Management of Public Urban Green in Milan: a case study

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Summary

This case study examines the transformation of urban green space management in Milan, Italy, focusing on the implementation of the GreenSpaces platform (initially called R3 TREES) and its impact on efficiency, cost-effectiveness and urban green quality. The study highlights how Milan, Italy's second-largest city, has revolutionized its approach to managing public green areas through innovative technology and a Global Service model.

Key findings include:

- Implementation of a Global Service Maintenance Contract in 2004, which standardized quality across all managed areas and coordinated various maintenance services.
- Introduction of GreenSpaces in 2005, which provided real-time monitoring and efficient management of urban green spaces.
- Development of a comprehensive geospatial data model that became the standard for urban green inventories across Italy by 2020.
- Integration of citizen engagement through a mobile app launched in 2015, allowing residents to report issues and track their resolution in real-time.
- Significant cost reduction in urban green management, with unit costs decreasing by 20% since the adoption of the Global Service Model and the introduction of GreenSpaces.

The case study demonstrates how the combination of technology, efficient management practices, and citizen participation has not only improved the quality of Milan's urban green spaces but also resulted in substantial cost savings. This approach has contributed to Milan's achievement of sustainability goals, including meeting the Paris Agreement on Climate Change targets by 2020, and improving its ranking in various sustainability metrics.

Introduction

Milan, the second-largest city in Italy, has undergone a significant transformation in its approach to urban green spaces over the past few decades. Once known primarily as an industrial and financial hub, Milan has made concerted efforts to enhance its environmental sustainability and quality of life for residents through innovative green space management.

These efforts include a better and more efficient management of public urban green spaces, as well as several private and non-profit initiatives implementing nature-based solutions and increasing the tree cover in the urban area of Milan. In this case study we concentrate on how the efficient management of public urban green spaces was achieved and what savings it allowed.

The maintenance of Milan's public green areas encompasses a wide range of activities, divided into regularly planned and sporadic maintenance projects or tasks. Regular maintenance covers plant elements (such as lawns, trees, and hedges), outdoor furniture elements (like playgrounds, benches, and sports equipment), and signage/information systems. Sporadic/one-off maintenance focuses on larger-scale projects in parks, degraded areas, playgrounds, and dog areas. Agronomic activities include weeding, lawn maintenance, flower bed creation, pruning, and tree care.

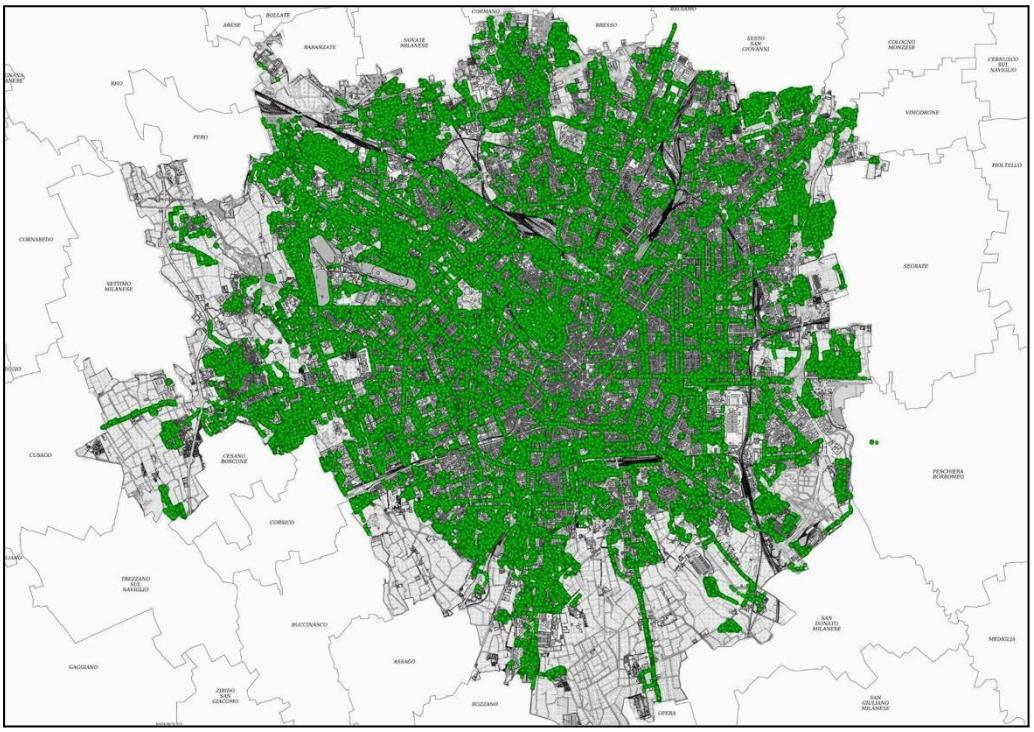
The city also maintains irrigation systems and performs various tasks on fixed, inanimate elements, such as restoring ground cover/paving, repairing fences and benches, maintaining signage, and addressing issues with manhole covers. This comprehensive approach ensures the upkeep and improvement of Milan's green spaces for public enjoyment and safety.

The Public Green Areas of Milan

The composition of urban green areas of Milan is as follows (data from 31/12/2024):

- Sites registered: 3282
- Public green areas of the city: 25.838.900 m^2
- Municipal green areas under direct management - Global Service: 19.200.649 m^2
- Green areas managed by bodies, associations and others: 6.638.251 m^2
- Public green areas per inhabitant (resident population 31/12/2023 – 1417597*) 18,23 m^2
- Play areas: 963 (641 in green spaces, 302in school gardens)

- Dog areas: 422 (total area: 679.458 m^2)
- Trees: 249.214



*Milan statistica: https://sisi.comune.milano.it/extensions/MiStat/MiStat_Home.html

Global Service Model

All the activities related to green management have been outsourced from March 2000 through a public tender to a Consortium with three-year contracts based on a Global Service model and measured through quality indicators. Starting in 2004, a management platform was developed together with R3GIS, based on GIS technologies and facility management systems. This model can be described as a performance contract based on a set of quality standards: the contractor is required to perform all maintenance operations in order to guarantee the achievement of the quality standard for all assets related to green areas (e.g. trees, shrubs, lawns, street furniture, pavements, playgrounds, irrigation systems, etc), observing the timetable agreed for each activity.

The Global Service for the maintenance of the green infrastructure of Milan is based on following principles:

- Uniform quality standards across all managed areas.
- Coordination of various services such as pruning, irrigation system maintenance, repair of infrastructure (e.g., benches, fences) and cleaning.
- Use of GreenSpaces (initially called R3 TREES) for real-time monitoring and efficient management.
- Reduced costs while ensuring high-quality outcomes through economies of scale.
- This model has proven effective in addressing the complex needs of urban green space management, while optimizing resources, ensuring traceability and enhancing transparency.

The role of GreenSpaces

GreenSpaces was introduced in Milan in 2005 with basic functions for the management of urban trees under the original name R3 TREES. Over the years the platform was extended to cover additional assets, tasks and workflows. It was immediately clear that the Global Service model would not work without the support of an adequate software platform. The number of people, work orders, issues, assets was too large to manage without a tailored information system.

The first step was to survey and upload into the management system all assets. For this purpose, a specific geospatial data model was developed together with the Politecnico of Milan, to make sure the information base is complete, but at the same time scalable and aligned with European standards. In 2020, the database model developed originally for Milan became the standard database model for all urban green inventories in Italy.

The next step was to make sure there were adequate tools to monitor quality standards and to make sure issues and non-compliances were dealt with in an efficient way. When a controller finds a situation which does not meet the contractual quality standard (e.g. grass height exceeds an agreed threshold) it creates a non-compliance by recording the position of the problem directly in the field via mobile phone, a georeferenced photo and a classification of the issue. An automatic workflow checks that there are no double issues reported and assigns the issue to the specified site, object and work team, creating a work order. GreenSpaces then monitors that the work orders are resolved in the agreed time.

Depending on the type of issue, the time required to solve it, and the size of the asset involved, a penalty is automatically proposed. The proposed penalties are periodically

discussed with the contractor and in the absence of valid justification, are then detracted from the payments.

Type of issue	Number
Dangerous non compliances to be solved within 24 hours	917
Non compliances of medium hazard, to be solved within 3 days	34.899
Non urgent non compliances, to be solved within 14 days	2.850
Issues reported by citizens	1.457
Issues related to the cleaning of sites	6.706
Areas checked which did not have any reported issue	58.898

Table 1: Issues recorded in 12 months

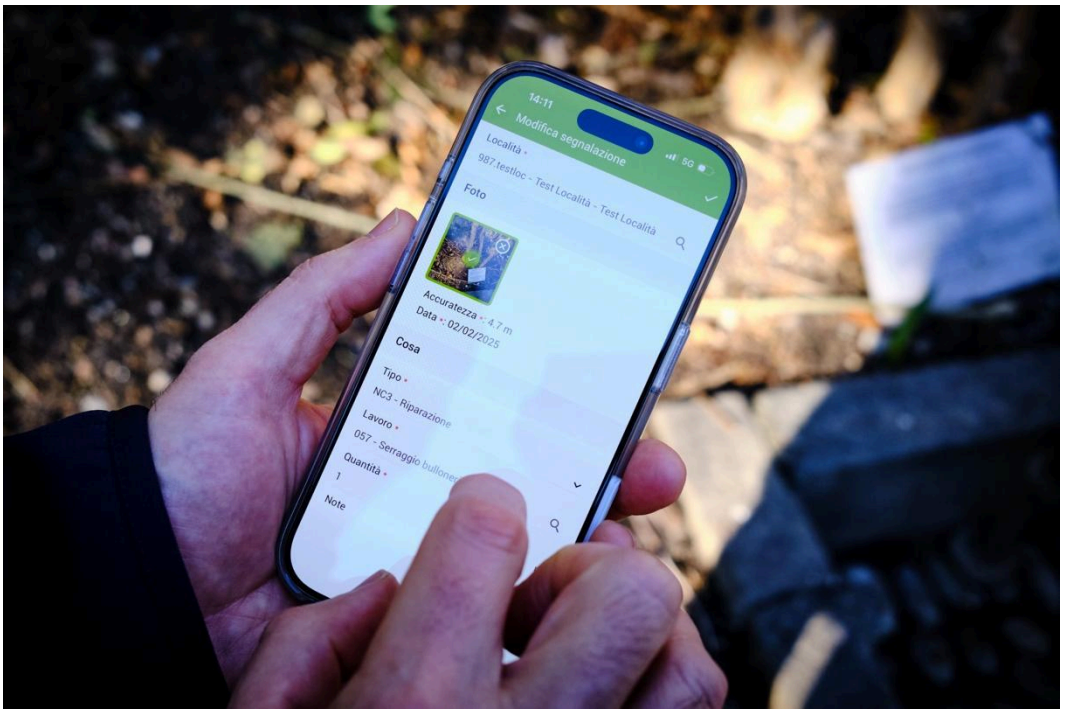


Figure 2: Recording of a Non-compliance with the smartphone in the field

Citizen Engagement

In 2015 the Municipality of Milan launched an app to engage citizens in the maintenance of green areas. Citizens can use a specially designed app to report issues such as broken playground equipment or malfunctioning dog park gates. Users can track the progress of their reports in real-time. It's the first technological tool that allows citizens to interact with the municipality for green space maintenance activities. The free app focuses on playgrounds, dog areas, and sports equipment. Reports are automatically integrated into the regular maintenance program. This initiative aimed to make it easier for Milan's residents to actively participate in maintaining their city and to improve the quality of the green areas.

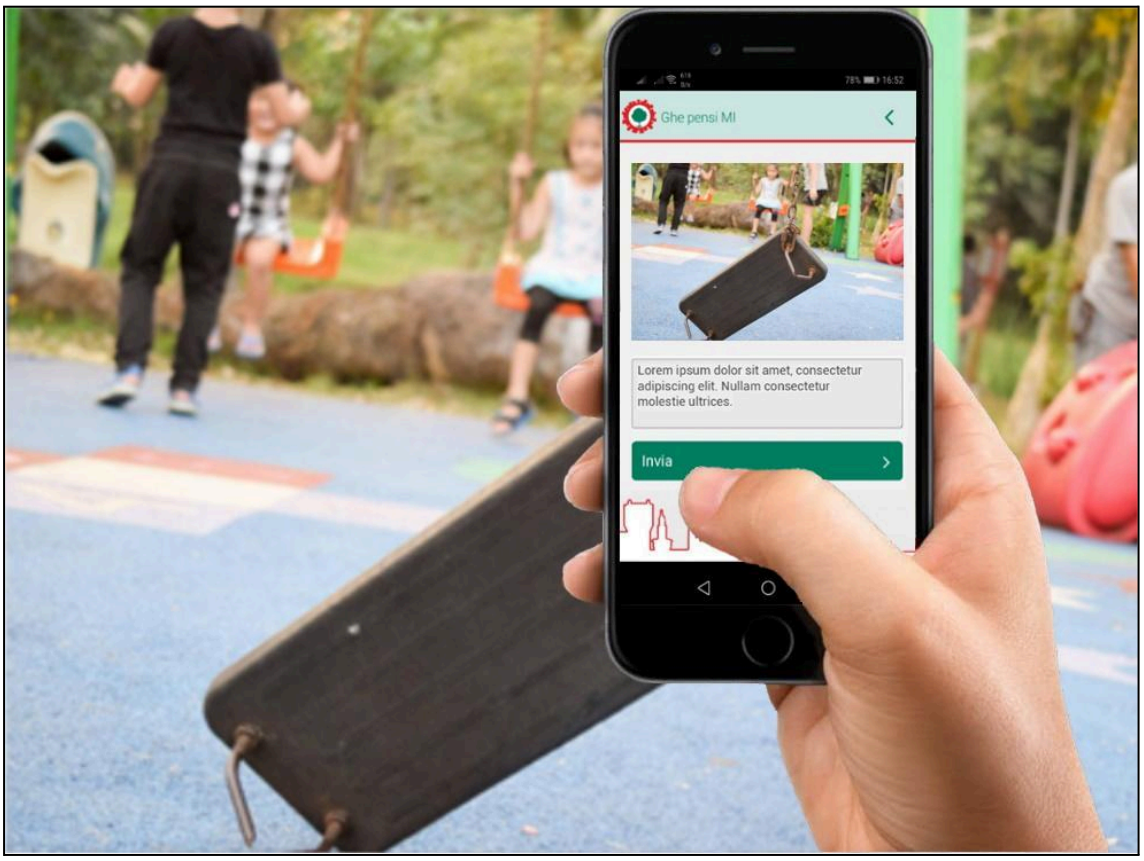


Figure 3: Example of an issue reported through the citizen's app

Management advantages

GreenSpaces introduced new tools with a documented benefit for all stakeholders involved in the management of Milan's green infrastructure. The main advantages are:

- possibility to track changes in the territory and public green spaces over time.
- access to reliable data and statistics in a quick and easy way.
- better management of programming and planning activities, making them more efficient and effective.
- full control over the condition of the city's green spaces.
- quick interventions to resolve faults, damages and critical issues
- up-to-date information on 'sensitive' elements (trees and equipment) in order to prevent accidents or personal injury and manage any disputes.

Conclusions

Milan's efforts in urban green management have yielded significant results:

- The city achieved the goals of the Paris Agreement on Climate Change by 2020, being the only Italian city to do so.
- Milan ranks among the top 5 cities in Europe for the number of sustainable buildings according to the LEED standard.
- The city has consistently improved its position in sustainability rankings, including economic and social sustainability metrics.
- The unit costs of urban green management were reduced since the introduction of the Global Service Model and the use of GreenSpaces by 20%.

Figure 4: A view of Porta Nuova area and the Headquarters of Regione Lombardia, a trademark of Milan