Transforming urban environments: the healthy city as a common asset

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Abstract. This paper demonstrates, through the narration of a direct experience in the field, the potential impact generated by the intervention proposed as a case study, as a driver for the development of the territory in a 'Healthy City' perspective, expressing a strong potential for social inclusion and functional and spatial qualification. The research, from which it originated, highlighted the role of the University in supporting the PA in proposing strategic governance actions for the development of the territory. This is achieved through its multidisciplinary competences and its ability to draw on the exchange of visions and contributions provided by the actors involved in order to enhance the available local resources and specificities, and to foster the socio-economic well-being of the community.

Keywords: Active city; Sports infrastructure; Urban resilience; Collective well-being; Integrated approach.

Cities as Strategic Labs

«Rapid regional and global changes are transforming living spaces and lifestyles, demographic trends, and the global environment, all with important consequences for human health and well-being. Urbanisation is of primary importance among the forces affecting population health. A significant percentage of the global population lives within cities and the proportion of urban dwellers is rapidly increasing » (Thomas *et al*., 2016).

All this leads to increasing problems related to inhabitants' health and well-being, safety and general quality of life. It is, therefore, fundamentally important to identify an alternative to the city scheme that has been imposed up until now, and to turn to new regenerative models capable of interpreting cities as places of experimentation according to an evolutionary rationale aimed at sustainable innovation, with interventions capable of redefining a new local identity, improving the environmental quality, health and well-being of communities. There is, in fact, «a pressing need for cities to develop sustainably without causing more damage than necessary to the environment or the health of its citizens» (Corburn *et al*., 2020).

«Cities are an increasingly central topic in sustainable development policies. [...]. The 2030 Agenda identifies urban areas as an opportunity to implement its goals, including an SDG [Sustainable Development Goal] specifically dedicated to cities and human settlements (SDG11). The New Urban Agenda is in the same vein, recognising and supporting the role of urbanisation as a powerful tool for sustainable development in both developing and developed countries. In fact, the most demanding environmental and socio-economic challenges are concentrated in cities, but at the same time they represent centres of industrial and social innovation and strategic laboratories for the development of a new "sustainability culture", also in relation to urban regeneration policies» (MASE, 2024).

The characterisation of this new culture capable of combining sustainability with technological development is not easy to define. As a primary action, it must necessarily reframe the role of the citizen/user, which must become absolutely central.

Indeed, the city of the future must not limit itself to redesigning buildings and infrastructure, and to transforming services.

«It has a new purpose and, for the first time, it is firmly based around the needs of people, while also proactively and dynamically preserving our planet. People are no longer second to infrastructure, buildings or land use, and a more 'regenerative' standpoint is now taken, acknowledging that the city's key role is also to foster healthier mindsets and behaviours» (Key Cities, 2022).

This is the only way a city can express its potential for social inclusion as well as functional and spatial qualification.

Hence, in this context, there is a critical relationship between the city and health and «in particular between urban planning and health [...] involving a profound redefinition of the concept of health – from a sectoral health model to a multidimensional social model – and at the same time pushing for the reorientation of urban policies [...] towards the promotion of health and well-being by searching for better habitability, liveability and hospitality conditions in cities [...] putting to work a new perspective (transversal to disciplinary and intervention sectors) in order to "see" and "construct" the new urban problems and "equipment" to experiment with new solutions to deal with them» (Bellaviti, 2005).

Starting with the World Health Organisation's (WHO) concept of "health" as «a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity» (WHO, 1948), it is evident how «inhabitants' well-being and health [...] cannot be separated from the quality of living spaces and not secondarily of open space, particularly in urban contexts. Insights from research in different disciplines can be translated into actions that will improve health as long as a holistic and transdisciplinary approach is taken that is geared towards health and the perceived quality of living in the city: from biology to medicine and social and healthcare assistance, transport planning, urban design, landscape architecture, environmental protection, the design of spaces in the city and multimedia communication» (Maspoli, 2018).

Such an approach must allow for the vision of urban health to shift from an anthropocentric perspective to an eco-centric one capable of enabling the joint evolution of human health and urban environmental health. In this way, «even when it comes to environmental impacts, cities are not only places of consumption and pollution, but hubs that give rise to creative and innovative solutions for transport, energy, education, econom-

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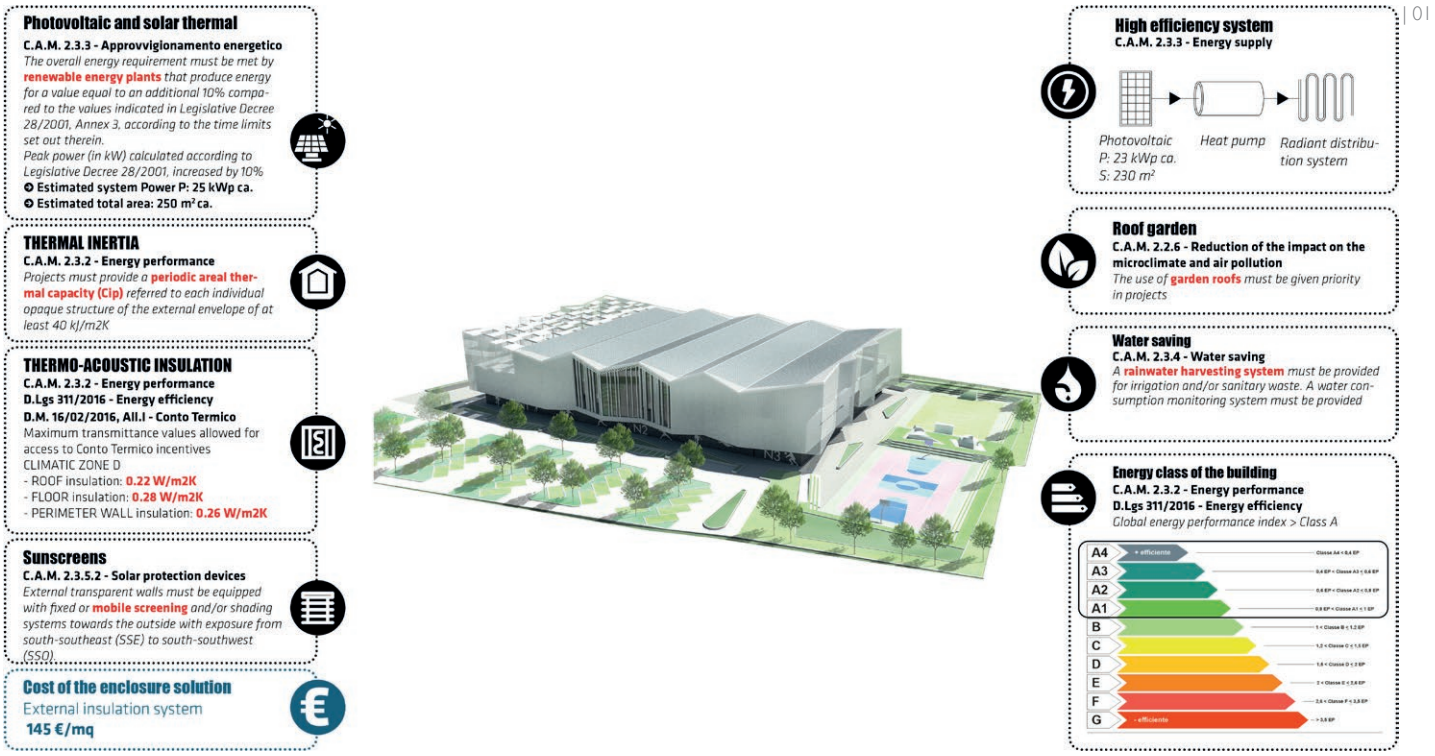
ics, housing or food systems. Such a shift from health in urban environments to healthy urban systems could change scientific and policy agendas, create benefits from connecting urban and planetary health, and have a major impact [...] to achieve sustainable development on an urban planet» (International Science Council, 2024).
Cities are thus defined as complex living systems that must be healthy to sustain healthy human lives and a healthy planet. Urban, human and planetary health are, therefore, connected. The various urban sectors, including housing, transport, the natural environment, the built environment, and the health and cohesion of the inhabitants, all become determinants of "urban health", such that the health of an individual depends on the functioning of cities and is the key to making a crucial contribution to the sustainability of the entire planet (Corburn *et al.*, 2020). Following this logic, interventions that modify the built environment to encourage physical activity among citizens also play a crucial role. In fact, «physical activity also boosts our mental health and the sense of well-being. The options for physical activity are not limited to indoor facilities [...]. There are also outdoor options, where our activity level to a large extent is determined by the environment, we move in. [...] All in all, beautiful, exciting and safe environments encourage movement, and hence, the design of the urban environment is essential for citizen's level of physical activity» (Danish Health Authority, 2020).

Innovative technological design for a sustainable and decarbonised built environment

In redevelopment processes that seek to integrate aspects of health and inclusiveness, the promotion of «multistakeholder partnerships to generate urban policies that, based on studies on the impact of health determinants in cities, can give rise to "smart" actions aimed at reducing health risks and promoting a healthy and inclusive urban environment» (Occhiuto *et al.*, 2023) is one of the objectives to be pursued. Citizens and administrations, within their different remits, should share the idea of public health as a resource by supporting and promoting policies geared towards the redefinition of new urban habitats. New living contexts in which work affecting the complex system of buildings and open spaces plays a key role in interpreting and guiding the changing needs of the community.
Urban densification phenomena, accompanied by the expansion of the built environment, have produced a sharp decrease in spaces dedicated to community activities and pedestrians and, in particular, in green spaces *pro capite* (James *et al.*, 2009). These are a limited resource, especially if we consider that many people live in urban areas where distances to green spaces increase, reducing the possibility of their frequent use. This inevitably causes a critical issue in terms of daily accessibility to open spaces and, in general, to places for the community, with repercussions in various areas such as health and social and environmental contexts (Barton and Pretty, 2010).
Public interventions that are attracting a lot of attention in Europe, and fortunately also in Italy, for their role in serving the community, include urban spaces designed for the development of user health. In the context of urban redevelopment interventions for the growth of well-being in our cities, these places, especially when dedicated to sports, can become the object of social and environmental experimentation for the benefit of the entire community.
The recent development in the academic field of research on the design of places for education and the health of users has increased significantly. This has encouraged direct dialogue between the world of research and regional administrations, giving rise to extensive experimentation with a vision of the project that addresses the theme of urban transformations from an environmental perspective to create a healthy city. This goal has the additional consequence of creating sustainable development models that are effective for the challenges urgently demanded by the changes taking place.
Approaches capable of interpreting cities as places of experimentation where the transformation of what already exists is implemented according to an evolutionary and incremental rationale aimed at innovation, with effective and sustainable interventions capable of redefining a new local identity, improving the community's environmental quality, health and well-being.
A series of experiences carried out at the University of Florence about urban redevelopment and the built heritage towards zero-energy buildings have confirmed that the sports infrastructure sector has great potential for research, experimentation and innovation, even if it is lagging. This is the case of the work developed from an active convention between the University Florence and the Municipality of Pistoia[1] to promote redevelopment actions for the definition of guidelines for an eco-compatible integrated design of healthy and inclusive environments (Fig. 1).
The study focused on the development of intervention strategies for areas to be redeveloped located on the edge of the densified city, and as an experimental case study, identified on the conversion of a devalued area into a sports/recreational area with a related project for a new Sports Hall (Fig. 2).
In the feasibility study phase, the research first defined a broad frame of reference consisting of paradigmatic examples that were analysed about the specific themes of increasing environmental and social resilience, defining adaptability/flexibility of the built environment's lifecycle, including through the

01 | Intervention strategies at area and building level according to Minimum Environmental Criteria – CAM, credits Antonia Sore, Elisa Belardi, Antonio De Pascalis

02 | Building-scale project objectives for the Sports Hall, credits Antonia Sore, Elisa Belardi, Antonio De Pascalis



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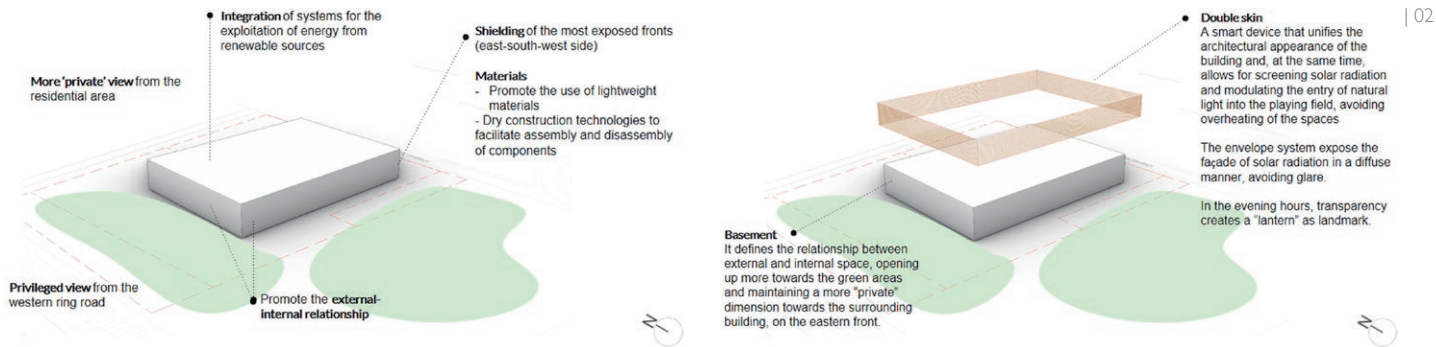

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introduction of technological and environmental innovations. Examples such as the planned social conversion of the sports infrastructures built for the 2014 World Cup in Brazil, the basketball stadium built for London 2012 that can be completely dismantled and recycled, or the sports areas of the "Stade de Suisse" for Berne 2005, or the Antalya Arena in 2015, with the largest renewable energy infrastructure and, finally, the use of innovative lightweight construction technologies and materials with high presentation (e.g., the ETFE used for the first time in sports buildings for the World Championships in Japan and Korea) (Allegri and Vettori, 2018), provide a complex reference framework on which to establish and implement, in the local setting of the Municipality of Pistoia, the innovative proposals for redevelopment of the intervention area.

A case study on the redevelopment of a suburban urban area shed light on local practices to enhance degraded urban spaces, the impacts of interventions, and the integration of health and equity aspects in the urban planning processes of the Municipality of Pistoia. The trial conducted aimed to provide tools for a local approach to support municipalities in deepening their understanding of how to implement effective and sustainable interventions in degraded urban spaces, and thereby provide optimal benefits

03 | Functional organisation of the outdoor areas with the identification of places for recreational/sports activities to serve the city, credits Antonia Sore, Elisa Belardi, Antonio De Pascalis

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for the whole local community. It was an opportunity to increase activity levels and support citizens to lead healthier lives.

The key points addressed in the experiment were (WHO, 2024):

- the promotion of strategies/policies geared towards re-defining new "active" urban environments starting with the shared concept of public health as a resource;
- a project approach that contemplates the physical characteristics of the intervention while respecting the requirements of the users and the vocation of the area;
- the creation of a significant public place with a distinctive character in order to enhance its environmental and cultural features to create place identity;
- the creation of "connective" places between the interior and exterior, and between the built environment and green areas, for the development of sports activities with characteristics of high sustainability and efficiency;
- the development of good practices for community involvement and close collaboration with stakeholders.

From a strategic point of view, the objectives thus defined were widely shared and discussed with the public administration, and were based on a sustainable design approach. Choices were made that led to more solutions in keeping with and that responded to the environmental cognitive framework of the context. The aim was to redevelop the entire area with large green spaces dedicated to outdoor activities, as flexible spaces to promote the health and well-being of users, and to design a new sports building with high sustainability and energy efficiency standards, in line with national and EU directives on nZEB buildings (Peluchetti *et al.*, 2022).

The scenario that emerged from the preliminary investigation phase thus indicated three fundamental macro-themes for this project:

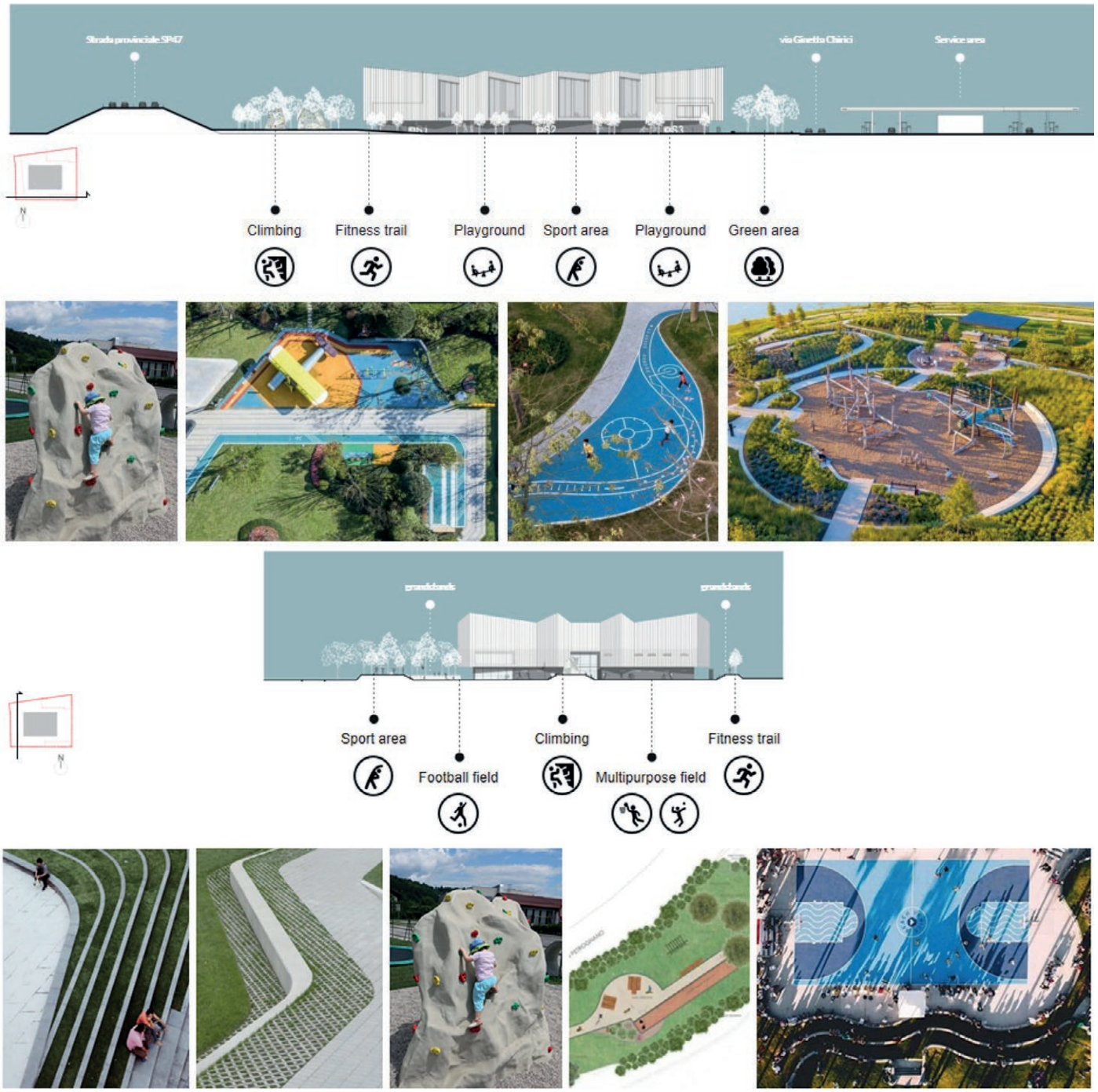
1. Sustainability and the reduction of the environmental impact with choices aimed at minimising the ecological footprint of the work, in terms of both energy consumption and the production chain of materials used;
2. Passive strategies for the environmental control of both the open space and the building with technological-compositional solutions capable of maximising and enhancing their effects to ensure indoor and outdoor comfort;
3. The use of renewable sources and energy sustainability to achieve the energy independence of the sports complex.

The project integrated and verified the incorporation of strategies aimed at establishing the correct balance of soil permeability in compliance with current regulations with the restoration of green areas. It also directed the choices for the construction of a building attentive to the reduction of consumption, resource optimisation and the promotion of adequate levels of indoor comfort.

The outdoor space was structured into three different functional areas, indoor, outdoor and hybrid, defined by the system of footpaths, which qualify as an integral part of the functional programme of the sports complex. Insofar as directly connected to the indoor space, they can be easily equipped and reprogrammed to accommodate different types of activities of a recreational-sporting, leisure and social interaction nature (Fig. 3).

The design and layout of the green system presents an outdoor area enclosed between the boundary of the lot and the building,

04 | Environmental sections with the identification of technological and material choices for individual areas, credits Antonia Sore, Elisa Belardi, Antonio De Pascalis



which is healthier and perceived as safe and welcoming by users, a space set up, in continuity with the sports hall building, to host recreational and relaxation activities suitable for families and non-competitive activities to be carried out independently. The arrangement of the paths and the discretisation of the outdoor space according to functionally independent areas make it possible to propose its use also by external users, especially in the summer season, as well as at the end of and/or during ongoing sporting events, at times and days other than those when the facility is open, favouring the appropriation of these spaces by citizens (Fig. 4).

The compositional choices made for the design of the Sports Hall were based on the presence of a single compact building to minimise the footprint on the ground and exploit the outdoor space in order to integrate the recreational/sports activities, structurally and functionally divided into three sections,

05 | The entrance to the new 'Palamaltinti' Sports Hall in Pistoia, credits Antonia Sore, Elisa Belardi, Antonio De Pascalis

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namely a central one containing the full-height playing field, and two lateral two-level ones housing all the additional functional areas necessary for a building of this type (changing rooms, equipment room, etc.).

The insertion of a double shell to protect the building from overheating in the summer months achieves two further objectives defined in the preliminary meta-design phase:

- Make the entrance recognisable by distinguishing the main façade through the design and planning of the cladding pattern, and qualify the space in front of it as a place for waiting, meeting and interaction between spectators at events and the ordinary users of the sports hall (Fig. 5);
- Integrate technological choices with regulatory dictates so that they become the key to understanding and an opportunity to test architectural-compositional solutions that enhance innovation, testifying to the virtuousness with which the building uses and manages the context's natural resources.

By integrating much of the existing greenery with the addition of new vegetation, the project aimed to preserve the existing ecosystem and urban landscape. All these aspects facilitated the integration and visual impact of the huge transformation of this area, making the project more sustainable, resilient and integrated into the urban landscape.

Integrated approach and operative synergies

The narration of this direct experience in the field highlights the potential impact generated by the project as a driver for the development of the territory in a "Healthy City" perspective, expressing a strong capacity for social inclusion and functional and spatial qualification (Corburn *et al.*, 2020). In particular, the project outcome contributes to the generation not only of economic value in transforming places, but also has a significant impact on society in terms of improving the quality of the built environment and the well-being of the community (Tjallingii, 2015).

The strategic aspects that characterise the urban transformation intervention presented, both at the level of methodological design and from the point of view of the policies implemented, suggest a synthesis reflection that highlights its potential in terms of new spatial-functional configurations, its capacity to generate positive effects, and the opportunity to create synergies between different operational realities (Roos, 2021).

The intervention, as a regenerative approach for the community, is configured as a tool both to improve compromised contexts and to create inclusive environments to combat inequalities, including those related to health, by proposing, in this specific case, places where physical activity is accessible to all (Danish Health Authority, 2020).

This is in line with the principles of the approach known as Active Design, which emphasises the strategic importance of «places and spaces which encourage people to move more, with more opportunities for everyone to increase their activity levels and lead healthier lives» through the creation of «network of multifunctional [place and] open space [...] across all communities to support a range of activities including sport, recreation and play [...]» (Sport England, 2023) considering not only the right size but also the right location to increase awareness and visibility of the activity.

The project, which shares the idea of collective health as a resource, promotes strategies aimed at redefining new "active" urban environments by working on the capital network, «constituted by the set of spaces, facilities and services of the public city, integrated by the elements of the environmental system» (Alberti and Radicchi, 2023). By reactivating unused spaces for the benefit of the community, the urban transformation intervention was studied to increase multifunctional services redeveloped in a sports key, and to increase of the plant-based component to improve environmental performance. It activates reconfiguration processes that start from the built environment and extend to the relevant spaces, intercepting additional places of proximity (Alberti, 2020). A proximity that, given the marginal location of the project concerning the urban fabric of the municipality of Pistoia, can be interpreted not so much in a physical sense but rather «as a new model of urban well-being, reflected in "responsible" planning – summarised in the notion of civic design (Scott Brown, 1990; Alberti, 2020) – capable of responding in an integrated and creative way to social, environmental and functional needs, making the best use of available human, spatial and economic resources» (Alberti and Radicchi, 2023).

The paper, which presents the results of an experience carried out in synergy with local authorities in the area, provides an opportunity to reflect on how architectural and technological research in the environmental field can interact with professional expertise in favour of responsible design to enhance the environmental component and promote the key to technological innovation in our territories.

The results of this activity, developed in partnership with the University within the framework of a memorandum of understanding, are a strategic experience for the PA both because this experience looks to new lines of research, also within the framework of the financial support of the European Commission, and because it envisages the enhancement of the territories directly involved.

This is one of the key aspects of the work presented, precisely to reduce the distance between the research context and the territorial situation capable of concretising its results. The aim is to enhance the research, whose wealth in creating innovation lies in the strength of the networks between local bodies (universities and local authorities) and the entire business world, as well as stable collaborations between producers and users.

Lastly, the case study presented demonstrates the effective overcoming of limitations related to the difficulties of dialogue with public administrations and/or institutional figures outside the academic world, outlining how, in a rather critical economic, cultural and environmental scenario, there are margins for the successful transfer of knowledge through operational experimentation.

The highly operational and site-specific character of the project presented may constitute a limitation from the point of view of its replicability in contexts with different socio-economic and environmental peculiarities. However, the design process adopted and based on a demand-performance approach centred on the characterisation of the framework of requirements and contextual constraints of a programmatic, technical and environmental nature allows for the provision of responses articulated and differentiated according to the different inputs through the adoption of systemic strategies and related compositional, functional and technological solutions (Leone and Raven, 2018).

NOTES

[1] Research Agreement (2018/2022) under art.15 of Law no. 241 of 7/8/1990 between the University of Florence – Department of Architecture – ABITA Interuniversity Centre, and the Municipality of Pistoia "Towards Zero Energy Buildings. Redevelopment of the existing building heritage: guidelines for public administrations".

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