Applying Transdisciplinary Experimental Methods to the Regeneration of a Former Nunnery

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Abstract. In the fields of architecture and urban planning, research over recent decades has shifted its focus from expansion to the transformation and regeneration of existing urban structures and buildings. In this context, scholars have primarily sought tools and methods to optimize building renovation processes and enhance their energy efficiency and structural performance. This article considers regeneration as more than a technical issue and proposes an alternative strategy to integrate urban analysis, building analysis, stakeholder mapping, placemaking, and scenario building into a unified process including people from the very beginning too. The contribution, therefore, through the description of a case study involving the development of a feasibility study for the regeneration of a former nunnery in Italy, illustrates a three-stage framework: 1) analysis, 2) discovery, 3) valorization, guided by a research-through-design methodology. It presents a vision of regeneration as a space where design can assume innovative roles, fostering community involvement in shaping urban transformation strategies. Most importantly, it can serve as a means to reconfigure disciplinary knowledge into transdisciplinary frameworks, addressing questions related to the future regeneration of heritage assets with uncertain uses.

Keywords: urban regeneration · transdisciplinary planning · participatory design

1 Introduction and Context

1.1 The Sense of Regeneration in the Neoliberal Era

The conclusion of the modern era, coupled with the decommissioning of industrial zones, the relocation of manufacturing activities, and the globalization of markets, has resulted in significant portions of the city remaining unused and awaiting repurposing to serve the needs of a transitioning society [1, 2].

Since the 1990s, in Italy, as well as across Europe and much of the United States, the discourse surrounding urban development has progressively shifted from an expansion-oriented research orientation to a consideration of the transformation of existing urban

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structures [3]. In this context of debate and the difficulty of establishing new regulatory schemes, many cities have experienced market-driven urban transformations grounded in neoliberal principles, operating under the assumption that actors would self-regulate [4–6].

The acknowledgment of the market's inability to self-regulate, coupled with protests spreading across numerous cities and the extensive impacts of urban transformation driven by competition to attract increasing capital, has in recent years led to the dissemination of various practices and tools. Additionally, there has been a renewed emphasis in academic literature on experimenting with urban planning models that prioritize the social and environmental sustainability of urban transformations [7–9].

The dissemination of gentrification [10–12], the substitution or mixing of the historical inhabitants of an area with new inhabitants capable of purchasing properties made expensive by their transformation [13], the expulsion of the less well-off classes from redeveloped urban areas from Milan [14, 15] Barcelona [12] and Belgrade [16]; the commodification of historical centres and the worsening of overtourism [17] are phenomena that contribute to the development of new sensibilities and the desire to experiment with new ways of imagining, designing and realising different forms of urban transformation.

The diffusion of practices of community involvement is a line of actions and experiments that, born in the Sixties [18, 19], has regained vigor [20] after a couple of decades of stagnation. Scholars in urban planning, sociology, and political science developed research frameworks, theories, and perspectives focused primarily on techniques and tools for collaborative, communicative, and radical planning [21, 22], as well as placemaking [23] and democratic experimentation [24, 25].

The last two decades have also seen growing interest in citizen involvement in urban transformations, particularly within design disciplines such as participatory design, civic design, and policy design [26]. More specifically, participatory design [27] has been engaged in searching for tools and methods to plan and run workshops and actions, improve citizen engagement, enhance the accessibility of these urban laboratories [28], and understand how, during the process, the public gathers around emerging cities' issues [29–31].

The method tested through the case study illustrated below is part of a line of research that goes beyond disciplinary contexts to develop tailor-made models and methodological approaches, drawing on the potential of a perceived all-encompassing unity of knowledge [32]. Many scholars indeed concentrate their research on integrating participatory methods as tools for developing disciplinary knowledge; however, less emphasis has been placed on exploring new theoretical frameworks that enable these assemblies not only to become collective, shared knowledge but also to serve as a place where transdisciplinary research through design in the field of urban planning and urban design could grow.

This paper falls within the scope of the research-through-design field [33, 34]. Therefore, it develops a methodological proposal following the completion of a participatory regeneration project, or, rather, a theoretical proposal resulting from the methodological knowledge generated by the project [35].

1.2 The Context

Casa Sant'Angela is a structure on Via Rosmini in Trento, originally built to accommodate the Ursuline Sisters' congregation. Erected in the early 1930s, it is positioned at the periphery of the historic center, in a zone that, over the past two centuries, has been swiftly integrated into the urban fabric of the contemporary city, evolving with a diverse morphological configuration over time. The complex was constructed on a residual lot that, until the 19th century, was situated in open countryside. Its development was impacted after World War II by the construction of the Brenner railway, which confined it to a strip of buildings between the road and the tracks, rendering it a peripheral area effectively separated from the social activity associated with other social hubs.

The Casa Sant'Angela complex, however, now forms an integral part of a rapidly evolving urban landscape. Previously situated on the periphery and prominently defined by the presence of the Monumental Cemetery, this area is progressively adopting a new function as a nexus of urban flows, activities, and functions.

The gradual abandonment of the facility by the Sisters of the Company of Saint Ursula and the outbreak of the Covid-19 pandemic ultimately resulted in the repurposing of the complex for emergency functions. This included the establishment of accommodation and the daytime distribution of meals to individuals in need. Such temporary utilization, through practical application, demonstrated the new potential of these spaces, thereby opening the complex to a different user demographic and fostering the development of a newly hosted community.

Based on these encouraging temporary uses, the Management Board of the Trento European Capital of Volunteering Committee commissioned a multidisciplinary team to conduct a feasibility study regarding the regeneration and transformation of Casa Sant'Angela into a community space.

1.3 Experimental Method and Approaches Design

While organizing the actions needed to develop the feasibility study, it was decided to consider the community of local third sector organizations, social enterprises, and cultural enterprises as a key element. Therefore, it was determined to give an important role to the design of participatory processes [27, 36, 37], alongside the survey and analysis of the building's structural, architectural, and urban features. To achieve this scope, the tested methodology borrowed from the approach to social innovation developed in design disciplines [38] and in studies on the relationship between design and territory [39].

The process based on these foundations consists of three main stages: 1) analysis; 2) discovery; 3) valorization.

The analysis stage (1) is fundamental to experimentation. It is inspired by the holistic territorial survey paradigm, placing the community at the center and shifting focus from just solving a problem and achieving a result to reflecting on the reasons behind the intervention. By developing a framework that considers the building's urban and architectural evolution, existing structural and functional constraints, and reconstructing the complex's functions and role in the city, the analysis phase reveals potential and lays the groundwork for innovative projects [40].

This phase involves the community's contribution to mapping resources for understanding the historical and social constructs within which the heritage is embedded. Subsequently, the community assumes the role of protagonist during the discovery phase (2), where the narrative and sharing of the framework developed during the analysis phase enable participants to "discover" the artifacts involved and the relationships of interest, frequently altering their perceptions of what already exists.

The valorization phase (3) develops from the results of the previous two phases. During this stage, reworking analyses, shifting perspectives on artifacts and their relationships, and engaging in open, shared reflection enable the reconfiguration of existing resources. This process supports the community's shared social goals and guides a development project rooted in local reality and its resources.

2 Case Study Casa Sant'Angela

2.1 First Phase: Analysis

Following the planned action, the process to deliver the feasibility study for the regeneration of Casa Sant'Angela began with a thorough analysis that included: 1) the location of the complex in relation to the current and future urban layout of the area; 2) a description of the spaces available into the building in terms understandable to all stakeholders; 3) collaboration with organizations interested in creating a map of the existing structures and exploring potential new relationships within the context.

1. Location of the complex in relation to urban layout

The Casa Sant'Angela complex is situated within a rapidly evolving urban setting. It is situated at the intersection of two major roads, increasingly central to the area's accessibility and growth. Along Via Rosmini and Via Giusti, respectively to the north and south of the building, are significant educational institutions: on one side, the Department of Humanities and Philosophy at the University of Trento, and on the other, two higher education schools. These institutions draw thousands of students daily, many of whom travel from outside the province.

The ancient Renaissance route of Via Madruzzo, recently improved by the construction of a pedestrian underpass connecting the city center to the museum complex comprising the MUSE and the Palazzo delle Albere, runs transversely to these main axes.

Along the westward extension of the Adige River, many redevelopment projects are in progress on abandoned structures. Although the early phase has been somewhat uneven, these efforts signal a significant renewal of the cityscape. Notable projects include restoring the Barchesse of the Palazzo delle Albere, converting the old trade fair zone, and establishing a center for cultural and entrepreneurial innovation, currently housing the Santa Chiara Cultural Center.

This urban transformation plan is further strengthened by plans to bury the railway corridor and redevelop the area of the Briamasco Stadium. Viale Madruzzo will not only connect the historic center to the Albere district but also become the center of a new urban network that extends uniquely from the city center to the banks of the Adige River (Fig. 1).



Fig. 1. Casa Sant'Angela in the urban context

2. Description of the spaces in the building

The Compagnia di Sant'Orsola complex results from combining several buildings, each simple and identified by its architectural design. Together, these volumes create a maze-like layout that feels more like a home than a public space. Despite its large size and expansive surfaces, a careful look shows that the complex functions as a large, shared residence.

The residential areas are located on the first and second floors, while the shared spaces, related to logistics and community activities, are mainly on the ground floor and in designated sections of the building.

Considering this peculiarity, reflected both in the material structure of the spaces and their interconnectedness, it was suitable to analyze the complex by breaking it into building blocks, thus clearly emphasizing its constraints and potential for change.

The outdoor spaces are probably the least prioritized resource in the entire complex, even though they cover more than half of the total area. Long kept out of public access, they have stayed in the background, despite being a key part of the site's layout and future potential. Over time, these areas have mainly served functional purposes related to the buildings, such as access and service routes, or have gained decorative value, such as the garden surrounding the entrance on Via Rosmini.

3. Map of the existing and potential new relationships

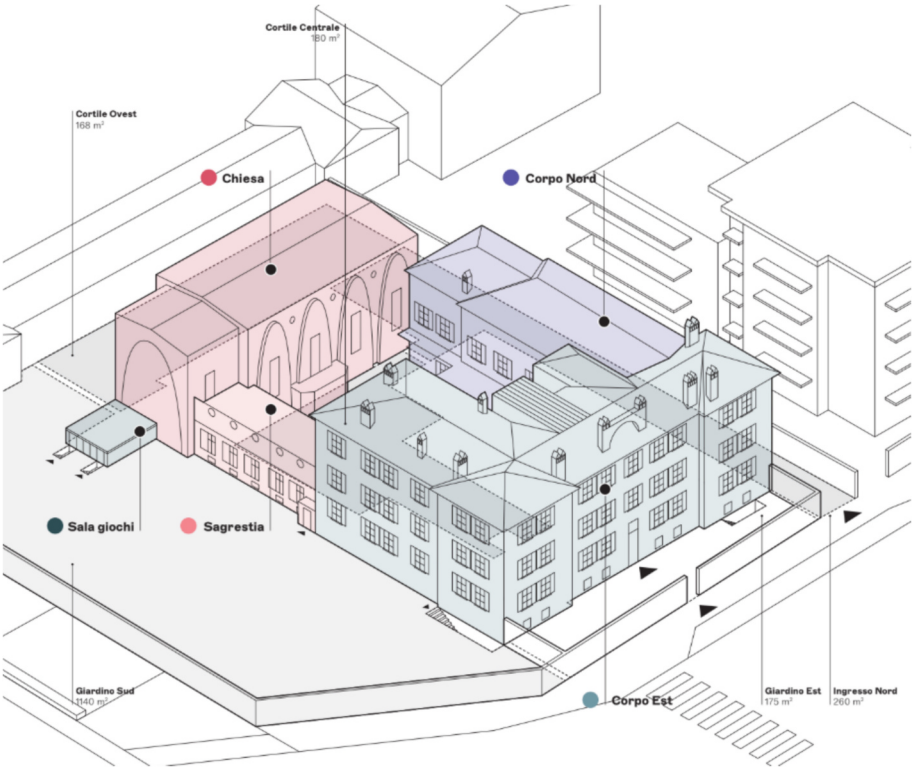

Fig. 2. Description of the building's blocks

We can see buildings in a city not only as places where people arrive, meet, and go daily, but also as hubs that both influence and are influenced by the network they are part of.

Enhancing Casa Sant'Angela's capacity to serve as a hub that fosters connections with the surrounding community is essential today. This ensures that formal and informal networks of people, associations, and institutions can create opportunities for collaboration and innovation.

To understand what kind of hub this building could become from the perspective of the urban network, in collaboration with Trento's social and cultural organizations, a map was created that connects the cultural and social aspects dedicated to the community. This map highlights the spaces, organizations, and stakeholders currently active. For each of these places, Casa Sant'Angela could serve as a development laboratory, a venue for events, or a partner to expand the network of activities. Similarly, these spaces are crucial for Casa Sant'Angela to define its identity and develop a sustainable project over time (Fig. 3).

This first phase led to conceiving and designing the project's structure as a process of creative recombination of existing resources: a) the social capital represented by local profit, nonprofit, public, or voluntary organizations, and b) the historical and real estate



Fig. 3. Map's detail

heritage, consisting of the building, to achieve socially recognized goals. Within the broad range of possible methods and activities, from the most widespread and well-known facilitation or participation actions to co-design groups with defined end users, we chose to act from the perspective of those who want to *make things happen*, given the experimental nature of the work.

In other words, we adopted tools and methods aimed at shaping existing conversations and fostering temporary, open, and flexible dynamics of discussion and conflict about what and how to do it [38, 41] in subsequent meetings with local public and private entities, in the qualitative and quantitative analysis, and in the drafting of the final product.

The activities carried out to achieve these effects have been:

- **Analyze the policy documents** and reports produced by relevant stakeholders during the year in which the process of Trento European Capital of Volunteering has been run.
- Collect answers with an **online open answer questionnaire** to gather insight and experience, delivered to the mailing list of the stakeholders (60 different organizations) mapped by the Management Committee during the European Capital year;
- **Collect and set benchmarks** with other similar common spaces.
- Realize **open interviews** with strategic stakeholders to deepen the map of emerging social needs.

2.2 Second Phase: Discovery

Analyzing expectations, meeting with local stakeholders, and conducting benchmarking research have helped us conceptualize and formalize several intervention scenarios, which are potential clusters of functions, people, and organizations based on socially and culturally grounded regeneration strategies with a strong identity.

These scenarios are a crucial part of the building regeneration process, as they allow for the practical application of concepts and operating models for cultural and social centers and innovative services by comparing them with familiar spaces and locations in nearby areas.

The design of the scenario to be discussed follows a transdisciplinary approach, enabling the creative re-imagining of the disciplines and the possibilities for their combination [42, 43].

Transdisciplinarity allows designers involved in the process to work between, across, and beyond disciplinary borders (Fig. 2), developing custom-made frameworks and methodological approaches to draw on the potentials of a perceived, overarching unity of knowledge [32] (Fig. 4).

Choosing a transdisciplinary approach appear to be the best way to develop urban regeneration scenarios capable of integrating: a) the refurbishment of infrastructure and systems; b) the definition of new functions that reflect the values that emerged from the Volunteering Capital Year process; c) the design of services for different target groups; d) architectural redevelopment; e) the development of construction site management phases; f) the development of the management model for the regenerated building; and g) the design of the placemaking strategy for a hybrid place that the city of Trento will have to learn to understand.

The process of scenario design and analysis has been guided by a rigorous feedback workshop with local third-sector managers and professionals to discuss previously designed scenarios.

The workshop was designed to consider, first, impressions, suggestions, and ideas from every relevant organization active in the local social and cultural sector, and, second, those from institutions involved in processes at various levels with different roles.

Below is a summary of the scenarios developed for comparison and the reasons mapped through the feedback sessions that led to their exclusion:

→ Creation of a sustainable mobility hub, a lack of such a feature in a city like Trento, which is strongly committed to promoting sustainable lifestyles.

The building is not adjacent to any transportation hubs; there are no stations or park-and-ride facilities nearby. This means that a sustainable mobility hub here would not find its natural user base, consisting of commuters who arrive in the city by bus, car, or train and use bicycles or scooters to get around the city center. The building also spans multiple floors, which limits its potential as a bicycle repair shop or parking lot, since moving vehicles between floors would be complicated and challenging.

→ Creation of a coworking space.

Coworking spaces still represent a service that can trigger innovation processes through cross-fertilization and encounters among people working in knowledge-intensive sectors. In Trento, too, several spaces have been designated for this purpose over the past fifteen years. This function underscores that opening a dedicated coworking

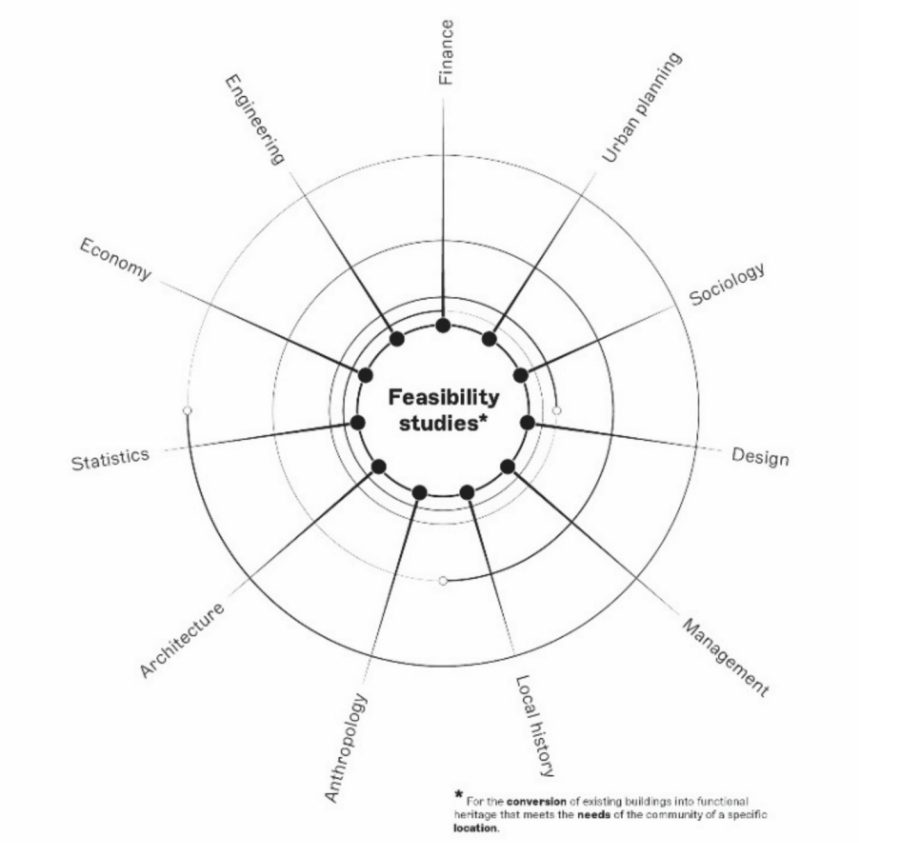

Fig. 4. Disciplines involved in the design of an urban regeneration strategy for a historical building

space within this building would duplicate existing ideas and, therefore, be less likely to spark innovation.

→ Creation of a hub for digital manufacturing, i.e., the broad spectrum of activities related to fablabs and makerspaces, which in recent years has become increasingly central to the design of sustainable forms of urban regeneration. In Trento, there are two such spaces, located at the University and the Muse museum. The possibility of designing new spaces to foster small digital artisan businesses could certainly be a valuable driver of innovation for the city. However, these initiatives require significant mobilization of knowledge and skills from interested parties to launch and sustain in the long term. In other words, spaces of this type could function, upon request, for example, by groups of students or alumni who, after using university spaces, embark on a production initiative.

Among others, two specific strategic scenarios were examined following positive feedback and initial investigations into the current structure.

These are, first, a scenario that transforms Casa Sant'Angela into a cultural center, and second, a scenario that proposes it as a hub for social catering.

The core of a cultural center is its active space, driven by a cultural program structured on two levels: a consistent schedule of cultural activities (such as events, performances, and meetings) and a variety of extracurricular activities, including workshops, one-time events, and rentals for third-party businesses. All these activities, aimed at the public, are managed by multiple entities overseeing the space. It is not necessarily expected that all entities will operate within a formal network or have established a second-level organization.

Social catering is a complex and diverse phenomenon that encompasses all practices that combine food services with social inclusion. Catering services include fine-dining restaurants, osterias and trattorias, pizzerias, and agritourism establishments, as well as itinerant services such as street food, food trucks, home delivery, and catering. Additionally, it can also encompass pastry shops and bakeries on one hand, and bars and pubs on the other. The social catering practices that develop at the intersection of these variables are diverse: from commercial establishments with social missions that employ disadvantaged individuals (possibly reinvesting profits into social projects) to places that offer meals at affordable prices or free of charge to those in need.

The workshop led the process of designing the strategic regeneration scenario into the final phase, in which the multidisciplinary team involved summarized the results of each phase in the final version of the scenario and the feasibility plan. This process results not only in the valorization of the building in sè, but, foremost, in the valorization of the community's contribution and the specificity of the designed strategy.

2.3 Third Phase: Valorization

The main goal of regenerating the Casa Sant'Angela spaces—resulting from participatory processes to define the project and from technical assessments to identify architectural constraints and opportunities—is to develop a broader, more flexible programmatic structure. This aims to create a community space that can accommodate diverse functions and users, spanning various social and cultural spheres.

The main challenge of the strategy is therefore to transform the building into a structure capable of hosting a new community, diverse in its users and dynamic in the recombination of its components. One of the foundational principles of the building's redevelopment is thus the decision to bring all public functions—that is, those open daily to different groups of people—to the ground floor or mezzanine level.

The proposed scenario envisions a clear functional distinction by level, which, with minimal structural work, allows different types of functions to coexist, creating a unified purpose and a center that can define its own identity within the urban landscape.

The mezzanine level is therefore designed to host public activities, while the first and second floors are repurposed for residential use, consistent with the building's original layout and function. Specifically, the mezzanine level features spatial continuity between the different building units, achieved by redefining the interior spaces. While maintaining separate entrances and distinct functions, these spaces can be easily connected, depending on the time of day and the composition of the expected user groups. This flexibility emphasizes the building's public purpose, allowing it to adapt dynamically to the urban environment and community needs by expanding or contracting its multifunctional components.

The upper levels, designated for residential use in this scenario, maintain the division between the two building units, making each floor divisible into two fully autonomous sections. Each level can thus accommodate two separate communities of residents simultaneously.

3 Results

The regeneration strategy for the feasibility plan results in four key components.

1. *The promotion of food as a bridge between cultures and a means of fostering well-being*. The public spaces on the mezzanine levels and those of the church hall define the regeneration strategy, which is grounded in a model that views food, nutrition, and community dining as defining elements for a building that must find its place within the neighbourhood and the city. The functions housed there will be dedicated to promoting healthy eating, health education, culinary instruction and training, and organizing opportunities for gathering and socializing.
2. *Housing to address the housing crisis*. The provision of residential spaces within Casa Sant'Angela addresses the housing needs highlighted by the city of Trento in recent years. Their configuration as separate, non-interconnected spaces does not preclude designing cohabitation projects that bring together diverse communities and groups; rather, it primarily involves arranging the spaces to accommodate the diversity and variety of social needs and emerging vulnerabilities.
3. *Clinics*. Spaces designated as clinics could serve vulnerable individuals to ensure everyone's right to healthcare, or—through a shared commitment to addressing emerging needs—become spaces dedicated to promoting well-being. This could be achieved by preventing new forms of addiction now observed among younger segments of the population, or by providing psychosocial and educational support to families facing social withdrawal.
4. *The Garden of Encounters*. Encountering others, forming new relationships and friendships (but also finding or changing jobs) happen precisely through these kinds of encounters—chance and fortuitous—with people we haven't planned to meet. The garden itself, as a space overlooking the city streets, can serve as the backdrop for these kinds of encounters that create the weak ties essential for improving one's temporary circumstances or personal and professional life.

The final document, elaborated on these key points, outlines:

- the best features to develop to enable efficient and sustainable use of buildings, and the minimum construction and structural interventions necessary to optimize buildings' internal spaces;
- the contextual scenario that makes certain identified functions drive the location's positioning within the geography of the city's public spaces;
- the preliminary estimate of the structure's renovation and operating costs;
- the model for launching the operation of the regenerated space based on a public-private co-designed strategy;
- the business model to ensure the economic and financial sustainability of the management of the regenerated place;

– some final recommendations to avoid the most common mistakes in social innovation and culture-based regeneration processes.

This approach and structure in the final document enable the development of a flexible regeneration strategy focused on the balanced distribution of resources and social capital, tailored to economic sustainability and the actual capacity of local communities to mobilize (Fig. 5).

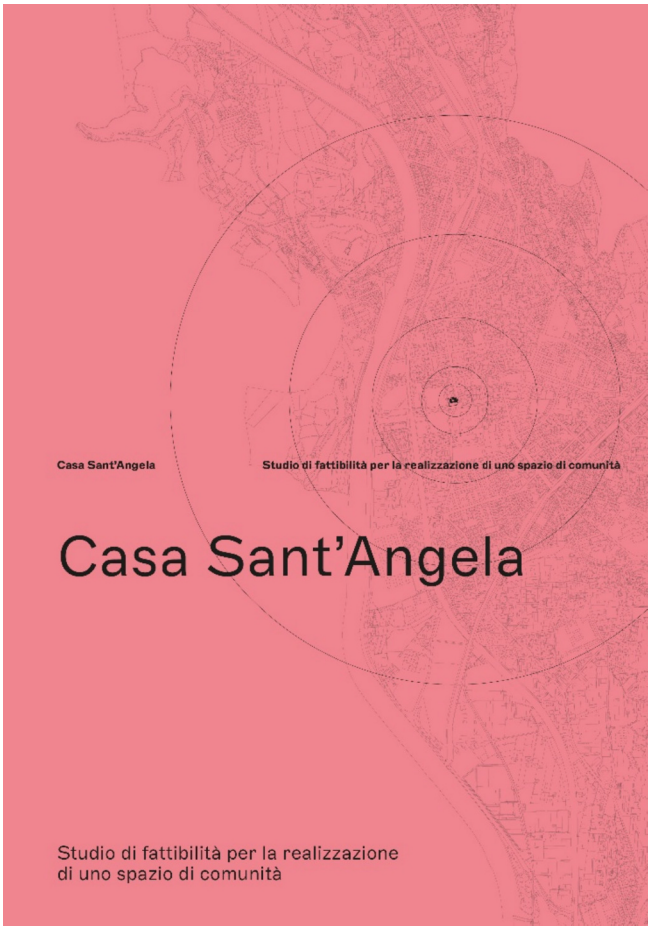

Fig. 5. Final document of the feasibility study for Casa Sant'Angela

4 Conclusion

The experimental approach, first and foremost, required a shift in focus away from a traditional technical consulting model. Whereas, in fact, when faced with the need to renovate a building, clients typically commission an architectural and/or engineering firm, here the mandate went beyond the development of specific solutions aimed at

revitalizing the building. Rather than assuming the role of an external party tasked with organizing the design process into a linear, logical sequence of identifying the elements and requirements necessary for the design solution and developing a solution based on their recombination, our role was therefore to facilitate and activate latent potential.

The focus was therefore directed not so much toward identifying technical and structural solutions to the building's problems to make it usable again by organizations with unknown purposes, but rather toward fostering an understanding of the project context as a complex of architectural, urban, structural, social, and cultural issues whose components are intertwined and often represent conflicting values.

In other words, the approach and method viewed the project context and the issues arising from it as a complex problem [44–46].

This approach led to the adoption of a transdisciplinary approach [42] and the conception of participation as the backbone of the design process. The transdisciplinary approach was adopted to enable the reworking of disciplinary knowledge generated during the study and analysis phase into the design action. The regeneration strategy developed was, in this sense, a pragmatization of the knowledge [47] and insights that emerged, as well as their reworking and organization into a coherent system capable of providing a framework and specific, detailed proposals for intervention.

Furthermore, the focus on community involvement and the design of the participatory process highlighted stakeholders' voices as a valuable asset. In the field of participatory planning, various solutions exist to prevent manipulation or the instrumental use of participants' goodwill. Some are adopted during the planning phase (establishing an advisory committee and denying promoters any form of power or privilege), and others during the implementation phase (providing participants with information, expertise, and balanced testimony, and entrusting process management to external parties). These solutions are commonly found in participatory projects, but they are not always completely successful [48].

The *Casa Sant'Angela* case study highlights that the use of an experimental method that offers tools and approaches to incorporate citizens' participation at different levels of the design process could prevent extractive and manipulative approaches toward citizens and participatory processes tout court.

This approach has made it possible to direct planning efforts toward representing—and thus legitimizing within the political process and institutions—the issues, concerns, and needs around which residents have rallied [49]. Rather than serving as a structure that conveys and informs, citizen participation has thus become an opportunity to discover the potential and highlight the needs of a community [50].

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