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# METHODOLOGICAL FRAMEWORK

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https://coolnoons.interreg-euro-med.eu/

# COOL NOONS

COOL NOONS is an innovative project for the way it addresses an urgent and underestimated issue such as the **evolution of urban tourism towards a more sustainable model**. Five pilot cities will be innovative solutions **to improve the visitor experience of tourists and residents during the hottest hours of the day**. The tools and methods used combine scientific accuracy, pragmatism and creativity, thanks to the diversity of the partners involved.

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**Mission**: Enhancing sustainable tourism

**Programme priority**: Greener MED

**Specific Objective**: RSO2.4: Promoting climate change adaptation and disaster risk prevention, resilience, taking into account eco-system based approaches

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D.1.1.1 Data Collection Methodology

WP1 Co-Designing innovative solutions for Mediterranean cities

Activity 1.1 Collecting and compiling data on visitors' behaviour

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Partners involved: American College of Greece

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## 1. Introduction

This document serves as the "Methodological Framework" for the COOL NOONS Project. The purpose of this framework is to articulate a scientifically robust methodology common to five pilots for systematically collecting and analysing data regarding visitor behaviour and environmental efficacy. The subsequent sections of this document are organized to provide detailed guidance on assessing cooling efficacy, attractiveness to tourist visitors, and overall experience enhancement, followed by general implementation guidelines and an appendix containing the questionnaire used in the study.

## 2. General methodological framework

This section outlines the general methodological framework of the COOL NOONS project for data collection, which systematically addresses the assessment of cooling efficacy, attractiveness for tourist visitors, and experience enhancement.

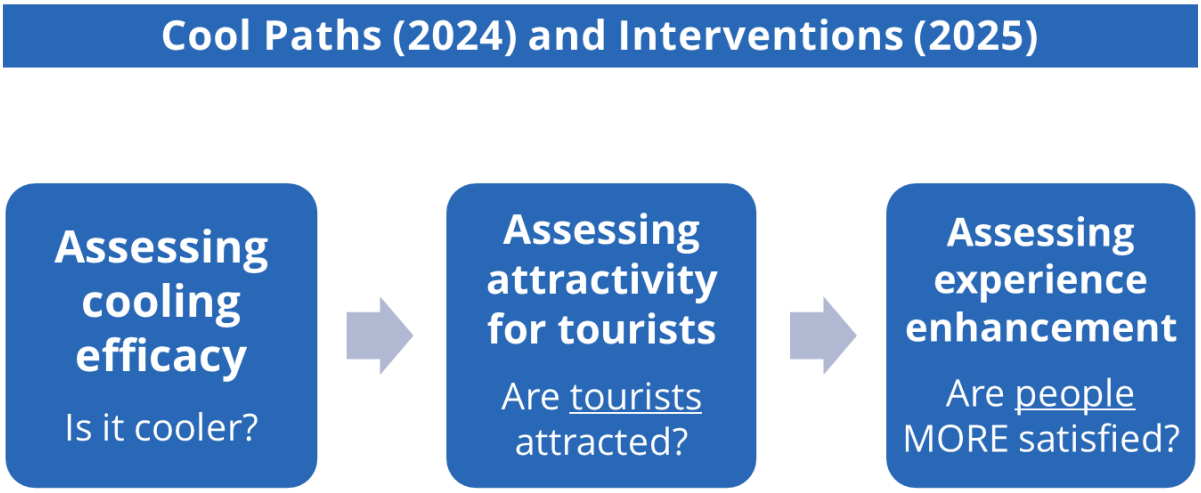



Figure 1. General methodological framework

## 3. Assessing Cooling Efficacy

**Objective**: Determine if the interventions actually reduce temperatures in cool paths and targeted areas.

**Data Collection Operationalisation**:

- Data:
  - Land Surface Temperature: This includes a comparative analysis of the LST determined based on the thermal bands of Landsat images for a previous and contemporary time period of interventions aimed at increasing thermal comfort in the urban environment.
  - Temperatures recorded from satellite imagery
  - Data from thermal cameras: This includes images collected alongside the mapped routed for each pilot. The images will present the current thermal conditions at street level, thus assessing the existing microclimate. The intervals of the images will be every 20 meters and will include detailed information regarding the effect and thermal capacity of urban features such as trees and shaded areas, urban equipment and choice of materials.
  - Weather Data available from weather stations: air temperature, air humidity, air speed (wind), and radiation

This task implies a comparative analysis of temperature, thermal comfort, humidity and all other available data with significance regarding predefined metrics. The comparative analysis will be completed in two phases considering:

a) Paths (spatial comparison): Existing cooler paths versus alternative hotter paths. This phase aims to evaluate the thermal conditions of different paths, of cooler versus hotter paths. It involves mapping these paths and selecting those that COOL NOONS will use as pilots for assessing cooling efficacy. Additionally, best practices in the existing cooler paths (such as the use of vegetation, materials, shading, and water features) will be identified and recommended for broader or localised interventions.

b) Targeted Areas (temporal comparison): Pre- and post-intervention analysis of the same areas at different periods in time. This phase will assess the targeted areas before and during/after interventions to measure the cooling efficacy of the implemented strategies. By comparing data from different time points, this analysis will provide a comprehensive evaluation of the intervention's impact on the microclimate coolness.

- **Period:**
  - (Baseline): ensure baseline data collection from available satellite imagery and thermal camera images that will determine the macro- and micro- climate. This baseline will allow to compare the paths selected for intervention with others that will not undergo any change, serving as control treatments.
  - For cool paths: data collected during the summer of 2024 (contrasting cooler vs hotter paths)
  - For targeted areas : data collected during the summer of 2025 (pre- and post-intervention)

- **Sources:**
  - Direct Data:

    Satellite Imagery: relying on data providers to collect thermal infrared radiation data over study areas.

    Thermal Cameras: applicable for the pilots that have acquired this equipment.
  - Indirect Data:

    Local Weather Stations within each city: to gather air temperature and related weather data.

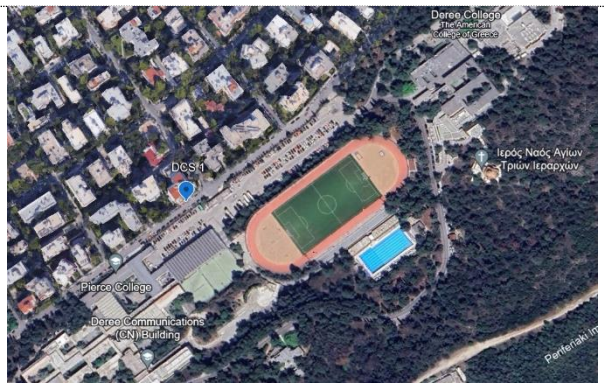
    National Meteorological Agencies: for comprehensive weather data.

- **Validation:**
  - Consistency in Conditions: it is necessary that data for pre and post-intervention are collected under similar weather conditions and at the same period of the day to mitigate the effects of seasonal or random fluctuations in weather states.
  - Statistical Analysis: to compare temperature data from before and after the intervention periods, i.e., for comparison between the cool paths and alternative paths; pre-intervention and during intervention in targeted areas.

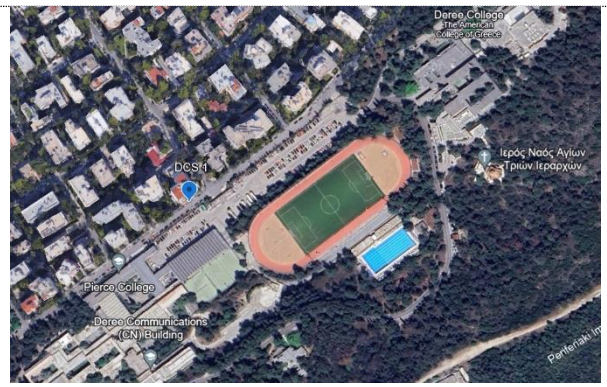
- **Operational Details:**
  - Scale and Precision: Data should be collected for cartographic representation at scales between 1:10 000 and 1:50 000, allowing for clear differentiation between intervened and non-intervened areas, considering the urban layout and the specific intervention zones when setting the scale.
  - Time Interval: as for satellite images, data depends on the day and period of the day of the satellite images, priority should be given to the use of images that allow the determination of

maximum LST values or, if it is possible, to define a range of variation for the seasonal period under consideration

- Data Accessibility and Storage: collected data analysis should be discussed among partners and data stored securely in compliance with data protection regulations.
- Data from thermal cameras: The images from the thermal cameras will follow similar collection patterns for all routes. A thermal data set will be collected on a mapped routes every 20 meters at a specific spot that will be referred to as the data collection spot (DCS) and will be identified with a pin on the map. For every location data collection spot (DCS), four thermal images will be taken and the same four images with a mobile camera as shown in the diagram below.




Data Collection Spot Marked on a Google Earth map.




Orientation of the four thermal and four normal pictures to be taken in every data collection spot.

- In total, every data collection spot (DCS) will generate eights (8) images (four thermal, and four normal) and a Google Earth extract with the geolocation. Every DCS will be numbered in order of visit sequence and a folder will be created with the name of the pilot, the name of the path (in case there are more than one paths in the city), the prefix pre or post to indicate if the pictures are before or after the intervention and the DCS number. Example: Lisbon_path1_pre_DCS1.

By integrating these data sources and following these implementation steps, each pilot can effectively assess the impact of its cool paths and interventions on urban heat alleviation, providing valuable insights into the sustainability and scalability of cooling strategies in Mediterranean cities. This methodological framework ensures that the assessment is carried out with scientific rigor, leveraging comprehensive data sources to produce reliable and actionable results.

## 4. Assessing Attractiveness for Tourist Visitors

**Objective:** Evaluate whether the cool paths and targeted areas attract more tourists and influence their behaviour, such as extending their stay in these paths/areas during peak heat times.

**Data Collection Operationalisation:**

- **Data:**
  - Objective/ revealed data

    Tourist Movements:

    GPS tracking data to measure and track tourist itineraries, register time and speed, and movement patterns within the cool paths and intervened areas (Lisbon)

    Wi-Fi points data to measure the increase in movement in the cool path by detecting the signals emitted by smartphones (Dubrovnik)

    Data about tourist movements will be provided by a telecommunication company (Imola)
  - Declared data (survey)

    Data from an online questionnaire survey to tourist visitors asking whether they were attracted to cool paths or designated areas, interest in cool paths or targeted areas had they known about their existence, thermal and environmental factors, adaptive behaviour and satisfaction and well-being (see the questionnaire at the end of the document).

    It is crucial that pilots use identical metrics and the same questionnaires to ensure that consistent analysis across the different cities of the diverse solutions tested. Even if supplemented with city-specific questions, asking the same questions is essential to effective and valid assessment. The methodological uniformity will support the reliability and validity of the findings, allowing for accurate comparisons, generalisability, and replicability of the interventions' outcomes across diverse urban environments.

- **Data Collection Timing:**
  - For cool paths: data collected during the summer of 2024 (The survey should be conducted during the summer of 2024 to provide insights into tourist visitors' preferences, which will be useful in selecting solutions to be tested in 2025)
  - For targeted areas of intervention: data collected during the summer of 2025

- **Sources:**

**a) Questionnaire survey**

- Intercept Face-to-Face Surveys: Conducted in tourist places (tourist information centres, attractions, hotels and even at cool paths) with tourist visitors asked to answer online via a QR code on their smartphones or provided with a tablet (higher likelihood of response).
- Self-Administered Online Surveys: As an alternative or complementing intercept face-to-face survey (lower likelihood of response, but less labour-intensive). Invitations should be displayed on roll-up banners at tourist centres or participating attractions or hotels, directing tourist visitors to respond online on their smartphones via QR codes. Other less preferable approaches may be employed include using social media invitations to participate, provided that the targeting specifically addresses tourist visitors to the pilot cities. However, there may be a time lag between the visit and the response, which diminishes the robustness of the data if responses are not collected at the end of the day of the visit or during the visit itself.

Each pilot should obtain at least **200** responses to this questionnaire (minimum), ensuring gender and age **balance**, and gathering responses from **different locations in the city**.

| |
|---|
| The questionnaire should be available in the national language and in the languages most frequently spoken by tourist visitors in the city. By default, we provide a Google Forms version of the questionnaire, which pilots can copy and apply (see the link for each questionnaire in the appendices). |

**b) Tracking tourist visitors' movements**

- **Participative/Active Tracking:**

  GPS tracking of voluntary participants in the study invited in hotels: to log movements and time spent in specific cool paths/areas (Lisbon)

- **Passive Tracking:**

  Wi-Fi Points: to passively track the increase in movement by detecting the signals emitted by smartphones (Dubrovnik)

  Telecommunication Data: to passively track tourist movements by detecting the signals emitted by smartphones (Imola).

**Simplified alternative Data Collection**: for pilot cities unable to implement objective tracking

- Survey-Based Itinerary Mapping: Incorporate a section in the survey where visitors can describe or draw their itinerary on a map of the city provided in the survey tool and the perceived coolest and hottest points (these may eventually include a cool path or area).
- Social Media Analysis: Monitor hashtags and geotags related to the cool paths or intervention areas to gather data on public engagement and visitor numbers. This method can provide insights into the popularity and usage patterns of the interventions without the need for sophisticated tracking technologies.

- **Target Groups**
  - **Tourist visitors** including both "users" and "non-users" of cool paths/areas to contrast behaviour. Each pilot should ensure not to intercept tourists just in a cool path or designated area, since a "non-user" control group is needed for comparison. Also, this intercept survey should not take place in the morning but at the hottest hours or immediately after.

- **Engagement Strategy:**

a) Personal Engagement Strategy:

- Data Collectors:

  Approach visitors at cool paths, designated areas, and other iconic tourist sites with Wi-Fi tablets for the online survey or QR code asking them to use their smartphones. This allows for a direct comparison of cool paths/designated areas with other paths and non-intervened areas.

b) Non-Personal Engagement Strategy:

- Indoor posters or roll-up banners with QR Codes: Set up informational outdoor advertisements at attractions, tourism offices, or hotels to invite participation. These outdoor advertisements will briefly explain the study's purpose (to create a fresher city environment) and display the QR code that direct tourist visitors to a landing page where they can complete an online questionnaire.

  - Local Business Collaboration: Engage tourist information centres, attractions or hotels to support the project by exhibiting the outdoor advertisements (and possibly including them as sponsors or partners in providing incentives)

- **Incentives:**
  - Rewards for Participation: Offering incentives such as discounts on local attractions, special offers at participating businesses, or entries into prize may encourage active participation in tracking and survey feedback.
- **Data Analysis:**
  - Comparative Spatial and Statistical Analysis: comparison of GPS data on foot traffic and duration of stays in cool versus non-cooled paths or areas.
  - Statistical Analysis: data collected by the questionnaire survey
- **Validation:**
  - Data ethics: ensure the anonymity and privacy of all participants in line with applicable regulations.
  - Representative Sampling: Aim for a representative sample of both groups to ensure that the findings are generalizable to the broader population of tourist visitors and residents.
- **Operational Details:**
  - Technology Integration: Ensure that the Wi-Fi tracking technologies are seamlessly integrated and capable of operating under various network conditions.
  - Stakeholder Engagement: continuous engagement with stakeholders to get collaboration if needed.
  - Data Handling: Ensure robust data management practices, including secure storage and handling of personal data, to maintain participant confidentiality and comply with data protection laws. The University of Coimbra's team is responsible for this matter.

By following this structured approach, the COOL NOONS project can effectively evaluate how cooling interventions impact tourist behaviour and their attractiveness as a refuge from heat, contributing to a sustainable and enjoyable urban environment for tourist visitors and residents.

## 5. Assessing Experience Enhancement

**Objective**: Measure satisfaction levels of tourist visitors and residents using the cool paths/areas versus those who do not, focusing on their thermal comfort, overall satisfaction, and perceived benefits of the cooling solutions to be tested.

**Data Collection Operationalisation:**

- **Data:**
  - 3-question self-administered online survey and geolocation of the respondents.
  - Variables to Measure: a) thermal (dis)comfort, b) overall satisfaction, and c) satisfaction with solutions to mitigate thermal stress, totalling **3** questions with numerical scales (1 to 7) (see the questionnaire at the end of the document).

  > It is crucial that pilots use **identical metrics** and **the same questionnaires** to ensure that consistent analysis across the different cities of the diverse solutions tested. Even if supplemented with city-specific questions, asking the same questions is essential to effective and valid assessment. The **methodological uniformity will support the reliability and validity of the findings**, allowing for accurate comparisons, generalisability, and replicability of the interventions' outcomes across diverse urban environments.

- **Data Collection Timing:**
  - For cool paths: data collected during the summer of 2024
  - For targeted areas of intervention: data collected during the summer of 2025
- **Target groups:**
  - Target Contrasting Groups: tourist visitors and residents who use the cool paths or were present in the targeted areas of intervention (Group 1) with those who did not use these fresher paths or cooled areas (Group 2).
- **Sources:**
  - self-administered online survey inviting tourists and residents to participate
  - outdoor urban advertisements (street posters, MUPIs – urban furniture for information and publicity, urban street furniture ads) with QR Codes: the invitation to respond the survey should be displayed on 2 or 3 in cool paths and 2 or 3 in outdoor advertisements with some

sistance among them and strategically placed with QR codes in hottest paths (2024). Similarly, there should be 2 or 3 roll-up banners with QR codes in designated areas and 2 or 3 in non-targeted areas (2025).

The questionnaire should be available in the national language and in the languages most frequently spoken by tourist visitors in the city. By default, we provide a Google Forms version of the questionnaire, which pilots can copy and apply (see the link for each questionnaire in the appendices).

Approximate location: Each QR code placed at different points (2 or 3 in cool paths; 2 or 3 in non-cool paths (2024); 2 or 3 in targeted areas; and 2 or 3 in similar non-targeted areas (2025) should correspond to the same questionnaire but be directed to a different landing page. Then, we can identify the respondents of each QR code, which indicates approximate location. This approach allows for linking respondents to the specific location of the QR code, as they are likely to complete the survey in loco in real-time.

Survey request geolocation: Some paid survey platforms (e.g., SurveyCTO, Formplus, Pointerpro) allow the determination of the respondent's physical location with the user's consent. However, Google Forms does not natively support geolocation requests. To collect geolocation data from survey participants using Google Forms, it is necessary to integrate it with an external platform like Fillout, asking respondents at the end of the survey to consent to sharing their geolocation. This integration facilitates the collection of geolocation data (and exact timestamps, which are always recorded in online surveys), making them available for analysis. However, in any form of survey geolocation requests, respondents must have location services enabled on their browser and device in order to input their geographical location. This fact strongly advises to ensure approximate geolocation by the previous method described.

- **Target Groups**
  - Tourist visitors and residents, including both "users" and "non-users" of cool paths/areas to contrast behaviour. Each pilot should ensure not to intercept only tourists in cool paths or designated areas, as a "non-user" control group is needed for comparison.

- **Engagement Strategy:**
  - Non-Personal Engagement Strategy:

Outdoor advertisements with QR Codes: Set up informational outdoor advertisements with 2 or 3 QR codes in cool paths and to 2 or 3 in hotter paths, and similarly for targeted areas and non-targeted areas. These outdoor advertisements will be placed on urban furniture across cool paths, targeted areas, and other tourist parts of the city to gather information from users and non-users of cool paths/areas. The outdoor advertisements should exhibit the name of the project, a persuasive message, and a QR code directing tourists and residents to a landing page where they can complete an online questionnaire.

Persuasive messages at outdoor advertisements to be discussed and selected may encourage participation. Examples: 'How hot is it? For a fresher city', 'How hot is it? Tell us now for a fresher city', or 'How hot is it? Speak up to fight climate change', 'How hot is it? Scan the QR Code to fight the heat', 'How hot is it? Scan the QR Code now and beat the heat'.

- Collaboration from public authorities to allow the exhibition of the outdoor advertisements /QR codes.

- **Incentives:**
  - Rewards for Participation: Develop incentive programs that might include discounts on local attractions, special offers, or entries into draws. These incentives can motivate both tourists and residents to participate actively in the project's data collection efforts.
- **Data Analysis:**
  - Statistical Analysis: Detailed comparative analysis of the data collected through the questionnaire survey
  - Spatial analysis based on the geolocation of the survey responses in cool versus non-cooled paths or areas.
- **Validation:**
  - Data ethics: ensure the anonymity and privacy of all participants in line with applicable regulations.
  - Representative Sampling: Aim for a representative sample of both groups to ensure that the findings are generalizable to the broader population of tourist visitors and residents.
- **Operational Details:**
  - Permissions: for placing outdoor advertisements with QR codes in the various strategic locations.

- Data Handling: Ensure robust data management practices, including secure storage and handling of personal data, to maintain participant confidentiality and comply with data protection laws. The University of Coimbra's team is responsible for this matter.

This approach should facilitate easier participation and broader data collection for assessing the effectiveness of the cooling interventions in enhancing visitor experiences.

## 6. Methodological Summary and Implementation Guidelines

This section provides a summary of the methodological framework and essential implementation guidelines to ensure consistency across all pilot cities involved in the COOL NOONS project.

### 6.1. Methodological Framework Summary

Table 1. Data Collection and Methodologies Overview

| Task | Target Area or Population | Methods | Sources & Data |
|---|---|---|---|
| **Assessing Cooling Efficacy** | Urban Paths &Targeted Areas | Comparative microclimatic analysis | . Satellite imagery<br>. Thermal cameras<br>. Local weather stations |
| **Assessing Attractiveness for Tourist visitors** | Tourist visitors | . Space-time behaviour tracking (when possible)<br>➔ Pre- ***versus*** post-movements<br>.Questionnaire survey<br>➔ intercept in-person approach or other<br>➔ data collection in tourist information centres, attractions, hotels, invitation through social media and digital platforms)<br>➔collection not only 1 place or just in cool places | . GPS tracking<br>. Wi-Fi-based location tracking<br>. Questionnaire survey (online)<br>(data: interest in cool paths/areas, thermal factors, adaptative behaviour and satisfaction) |
| **Assessing Experience Enhancement** | Tourist visitors & Residents | . Online survey aiming to obtain in loco real-time geolocated perceptions[1] via outdoor invitation & QR code Brief<br>➔ in cool paths/areas ***versus*** hottest paths/areas | . Self-administered online questionnaire<br>(geolocated data on thermal sensation, satisfaction with experience and cooling solutions)<br>→ Geolocation derived from the different QR codes<br>(each QR code directs to a different link to provide approximate geolocation of the respondents of that QR code) |

[1] Online survey aiming to obtain real-time geolocated perceptions through either approximate geolocation via different QR codes or precise geolocation from respondents' survey answers if this feature is enabled in the survey.

### 6.2. General Implementation Guidelines

These guidelines establish a common framework for the data collection phases detailed in the previous sections, promoting uniformity in methodology and ensuring the comparability of results.

1. **Unified Approach Across Cities**: It is crucial for all pilot cities to adhere to the outlined guidelines to maintain standardization in data collection and analysis. This uniformity will enable effective cross-city comparisons and more robust conclusions regarding the project's impact. The final version of the questionnaires in English, French, and possibly Spanish or Italian (except for the national languages: Croatia, Portugal, Montenegro, Italy?) must be reviewed to ensure consistent wording across all pilots. Ensure the QR codes will not expire.

2. **Results Testing Validation through Control Groups and Baseline Measurements**: To effectively test the impact of cool paths and cooling interventions comparative analysis implies data collection including control groups and baseline measurements. This involves:

- Comparing weather measurements between cooler paths and hotter paths to assess the cooling differences, as well as comparing baseline weather measurements with post-intervention data in targeted areas to evaluate the impact of the interventions.
- Contrasting users of cool paths or non-intervened areas with non-users to serve as a control group (data collection regarding different locations during the same period)
- Contrasting pre- versus post-implementation or promotion data of cool paths or targeted areas on tourist movements to assess increased tourist flows (data collection different periods targeting the same paths/areas)

3. **Consistent Use of Research Instruments**: Use identical metrics and questionnaires across all pilot cities. While city-specific questions can be added, the core questions must remain consistent to allow for effective and valid assessment and comparison.

4. **Geolocation Data Collection**: By default, we provide a Google Forms version of the questionnaire, which pilots can copy and apply (see the link for each questionnaire in the appendices). However, Google Forms does not natively support geolocation requests, unlike some paid survey platforms (e.g., SurveyCTO, Formplus, Pointerpro) that allow the determination of the respondent's physical location with the user's consent. To collect geolocation data from survey participants using Google Forms, it is necessary to integrate it with an external platform like Fillout, asking respondents at the end of the survey to consent to sharing their geolocation. This integration facilitates the collection of geolocation data (and

exact timestamps, which are always recorded in online surveys), making them available for analysis. However, in any form of survey geolocation requests, respondents must have location services enabled on their browser and device to input their geographical location. This strongly advises ensuring approximate geolocation. Therefore, in any case, all pilots should ensure approximate geolocation by using different QR codes that direct respondents to different landing pages corresponding to the various locations. This approach helps gather approximate location-specific data even if precise geolocation is not enabled.

5. **Pre-Test of the Questionnaire and Technologies**: Conduct a pre-test of the questionnaire and associated technologies in a controlled environment before full deployment. This step will help identify and resolve any issues related to question clarity, technical functionality, and user interface.

6. **Consultation with scientific-technical partners**: Engage the University of Coimbra's team and the American College of Greece for expert consultation before launching the questionnaires and other data collection instruments. Their expertise can ensure the scientific rigor and validity of the methodologies employed.

7. **Training for Data Collectors**: Provide standardized training for all data collectors and methodological instruments across the pilot cities to ensure uniformity in how data is gathered and recorded. This will help in reducing variability and bias in the data collection process.

8. **Stakeholder Engagement**: Develop engagement with local stakeholders, including public authorities, businesses, and community groups, to ensure support for the project. This engagement can facilitate the placement of outdoor advertisements and QR codes, as well as encourage participation from tourist visitors and residents.

9. **Regular Monitoring and Evaluation**: Implement a system of regular monitoring and evaluation to track progress, address any emerging issues, and ensure that the project stays on course. This can involve periodic reviews of the data collected and adjustments to the methodology as needed.

By following these guidelines, the COOL NOONS project aims to create a standardized yet flexible approach that adapts to the specific needs and capabilities of each pilot city. This strategic implementation ensures that data collected are reliable, comparable, and actionable, contributing significantly to the project's overall success in enhancing urban tourism sustainability amid climate challenges.

## Appendix A. Questionnaire Task 2 "Assessing Attractiveness for Tourist Visitors"

Survey: **My Visit to this City**

**Link to access and copy:**
https://docs.google.com/forms/d/1nkv3yHsKE78dPp3PXw7hArMzjVBUiQg0qBuTX0fOUZY/edit

[**Introductory Question**]: In this questionnaire draft, the structure for a multilingual questionnaire has already been created, with an introductory language question directing respondents to different sections of the same questionnaire. Versions in French (and Spanish) still need to be reviewed by native language experts.

- ☐ In ENGLISH [the survey will direct to the section 2]
- ☐ ... NATIONAL LANGUAGE → [the survey will direct to the section 3]
- ☐ En FRANÇAIS → [the survey will direct to the section 4]
- ☐ En ESPAÑOL or other language chosen→ [the survey will direct to the section 5]

English version

This survey is part of the European COOL NOONS project, which involves five Mediterranean cities, including the one you are visiting. We value your impressions and there are no right or wrong answers. Please be assured that your responses will be anonymous, secure, and treated with the utmost confidentiality. Completing this survey should take approximately 6-8 minutes.

THANK YOU for your cooperation!

INFORMED CONSENT. I declare that I agree to participate in this study, knowing that my data will be treated in an anonymous, aggregated and confidential manner.

☐ Yes ☐ No

**TRIP CARACTHERISTICS**

**1. Have you been here before?** ☐ Yes ☐ No, never

**2. How many nights are you going to stay in this city?** _____

**3. Do you have any health condition that makes you more vulnerable to the heat?**

☐ Yes ☐ No

**4. Are there any individuals vulnerable to heat or children in your travel group TODAY?**

☐ Yes ☐ No

**YOUR VISIT TO THE CITY TODAY**

[Internal Note about the concept measured: Itinerary choice criteria]

**5. How much did the following criteria influence your route in the city today?**

(Rate from 1 = Not influential to 7 = Very influential)

Shortest route to the places I want to visit

Coolest route (e.g., with shade, breeze)

Route including a green area (e.g., garden, park)

Route including as many places of interest as possible

[Internal Note about the concept measured: Thermal sensation]

**6. Today, how HOT did or do you feel?**

1 = Not hot at all 7 = Extremely hot

[Internal Note about the concept measured: Thermal (dis)comfort/ thermal stress]

**7. Please indicate your level of agreement** with the following statements (1 = Strongly Disagree to 7 = Strongly Agree):

I felt very uncomfortable due to the heat while visiting

Moving around during peak heat was extremely unpleasant

The heat I felt today made me feel unwell

[Internal Note about the concept measured: Interest trade-off between cooling solutions and must-see attractions]

**8. Please indicate your level of agreement** with the following statements (1 = Strongly Disagree to 7 = Strongly Agree):

I opt for a cooler route...

... as long as it leads to what I want to visit

... even if it takes longer

... especially if it includes a garden or park

... even if it takes me to less touristy areas and attractions

For me, visiting the main attractions is so important that:

... I stick to my plan, no matter the heat

... I will wait in long queues in the sun if needed

[Internal Note about the concept measured: Willingness to Detour for Thermal Comfort]

**9. To what extent are you willing to TAKE A DETOUR from the shortest route to the places you want to visit in order to follow a cooler pathway or pass by a fresher area (e.g., garden, park)?**

(1 = Not at all, 7 = Very much)

[Internal Note about the concept measured: Adaptative behaviour: activity-related strategies; environmental coping strategies and body-related strategies]

**10. Please indicate your level of agreement with the following statements** (1 = Strongly Disagree to 7 = Strongly Agree):

Today, to get relief from the heat...

... I preferred shaded areas or spent more time in indoor cooler locations

... I sought water features like fountains

... I protected myself by drinking a lot of water

... I used fresh clothes and sun protective items (e.g. a hat or sunglasses)

The heat made me...

... plan my visit activities to avoid the hottest parts of the day

... go to other places such as natural areas or the beach

**What other effective way did you use to cope with the heat TODAY (or in a recent very hot day)?** (optional)

[Internal Note about the concept measured: Overall satisfaction]

**SATISFACTION**

**11. HOW SATISFIED are** you with your experience of visiting this city TODAY?

1= Not at all satisfied to 7= Very satisfied

**12. Think about the EXPECTATIONS** you had. How does your visit to this city rate compared to what you expected?

1= Much worse than expected to 7= Much better than expected

**13. Imagine an IDEAL OR PERFECT VISIT** to a city. How close is your experience visiting this city to your ideal one?

1= Very far from ideal to 7= Very close to ideal

[Internal Note about the concept measured: Multi-attribute satisfaction: weather aspects]

**14. Please rate your satisfaction with the following aspects of the city** (1 = Very dissatisfied, 7 = Very satisfied)

Fresh transportation options

Shade availability

Presence of water features (fountains, lakes, splash pads, misting stations)

Green areas availability

Indoor locations to go to during the peak heat hours

Pathways and areas that offered cooler temperatures

[Internal Note about the concept measured: Restoration in terms of well-being]

**15. Please indicate your level of agreement with the following statements** (1 = Strongly Disagree to 7 = Strongly Agree):

I felt mentally refreshed after visiting cool or shaded areas

I felt less tired after being in cooler places

My ability to concentrate increased after time in comfortable temperatures

**16. What do you suggest the city implement to reduce the effects of the heat?** (optional)

**17. Do you know about any designated "Cool Path" the city offers?**

☐ Yes ☐ No

**Opting for a "Cool Path" (if Yes)**

**18. Where did you hear about the city's "Cool Path"?**

Information outdoor advertisements /signs

Tourist Information Centre

Internet

Other: _____

**19. Did you or will you opt for a city's “Cool Path"?**

☐ Yes ☐ No

**20. If you heard about the “Cool Path” but you did not choose it, why not?**

**Opting for a "Cool Path" (if No)**

**If you knew about the city's “Cool Paths”, would you consider opting for one of those routes?**

☐ Yes ☐ No

**SOCIODEMOGRAPHIC INFORMATION**

| | | | | |
|---|---|---|---|---|
| **Your age:** _____ | **Country of residence:** _____ | | | |
| **Gender:** | ☐ Male | ☐ Female | ☐ Other | ☐ Prefer not to disclose |
| **Education:** | ☐ Less than secondary | ☐ Secondary education | ☐ College/ University | |

Thank you so much!

Note. If integration of geolocation request: Our goal is to improve visitor comfort in European cities. Please allow geolocation after submitting your response. Click here to enable us to relate your answer to the day's weather conditions.

## Appendix B. Questionnaire Task 3 "Assessing Experience Enhancement"

Self-administered Survey via and QR code "**How hot is it?"**

(Points with outdoor advertisements
in cool paths & targeted areas *versus* in hotter paths & non-targeted areas)

**Link to access and copy:** https://docs.google.com/forms/d/1TwmlNhInQKBuP-PBbR9djcu-eAkOiP0SkOAPcBGZNFQ/edit?ts=666ac75d&pli=1

[**Introductory Question**]: This questionnaire draft was just created in English. The structure for different languages is not yet created but pilots can use an introductory question like the following to provide a multilingual questionnaire, with an introductory language question directing respondents to different sections of the same questionnaire.

- ☐ In ENGLISH [the survey will direct to the section 2]
- ☐ ... NATIONAL LANGUAGE → [the survey will direct to the section 3]
- ☐ En FRANÇAIS → [the survey will direct to the section 4]
- ☐ En ESPAÑOL this language or other → [the survey will direct to the section 5]

**How hot is it for you?**

1 = Not hot at all to 7 = Extremely hot

**Are you a tourist or a resident in the city?**

☐ Tourist

☐ Resident [the survey will direct to the section 'If resident'; the questions are equivalent]

**How satisfied are you now with your city visit?**

1 = Not satisfied at all to 7 = Very satisfied

**How satisfied are you with the cooling solutions the city provides?**

1 = Not satisfied at all to 7 = Very satisfied

Your age?_____

Informed Consent. Submit your answers if you agree to participate in this European study. Thank you so much!

Note. If integration of geolocation request: Our goal is to improve visitor comfort in European cities. Please allow geolocation after submitting your response. Click here to enable us to relate your answer to the day's weather conditions.

[section If Resident]

**How satisfied are you now moving through the city?**

1 = Not satisfied at all to 7 = Very satisfied

**How satisfied are you with the cooling solutions the city provides?**

1 = Not satisfied at all to 7 = Very satisfied

Your age?_____

Informed Consent. Submit your answers if you agree to participate in this European study. Thank you so much!

Note. If integration of geolocation request: Our goal is to improve visitor comfort in European cities. Please allow geolocation after submitting your response. Click here to enable us to relate your answer to the day's weather conditions.