Case study

Assessing the sustainable development of the historic urban landscape through local indicators. Lessons from a Mexican World Heritage City

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ABSTRACT

This research tests the flexibility and transfer potential of a methodology that identifies common urban indicators and assesses their potential to monitor correlations between development factors and heritage conservation, using Querétaro city, Mexico, as the case study. This study aims to advance the implementation of Sustainable Development Goals on urban development (SDG11) and climate change (SDG13). These goals stress the importance of adequate operational tools to monitor progress and embody a juncture for coherence across distinct but intersecting strategic areas that explicitly consider natural and cultural heritage. The three steps of analysis consisted of: (a) Compilation of a list of commonly used local indicators for sustainable development; (b) Semi-automated search for indicators as factors affecting the conservation of a World Heritage City within urban management tools implemented at metropolitan, municipal, and district level; and, (c) Systematic classification of identified urban factors as strengths, weaknesses, opportunities, and threats (SWOT) to the conservation of a historic district listed as UNESCO World Heritage. The analysis proved relevant for the identification of 34 key development areas in which synergies with heritage conservation can be discussed as co-benefits and trade-offs. It also revealed incompatibilities on development visions across sectors and managerial levels. Conclusions elaborate on the potential of indicators to bridge ontological challenges for the correlation of urban heritage values with development factors. This methodology can advance the structuration of local adaptive governance, the refinement of urban indicators in support of evidence-based policy-making and systemic approaches for the sustainable development of urban heritage.

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Introduction

Sustainable Development Goal (SDG) 11 (on urban development) and SDG13 (on climate change) stress the importance of aligning development agendas and sustainability goals as well as adequate tools to monitor progress in the urban context. These SGDs also embody a juncture for coherence across distinct but intersecting strategic areas, a juncture that explicitly considers the sustainability of natural and cultural heritage. The recognition of the earth's biophysical boundaries is contributing to the understanding of sustainability as an absolute concept, whilst economic and social benefits are increasingly discusses as relative factors (for discussion see Mori [1]). Particularly in the light of climate change, environmental parameters are becoming fundamental criteria in which cities sustainability are critically discussed. According to Mori [1], the minimal requirement for city sustainability is that economic and social benefits need to be maximised in order to enhance living standard as far as the target city is sustainable in terms of environmental limitations and socio-economic equity. This implies that to steer sustainable development, governments must have the capacity to determine their required balance between economic and social development within the limits of environmental resources [2].

As sustainability "is moving from an abstract concept to a measurable state of dynamic human-ecological systems" [3]. Much effort is currently focusing on measuring progress on sustainable development based on the analysis of the impacts of interdependencies [4,5]. Commonly, assessments addressing causal relationships between goals and policies at the local/urban level are broadly explored though the use of indices and indicators. However, the fragmentation of the urban management practice across sectors and governance levels poses considerable challenges to monitoring and assessing progress in integral terms [6]. Similarly, multidimensional systemic heritage practices, and tools for the assessment of synergies across wider urban sectors are lacking [7,8].

Cultural heritage as a well-positioned urban development sector, has witnessed the inclusion of sustainability principles through a landscape approach that reinforce the idea of context-specificity of heritage conservation and resources management [9–11]. Yet the relationship between cultural heritage conservation and the environmental dimension of sustainability has been poorly addressed in the context of urban development [7,12]. The articulation between cultural heritage and climate change has often reduced environmental aspects to be considered as risks [13]. Recent research suggests that landscape-based conservation principles such as "the upscaling of conservation activities in its wider context, and partnerships among different sectoral and governance sectors, can benefit from additional exploration in the context of climate change solutions" [14]. However, the coordination and integration of all urban sectors into climate change strategic action has been recognized as a challenge to local governance practices [15,16].

To address this issue, this research reflects upon the governance structures and the appropriateness of tools designed to direct the course of action towards sustainable development in a coherent manner [6,17]. This includes all sectorial structures such as those tailored for the management of cultural heritage, to determine which aspects of local management practices are advancing or constraining the implementation and monitoring of sustainability goals [18]. Rather than contributing to the conceptualisation of sustainable development, this research uses as a basis the principle that a city, to be considered sustainable, should be able to define its own sustainability vision [2]. Such vision should be defined in policies, shared and operationalised across sectors to steer development actions through appropriate tools such as management plans, whilst progress and synergetic impacts should be monitored, using for instance urban indicators [19].

Research aims

This research aims to test the flexibility and transfer potential of a methodology designed by Guzman et al. [20], that explores frequently used urban indicators at a global level to identify and monitor systemic correlations between development factors and conservation in World Heritage Cities. The applicability of the methodology at a local level is tested using Querétaro city, Mexico as a case study. This is a medium-sized city where the implementation of SDG11 and SDG13 is foreseen in the local agenda. The efficient implementation of such goals must balance unplanned urban growth with the conservation of a World Heritage (WH) historic district. Additional challenges are related to weak governance structures in which accountability and policy assessments are not common practice; but also, to managerial limitations associated with cuts in local budgets and a lack of policy articulation.

Frequently used indicators at the local level are used to assess the coherent alignment of the city's sustainable development vision with heritage conservation under the lenses of the adaptive governance triad. This is composed by policies, management plans, and monitoring tools expected to facilitate managing systemic complexity towards sustainability [19,21,22]. Indicators as units of measure, provide incomplete descriptions of reality [23]. Yet, these carry meanings and values assigned to development visions across sectors with a contextual dimension. Therefore, indicators are useful references for the identification of perhaps overlooked factors but that create relevant dynamics across sectors [20].Results facilitate the systematic classification of factors having an impact on Queretaro's WH site, provide insights into governance coherence by localising managerial responsibilities and shed light on the extent a coherent sustainable development of the WH historic centre is operationalized across managerial levels and sectors. Lessons extracted from the methodology transferability can benefit wider WH sites in emerging urban context in different parts of the world by developing locally tailored assessment methods for the adaptive capacity of governance tools, the revision of their coherent alignment and the relevance of implemented monitoring systems.

Queretaro, Mexico: an emerging World Heritage City

The city of Queretaro is often ranked among the cities in Mexico with better economic and social development. However, its development model, which is driven by industrial competitiveness, has been criticised by academics and local practitioners for widening the gap of spatial segregation and insufficiently answering environmental concerns [24,25]. In Mexico, the concept of sustainability has been adopted in the political discourse for urban development as a result of national efforts to implement international commitments [26,27]. Although sustainability and sustainable development are included in the governance discourse in Mexican cities [26], in practice, environmental conservation and climate change actions are absent from the strategic planning in Mexico's emerging cities such as Queretaro [28].

The cultural and historic values of the old colonial town of Querétaro are based on the retention of the geometric street plan of the Spanish conquerors side by side with the twisting alleys of the Indian quarters [29]. The property has been inscribed on the WH List since 1996. A management plan was implemented a in 2012, together with a set of indicators to monitor the state of conservation of the property. However, local managers have been unable to solve public concerns over the heritage in the old town by drawing on the relevant development sectors and actors [30–32].

Methodology

Systemic and dynamic approaches to heritage conservation practices are scarce; and the existing few have mainly focused on heritage-led urban regeneration [7,33]. This research explores such approaches trough the lenses of governance adaptive capacity to unveil the sustainability and development values in which urban heritage is contextualized. By using common indicators across sectors, different value systems in a city are expected to be exposed as well as the interactions they create between cultural heritage management and wider sectors. This methodology analyses the state-of-the-practice whilst adapting the three stages methodological approach by Guzman et al. [20] to assess the alignment of operational governance tools in the case study. Stage 1. Identification of available governance tools implemented in the city of Queretaro. Stage 2. Identification of available monitoring tools and extraction of commonly used monitoring indicators across sectors interacting in the case study. Stage 3. Systematic identification and classification of synergies between urban development and climate action (led by frequently used indicators) as strengths, weaknesses, threats, and opportunities to the conservation of cultural heritage.

Identification of strategic governance tools implemented in the city of Queretaro

Four operational tools were identified representing Queretaro's urban development, urban management, cultural heritage management and cultural heritage development. The tools corresponding to three scales of urban management (metropolitan, municipal, district) are described in aims and contents in Table 1. No governance tool on climate action was available in the city of Queretaro by the time this research was carried out. However, references to SDGs and the Sendai Framework for Climate Action as well as aspects needed for their implementation are mentioned in governance tools at the metropolitan level (hereafter Q500).

Table 1
Local governance tools analysed.

Governance source		ABB	Aim	# Indicators
Metropolitan level	Territorialisation Strategy of the Urban Prosperity Index in Querétaro 2018–2031	Q500	To provide a roadmap for the implementation of sustainability principles through the SDGs of the 2030 Agenda.	87
Municipal level	Queretaro's Municipal Development Plan 2015–2018	QMDP	To achieve urban development through 5 guiding axes: Human City; Safe City; Compact City; City with Development; Government Openness.	None
WH Property level	Management plan for Queretaro's Historic Monument Zone and Traditional Neighbourhoods, 2011	MP	To identify the values and attributes that sustain the patrimonial site; recognition of the conservation status of these attributes and the variables involved in their dynamics.	20
	Urban development plan for Queretaro's Historic Monument Zone and Traditional Neighbourhoods 2007	DP	To define land uses, policies, and strategies to ensure the conservation of the urban structure.	None

At the municipal level, the city's development plan (hereafter QMDP) is included in this analysis, despite its expiration in 2018, because there is no other tool replacing the highest-level governmental tool for urban planning in which local efforts towards sustainable development are expressed. Additionally, the Q500 makes several references to the QMDP and its fulfilment. The Management Plan for the WH district (hereafter MP) and the development plan for Queretaro's Historic Monument Zone (hereafter DP) represent governance tools for the district level, covering a wide range of urban factors in relation to the conservation of World Heritage properties and their buffer zone. Neither of these have an expiration date nor provide indications of updates, revisions, and/or amendments since the time of their implementation.

From all identified tools, only the Q500 and the MP include a list of indicators; however, these have different purposes. The Q500 applies the standardized City Prosperity Index developed by UNHABITAT to assess how local policies affect the prosperity of the city. The MP proposes 20 indicators to monitor the state of conservation of the historic district, thus, it is the only monitoring tool tailored to the case study.

Compilation of a list of frequently used indicators in the city of Queretaro

The purpose of this stage is to reveal common urban phenomena being frequently monitored across sectors and local managerial levels. Considering that local governance tools do not match the requirement of providing monitoring tools, the methodology proceeded to select available monitoring frameworks applied to the case study following Guzman [20] based on Tanguay [34]. Instead, the requirements for selection are as follows: (1) indicators frameworks should be applied to the Mexican urban context that included the city of Queretaro; (2) frameworks should include a wide range of urban topics as possible, to ensure a better coverage of to the three classic components of sustainable development (social, economic and environmental). Resulting from a thorough online search, eight reports and assessment studies were selected (Table 2). Four national indicator frameworks were included, from these, three were ranking reports on urban competitivity elaborated by non-governmental institutions [35–37]; and one federal report on urban development [38]. Four indicator frameworks were found tailored for the case study. These included two assessment methodologies for urban management developed by UN agencies [39,40]; and the two governance frameworks for territorial planning and heritage conservation [41,42] identified in step 1. From these frameworks, a total of 435 indicators were gathered, from which indicators with the highest number of repetitions found across sources were extracted. Frequently used indicators were shortlisted through queries quantifying the frequency of keywords as well as their relationship to dimensions of sustainability, i.e. social, economic, and environmental remaining as faithful as possible to their rationale. The overlap between the dimensions of sustainability, was classified as follows: equitability (social and economic), viability (economic and environmental), liveability (social and environmental) and sustainability (overlapping of the three dimensions) [34].

Systematic identification and classification of synergies between urban factors and heritage conservation

Shortlisted indicators (Table 2) were refined into keywords related to local customary terms, for instance, *natural disaster* as was found as generic indicator, whereas at the local level, *floods* and *storms* are more likely to replace this indicator relating to the most common natural phenomena. This facilitates the directed content analysis and identification of urban factors referenced as having an impact on the cultural heritage within the 4 governance tools identified in stage 1 (table1). Mentions to keywords were gathered and coded in the software Access for their classification as factors affecting the conservation of cultural heritage following three post-coding dimensions by Guzman et al. [43]. **Dimension 1:** *Management situation analysis*: as external or internal to the management of the World Heritage property. **Dimension 2:** *Impact analysis:* as negative or positive (intended and unintended) causal effects of dynamics among sectors. **Dimension 3:** S*ustainability dimensions*; this second classification maintains dimensions defined in originals sources of frequently used indicators (stage 1), and adds dimensions if a factor is found complying with the sustainability dimensions proposed by UNESCO's cultural statistics [44]. A SWOT analysis of factors having an impact on the WH district results from a summative analysis of relationships between post-coding dimensions 1 and 2: Strengths are those urban factors having a positive impact and are competences of the heritage management. Weaknesses represent urban factors that have a negative impact on the conservation of World Heritage historic district, and are actions directly related to the heritage management. Opportunities represent urban factors that have a positive impact on the conservation of World Heritage property but of external competences to the heritage management. Threats are urban factors having a negative impact on the conservation of the historic district that are external competences to local heritage management. Considering that the coverage of sustainability dimensions is often neglected in indicator studies, dimension 3 fosters a systemic approach in which implications across the different dimensions are assessed but also expands the understanding of urban development values though a cultural dimension.

Table 2
Indicator frameworks applied to Queretaro city.

Types of sources		Aims and focus	Indicators
National level	1. Índice de Competitividad Urbana 2018 (IMCO, 2018)	It measures the competitiveness of cities, their ability to attract and retain talent and investments, which translates to greater productivity and well-being for their inhabitants.	120 indicators
	2. Mexico's States of Opportunity, 2012	Ranks Mexican states based on their urban competitiveness.	64 indicators
	3. Ciudades competitivas, ciudades cooperativas	Revises urban competitive indexes and elaborates a methodology for a competitive index for Mexican cities.	36 indicators
	4. National Urban System Catalogue 2012	A tool for planning, decision-making, and analysis of the urban dynamics in Mexico useful for the government, academia, and the private sector.	24 indicators
Local level	5. Observatorio Urbano Local Del Municipio De Querétaro (IMPLAN Querétaro, 2008)	A comprehensive analysis of public policies assessment to address urban poverty.	42 indicators
	6. GEO Zona Metropolitana Querétaro (Gobierno del Estado de Queretaro, 2008)	Analytical tool on urban factors and their effects on theenvironment, human health, and actions that must be developed to mitigate the consequences of human activities, based on pressure, state, impact, response (PSIR) and scenario analysis and proposals.	42 indicators
	7. Estrategia de Terriotorialización del Índice de Prosperidad Urbana en Querétaro, Q500 2018−2031	Locally adapts the City Prosperity Index developed by UNHABITAT and measures the extent in which policies affect the prosperity of the city, at the same time strengthening the monitoring and reporting capacities of the municipal entities.	87 indicators
	8. Management plan for Queretaro Historic Monument Zone, 2011	Establishes the degree of progress and/or setback in the areas of performance: economic, social, tourism, infrastructure, and provision of services	20 indicators

Results and discussion

Identification of strategic governance tools implemented in the city of Queretaro

Results from this stage highlight the consolidation of the heritage conservation as an urban sector supported by a strong governance structure in the case study. The historic district was found as the only urban scale complying with a triad of adaptive governance tools. These include a national cultural heritage policy and the management plan including a set of indicators. However, the lack of revisions within a specific time frame of wanted and unwanted results constrains the sector's adaptive capacities towards sustainable practices.

Within governance tools (shown in Table 1), the term *sustainability* and *sustainable development* was found used interchangeably as a balancing exercise of the three sustainability dimensions. The city's approach to sustainable development was found mentioning the regulation of activities with negative impact on the natural environment. These mainly focus on controlling urban growth and the preservation of natural resources that guarantee the harmonious development of people with their environment. However, such resources are not identified nor their limits. The lack of actions linked to accountable goals contributes to the lack of knowledge on the efficiency of policies and strategies to define and assess the sustainability of practices in the case study.

Compilation of a list of frequently used indicators in the city of Queretaro

The lack of monitoring tools tailored to the case study was resolved by including wider indicator frameworks, such as those used at national level. This decision proved pertinent for the identification of urban themes frequently monitored in the case study. A total of 36 indicators were found frequently used in a range from 4 to 3 times across the analysed frameworks (Table 3). The categorization of indicators across sustainability dimensions corresponded to the rationale reflected in their original sources. As such, most indicators rationales were found referencing social and economic development, mainly in their overlap, thus, representing the equitable dimension. Indicators categorized as covering the sustainable dimension were found mainly discussed as environ-

Table 3
List of frequently used local indicators.

Indicator	Dimension
1. Urban Size	Sustainable
2. Protected Areas	Environmental
3. % of Green Areas – Recreational Parks	Livable
4. No. of Public Libraries	Equitable
5. No. of Theatres and Music Halls	Equitable
6. Festivals and Religious Parties	Social
7. No. of Museums	Social
8. Road Network	Equitable
9. Population Density	Equitable
10. Literacy Rate	Equitable
11. Air Pollution	Livable
12. Accessibility (River Area)	Livable
13. Housing	Equitable
14. Deterioration phenomena (built environment)	Equitable
15. Marginalisation Rate (Low)	Equitable
16. Community Involvement in Decision-Making Processes	Social
17. % Population with Access to Healthcare	Equitable
18. Research and Development	Equitable
19. Financial Organisation	Economic
20. No. of Police	Equitable
21. Natural Risk	Sustainable
22. No. of Automobiles – Road Traffic	Sustainable
23. Crime Level (Robbery)	Equitable
24. New Constructions/% of New Buildings (On Virgin Land)	Equitable
24. No. of Schools	Equitable
26. No. of Markets	Equitable
27. Productive Sectors (agricultural, industrial and services)	Equitable
28. Recreational-Sport Areas	Equitable
29. Electricity (Light Infrastructure)	Equitable
30. Water Supply	Sustainable
31. Telephone (Access, Visual Disruption)	Equitable
32. Investment for Intervention	Equitable
33. Modes of Transport	Equitable
34. Access to Sewage System	Equitable
35. Population with University Degree	Equitable
36. No. of Hotels	Equitable

mental, economic, and social concerns. Environmental indicators and assessments are scarce in the monitoring tools applied to the Mexican urban contexts. This scenario confirms that economic growth and the city's competitiveness to attract global investment are leading themes for assessing development in the Mexican context. Themes on urban management efficiency, well-being, culture,
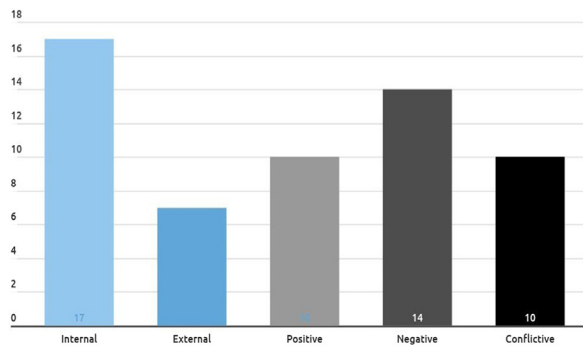
Fig. 1. Distribution of management situation analysis and impact analysis.

Fig. 2. SWOT analysis across governance levels.

Fig. 3. Coverage of sustainability dimensions in SWOT.

and environmental conservation are less represented in the assessment of social and environmental development in Mexican cities.

Shortlisted indicators represent frequently monitored factors having a strong influence in steering local development and policy-making. The role of external competitive rankings are particularly mentioned in QMDP [[45], p. 130]. In the case study economic parameters are predominant whereas environmental issues and other factors having an impact on climate change are largely disregarded.

Systematic identification and classification of synergies between urban factors and heritage conservation

A common trait among urban governance tools is that, rather than quantifiable short, medium, and long-term operational objectives, sections for strategies and objectives are mostly redacted in the form of recommendations to further develop sectorial strategies and respective monitoring tools. The governance tools analysed include a descriptive content about the requirements and limitations to adapt global concerns such as sustainability, climate change, and heritage conservation as a form of diagnostic discussion. Management plans tend to discuss development factors prioritised through time and what has been considered as positive and negative consequences of policies and strategies. This descriptive content was useful for the analysis of indicators as keywords that can be traced across several tools and sectors as well as for determining probable system-wide impacts and connections of different strategic priorities. Thus, the analysis of interactions among urban development factors was possible across three urban scales: metropolitan (conurbation area), municipality, and historic district; and among urban development and cultural heritage conservation as governance sectors.

The search for frequently used indicators as factors showing synergies with heritage conservation revealed that most interactions are discussed for having a detrimental impact on the conservation of the historic district, and as internal issues to the management of the WH property (Fig. 1). When analysing the coherent alignment of factors across governance tools, it was possible to identify a new category of 10 *conflictive* factors (28%) that did not comply with such a normative character. Such factors showed discrepancies in the categorisation according to the *Impact* analysis. Thus, documents showed incompatible descriptions of development interactions across management levels in texts sources. *Conflictive* factors indicate those sectors susceptible to the revision of trade-offs as well as coherent alignment of sustainability visions across managerial levels. These are further discussed in the next section. Results from the analysis of governance tools revealed that the highest number of factors are discussed at the district level, followed by the metropolitan level (Q500), and lastly at the municipal level (QMDP) (see Fig. 2).
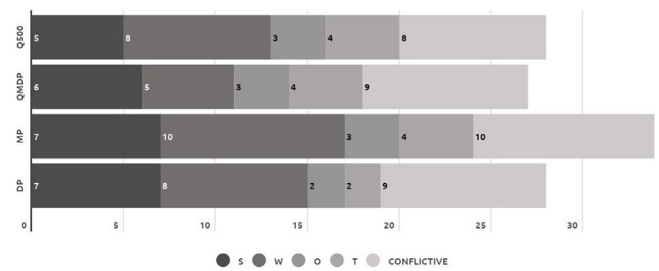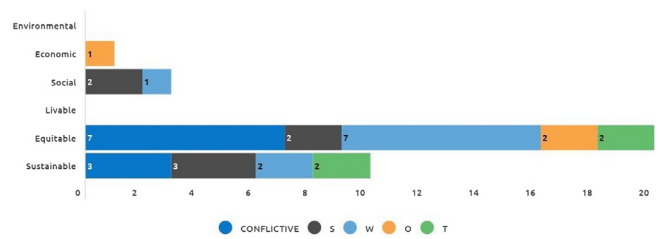
The analysis on the coverage of sustainability dimensions from development factors having an impact on the historic district showed that the equitable dimension is largely operationalised (see Fig. 3). Correspondences with the cultural heritage sector are made through access to education, health, marginalisation rates of inhabitants, and housing. The social dimension alone is often correlated with cultural heritage through themes on demography and life quality, which consider the consumption of cultural resources as well as social inclusion in public spaces within the heritage property. Urban development factors related to urban size, protected and green areas, as well as aspects related to the management of environmental resources are categorised as sustainable in Fig. 3 (see also Table 4). Environmental related indicators were found from the heritage sector discussing the city's efficiency and performance in terms of the resource management of water and waste. Aspects related to climate change and its impacts in the case study were focused on CO_2 emissions, air quality, and flooding as the main local issues and impacts. However, both environmental and climate change themes were not found referenced equally or in a coherent manner across urban governance tools.

The cultural heritage sector was found linking the environmental dimension with urban settings in which nature and heritage interact (riverbanks, gardens, and parks) and directing investment and actions of their maintenance and improvement. Climate action aspects were found relating conservation actions such as the creation of pedestrian areas, the introduction of bike lanes, and the limitation of traffic within the protected urban area with the mitigation of CO_2 emissions by limiting the transit of automobile and transportation systems. Air pollution was also found mentioned as detrimental to heritage's building materials. However, conflictive actions were found commonly prioritizing contradictory actions at higher urban levels. For instance, urban governance tools tend to perpetuate the widening and construction of roads peripheral to the historic district or within traditional neighbourhoods (buffer zone). From the cultural heritage sector, these same strategies are referenced as challenges for the accessibility and connection of the property with the rest of the city.

The SWOT analysis of factors having an impact on the WH district

The SWOT analysis revealed that *weaknesses* were discussed with the greatest frequency but unevenly across the tools. In contrast, *strengths*, *threats* and *opportunities* showed a relatively even

Table 4
SWOT analysis of frequently used indicators applied to Queretaro city.

	Indicators	Dimensions	Q500	QMDP	MP	DP	State of conservation indicators
Strengths	1. Urban Size	Sustainability	√	√	√	√	None
	2. Protected Areas	Sustainability	√	√	√	√	Catalogued historical monuments on total buildings
							Catalogued historical monuments on total historical buildings
	3. % of Green Areas-Recreational Parks	Sustainability	√	√	√	√	None
	4. No. of Public Libraries	Equitability	√	√	√	√	None
	5. No. of Theatres and Music Halls	Equitability	√	√	√	√	None
	6. Festivals and Religious Parties	Social	–	√	√	√	None
	7. No. of Museums	Social	–	–	√	√	None
Weaknesses	8. Road Network	Equitability	√	√	√	√	None
	9. Population Density	Equitability	√	√	√	√	% Population with disabilities
							Population by age group (% elder population, students)
							Population by gender
	10. Literacy Rate	Equitability	√	√	√	√	Literacy rate (low education level in historic neighbourhoods)
	11. Air Pollution	Sustainability	√	√	√	√	None
	12. Accessibility (River Area)	Sustainability	√	√	√	√	None
	13. Housing	Equitability	√	–	√	√	Properties with residential use on the total of buildings in the Historic Centre
							Properties catalogued with residential use on the total catalogued buildings in the Historic Centre
							Private owned catalogued properties
	14. Deterioration phenomena (built environment)	Equitability	√	–	√	√	% of deteriorated-ruinous buildings (20%)
							No. of catalogued historical monuments abandoned to total catalogued buildings Historical Centre
							No. of properties with visual disruptions on the total catalogued buildings in the Historic Centre
	15. Marginalisation Rate (Low)	Equitability	√	–	√	–	None
	16. Community Involvement in Decision-making Processes	Social	–	–	√	√	None
	17. % Population with Access to Healthcare	Equitability	–	–	√	–	None
OPP.	18. Research and Development	Equitability	√	√	√	√	None
	19. Financial Organisation	Economic	√	√	√	√	None
	20. No. of Police	Equitability	√	√	√	–	None
Threats	21. Natural Risk	Sustainability	√	√	√	√	None
	22. No. of Automobiles – Road Traffic	Sustainability	√	√	√	√	None
	23. Crime Level (Robbery)	Equitability	√	√	√	–	None
	24. New Constructions/% of New Buildings (On Virgin Land)	Equitability	√	√	√	–	None
Conflictive factors	25. No. of Schools	Equitability	√	√	X	X	None
	26. No. of Markets	Equitability	√	√	X	X	None
	27. Productive Sectors (agricultural, industrial and services)	Equitability	√	√	X	X	Distribution of productive activity according to the corresponding group in the tertiary sector, those properties with mixed use: commercial/housing and housing/services
							Distribution of the economically active and employed population according to the productive sectors by gender
							Historic monuments with tertiary uses
							Catalogued properties with tourist use on the total of catalogued buildings with tertiary use in the historic centre
							Properties with tertiary uses on the total of buildings in the historic centre
							Properties with touristic use on the total of buildings with tertiary use in the historical centre

Table 4 (*Continued*)

	Indicators	Dimensions	Q500	QMDP	MP	DP	State of conservation indicators
	28. Recreational-Sport Areas	Equitability	√	√	X	X	None
	29. Electricity (Light Infrastructure)	Sustainability	–	√	X	X	None
	30. Water Supply	Sustainability	√	√	X	–	Grade of water pressure
	31. Telephone (Access, Visual Disruption)	Equitability	–	√	X	X	None
	32. Investment for Intervention	Equitability	√	√	X	X	Catalogued historical monuments abandoned to total catalogued buildings historical centre
	33. Modes of Transport	Equitability	√	√	X	X	None
	34. Access to Sewage System	Sustainability	√	–	X	X	None
NI	35. Population with University Degree	Equitability	–	–	–	–	None
	36. No. of Hotels	Equitability	–	–	–	–	None
	None	Environmental	–	–	√	–	Wastewater treatment
	None	Environmental	–	–	√	–	Per capita generation of solid waste

distribution. Conflictive factors evidenced disagreement mainly in factors seen as *opportunities* at the metropolitan and municipal levels but seen as *threats* or *weaknesses* at the district level. For instance, the infrastructure sector is showcased as a *strength* for the urban development sector based on the full coverage of the services within the historic district. However, at the district level, failures, and damages due to aging infrastructure are indicated as priorities for renovations (*weaknesses*). Similarly, the diversity of (traditional) functions and mixed uses that the historic district offers is acknowledged as a *strength* from the urban development perspective (Q500 and QMDP). Yet, strategies and actions at those same levels were found prioritizing interventions that foster tourism development and thus, highly influencing the change of urban functions. The SWOT analysis explores the qualitative aspects of the cultural dimension that is often underexplored in monitoring practices from the urban development discipline.

The identification of twenty indicators forming the cultural heritage sector corresponding to wider development factors suggests prospects for the sector to provide feedback on wider governance and sectorial structures towards coherent policies. Identified urban themes predominantly focus on the social and economic dimensions, whereas factors covering the sustainable dimension were found to have less frequent correlation with indicators from the heritage sector. Additionally, synergies between heritage and environmental conservation were found absent in available monitoring systems. Table 4 shows the list of frequently used indicators, their categorisation as SWOT and their localization across governance tools. The last column shows current indicators for the state of conservation of the property that can be correlated with identified development sectors. This comparison not only helps in the visualisation of cultural values across urban sectors and sustainability dimensions, but also shows how urban sectors exemplify different values of an urban, cultural, and historic nature across the different urban scales.

As shown in Table 4, factors classified as SWOT identify areas in which local governance can not only re-assess its goals for sustainability but also improve its managerial efficiency. In Queretaro city, aspects related to changes in land use and traditional functions were identified as critical areas for strategic planning. As part of the historic and cultural values, a multi-functional historic district is valued across urban governance levels. However, the maintenance of such character is challenged by the lack of coherent development between the historic core and the rest of the city. Across governance tools it is acknowledged that an unplanned urban sprawl and the lack of efficient transport systems has led the historic centre to concentrate most of the urban equipment in the city (seen as strengths). This, however, remains highly insufficient to satisfy contemporary requirements of a metropolitan city (seen as weaknesses). Consequently, a vicious cycle has led to different functions abandoning the historic quarter (seen as threats). New uses for historic buildings, however, prioritise touristic activities rather than balancing urban equipment and services for the local population (conflictive factors) ore renew existing ones (weaknesses).

Conclusions

This paper used an innovative methodology for the systemic analysis of synergies of urban factors and heritage conservation in the World Heritage City of Queretaro, Mexico to contribute theoretically to the prospects of landscape-based conservation to link results-based management within cities as complex systems. By using governance as analytical lens and coherency as the normative character this research assessed local conceptualisations for sustainable development, climate action, and heritage conservation in their alignment across operational and monitoring tools. The methodology proved transfer value by providing relevant insights on local governance capacities to (1) align a common vision for sustainable development, and (2) to coherently integrate heritage conservation, across levels and sectors. The analytical framework proved useful for the identification of balances and imbalances in strategic actions in cities, and thus in the urban system. In this wat, frequently used indicators among different sectors applied to a specific urban context have proven beneficial for deepening the understanding of (and evidence) urban values systems in which heritage conservation is embedded but also plays an active role.

Lessons from the Mexican case study suggest that the sustainable development of the Word Heritage city is challenged with an ad hoc prioritisation of development factors that lead to a bias in the operationalisation of strategies towards the interests of policymakers on the city's economic competitiveness. Frequently used indicators tailored to the assessment of the case study's development proved relevant for the analysis of urban factors affecting the conservation of a World Heritage property. A total of 36 factors were identified having synergic correspondences as SWOT to the management of the WH district from which 10 factors showed incompatibilities and contradictions across sectors and managerial levels. The analysis of indicators unveiled considerable limitations on the conceptualization of environmental sustainability, but also on the operationalization of climate actions. Although governance tools for heritage management tend to make stronger connections between environmental, social, and economic dimension in strategic planning, considerable challenges to implement efficient actions remain the lack of a shared strategic vision accompanied by quantitative targets.

The proposed methodological framework can guide the readjustment of local actions and thus, contribute to an adaptive (systemic) governance structure in practice, including the refinement of urban indicators to enhance feedback in support of evidence-based policy-making [46]. More research should explore the potential transfer of this methodological approach to current state-of-the-practice across different urban contexts for comparative purposes. Insights form different urban contexts on what is to be developed and what is to be conserved with a systemic and transdisciplinary perspectives could expand the logical structures of current conceptualisations. Thus, this methodology could contribute to balancing ambiguous and standardised conceptualisations of sustainability that are globally accepted with those tailored to the specificities of local contexts through empirical knowledge.

Aknowledgements

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