals (Alseragy, Elnokaly and Abul-Ela, 2018; Brebler, 2022; Mareeva et al., 2022; Hussaen A H Kahachi, Abreu and Ehsan, 2024).

Sustainable urban development emphasizes resilience, environmental stewardship, and social equity (Schraven, Joss, and de Jong, 2021; Qureshi, Alaloul, and Musarat, 2023; Hussaen, A.H. Kahachi, Abreu, and Ehsan, 2024). Although old cities often face challenges such as urban decay, deterioration of physical and visual characteristics, and encroachment upon old neighbourhoods by new development (Kahachi, 2017; Mareeva et al., 2022), sustainable urban development aims to address these challenges by rejuvenating neglected neighbourhoods and promoting urban cohesion (Chen et al., 2022). It involves integrating sustainable development principles, such as resource-saving urban development, mixed land use, sustainable transportation, high-density regeneration, and green design (Nik Hashim, Alias and Md. Dali, 2022). Incorporating these principles into urban development initiatives offers old cities the potential to rejuvenate as sustainable and vibrant communities, while addressing issues of urban decay and fulfilling global sustainability goals (Kahachi, Ali, and Al-Hinkawi, 2022; Stupar et al., 2023). However, this transformation requires a delicate balance to ensure that social sustainability, prioritizing the well-being and needs of local communities, is not overlooked (Ali et al., 2023; Kahachi, Ehsan, and Abreu, 2025). The application of such principles to old cities presents a paradox. Historic preservation efforts frequently resist the introduction of new technologies, retrofitting practices, and other sustainability measures that may compromise the architectural integrity and traditional characteristics of these areas (Lehmann, 2006; Schraven, Joss and de Jong, 2021). Thus, old cities must navigate complex interdependencies, preserving the historical continuity that defines their essence while adapting to sustainable urban practices. Based on this, there is a need for a collective effort to address the issue of revitalizing the heritage of old cities worldwide; however, there is a gap in the literature on the most common challenges and opportunities associated with this process.

This research explores the interplay of preservation and sustainability in revitalizing heritage within old cities worldwide. Instead of focusing on a single case study, this study identifies and analyses the most common challenges and opportunities in sustainable urban development across multiple historic cities. The comparative approach enables the identification of global trends, highlighting shared barriers and best practices in sustainable heritage revitalization. This allows the research to offer broader insights applicable to diverse urban contexts rather than location-specific solutions.

2. Research Methodology

This study systematically examines the recurrent challenges and opportunities in sustainable urban development within old cities. A qualitative mixed-methods approach was employed, combining a literature review and expert interviews for a comprehensive analysis.

The first phase involved a comprehensive review of academic literature highlighting cases from around the world to identify common challenges and opportunities for sustainable development in old cities. This review synthesized thematic patterns such as regulatory frameworks, financial challenges, and the preservation-modernization dichotomy across global contexts. By analyzing multiple international cases, this study identifies overarching trends that transcend local specificities, enabling a broader understanding of sustainable heritage management. The narrative method offered flexibility in exploring diverse sources and presenting a holistic understanding of the subject matter. It offered a foundation for understanding the theoretical and practical dimensions of sustainable urban development in heritage settings. However, this choice did not come without some limitations. The breadth of the review made it difficult to account for

every regional nuance, leading to potential oversights in less-documented contexts. Furthermore, its interpretative nature may introduce subjectivity. To address these limitations, the review prioritized peer-reviewed and high-impact publications and included a wide geographical scope to ensure the representation of global perspectives—additionally, validation of findings through expert interviews enhanced reliability.

In the second phase, semi-structured interviews were conducted with experts from multiple countries, including Italy, United Kingdom, Spain, Egypt, Morocco, Saudi Arabia, Iraq, China, India, Indonesia, United States, and Brazil. Their expertise included urban planning, architecture, policy-making, and building conservation. The interview process included a mix of virtual and in-person interactions over 3 months to accommodate the geographic diversity of the participants. These interviews served to corroborate the literature findings and gather practical, nuanced insights. This provided an opportunity to collect detailed and context-specific information that literature alone could not capture. The semi-structured format allowed for in-depth exploration of individual expertise while maintaining comparability across interviews. The sample size of 12 experts was chosen to ensure depth in responses while balancing feasibility constraints. Although this number might be considered insufficient by some researchers, the participants were selected based on their professional expertise and geographical diversity, ensuring a well-rounded perspective on global heritage preservation challenges. Furthermore, the expert selection criteria were defined as follows:

- A minimum of 10 years of professional experience in heritage conservation, urban planning, or sustainability.
- Representation across different global regions to capture diverse urban contexts.
- Balance across academia, policy-making, and private-sector practitioners.

A purposive sampling approach was used to ensure alignment with expertise. The interviews followed a structured guide with predefined questions, including: What are the primary sustainability challenges faced by old cities? How do policy and governance frameworks influence sustainable heritage management? What innovative strategies have been successful in balancing sustainability with historic preservation? Interview transcripts were analyzed using thematic analysis to maintain objectivity. Future research with larger samples could enhance validation and generalization. It is essential to note that the research adhered to rigorous ethical standards, including obtaining informed consent from participants, maintaining the confidentiality of responses, and ensuring transparency regarding the purpose of the study.

3. Challenges in Implementing Sustainable Urban Development in Literature

As previously outlined, the primary challenges associated with integrating sustainable practices in old cities reflect the intrinsic qualities of old cities, including conflicts between preservation and modernization, financial constraints, social and cultural tensions, and environmental vulnerabilities (The Getty Conservation Institute, 2010; Zhang and Liu, 2024). This paper examines these issues to illustrate the complexities of sustainable development in historical settings:

3.1. Preservation versus Modernisation

Preservation of the historic fabric and intergenerational memory is a fundamental aspect of cultural identity in old cities. Nevertheless, it directly conflicts with the need to incorporate sustainable technologies and infrastructures. Preservation policies in many old cities further complicate modernization efforts. Researchers (Khan and Guleria, 2024; Mason, 2024; Tavakoli and Tumer, 2024) argue that strict preservation laws aimed at protecting a city's identity, collective memory, and historical continuity can restrict visual and structural modifications needed for energy-saving updates, as well as architectural adaptations essential for climate resilience that would visually alter or physically impact the historic appearance. Historic buildings often feature materials, construction techniques, and designs that are energy-intensive and incompatible with modern energy-saving methods (The Getty Conservation Institute, 2010; Al-Saffar, 2024). Nevertheless, some old cities prohibit modern transportation integration, solar panel installations on the rooftops of heritage buildings, and even minor adjustments for energy efficiency, such as installing insulation or double-glazed windows, may be disallowed as they conflict with building's original design and materials, potentially compromising their urban and architectural integrity (Hmood, 2022; Moazzeni Khorasgani and Asadi Eskandar, 2024; Salah Et Al., 2024). Such restrictions hinder the

efforts of old cities to meet global sustainability goals, especially when regulatory frameworks are skewed towards preservation at the expense of sustainability.

Case studies highlight this tension. For example, regulations in some European cities delay or even prevent rooftop changes, hindering the adoption of renewable energy and the replacement of energy-inefficient windows (Siravo, 2011; StudySmarter, 2022; Salah et al., 2024). In contrast, cities like Belgrade, Mecca, and Konya have over-prioritized modernization, resulting in the loss of historical identity and community accessibility (Tim Hume and Samya Ayish, 2013; Yaldız, Aydın and Sıramkaya, 2014; Stupar et al., 2023). These examples illustrate the need for a flexible policy approach that strikes a balance between preservation and environmental sustainability.

To illustrate the research process, Figure (1), presents a flowchart outlining the methodological approach adopted in this study. The study follows a qualitative mixed-methods approach and is structured in two phases:

- Phase 1: A comprehensive literature review synthesizing thematic patterns from global case studies.
- Phase 2: Semi-structured interviews with experts from multiple disciplines and regions to validate and enrich the findings.

Additionally, ethical considerations such as informed consent and confidentiality were rigorously maintained. The workflow of this methodological framework is depicted in the diagram below.

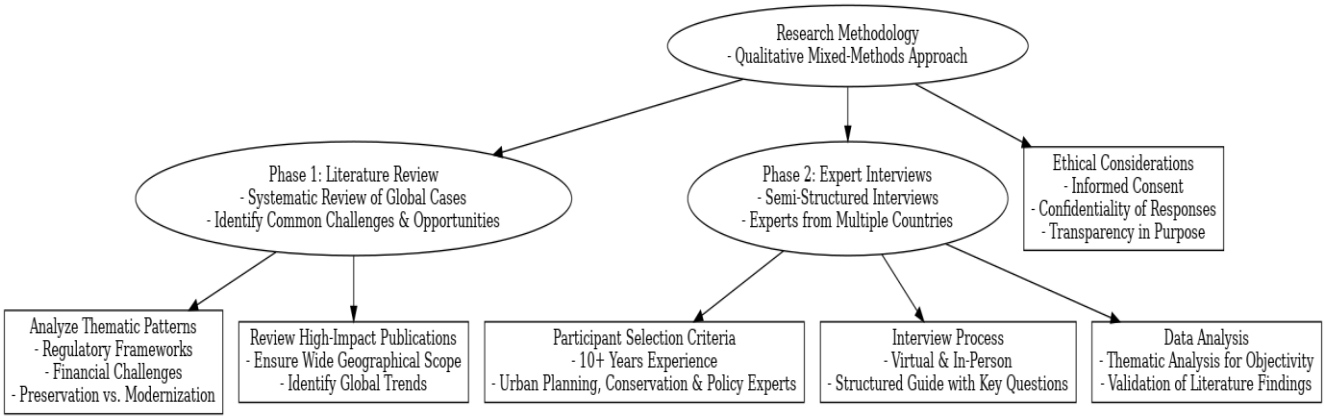

Figure 1: Research Methodological Approach Flowchart, (Source: Authors)

3.2. Economic Constraints and Funding Limitations

Retrofitting older buildings with sustainable technologies often incurs substantial costs due to the need for special techniques, skilled labour, and unique materials that align with heritage conservation standards. Researchers (Jagarajan et al., 2017; Khairi, Jaapar and Yahya, 2017) argue that such upgrades are frequently resource-intensive, requiring skilled labour that can significantly increase expenses. The resulting financial burden often limits sustainable retrofitting options for both public and private sectors, hindering the environmentally conscious preservation of historic areas. Moreover, funding sources specifically allocated for sustainable upgrades in old city cores are often limited and prone to subjectivity (Jagarajan et al., 2017; Jahed et al., 2020). Public funds may cover essential maintenance but rarely extend to comprehensive, sustainable retrofits (Jahed et al., 2020; DMA Group, 2023). Private investment in heritage sites is also constrained due to the low return on investment and high costs associated with sustainable retrofitting (Afiqah et al., 2018; DMA Group, 2023; Abdou, 2024). Furthermore, the absence of dedicated funding channels restricts the scope of sustainable projects in old cities (DMA Group, 2023; Selim, Abulnour and Eldeeb, 2023). Consequently, many buildings are maintained using traditional methods that do not prioritize environmental efficiency.

Current policy frameworks often fail to provide adequate incentives for sustainable upgrades in historic sites, placing older cities at a disadvantage in terms of environmental improvements. Although some programs offer incentives for sustainable renovations, these are typically targeted at newer developments (Afiqah et al., 2018; Jahed et al., 2020; DMA Group, 2023). Old cities require funding mechanisms that acknowledge the higher costs and specific challenges of sustainable retrofits in heritage sites. Solutions such as heritage-specific green grants or tax incentives could address this gap, but they

remain underutilized (Jahed et al., 2020; Abdou, 2024). Without targeted funding, the financial burden of sustainable retrofits in historic cities will continue to impede progress toward sustainability (DMA Group, 2023).

Additionally, many researchers highlight that community-engagement decision-making frameworks and tools could offer practical solutions to fund and direct the funding, overcoming some of these constraints (Jagarajan et al., 2017; Afiqah et al., 2018). By actively involving local stakeholders, these frameworks could facilitate the prioritization of sustainable projects, ensuring that financial resources are allocated effectively and in a way that aligns with both environmental goals and the cultural value of heritage sites. This collaborative approach could foster a more inclusive and adaptable policy environment, leading to a more sustainable future for older cities.

3.3. Social and Cultural Tensions

Incorporating sustainable urban development in old cities often engenders social and cultural tensions, particularly when tourism is a significant economic driver. The importance of collective memory and community dynamics can create conflicting demands on urban space and resources, with residents' needs frequently overshadowed by the requirements of visitors (García-Hernández, De la Calle-Vaquero and Yubero, 2017). This, cemented by the complexities derived from balancing environmental objectives with the preservation of community identity and residents' quality of life, makes implementing sustainable practices in such contexts very challenging (Staniscia, 2020; DMA Group, 2023). In many old cities, such as Rome, Barcelona, and Porto, preservation efforts can lead to the commodification of local culture, where urban planning increasingly favours tourist-oriented designs over authentic, community-centred spaces (Staniscia, 2020; Liberato, Nogueira and Liberato, 2022). This shift can disrupt the daily lives of residents, making it difficult to maintain a cohesive social fabric. For example, pedestrianization projects intended to reduce carbon emissions might limit residents' access to transportation options, especially in areas that lack alternative modes of travel.

The commodification of local culture for tourism can further erode the identity and authenticity of old cities. In some cases, historical landmarks and public spaces are altered to appeal more to visitors than to meet residents' needs (García-Hernández, De la Calle-Vaquero and Yubero, 2017). This practice can lead to the transformation of these cities into "heritage spectacles" rather than vibrant communities. Examples include Venice and Barcelona, where an influx of tourists has strained resources and disrupted local lifestyles (Liberato, Nogueira and Liberato, 2022). The challenge lies in creating urban plans that prioritize sustainability without undermining the social fabric or cultural identity of historic cities. Hence, researchers suggest that a holistic solution involving all stakeholders—residents, businesses, government, and tourists—is vital for successful sustainable tourism strategies (Jahed et al., 2020; Liberato, Nogueira and Liberato, 2022). Empowering local communities, enforcing zoning regulations, and promoting cultural education for visitors can balance tourism with preservation, ensuring economic benefits remain within the community while safeguarding cultural heritage.

3.4. Environmental Vulnerabilities and Climate Challenges

Environmental vulnerabilities constitute a significant challenge for historic cities seeking to implement sustainable urban development. Old cities were often designed in response to local climate and geography—for instance, with narrow streets to provide shade in hot climates or with dense layouts to protect against winds (Liu et al., 2023). However, these characteristics, which once contributed to resilience, now leave old cities particularly susceptible to modern environmental pressures, especially with climate change impacts (Yildirim, 2022; Raffa, 2023; Díaz, Zambrana-Vasquez and Bartolomé, 2024). Yildrim (Yildirim, 2022) adds that, in some cases, such as Sanliurfa in Turkey, these vulnerabilities are exacerbated by limited green infrastructure and antiquated drainage systems that may prove inadequate under extreme weather conditions, such as flooding or heatwaves.

The structural fragility of historical buildings complicates the implementation of sustainable technologies. Numerous edifices in historic cities cannot support renewable energy installations, such as rooftop solar panels or green roofs, due to their architectural limitations (Trovò, 2023; Salah et al., 2024). In addition, the organic street layouts and dense designs of many old cities restrict space for adding new sustainable infrastructures, such as large parks or green corridors (Yildirim, 2022; Raffa, 2023). As seen in

cities like Marrakesh or Venice, the constrained space in densely developed areas limits the ability to enhance climate resilience without risking damage to their historical character (Ben Salem et al., 2021; Karaseitanidis et al., 2022; Vitti, 2022). Moreover, long-term resilience planning is essential for historic cities, yet it often receives less priority compared to immediate preservation needs. For instance, a lack of proactive planning can leave historic cities exposed to flooding or erosion, potentially damaging irreplaceable heritage assets. Thus, researchers (Elyasi and Yamaçli, 2023; Takva, Takva and İlerisoy, 2023) argue that integrating resilience planning into preservation policies could enhance the long-term sustainability of old cities, enabling them to adapt more effectively to environmental changes without compromising their historical character.

The challenges in implementing sustainable urban development in historic cities highlight the inherent tensions between preservation and modernization. Financial and policy constraints, social and cultural tensions, and environmental vulnerabilities collectively create a complex landscape which requires careful navigation. Addressing these challenges is crucial to advancing sustainability in historic cities and urban cores. Despite this, in their literature review, Premaratna et al. (Premaratna et al., 2023) found that the intersection of sustainable cities and urban ageing remains underexplored, leading to a lack of comprehensive models that address both aspects. Hence, a nuanced approach that combines sustainable practices with cultural preservation is crucial for historic cities to evolve in harmony with modern sustainability demands. There is a need for a framework that promotes innovative solutions that respect both historical integrity and contemporary environmental priorities, laying the groundwork for exploring the potential opportunities that sustainable urban development holds for these unique urban areas.

4. Opportunities for Sustainable Urban Development

Despite the challenges previously discussed, old cities present a diverse array of possibilities for sustainable development that can align with their unique attributes. Their cultural assets, historical architecture, and strong community structures facilitate approaches that not only protect the urban fabric but also enhance the quality of life for residents. This paper examines four key opportunities: community engagement, cultural tourism, technological advancements, and innovative policy frameworks:

4.1. Enhanced Community Engagement and Social Cohesion

Old cities inherently foster a strong sense of community identity tied to their historical significance, and this social cohesion is a valuable asset in promoting sustainable practices. Cultural heritage within these cities can unite residents around shared values, empowering them to become stewards of their urban environment (Logan, 2020; Matthews et al., 2020). Research indicates that cities where local communities are deeply involved in preservation and sustainability efforts tend to achieve more enduring environmental and social impacts (Suzuki, 2022; Zain El Shandidy, 2023). For instance, in the historic Medina of Fez, community-driven projects such as traditional water management practices and eco-friendly lighting have reduced environmental impacts while reinforcing a sense of collective responsibility among residents (Boussaa and Madandola, 2024; Seve and Avilla-Royo, 2024). Furthermore, community engagement can be fostered through educational programs and government-sponsored workshops that equip residents with knowledge about sustainable practices (Tilbury and Wortman, 2008; Chen et al., 2022; Stupar et al., 2023). For instance, in old cities like Vitoria-Gasteiz and Cahors, the living labs, where co-creation processes and discussions with local stakeholders on energy-saving techniques tailored to historical buildings took place, have successfully involved residents in sustainable initiatives (Egusquiza et al., 2021). Such initiatives not only provide practical tools for addressing environmental challenges but also empower communities to take ownership of sustainability efforts. By creating platforms for shared learning and collaboration, such programs encourage residents to view sustainability as a collective responsibility rather than an external mandate (Tilbury and Wortman, 2008; Egusquiza et al., 2021; Lucchi, 2022; Deepak Kholiya, 2023). This approach aligns with the emphasis on community-oriented spaces, ensuring that sustainable practices not only advance environmental stewardship but also enhance social cohesion as residents collectively work toward goals that honour both cultural heritage and ecological responsibility.

4.2. Tourism and Economic Revitalization

Cultural and religious tourism presents a significant opportunity for economic growth in old cities, with the potential to direct revenue toward sustainable initiatives. As previously noted, old cities have a competitive advantage due to their rich heritage, attracting tourists who seek culturally immersive experiences (van der Borg, Costa and Gotti, 1996; García-Hernández, De la Calle-Vaquero and Yubero, 2017; Ali et al., 2023). In their paper, Sabloff and Smith (Smith, 2009) discuss the archaeology of old cities and their various characteristics, arguing that responsible tourism models can help generate funds necessary for preservation efforts and eco-friendly upgrades. For instance, old cities like Alexandria, Edinburgh, and Venice have reinvested some of the tourism revenue into conservation projects, such as rainwater harvesting and energy-efficient systems, directly supporting both sustainability and heritage (Edinburgh Tourism Action Group, 2012; Elsorady, 2017; Ursino and Pozzato, 2019). By channelling financial resources from tourism back into the community, the city ensures that cultural tourism supports both economic and environmental objectives. However, sustainable tourism hinges on policies that manage visitor numbers and encourage off-peak travel, thus reducing stress on historical sites. Kyoto's approach to controlling tourist influx highlights the importance of sustainable tourism practices (André Andonian et al., 2016). By instituting visitor limits and promoting off-peak travel, Kyoto mitigates the negative effects of tourism while preserving the cultural landscape. This sustainable model ensures that tourism remains beneficial for residents without impacting the cultural essence and the quality of life.

4.3. Technological Innovations and Adaptive Reuse

Technological innovations present novel opportunities for sustainable development in historic urban centres, particularly in the domains of energy efficiency and waste reduction. Recent advancements in environmentally conscious technology have rendered feasible the integration of eco-friendly solutions without compromising historical aesthetics and identity (Elsorady, 2017; Tsoumanis et al., 2021; Lucchi, 2023; Nursanty et al., 2024; Xu, 2024). This balance is vital, given that old cities' unique architectural identities often resist visual disruptions. For instance, a project in Santiago de Compostela has implemented solar technology by installing inconspicuous solar panels that harmonize with historic architecture, thereby reducing dependence on conventional energy sources(Lucchi et al., 2014). According to Lucchi et al. (Lucchi et al., 2014), the building stock has been classified into specific levels of constraint in order to define the compatible retrofit interventions for each level.

Furthermore, adaptive reuse of extant structures further enhances sustainability by extending the functional lifespan of existing buildings and mitigating the necessity for new construction. Repurposing historic sites for modern use not only preserves their architectural legacy but also supports environmental goals (Bullen and Love, 2011; Takva, Takva and İlerisoy, 2023). In London's historic Shoreditch and King's Cross districts, adaptive reuse has allowed for sustainable transformations of spaces, with old warehouses being repurposed into residential and commercial spaces, incorporating upgrades such as energy-efficient lighting and advanced insulation (AbdelShakour Ali, Hassan Elborombaly and Maarouf Ahmed, 2020; Coffman, 2022). By repurposing old buildings for contemporary uses, old urban cores can create functional spaces that serve modern needs while conserving resources. Adaptive reuse demonstrates the potential to integrate sustainable practices within the historical context, illustrating the harmonious coexistence of innovation and heritage.

4.4. Policy and Governance Innovations

Effective policy and governance structures are crucial for balancing the dual objectives of preservation and sustainability. Revitalization innovations and programs that protect historical integrity and support eco-friendly practices help ensure the longevity of old areas (Özaslan, 1995; Zagroba and Gawryluk, 2017; Farhan et al., 2021). Li-Cha (Li-cha, 2009) discussed the concept of architecture culture and proposed a theory for the reconstruction of old cities, suggesting that integrating policy frameworks aligned with preservation and sustainability objectives can help facilitate modernization while protecting historical assets through innovation. For example, Barcelona's policy framework, which protects historical sites while incentivizing sustainable upgrades, such as energy-efficient retrofits, through tax breaks and grants, demonstrates how policies can successfully balance heritage conservation with environmental needs (Martí-Costa and Miquel, 2012; Liberato, Nogueira and Liberato, 2022).

Public-private partnerships, while they can be limited in some aspects, can also support sustainable development by combining diverse resources for projects in historic towns (Abdou, 2024). Collaborative efforts between municipal authorities, private investors, and non-profit organizations have successfully funded sustainable projects in many historic towns where green retrofitting and waste management systems have been implemented (MacDonald, 2011; Sergi et al., 2019). These partnerships not only address funding limitations but also contribute specialized expertise to the projects, ensuring that the outcomes align with both preservation and sustainability objectives (MacDonald, 2011). Such models, combining public and private resources, underscore the importance of flexible yet comprehensive frameworks that advance sustainable development in old cities.

The opportunities for sustainable urban development in historical cities demonstrate that heritage preservation and sustainability can be effectively integrated. Sustainable tourism and heritage preservation contribute to economic growth while safeguarding the city's distinctive identity. Community-oriented initiatives enhance social cohesion, preserving the demographic and cultural diversity essential to the character of historical cities. Adaptive reuse presents an environmentally responsible alternative to new construction, extending the life cycle of historic structures. Concurrently, smart technologies enable modern efficiencies without compromising historical integrity. Collectively, these opportunities illustrate that sustainable urban development in historical cities is not only feasible but can establish a benchmark for other historical and modern cities alike. By exploring these opportunities, historical cities can offer sustainable living models that balance economic, social, and environmental needs while preserving the historical legacy for future generations. The examination of these initiatives serves as a valuable example for policymakers, urban planners, and preservationists aiming to create sustainable yet culturally vibrant urban spaces that respect the past while embracing the future.

5. Findings: Dynamics of Sustainable Development in Old Cities in Practice

The findings from the literature review revealed four main sustainability challenges: policy rigidity, economic constraints, social tensions, and environmental vulnerabilities. These themes were discussed with the experts, whose insights further contextualized the challenges and validated the broader patterns identified in the literature. The expert interviews provided invaluable perspectives on why sustainable urban development in old cities faces unique challenges and limited success. Experts emphasized that the challenges and opportunities of old cities are shaped by their distinctive features, such as dense urban layouts, historic preservation requirements, and socio-cultural significance, making generic sustainability solutions ineffective.

A recurring theme in the interviews was the tension between strict regulatory frameworks governing heritage preservation and the integration of modern sustainability measures. Experts widely agreed that while these regulations are essential for safeguarding historical authenticity, they often hinder the adoption of renewable energy systems and energy-efficient retrofits. For example, in cities like Jaipur in India, some preservation laws prohibit even minor modifications, such as installing low-profile solar panels or double-glazing windows. This conflict reflects a broader fear of compromising visual or structural integrity, yet it underscores the need for flexible policies that accommodate subtle and context-sensitive technological adaptations.

As for economic constraints, it emerged as another significant barrier. Retrofitting historic buildings with sustainable technologies requires specialized skills, unique materials, and substantial financial investment, which often exceeds the budgets of private property owners and municipal governments. The limited availability of targeted funding mechanisms exacerbates this issue. Cities like Istanbul struggle to implement large-scale sustainable retrofits due to these challenges. Experts proposed solutions such as tax incentives, subsidies for green retrofitting, and innovative financing models, where tourism revenue is reinvested into preservation and environmental upgrades.

Finally, the social and cultural tensions were also highlighted, particularly the imbalance between tourism-driven development and the needs of local communities. In many heritage-rich cities, such as Hoi An, the prioritization of tourism revenue has led to the displacement of residents and a loss of cultural authenticity. Experts emphasized that participatory planning processes, where community voices are actively involved in decision-making, can help mitigate these tensions. Reinvesting tourism revenues into

community services and infrastructure was recommended as a practical way to balance economic and social objectives.

Despite these challenges, experts agree that numerous opportunities exist to align heritage preservation with sustainable development. Community engagement emerged as a critical factor, with successful examples demonstrating that inclusive, locally driven initiatives foster a sense of ownership and long-term commitment. Projects in cities like Mexico City, where residents played a central role in waste management reforms, were noted as exemplary models. However, experts cautioned that such efforts often fail when benefits are not clearly communicated or when decision-making processes lack transparency. Additionally, technological advancements were recognized as key enablers of sustainable development in old cities. Experts cited adaptive reuse and context-sensitive innovations, such as low-profile solar panels and energy-efficient materials that mimic traditional aesthetics, as transformative solutions. In cities like Berlin, these technologies have been successfully integrated into historic structures without compromising their visual or cultural integrity. Finally, the interviews revealed that fragmented governance often undermines progress. In some cities like Baghdad, overlapping jurisdictions and conflicting priorities create inefficiencies and hinder collaboration. Experts advocated for multidisciplinary, cross-agency frameworks to align the diverse interests of stakeholders, emphasizing the importance of clear communication and unified mandates.

These findings demonstrate the need for systemic approaches that address the inherent tensions and capitalize on the unique opportunities presented by old cities. By fostering inclusive decision-making, leveraging technological advancements, and adopting innovative policies, old cities can navigate the complexities of sustainable development while preserving their historical and cultural legacies. This synthesis bridges the theoretical insights from the literature with practical strategies derived from expert perspectives, providing a pathway for old cities to evolve into sustainable and resilient urban environments. The interviews revealed that systemic tensions between competing priorities shape the dynamics of sustainable urban development in old cities. Preservation policies, while protecting cultural heritage, often obstruct modernization efforts. Similarly, unchecked tourism risks over-commercialization, which strains resources and local communities. Addressing these dynamics requires a delicate balance of stakeholder interests. Moreover, a critical conclusion from the interviews is the inadequacy of some current initiatives, which are largely reactive, fragmented, and centred around specialists. Policies are often designed to address immediate needs rather than promote long-term sustainability, resulting in short-lived outcomes. Experts consistently called for a dynamic, multidisciplinary, and cross-stakeholder decision-making framework to address these limitations. Such a framework would:

- Integrate Diverse Stakeholders: Bring together residents, local governments, private investors, conservationists, and environmentalists to co-create strategies.
- Focus on Long-Term Goals: Shift from short-term, piecemeal actions to comprehensive, resilience-focused planning.
- Adapt to Local Contexts in a Holistic Manner: Recognize the unique socio-cultural, economic, and environmental characteristics of each city and address them holistically.
- Encourage Innovation: Promote the adoption of technologies and practices that harmonize sustainability with heritage conservation.

In summary, the expert interviews highlighted that sustainable urban development in historic cities is a dynamic and multifaceted challenge. While opportunities abound, their potential remains underutilized due to fragmented governance, limited community involvement, and a narrow focus on preservation over sustainability. A holistic and inclusive approach is crucial for transforming traditional cities into vibrant, resilient urban spaces that respect their heritage while meeting contemporary sustainability objectives.

6. Conclusions

In conclusion, achieving sustainable urban development in old cities presents both unique challenges and valuable opportunities. Balancing historical preservation with sustainability demands a nuanced and multi-dimensional strategy. Through community engagement, responsible tourism, technological adaptation, adaptive reuse, and proactive policy, old cities can evolve sustainably while maintaining their cultural significance.

The findings from this study highlight key challenges and opportunities in implementing sustainable urban development in old cities. These insights are synthesized in Figure 2, which presents a comprehensive flowchart summarizing the research. The findings reveal four primary sustainability challenges: (1) restrictive preservation policies, (2) financial constraints, (3) social and cultural tensions, and (4) environmental vulnerabilities. Conversely, opportunities for sustainability arise through (1) community engagement, (2) cultural tourism, (3) technological innovation, and (4) policy adaptation. These interrelated factors shape the dynamics of sustainability in old cities. To provide a visual summary, Figure (2), maps the study's key elements, from research aims to identified challenges, opportunities, and resulting conclusions.

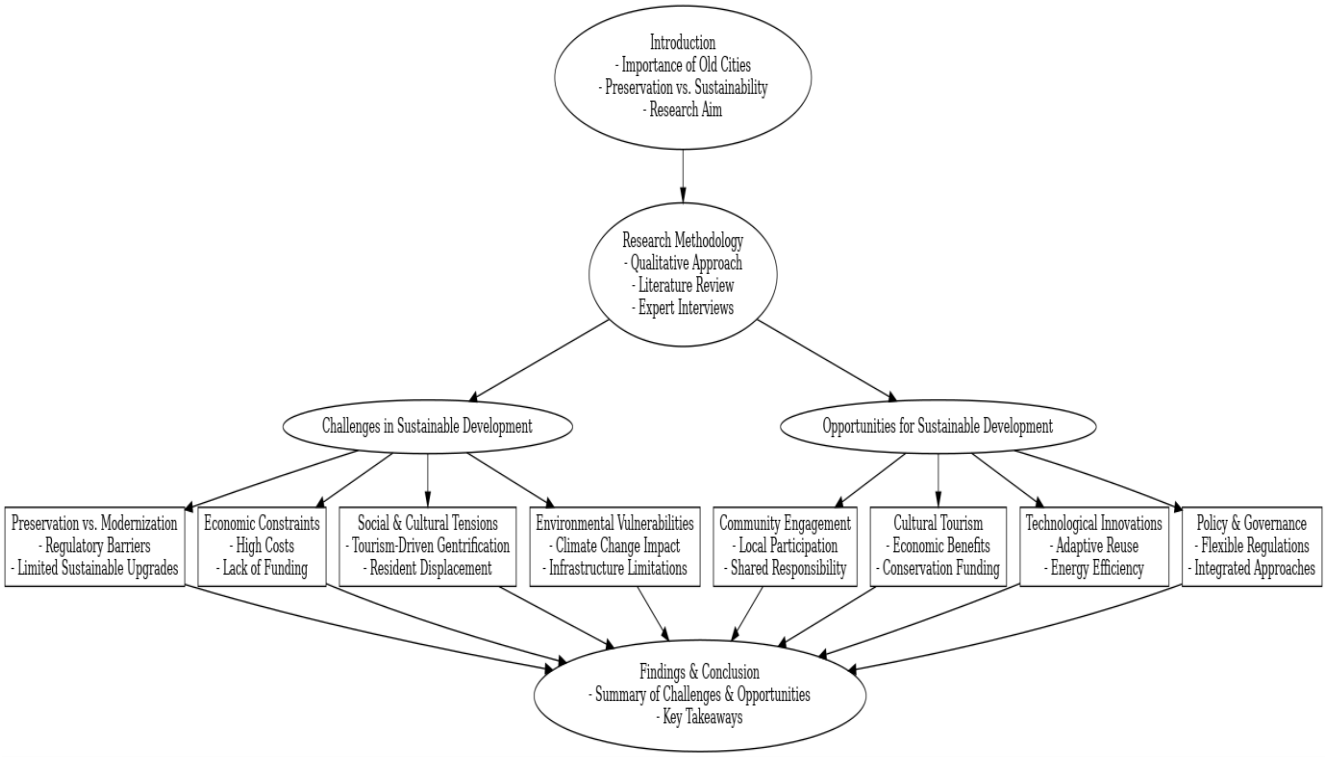

Figure 2: Research Flowchart, (Source: Authors)

The distinctive socio-cultural and architectural legacies of old cities complicate standard sustainability models, which often fail to accommodate their unique challenges. Additionally, while some practical guidelines exist for urban planners and policymakers, they frequently lack empirical support and detailed application, particularly in rapidly changing urban environments. Interdisciplinary practices and research, drawing on archaeology, urban studies, and environmental science, could bridge these gaps by providing holistic insights into sustainable practices for historic cities and urban cores. Interdisciplinary research, drawing on fields such as urban studies and environmental science, could bridge these gaps by offering actionable insights tailored to historical settings.

Such frameworks would enhance urban development by aligning environmental, social, and cultural priorities with the preservation of architectural heritage. Effective decision-making practices must prioritize both sustainability and cultural heritage, ensuring that upgrades enhance community well-being while preserving historical value. They aim not only to preserve the city's historical character but also to promote social interaction economic growth, and enhance public activities, all in an environmentally friendly manner. Future research should also expand on this study by conducting comparative quantitative analyses across old cities, integrating empirical data on sustainability performance indicators to enhance our understanding of the size of influence these frameworks have.

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