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ADAPTIVE REUSE IN FRAGILE CONTEXTS. COMBINING AFFORDABLE HOUSING SOLUTIONS, NEW JOB OPPORTUNITIES AND REGENERATION OF URBAN PERIPHERIES

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ABSTRACT

The proposed contribution considers living spaces in relation to the themes of affordable housing, work accessibility, adaptive reuse of existing heritage, and regeneration of peripheral areas. It presents the first results of an ongoing research-by-design experience, undertaken at Politecnico di Milano's Department of Architecture and Urban Studies, within the "Territorial Fragilities" Project, and bringing together two lines of research dedicated to contemporary housing solutions and to town and city peripheries. The research is also developed through teaching activities as part of the "Affordable Housing" Final Thesis Studio (MSc in Architecture – Built Environment – Interiors). The aim is to define innovative housing solutions obtained from adaptive reuse of non-residential, underused or abandoned public assets (offices, schools, hospitals, depots, barracks). The architectural solutions will seek answers to profound socio-economic-demographic changes (transformation of family structure, labour market insecurity, migration) and the criticalities they trigger (inadequate space, functional rigidity, lack of targeted services, poor affordability). Housing access is often conditioned by unemployment, therefore the research challenge consists in producing scenarios where a building can become not only a home but also contribute to reactivating the finances of people who are in need of a life experience that goes beyond just a roof over their heads. In this

perspective, housing is seen as a tool for starting empowerment processes – of people and buildings – that define new space and type solutions able to produce effects, especially in fragile contexts when supported by special policies. The contexts touched upon by the research are fragile areas: buildings and neighbourhoods found in town and city peripheries. The intervention aims to reinforcing economic and relational networks already present within the context, impacting the surrounding public spaces and encouraging an alternative way of living.

KEYWORDS

Territorial fragilities; affordable housing; peripheries; adaptive reuse; home-work link.

INTRODUCTION

Our contribution addresses the subject of living space designed in the perspective of access to housing, the home-work connection, the adaptive reuse of existing stock, regeneration of peripheral areas and fragile contexts. The text presents the initial results of ongoing studies developed within the "Territorial Fragilities" project put in place by Politecnico di Milano's Department of Architecture and Urban Studies. Two distinct lines of research¹ are brought together: *ForDwell*, considering forms, uses and spaces for contemporary living, and *PeriFrag*, observing projects and policies for

¹ Overall, this paper is the joint work of the two authors. However, §1 and §2 were written by Fabio Lepratto; part §4 by Elena Fontanella; the abstract, the introduction, §3 and §5 were written together.

architectural, urban and social regeneration of town and city peripheries. The argument developed here refers to the first stage of a research-by-design experience, aimed at defining new forms of accessible living, achieved by the inventive redevelopment of non-residential, under-utilized or derelict public stock. The research was developed within the Affordable Housing Final Thesis Studio at Politecnico di Milano,² which was a place for research and design experimentation using a multidisciplinary approach.

1. ACCESS TO HOUSING

Italian housing conditions are in a critical state, with an average regression of affordability and institutions seriously challenged in coping with the growing crisis, which also extends to new forms of fragility that affect even regular user profiles (Baldini 2010). If it is true that "one hundred years of housing policies in industrialized countries have never eliminated housing exclusion" (Tosi 2017), it is equally demonstrable that it is actually a growing phenomenon (Nomisma for Federcasa 2016), in Italy and across most of Europe (Pittini et al. 2017). There are between two and three million Italian families facing housing difficulties, many of whom suffer social marginalization (Tosi 2017). Over 1,700,000 households are at similar risk of succumbing to forms of default and loss of their home.³ In the face of these high numbers, public housing stock, estimated at just over 850,000 dwellings, is not proportionate to the number of people experiencing acute housing difficulties.⁴ This

growing "fragilization" of housing conditions is a process simultaneously encountering social, spatial and institutional issues, faced with the rapid change in economic conditions and, above all, with difficulties in accessing employment and income. The sheer speed at which the latter vary impacts the population much more quickly than the ability of institutions to react with policies or of spaces to adapt to changing needs (Balducci 2018): a misalignment that accentuates social marginality, neglect, deprivation.

The correlation between access to housing and access to employment, especially in peripheral areas, has been addressed in recent programs and policies promoted by local institutions, linked to cohesion and social inclusion projects, financed at national and community level. For example, the special program for urban redevelopment and safety in peripheries launched by Naples Municipal Authority merges the right to housing with the right to work, education and training. The joint goal of the "Agenzia Sociale per la Casa" ["Social Agency for Housing"], financed with PON (National Operational Program) funds for metropolitan areas, is to counteract those housing problems generated by lack of income because of unemployment. In addition to receiving a living space, the people engaged by the program are included in guided independence courses, aimed at rebuilding employment and so indirectly resolving right to housing issues.⁵ Similarly, in Milan's Lorenteggio district, ongoing urban requalification is aided by a plan to support training, professional requalification and self-employment for the most fragile subjects and the unemployed. The aim is to strengthen the economic

² Politecnico di Milano, School of Architecture Urban Planning Construction Engineering, Master of Science in Architecture - Built Environment Interiors, Final Thesis Studio "Affordable Housing: Domesticity Reloaded. Form, Uses, Spaces, Practices and Policy for Contemporary Dwelling". Professors: Massimo Briccoli, Gennaro Postiglione, Stefania Sabatelli. In collaboration with the Research Team "ForDwell-DASTU Dipartimento d'Eccellenza": Gaia Caramellino, Stefano Guidarini, Fabio Lepratto, Simona Pierini, Roberto Rizzi; and with AIUC School scholars: Barbara Brollo, Antonio Carvalho, Lorenzo Consalve, Elena Fontanella, Francesca Gotti, Marco Jacomella, Massimiliano Nastri, Ingrid Paoletti; in cooperation with Double Degree program TU Graz prof. Andreas Lichtbau.

³ Less than 4% of Italy's housing stock: one of the lowest percentages in Europe.

⁴ Source: Nomisma research for Federcasa "Il ruolo dell'ERP negli interventi di rigenerazione delle periferie-Stato di fatto e prospettive future" ["Public Residential Building's role in regeneration actions for peripheries – state of affairs and future prospects".

⁵ www.coesionenapoli.it/bandi-e-avvisi/pon-metro-napoli/

fabric of the neighbourhood, in tandem with the improvement of spatial quality. The various actions envisaged, with POR-ESF funds for 2014–2020 and the European Regional Development Fund, also 2014–2020, combine support for micro-businesses and the creation of social impact enterprise. Only the future will tell if these actions are successes or failures. It is nonetheless interesting to register how housing and employment are perceived as interacting issues, which cannot be addressed separately. Moreover, what kind of space do these kinds of projects require? What role could be played by a rethinking types of living spaces? What prospects open up for abandoned public buildings in developing opportunities that combine access to housing and access to jobs? This research considers the idea of starting over from unused buildings and their repurposing, to trigger positive reactions in the relationships between spaces, societies, institutions, and economies. The boundaries of the project research are therefore determined by the recognition of two main issues: the need to act on the home-work link, and the desire to seek opportunities for reclaiming extant public – and not solely residential – stock.

2. THE HOME-WORK LINK

The problem of having access to housing is the fallout of failure to find employment. In the current conditions of uncertainty and high unemployment, a large part of the population is marginalized, without a continuous and adequate income that would allow stable access to a decent home.

The architectural relationships between work and living spaces stand as a concrete expression of the different economic models following on over time, with specific building types emerging for each model, distinguished by the ways in which the

settings are conceived and organized. For example, the archetypal shared work and living space of the Medieval house-shop or the rigid functional separation, typical of Fordism (Holliss 2015). Starting from the 1970s, changing economic models brought new practices in the use of space and triggered type changes (still incomplete), which highlight how existing dwellings are often unsuitable for current needs, especially if referred to today's forms of economic livelihood (van Gameren et al. 2019). This occurs in an era where work or productive environments demand compatibility with living spaces and installation in urban areas (Melotto, Pierini 2012; Misino 2018). We refer not only conditions rendered favourable by current technologies that enable efficient remote or home working (as the spread of smart working activity due to Covid-19 pandemic has shown), but also the return of manufacturing, artisanal or digitized production, within the urban fabric (Rappaport 2015). Nonetheless, the most recurrent experiments proposing new architectural solutions do not seem to fall within the realm of affordable housing.

Among the most popular type variants, the concept of a single building accommodating "co-living" and "co-working" combinations has taken hold in Europe and the United States, also attracting attention in the academic field (Coricelli et al. 2018). It is worth pointing out, however, that this is a commercial product, targeting subjects who do not face economic problems: generally young professionals who do not see themselves in traditional housing models and are willing to commit themselves economically to live within solutions they consider most congenial to their needs. There seems to be room for exploring new architectural solutions therefore, which might offer scenarios for rethinking the status of the dwelling and transforming it into a spatial support for accommodation but also assisting in the reactivation of the finances of those requiring a housing experience that

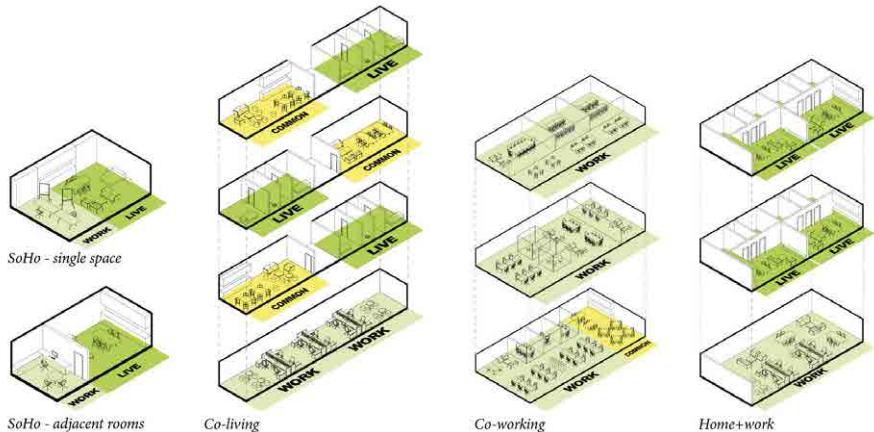


Figure 1. Contemporary housing+working models, ranging from private to public way of interaction between the different embedded activities (Cui, Mendoza 2019). From left to right: SoHo (with a single space or adjacent rooms), Co-living, Co-working, Home+work. In light green: working spaces, in green: living spaces, in yellow: common facilities.

goes beyond just having a roof over their heads. By combining accessible housing, a productive environment and upgrading of extant properties, a dwelling can then become a device for initiating processes to redeem people, buildings and urban contexts by defining innovative space and type solutions, integrated with targeted policies and services.

3. STARTING OVER FROM EMPTY PERIPHERAL SPACES

Italy is littered with public structures in a state of neglect but with huge redevelopment potential. As detailed by many studies and much research,⁶ Italy has a large pool of unfinished works, derelict buildings, unused structures, assets confiscated from organized crime, etc. Part of the huge

extent of this legacy – comprising offices, schools, hospitals, depots, boarding schools, barracks, warehouses, sports facilities, and much more – can be brought under the microscope thanks to a number of databases, including real estate surveys conducted by public authorities and made available by the Ministry of Economy and Finance, or the list of assets confiscated from organized crime, collected from the open platform OPEN RE.GI.O.⁷

Faced with the question research asks about how unexploited public assets can be put to good use in an approach seeking interaction between residential spaces and work opportunities, development potential may vary according to different factors, which include prompting from contexts, social networks, local opportunities and resources, public and private players, the type of

⁶ Among them: Re-cycle Italy PRIN (Projects of Relevant National Interest) research (<https://recycleitaly.net/>); Ri-formare Milano and Ri-formare Periferie: a teaching and research project promoted by the School of Architecture of Politecnico di Milano (<http://www.riformaremilano.polimi.it/>); The Abandonment Atlas for the Metropolitan City of Milan, promoted by the Centro Studi PIM (<http://www.pim.mi.it/atlanfe-abbandono/>); The research developed by the Permanent Laboratory on Abandonment Places of the Università degli Studi di Milano, Dipartimento di Beni Culturali e Ambientali (<http://users.unimi.it/abb/index.html>).

⁷ Official platform of the National Agency for the Administration of Distressed and Confiscated Assets from Organized Crime (Anbsc): <https://openregio.anbsc.it/>.

artefact, its size and state of repair, the user profiles (ordinary or fragile) to be engaged. The reference contexts correspond to areas that are experiencing or have experienced fragilization processes in the past and focus above all on "rejects" located in town and city suburbs, where there is more marked social and material vulnerability, often accompanied by strong housing pressure. Within these town and city contexts, the presence of abandoned or underutilized buildings simultaneously represents a "fragility" and a "spatial resource". Indeed, while the presence of abandoned buildings contributes to degradation in peripheral areas (Bianchetti 2003; Petrillo 2018) by intensifying the perception of a daily absence of care, it also represents an opportunity for redevelopment that will trigger or support regeneration processes. The quest for accessible housing solutions able to integrate work opportunities and accommodation spaces becomes a chance to overturn the predominantly monofunctional residential status that is often the case in peripheral areas and contributes to the development of new centralities. This could translate into the ability to spark changes through architectural projects, acting on the spatial dimension of suburban fragility in towns and cities, while engaging social and economic fragilities. When synergies develop for housing, employment, social policies, and the regeneration of metropolitan suburbs, the effects produced by spatial conversions strengthening the home-work link could possibly contribute to generating better effects for economic and social factors. Architectural actions on abandoned buildings also aim to strengthen relationship and economic networks found in the reference context and generate further transformations to impact neighbouring public spaces, promoting an alternative

way of life able to "make a city". The various options for redevelopment of buildings abandoned in the urban fabric are closely linked to the specific construction features (both in spatial and structural terms) and to the characteristics of the reference contexts. However, in more general terms, we can identify various openings that support ideas for conversion into economically accessible residential buildings that can accommodate work and production spaces, where spatial potential derives from the type of public building where neglect is prevalent. In particular, considering the presence in Italy of state-owned barracks, schools, hospitals, mental homes, and indoor markets, in a state of neglect or severely underutilized,⁸ we can suppose that these types of construction lend themselves to redevelopment projects both in short-term and long-term scenarios. In point of fact, these categories frequently combine the presence of large spaces, often on the ground floor (gyms and refectories in the case of schools; canteens or garages in the case of barracks) with smaller circulation areas set along corridors (for example classrooms or hospital rooms), and with large distribution and circulation spaces. The categories mentioned feature not only individual buildings but also groups of constructions vaunting open spaces that connect seamlessly with public areas. Opening these up, and quickly, may offer an opportunity to rethink the relationship with the surroundings. These opportunities for repurposing and redevelopment could open the door to unforeseen combinations that precisely through the integration of domestic and production spaces contribute to enhancing existing areas that have lost their active role in the life of contemporary cities.

⁸ The Italian Ministry of Economy and Finance completed an accurate Survey of Public Administrations Real Estate, including that in state of abandonment. The data are collected according to art. 2, paragraph 222, Law 23 December 2009, no. 191. Administrations inform the Ministry: about 80% for the 2016 survey.

4. LEARNING FROM PRACTICE: THREE CRUCIAL "INGREDIENTS"

The first step declared in the research project discussed here aims to work on integrating the more strictly private and domestic dimension of living and working the same place. It intends to observe with coherence the accessibility of dwelling and working in peripheral urban and metropolitan contexts by enhancing existing spatial resources.

In this sense, it intends to recover the complexity often found in a number of types in the past, which has gradually been lost. To do this, the (minimum) "ingredients" deemed necessary for the definition of innovative structures that would integrate living and work areas were identified and explored with reference to recent works and experiments in the Western context. This breakdown is required before proceeding to the subsequent phase of re-composition, articulation and hybridization, which will be addressed by the project in its role as an outright instrument and field of research. There are three ingredients – understood as components for pursuing the relationship between access to a home space and access to a work space – identified as "domestic spaces", "production spaces" and "shared spaces".

1) *Domestic* –in particular *affordable*– spaces can be considered an essential ingredient, beginning from adaptive reuse of non-residential public buildings, an approach that opens up the possibility of increasing the number of accessible dwellings, starting with abandoned public resources. In this respect, the Vandkunsten Architects Apartments in the Constable School project, put in place in Copenhagen in 2015, is a particularly relevant reference. These small student apartments were devised in a school building that had been abandoned for decades, in the up-and-coming Margretheholm district. The project focused on redevelopment of the entire building, to which a new layer was

added that did not erase what already existed and allows appreciation of the brickwork textures near staircases and windows. The contrast between new and extant also permeates internal spaces, where the housing units are integrated and completed by collective spaces (areas for studying or socializing). The Gantry Studios project in London, designed by Architecture 00 + HawkinsBrown (2017), is another interesting case study of the potential of infilling work and shared space with an existing structure. Indeed, the project was born from an existing framework used as a warehouse for the 2012 Olympics and averted its probable neglect by seeing the potential for redevelopment. The twenty-one units mimic the archetypal house concept and are arranged on the three levels of the structure. Each is finished in different colours and materials, while the supporting structure was constructed from prefabricated wooden modules. These two examples take two approaches recurring in the conversion of existing structures: the first corresponds to the reutilization of the entire building, starting from the intervention on the envelope, while the latter exploits the extant as a support into which smaller elements are introduced to make the space habitable.

2) The *production spaces* intended to be integrated into the design experiments, range from more traditional types of work environments (art studios, manual workshops, ateliers, offices) to more innovative spaces linked to new forms of production, including cultural. Strathcona Village, built in Vancouver (2018) to designs by GBL Architects, shows how integrating production spaces into residential complexes can affect the base layer of buildings, combining light industrial production, commercial spaces and offices. A BETA Office project in progress in Amsterdam – NDSM Treehouse – develops a concept for 100 affordable studios for young emerging artists. This incremental structure built from recycled materials combines individual

workspaces with two large area for hosting exhibitions and workshops, concentrating on the interaction between private, collective and open spaces.

3) It is precisely the latter dimension, the collective space and "communal area", that represents a third important ingredient. Referable to both the domestic and the productive component, the communal areas can build the way to opening towards the context of reference and the local community, as in the case of the *Ru Paré Community*, which redeveloped a school into a community centre, to a design by BETA Office. In a suburban district of Amsterdam (Sloterhaar, 2017), the redevelopment devised by this project refers both to the building itself and to the surrounding district, with the added aim of stimulating the local economy. The old classrooms allowed placement of different functions related to the new community centre, while the presence of a gym – initially considered an element of weakness because

of its position inside the building – developed into a resource. By relocating the building's entrance to the gym and adding a vertical opening and closing system, this area became a foyer that manages the transition from the interior to the exterior. Communal areas thus became the core of the project. The case of *Hal7 Makers Corner* is also interesting for the role played by communal spaces in hybrid programs. Realized by Vandkunsten Architects in Roskilde (DK, 2017), the conversion worked on redeveloping a disused industrial shed by modifying the structure itself and installing new buildings inside it. The new building units are then made by upcycling waste, in particular by repurposing disused shipping containers. The spaces created inside the readapted and suitably insulated containers are dedicated to work and light production, while the intermediate spaces are designed to welcome both those who work inside the structure daily and as a meeting point for the local community.



Figure 2. Two adaptive approaches to make the space habitable: reusing the entire building within the envelope (I), exploiting the extant as a support for introducing smaller units (II). Left side: Student Apartment in the former Constable School, Vandkunsten Architects, Copenhagen 2015 (Diagram and sketch: Lepratto 2020). Right side: The Gantry Studios. Architecture 00 + HawkinsBrown, London 2017 (Diagram: Fontanella 2020, photos: Lepratto 2020).

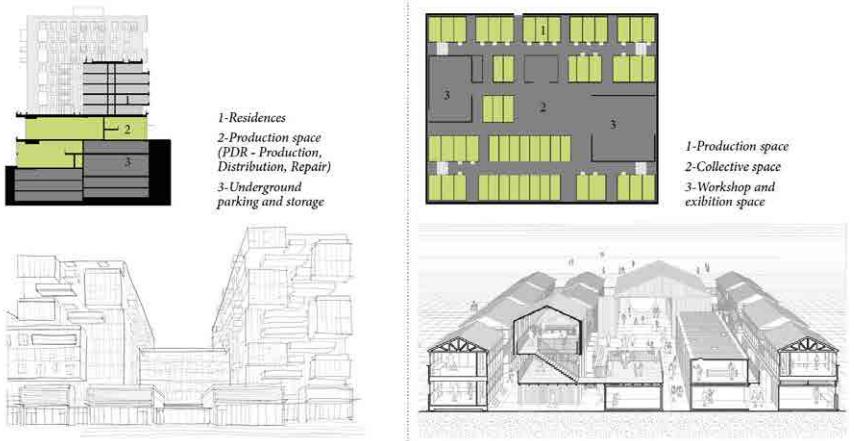


Figure 3. "Productive spaces" in recent developments. Left side: Strathcona Village, GBL Architects, Vancouver 2018 (Diagram: Grassano 2020, sketch: Lepratto 2020). Right side: ADSM Treehouse, Beta Office, Amsterdam (ongoing) (Diagram: Grassano 2020, perspective: Beta Office 2019).

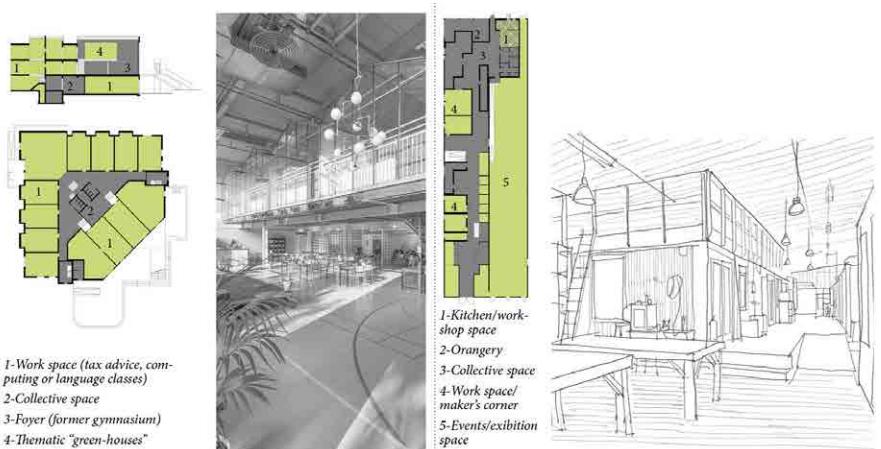


Figure 4. Collective spaces and communal areas. Left side: Ru Paré Community, Beta Office, Amsterdam 2017 (Diagram: Grassano 2020, photo: Marc Faasse - Beta Office 2019). Right side: Hal7 Makers Corner, Vandkunsten Architects, Roskilde 2017 (Diagram: Grassano 2020, sketch: Lepratto 2020).

CONCLUSIONS: FIVE POINTERS FOR ARCHITECTURAL DESIGN TRIALS

By studying and comparing an extensive number of past and contemporary case studies – some of which were described in the previous paragraph – we drafted initial input for defining some points crucial in outlining a possible functional program that will be tested and implemented through future research by design. These points range from the scale of functional areas to relationships within the building, and also look at the rapport with the contexts.

Domestic spaces

In an attempt to redefine living spaces perceiving them in relation to workspaces, we can define a domestic environment by suggesting a number of architectural configurations, even far removed from what we usually call "home". Finding dedicated resources and spaces for working, in an affordable housing context may require compression of private domestic arrangements, partially offset by planning for shared spaces and services. We see not only the construction of small apartments, occupied by a single-family, but also of "clusters" of rooms or mini-lodgings, grouped around communal spaces,⁹ as well as independent micro units, prefabricated boxes positioned to render large-scale structures habitable, with sound and heat insulation, air-conditioning, and building services. Depending on each case, the challenge posed by finding a physical demarcation line between the home and the work environments will differ. Sometimes these two dimensions share a single space and a boundary is established simply by the time of day. In other situations, home and work are in adjacent rooms, separated by furnishings or a door, and only the actual user is involved. In yet other cases, the two dimensions are installed in the same

building, connected by a distribution system, and the workers are not obliged to reside there or residents to work there.

Productive environment

The space of the productive environment can be organized to meet the requirements of different work situations: self-employed, business, contractor, etc. Some workplaces are fluid, complex to describe; others are more static and traditional. Design then needs to conceive and/or combine environments that have very different characteristics and scales: the minimum space required by a freelancer who may need nothing more than a PC; the environment required by a small business; a medium-sized production area for companies or cooperatives. In the first case, a workspace can overlap with a dwelling (Small Office Home Office – SoHo categories) or it can be integrated into shared spaces, where it is possible to rent meeting rooms or occasionally work with other professionals (co-working spaces). The latter two cases, albeit on different scales, require spaces with boundaries, properly separated from a domestic area, often for hygiene, safety or access control reasons. They include home-workshops, where the two functions interact but are separated by a boundary, and production surfaces integrated into neutral mixed-use buildings, available to host activities compatible with – even if not directly connect to – housing. In the three cases, if the working activity is visible from the outside, it is a positive element that may foster business development.

Communal areas

Communal spaces play an important negotiating role for areas in the building, first of all managing the relationship between the dimensions of personal and working lives, acting as filters to ensure coexistence of the two aspects in a single construction. Shared

⁹ For instance, the Mehr als wohnen project (2009-2015), designed by the Duplex Architekten firm of Zürich.

spaces can be configured as informal areas, extremely adaptable and thus versatile in use. They may allow an integration of leisure and socialization activities and shared services (laundry, gym, communal kitchens etc ...). They are often intersected by distribution spaces, transforming stairs and corridors into timeout or observation spaces for the many activities going on in the complex. They have different levels of accessibility that correspond to just as many levels of sharing: some are aimed at the general public, others are only for the entire community of resident and/or workers who have settled in the building, or part of it. Finally, other environments can be shared by a few individual users, generally to complement their compact homes.

Adaptive reuse

The identification of abandoned public buildings can be considered a relevant starting point for definition of non-conventional adaptive reuse projects focused on the home-work relationship. If the presence of unused buildings in a state of neglect inevitably generates forms of degradation around them, regardless of their location, their redevelopment comes as a great opportunity in the urban fabric for upcycling rejects into resources to avoid further consumption of land and waste of embodied energy. The adaptive reuse of vacant public buildings can open up forms of temporary living tied to specific situations demanding immediate responses, but also be involved in long-term planning. Such time constraints will inevitably correspond to different levels of conversions, use of economic resources and materials. In a perspective targeting environmental sustainability, the latter can be identified as part of virtuous recycling and upcycling processes.

Periphery Regeneration

In peripheral areas, converting what is discarded and no longer used into resources also offers

an opportunity to start or support wider-ranging regeneration processes. Within these, the relationships between living and working spaces can play an active role in abolishing residential or production monofunctionality, which is often a connotation, fostering mixité, leveraging local specificities. In contemporary suburbs, developing the home-work connection can translate into the possibility of promoting opportunities for exchange that may allow these contexts to be opened up, engaging them with their surroundings by intercepting flows and attracting a non-resident population. At the same time this could contribute to the strengthening or building – when absent – of a sense of belonging to a community and a place. In this perspective, the energies (like non-profit associations and cooperatives) already present in these territories, which very often perform different activities in these contexts in support of the local population, represent an additional resource with which experiences such as those already mentioned for Naples and Milan could come into contact and build fertile interactions.

The preliminary work presented here targets a perspective of design research commensurate to the different scales of architecture; housing, social and urban planning policies; economics; and social sciences. From a methodological standpoint, the role attributed to future architectural experimentation is considered crucial as a further investigation to increase knowledge of the described topic. The project is used as a probe capable of testing redevelopment actions in paradigmatic situations. The experiments will help to understand complex realities that intercept the material, social and institutional dimensions. The research key combined with clearly stated intentions to act are intended to produce narratives, stimulate new scenarios, asking interacting disciplinary sectors open questions, tracing generalizable and/or replicable actions that increase disciplinary knowledge.

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