# A Literature Review of the Urban Heat Island (UHI) Phenomenon Connected with Smart Cities Paradigm

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**Abstract.** The article aims to analyse the approach used to evaluate Urban Heat Island (UHI) to determine the most suitable parameters based on the urban features of every city. The authors want to investigate the current state of knowledge on the role of Urban Heat Island (UHI) and its associated characteristics in the field of Urban Planning and Smart Cities. This exploration will begin by discussing the concepts of UHI, Smart City, and City Dashboard. They systematise the methodology, classifications, issues, and solutions found in recent scientific studies. This literature review proposes a systematic approach, analysing the best-known databases in the field of scientific research (Google Scholar, Scopus and Science Direct) in order to catalogue and systematise the most consonant approach according to certain characteristics in the study of UHIs. This paper represents a first phase of a broader research and provides a literature base to better understand how to deal with urban heat islands, following an urban planning vision dependent on the concept of Smart Cities. This analysis led to the definition of a set of indicators useful for studying this issue from an urban planning perspective and possible new studies on the interconnection between City Dashboard, Smart Cities and UHI.

**Keywords:** Urban Heat Island · Smart Cities · Urban Planning · Systematic Literature Review · Sustainability · City Dashboard · Indicators

## 1 Introduction

Global warming is one of the most important challenges of our time, affecting the daily lives of individuals and populations around the world. The rapid increase in the planet's average temperatures, resulting from human activities, has led to a series of environmental, social, and economic consequences that manifest themselves in various ways in everyday life.

The study of global warming and its impacts therefore becomes particularly important. Understanding the reasons for climate change, monitoring its consequences, and finding ways to mitigate and adapt have become mandatory goals for a good quality of life and to ensure a sustainable future for the next generations. Through data analysis,

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climate modelling, impact assessment and the development of innovative solutions [1, 2], an understanding of global warming can be provided, and action can be directed towards policies and practices to address it.

One of the key elements of global warming that can be addressed through the concepts of Smart Cities is the analysis of Urban Heat Islands (UHI) effects.

UHIs are a distinctive feature of urban areas, manifesting themselves with significantly higher local temperatures than surrounding areas [3]. As a result, cities are often revealed as heat oases, where temperatures can reach significantly higher values than in the surrounding rural areas.

Increasing urbanisation and the rapid expansion of metropolitan areas are redefining the structure of our planet. The transformation of rural areas into urban settings has led to UHI being seen as one of the most relevant and debated phenomena in climate and environment.

Human activities play a significant role in accentuating the phenomenon of urban heat islands [4]. Heat emissions from vehicles, heating systems, air conditioning and industries further amplify local warming [5]. Removal of vegetation and replacement of permeable soils with impermeable surfaces contribute to exacerbating this effect [6].

Urban heat islands have significant impacts on urban life and the sustainability of cities. Rising local temperatures can lead to increased energy demand for cooling buildings, leading to rising energy costs and increased greenhouse gas emissions [7]. In addition, high temperatures put human health at risk, causing heat stress and increasing susceptibility to heat-related diseases [8].

In the context of an increasingly urbanised world, cities represent not only epicentres of economic and social activity, but also sites of complex environmental challenges. The evolving concept Smart Cities offers unprecedented opportunities to address the challenges of urbanisation in innovative and efficient ways.

To address this issue, the tools under the Smart City paradigm [9] can provide an innovative approach to urban design and management. Smart Cities combine advanced technologies with urban data and smart governance models to improve efficiency, sustainability, and quality of life for citizens. For example, to tackle this problem effectively, more and more cities can adopt innovative tools such as City Dashboards like London [10] and Florence [11].

City Dashboards [12–15] are digital platforms that collect, analyse and display data from a variety of sources, including environmental sensors, weather stations, satellite imagery, and socioeconomic data. City Dashboards are very articulate systems that provide comprehensive and up-to-date data/information on weather conditions, pollution, metro lines, the latest news. City dashboards are specifically developed to generate responsibility of public institutions towards the population [16, 17]. In addition, these tools offer an integrated, data-driven approach to monitoring and managing UHI. These platforms provide municipal administrators and stakeholders a real-time overview of environmental conditions and climate trends. This allows them to make well-informed choices and implement targeted actions to mitigate UHI.

City Dashboards are powerful tools for gathering, analysing and visualising a wide range of urban indicators [18], including those related to Urban Heat Islands (UHI). Indicators are quantitative or qualitative measures that are used to assess the condition

and progress of a city in several domains, including but not limited to the environment, economy, mobility, and health. When addressing UHIs, several indicators may be used, such as surface temperatures, relative humidity, vegetation cover, energy consumption, air quality and other factors.

The connection between indicators and City Dashboards is important for effectively understanding and managing UHIs. City Dashboards serve as centralised platforms that gather, merge, and present relevant indicators in a concise and simple-to-read way. These platforms enable citizens, urban administrators, planners, researchers, and stakeholders to monitor in real time every change related to a city and understand the level of dangerous for specific domains.

Starting from these assumptions, the main goal of this paper is to examine the scientific literature to identify approaches and methodologies for studying urban heat islands. The authors recognise the existence of previous research studies on the UHI subject [19–22]. However, this study distinguishes itself from the others by integrating previously unexplored concepts such as urban heat islands, smart cities, and city dashboards. The authors also aim to exploit concepts and indicators available in the context of Smart Cities and develop analytical strategies to address current urban planning challenges. For obtain these main goals, the paper is organised as follows: after the introduction, the second paragraph analyse concepts and methods under the main fields of smart city, UHI, and city dashboards. The third paragraph introduces the used methodology for the scientific review. Finally, the results are presented before underlining final considerations and conclusions.

## 2 Concepts and Methods

In today's world, cities have significant issues that are also a result of fast and unregulated urbanisation. Among these factors, UHI emerges as particularly significant, because it has direct impacts on the well-being of inhabitants and the effectiveness of urban infrastructure. However, the Smart City paradigm with its tools and its potentiality on analysing data provide opportunities to address these challenges. This paragraph analyses the concepts associated with Urban Heat Island (UHI) and Smart City, emphasising the key elements of intersections and synergies between them.

### 2.1 Urban Heat Island: Definitions and Impact

Urban Heat Island (UHI) is a thermal phenomenon characterised by elevated temperatures seen in cities compared to the surrounding rural or suburban regions. This phenomenon is the result of a complex interaction between various factors, such as heat absorption by urban materials, heat emission from anthropogenic activities, and significant alteration of soil characteristics [8] which leads to extra heating. UHI has many adverse consequences, such as increased energy demand for cooling buildings, degradation of air quality, and thermal stress.

The origins of urban heat islands can be traced to the configuration and land use of urban areas. Urban surfaces, such as buildings and roads, have a higher capacity to absorb and retain heat compared to rural areas [23]. This heat storage effect is particularly

pronounced during clear nights, when urban surfaces gradually release heat accumulated during the day.

### 2.2 Smart City and City Dashboard: Concept and Applications.

Defining a smart city can be hard due to its multifaceted nature. However, its association with a city dashboard, which will be explained later, has prompted the authors to define a smart city as a place that takes advantage of technology to improve the quality of life, the liveability, and environmental sustainability of the city [9, 24–27]. Smart cities use data from a variety of sources, such as IoT (Internet of Things) sensors, mobile devices, and monitoring systems, to optimize urban services, mobility, energy and more. Within the framework of Urban Heat Island (UHI), the principles of Smart City may be applied to identify and develop new environmentally friendly spaces, including green and white roofs, investigate the utilisation of innovative urban materials, and provide efficient and low-pollution public transportation options. These initiatives not only reduce the heat island impact but also enhance urban resilience and quality of life.

The intersection of Urban Heat Island and Smart City offers fertile ground for interdisciplinary innovation and research. The challenges related to UHI require an integrated approach that combines smart technology with sustainable urban design and whole-population engagement. Exploring these connections between the various concepts is critical to the development of resilient, sustainable, and inclusive cities. A tool that can be used to address UHI according to Smart City paradigm is the City Dashboard.

The City Dashboard is a comprehensive system that monitors and visualises data, offering a real-time summary of several metrics and indicators that impact a city. The indicators may include demographics, traffic, air quality, energy consumption, traffic accidents, crime rates, waste collection, noise levels and other metrics that reflect the functioning and quality of life in an urban community.

The main objective of a city dashboard is to provide policy makers, urban planners, local administrators, and citizens with a tool to better understand the dynamics and challenges of urban life. These systems enable them to make more informed decisions, to identify critical areas requiring action and to evaluate the effectiveness of public policies implemented.

City dashboards may have a substantial effect on urban living. Below are listed some of the most significant impacts:

1) Optimised urban planning: Improved availability of urban data empowers urban planners to make well-informed choices on urban development, transport management, green space distribution and other related aspects. For example, politicians may use this approach to determine the sites of new green zones.
2) Greater transparency and citizen involvement: City dashboards provide more openness and public engagement by providing people with access to data about their city, fostering transparency and encouraging active participation in urban life. This may result in an enhanced feeling of civic responsibility and increased engagement in the development of local policy. For instance, it might be used to apprise senior citizens of the hottest parts of the city at a certain time of the day.

3) Reducing emergency response times: City dashboards facilitate expedited and efficient emergency response by continuously monitoring data related to public safety, the environment, and urban services. This enables prompt action in circumstances such as traffic accidents, floods, or other natural disasters. For example, it might be advantageous in determining the most efficient routes inside a city by using data on accidents, temporary road closures, and several other pieces of information.
4) Optimisation of resources: Through the analysis of data gathered by city dashboards, local authorities may discover inefficiencies and bottlenecks in public services, allowing for improved allocation of resources and more effective city administration.
5) Improved quality of life: City dashboards can enhance the quality of life for urban people by using data to tackle issues like pollution, traffic congestion, and crime. This contributes to creating more liveable and sustainable cities. Politicians may use it as a tool to determine whether or not to implement traffic restrictions in certain regions based on air pollution levels.

The indicators used in the development of City Dashboard are very significant in tackling the issue of Urban Heat Island (UHI), particularly with regards to the first and final points on the list. City dashboards are a helpful tool for contemporary urban administration, offering a concise and comprehensive summary of urban life and facilitating improved planning, resource allocation, and citizen engagement.

## 3 Methodology

This paper examines the latest studies on urban heat islands (UHI) over the last few years, to identify the key components that are considered relevant for the functional analysis of UHI for urban planning. The research is structured into five distinct steps:

1) Investigating scientific articles that are relevant to the analysis;
2) Skimming the scientific and relevant papers by considering their abstracts;
3) Developing a clear table summarising the collected results;
4) Conducting a comparative analysis of the articles selected in step 2;
5) Identifying the most significant indicators related to urban morphology that are important for evaluating the urban heat island effect.

The selection of relevant publications was based on three criteria: the degree to which the issue aligns with an urban planning goal, publishing in open access journals, publication period. The 'Google Scholar,' 'Scopus,' and 'Science Direct' platforms were chosen due to their open access nature and their effectiveness in research findings.

Articles were retrieved from Google Scholar, Scopus, and Science Direct databases through a query containing the terms 'urban heat island,' 'urban planning' from 2020 to 2023. Due to the vast number of papers, over 56,000, it is unfeasible to examine such a substantial quantity of publications. Therefore, it was determined to further simplify the search by merely concentrating on the titles of the different publications. As a result, a total of 201 scientific publications were identified across all three search engines, and none of the duplicate papers have been eliminated from any of the search engines. The authors attempted to enhance the relevance of the text by using the phrases "Smart City" and "City Dashboard". However, their study had no results.

Therefore, the authors decided to modify the search criteria to make it more recent and targeted towards identifying interesting indicators used in city dashboards. The aim is to obtain a larger number of search results by using fewer keywords in search engines. Additionally, considering the abundance of scientific articles that discuss the use of indicators in city dashboards [13, 18, 28] it would be more effective to replace the newly added words with the single term "Indicator".

Furthermore, to align with the original objective and ensure relevance, the time frame for the search will be limited to the period from 2022 to 2023. As a result, a total of 73 articles will be included in the search.

Afterwards, by analysing the abstracts of the downloading papers, a comprehensive assessment of the articles is conducted, revealing the key components of the study.

## 4 Results

The results of the first step concerning the search and the various modifications in the search to arrive at a reasonable number of articles that could be analysed manually are shown in Table 1.

**Table 1.** Summary table of the results obtained by searching the various search engines.

| | First Attempt | Second Attempt | Third Attempt | Fourth Attempt |
|---|---|---|---|---|
| Terms in the content | Urban Heat Island, Urban Planning | | Smart City, City Dashboard | Indicator |
| Terms in the title | | Urban Heat Island, Urban Planning | Urban Heat Island, Urban Planning | Urban Heat Island, Urban Planning |
| Years | 2020–23 | 2020–23 | 2020–23 | 2022–23 |
| Google Scholar | 17,600 | 139 | 0 | 47 |
| Scopus | 30,439 | 44 | 0 | 17 |
| Science Direct | 8,273 | 18 | 0 | 9 |
| Total | 56,312 | 201 | 0 | 73 |
| Motivation for the change of research | Research more precise | More focalised on city dashboard | Need more results and more current, looking for indicators useful for a City Dashboard | |

The result of this supplementary investigation is a cumulative total of 73 publications. However, not all papers can be evaluated due to different reasons. Upon doing an initial study of the findings, the authors had to exclude any publications that were difficult

to scan or inaccessible for download. Additionally, they remove duplicates detected inside each individual search engine and duplicates of the same article across all three search engines. Furthermore, items published in languages other than English were also removed. Table 2 shows the schematisation of articles that cannot be used for search purposes. A total of 47 scientific publications were accessible for empirical analysis as a consequence of this approach.

**Table 2.** Table with analysis and elimination of non-downloadable, duplicate or non-English items.

| | | Google Scholar | Scopus | Science Direct | |
|---|---|---|---|---|---|
| Non-Downloadable | | 6 | 1 | 0 | 7 |
| Repeated in single search engine | | 3 | 0 | 0 | 3 |
| Repeated among all search engines | 15 | | | | 15 |
| Not in English | 1 | | | | 1 |
| Total to skim | | | | | 26 |

A decision was reached to conduct a more comprehensive examination based on the abstracts of the remaining 47 publications. A total of 14 publications were selected for further investigation based on this evaluation. Table 3 provides a concise overview of the whole process used to reach the final paper skimming. Figure 1 shows the results of the skimming in more detail from the totality of the search results.

**Table 3.** Table summarising step-by-step cleaning of the results obtained.

| Total before cleaning | Total after cleaning | Total after reading abstract |
|---|---|---|
| 73 | 47 | 14 |

In order to have a thorough understanding of the most recent developments in the field of urban heat islands, the authors have opted to construct Table 4. This table includes a title, a case study, and the indicators used in the research. It helps in the identification of relevant information to do this literature review.

Land Surface Temperature (LST) is often used as the primary indicator in most papers. This is because urban temperature data has to be compared with rural data, making LST an essential factor. The most frequently used indicators, categorised accordingly, include measurements of building height [29, 41, 42], indices referring to the percentage of built-up land [29, 30, 33, 34, 38], measurements of the percentage of green and blue spaces in specific areas [30, 33–36, 38–40, 42] and wind speed [29, 32, 41].

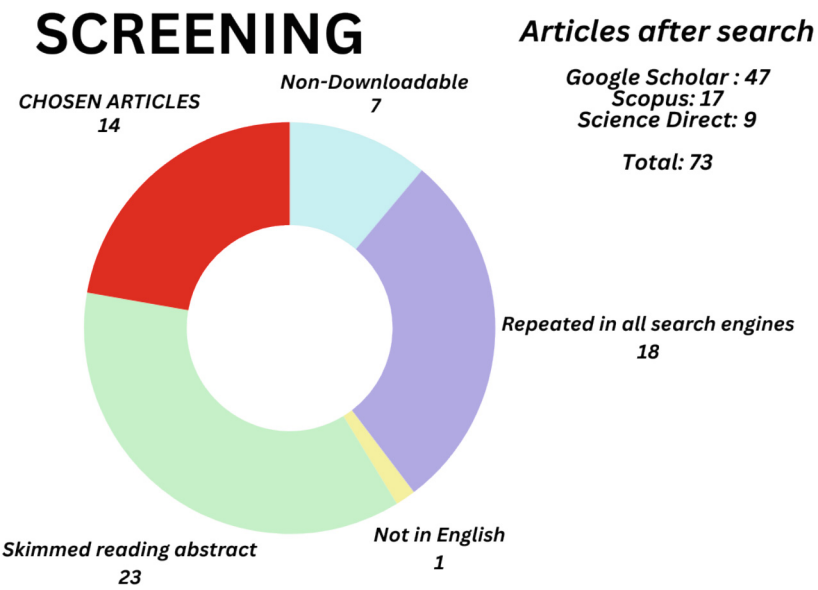


**Fig. 1.** Summary of the screening of articles found through searches.

**Table 4.** Table summarising most important information of chosen articles.

| Title | Case study | Indicators |
|---|---|---|
| Analysing the Impact of Urban Planning and Building Typologies in Urban Heat Island Mitigation [29] | Sidney Metropolitan Area, Australia | Building Height (BH);<br>Street Width (SW);<br>Aspect Ratio (AR);<br>Built Surface Ratio (BSR);<br>Built Area Ratio (BAR);<br>Land Surface Temperature (LST);<br>Ambient Temperature (AT);<br>Wind Speed (WS);<br>Gradient of Temperature Decrease along the district axis (GTD) |
| Analysing the Urban Heat Island In Ho Chi Minh City In Relation To Urban Planning Processes from 2010 To 2020 [30] | Ho Chi Minh City, Vietnam | Land Surface Temperature (LST);<br>Normalised Vegetation Index (NDVI);<br>Normalised Difference Built-Up Index (NDBI) |
| Assessment of Urban Heat Islands For Land Use Based on Urban Planning: A Case Study in the Main Urban Area of Xuzhou City, China [31] | Xuzhou City, China | Land Surface Temperature (LST);<br>Urban Development Land (UDL) |

(*continued*)

**Table 4.** (*continued*)

| Title | Case study | Indicators |
|---|---|---|
| Assessment of Wind Characteristics And Urban Heat Island Dynamics For Urban Planning: A Case Study Of Toulouse, France [32] | Toulose, France | Local Weather Type (LWT);<br>Wind Intensity (WI);<br>Local Climate Zone (LCZ) |
| Discerning The Success of Sustainable Planning: A Comparative Analysis of Urban Heat Island Dynamics in Korean New Towns [33] | Bundag, Ilsan, Guangyao and Songdo, South Korea | Land Surface Temperature (LST);<br>Green Normalized Difference Vegetation Index (GNDVI);<br>Modified Normalized Difference Water Index (MNDWI);<br>Digital Elevation Model (DEM);<br>Normalize Difference Built Index (NDBI);<br>Euclidean Distance to Roads (EDR);<br>Population Density (PD) |
| Effects of Urban Planning Indicators On Urban Heat Island: A Case Study of Pocket Parks In High-Rise High-Density Environment [34] | Hong Kong, China | Ratio Of A Building's Total Area To The Land Area On Which It Is Built (FAR);<br>Building Density (BD);<br>Park Area (PA);<br>Tree Cover Ratio (TCR);<br>Shrub Cover Ratio (SCR) |
| How Can Urban Green Spaces Be Planned To Mitigate Urban Heat Island Effect Under Different Climatic Backgrounds? A Threshold-Based Perspective [35] | Hohhot, Beijing, Shanghai and Haikou, China | Urban Green Space (UGS);<br>Cooling Intensity (CI);<br>Absolute Cooling Threshold (ToCabs) |
| How Can Urban Parks Be Planned To Mitigate Urban Heat Island Effect In "Furnace Cities"? An Accumulation Perspective [36] | Fuzhou, China | Radiative Transfer Equation (RTE);<br>Park Cooling Intensity (PCI);<br>Park Cooling Gradient (PCG);<br>Park Cooling Area (PCA);<br>Park Cooling Efficiency (PCE);<br>Efficiency Threshold Value (TVoE) |
| Planning Strategies For Urban Heat Island Mitigation: An Application Of Local Climate Zone Into The High density City Of Hong Kong [37] | Hong Kong, China | Land Surface Temperature (LST);<br>Sky View Factor (SVF) |
| Spatial Changes of Urban Heat Island Formation In The Colombo District, Sri Lanka: Implications For Sustainability Planning [38] | Colombo District, Sri Lanka | Land Surface Temperature (LST);<br>Normalised Differential Vegetation Index (NDVI);<br>Normalised Differential Accumulation Index (NDBI);<br>Population Density (PD) |

(*continued*)

**Table 4.** (*continued*)

| Title | Case study | Indicators |
|---|---|---|
| Spatial Process Of Surface Urban Heat Island In Rapidly Growing Seoul Metropolitan Area For Sustainable Urban Planning Using Landsat Data (1996–2017) [39] | Seoul Metropolitan Area, South Korea | Land Surface Temperature (LST);<br>Changes in Land Use and Land Cover (LULC);<br>Impervious Surface (IS);<br>Persistent IS (PIS);<br>Newly Added IS (NAIS);<br>Forest Area (FS) |
| The Urban Heat Island Of The Metropolitan City Of Turin. Strategies For A Sustainable Urban Planning [40] | Turin, Italy | Air Temperature (AT);<br>Urban Morphology (UM);<br>Exposure of Urban Spaces to Sunlight (EUSS);<br>Albedo Coefficients of Outdoor Areas (ACOA);<br>Percentage of Greenery and Water (PGW);<br>Distance from the Built-Up Area (DBUA);<br>Land Surface Temperature (LST) |
| Urban Heat Island And Thermal Comfort Conditions At Micro-Climate scale In A Tropical Planned City [41] | Putrajaya, Malaysia | Diffuse Solar Radiation (DSR);<br>Reflected Solar Radiation (RSR);<br>Land Surface Temperature (LST);<br>Physiologically Equivalent Temperature (PET);<br>Wind Speed (WS);<br>Building Height (BH); |
| Urban Heat Island's Vulnerability Assessment by Integrating Urban Planning Policies: A Case Study of Montpellier Méditerranée Metropolitan Area, France [42] | Montpellier Metropolitan Area, France | Green Space (GS);<br>Building Footprint (BF);<br>Building Height (BH);<br>Constraction's Location (CL);<br>Air Conditioning (AC);<br>Topography (T);<br>Proximity to Natural Areas (PNA);<br>Surface Urban Heat Island Intensity (Day and Night) (SUHII);<br>Population Density (PD);<br>Land Uses (Daytime) (LUD);<br>Land Uses (Nighttime) (LUN);<br>Sensitive Population (SP);<br>Health and Care Facilities (HCF);<br>Low-Income Households (LIH);<br>Building Age (BA) |

## 5 Discussions and Conclusions

After conducting an extensive analysis of recent scientific literature and examining the present understanding and connections between Urban Heat Islands (UHI) and Smart Cities, it is evident that there has not yet been a comprehensive method for evaluating UHI.

During extensive searches across many search engines, it became evident that there is a lack of literature that primarily focuses on urban planning and urban heat islands using

city dashboards. This field has the capacity to be a fascinating domain of investigation and development.

Some researchers attempt to categorise and provide significant details on the indicators of various Local Climate Zones (LCZ). However, their analysis is limited to just a few indicators, that always consider meteorological and urban geometry parameters. The objective of future research papers might be to identify universal indicators that can be used to categorise urban heat islands. This would include examining noteworthy aspects of the examined publications.

The key indicators analysed in the articles are Land Surface Temperature, Building Heights, Wind Speed, Vegetation and Built-up Index. An important element emphasised in this research is that in cities situated in close proximity to the sea or lakes, the distance from these bodies of water is commonly ignored.

Essentially, a comprehensive analysis of the urban heat island phenomenon reveals a complex and continuously changing scenario that mirrors the increasing understanding of the many factors that contribute to elevated temperatures in metropolitan areas. Existing literature indicates that the socialisation process of people in urban areas has a significant impact on the environment. Administrators may find it important to establish public places suitable not only for socialisation but also for those dynamics that can mitigate the negative effects of Urban Heat Island (UHI). Furthermore, the local urban warming may have a substantial impact on public health, energy efficiency, and the general quality of the urban environment.

After examining several solutions and relevant research, it is important to underline the following actions (but they are not exhaustive) to mitigate the adverse impacts of Urban Heat Island (UHI):

1) Vegetation in urban areas. Participating in tree planting and creating parks or gardens may effectively lower surface and air temperatures due to the cooling effect and humidity provided by trees.
2) Vertical gardens and green roofs. Vertical gardens and green roofs reduce heat absorption naturally. Indeed, plants absorb heat and evaporate water through the process of transpiration, cooling the surrounding air and reducing the temperature of buildings.
3) Paving with reflective materials. Using reflective materials on roads, sidewalks and roofs may decrease the heat absorbed. Light-coloured materials or specialist reflective coatings possess a greater ability to reflect solar energy in comparison to normal dark materials.
4) Urban planning initiatives and specialised Urban Master Plans that are interconnected with land use, water usage, and climate changes, in general. Urban temperatures may be controlled and reduced by designing cities to optimise natural spaces and decrease the use of asphalt surfaces. Effective planning strategies may include the establishment of green corridors that connect various parks and green spaces, as well as initiatives related to the efficient use of land and water resources. Furthermore, the promotion of sustainable mobility via the encouragement of bicycling and public transit may also result in measures that alleviate the adverse impacts of Urban Heat Island (UHI). By decreasing the number of vehicles on the road, it is possible to contribute to mitigating the impact of urban heat islands.

5) Aquatic environments. Water has a notable capacity for heat absorption due to its high specific heat, allowing it to absorb a substantial amount of heat without suffering a significant rise in temperature. Integrating fountains, ponds, or other water elements may effectively lower the temperature of the surrounding environment.
6) Monitoring and adaption measures using tools such as city dashboards. The capacity to continuously monitor all the data and indicators about urban heat island (UHI) and climate change allows for the subsequent adjustment of municipal and local policy.

It is crucial to foster collaboration among scholars, urban planners, policymakers, and local communities in the future to implement methods that mitigate and adapt to challenges. Currently, the only means of studying urban heat islands is through a multidisciplinary approach. This approach must be adopted to consider the Urban Heat Island (UHI) under the interdependence between climate change, urban planning, public health, and environmental sustainability.

City dashboards are used in the development of today's smart cities, basically to assist decision-makers in making well-informed decisions, not only in relation to the mitigation of the urban heat island phenomena [43]. These tools are valuable for collecting, assessing, and visually presenting customised indications and data.

The city dashboard provides a real-time and comprehensive overview of current conditions and trends in urban environments, whether at a local or regional level. It enables prompt reactions to urban issues and assists in determining the priorities and the key areas for action by public administrations.

Developing heat-resistant cities requires a proactive attitude and specific actions to reduce the ecological effects caused by human behaviours and activities. Similarly, effectively addressing the adverse effects of urban heat islands requires a high level of awareness and sensitivity from the entire community, aiming to establish healthy, sustainable urban environments that can withstand future climate challenges.

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