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A NEW LIFE

FOR LANDSCAPE, ARCHITECTURE AND DESIGN

foreword by
Mario Losasso

edited by
Francesca Scalisi

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Foreword

The road towards a durable and sustainable development, as an alternative to linear and dissipative models of the recent past and the present, now appears to be paved. The great effort that has been generated after the pandemic with a great strategy to restart Western world economies towards a green transition, backs up the growing diffusion of profound convictions in the scientific and academic sectors but also in the entrepreneurship and production sectors as well as in large parts of public opinion. Finally, the action of youth movements is also relevant, since they speak up for equity and concrete action against inequalities and the climate crisis. Besides the climate crisis, others appear in the present, showing great imbalances and also considerable potentialities. After greatly working on knowledge, information and experimentation, today there is a deeper awareness of the challenge ahead. From the pandemic crisis to the progressive alarming signs of destabilisation of the fossil-fuel energy market, we live in a scenario of uncertainty, and we are also witnessing the birth of a new key-concept system that emerges in an increasingly widespread environmental awareness that affects the project visions and its different skills in the fields of architecture, engineering, and design. The new key words are organised on several levels, concepts and actions that once were separated and now are reflected in international and national technical policies.

The main subjects of the present – oriented towards a sustainable future – lead towards a big effort to overcome the problems of present society and its lifestyles. The factors are well-known and they range from climate change to land and non-renewable resources use, from pathogenic problems to the great socio-economic difficulties that affect even the most developed economies. New scenarios with guide-concepts are born: energy or food self-sufficiency, 'zero food miles' processes, combined actions of climate adaptation and mitigation, social inclusion, ecological mobility, '15-minute cities', increasing the efficiency of processes and projects in reducing waste through reuse and recycling actions. In the collective consciousness – as in widespread knowledge – it begins to emerge the demand for a new life for the built environment which is the subject of the 6th volume of the series Project | Essays and Researches edited by Francesca Scalisi. It is a complex issue, which contains a well-structured panorama of points of view and experiences aimed at the common transition process. It places at the core of the operations the project subject in its various forms, starting from the knowledge components up to more strictly operational ones.

In the original layout of this volume of the series, the core elements were based on the relevance of the articles that express both methodological approaches and outcomes of descriptive research on the main innovation factors currently concerning the major

issues of green and digital transitions. In this cultural and scientific direction one can find the continuity consistency of the work already done in the published volumes of the series, aiming to show original traits in the field of academic and operational research on the project subjects. The curatorship of this volume has well grasped this complex layout, showing an interesting and well-structured panorama on the transformations of the built environment aimed to a vital drive, that is, regenerative and not merely conservative, as a mandatory path to provide a purpose for the future and a perspective to the new generations.

Changing the metabolism of urban habitats today is a crucial factor to work on by changing points of view and production and consumption systems. Urban habitats also are contexts exposed the most to the effects of climate change and other crisis factors, showing all the problems of creation, management and functional, physical and cultural transformations necessary to resist the impacts of numerous critical factors and to anticipate some ways out based on a unified concept of the inclusive living environment of urban settlements. Among many crises, the climatic one due to global warming is now underway and the data recently released by the IPCC – Intergovernmental Panel on Climate Change (2021) report projections that raise greater concern than in the past, calling even more to the commitment to adapt urban contexts and to mitigate the causes of climate change to be implemented by downsizing energy consumption and reducing greenhouse gas emissions.

In the background of the green transition, some scenarios are defined to achieve the objectives set by the European agenda for 2030 and 2050: minimisation of the flows of matter and energy in urban habitats with the same efficiency and effectiveness of the processes, cities merging with the environment, actions of climate adaptation implemented to get climate mitigation. In the contributions of the volume A New Life for Landscape, Architecture and Design this complex scenario is convincingly explained, pointing out the different subjects that will be a challenge for the future and outlining an approach capable of generating multiple benefits for ecosystems and biodiversity, operating on the protection of health, safety, comfort, communities and identity cultures. Virtuous processes will have to be implemented in the socio-economic field, wondering what the best contributions can be to build operating conditions that go beyond the conventional market and are capable of establishing resilient communities.

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A NEW LIFE FOR BUILT ENVIRONMENT

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The subjects of climate change, excessive use of soil, renewable resources, ever-increasing production of waste, the current pandemic emergency and the global socio-economic crisis that it is causing, have in fact entered our daily life. Even if these are terrible issues, they can be, somehow, seized as an opportunity to rethink the way we live and our world. In this 'revolutionary' (Floridi, 2020) and 'polycrisis' (Losasso, 2020) context, specifically referring to the building industry, the Academy, the Research and Industry worlds are called to give answers – based on sustainability and the principles of the Green Deal – that can stimulate reconsiderations and re-orientations of processes, products and services, new projects on places, buildings, objects and materials, able to positively affect the governance of the global change that our planet and humanity need, able to give a 'new life' to the built environment, at any scale.

In the light of these considerations, the volume entitled A New Life for Landscape, Architecture and Design encloses 14 essays, research and original experiments, projects and interventions. While they address only some of the issues listed in the introduction, they are food for thought and contain good practices capable of give a contribution to the international debate on the subject.

For the Cultural Heritage it is clear that the 'passive preservation' can no longer be the ultimate goal of the intervention: the more marked the cultural heritage is in its material and intangible, natural and anthropic elements, the more there is a need for actions aiming to give new 'dignity' and new life to these Assets, sometimes ruins, deprived of their original identity, both to the enjoyment of current generations and to be passed on to future ones. Enhancement, enjoyment, communication and accessibility, also applied through digital and ICT potentialities, are fields of study as multidisciplinary holistic and systemic methodological approaches capable of reading, interpreting and translating into actions the complex relations between pre-existing elements, natural context and added anthropic systems.

In this sense Paço do Frevo can be considered a perfect example for the redevelopment of the built heritage. The objective of including the city of Recife in the cultural tourism circuit is implemented with the Redevelopment Plan of the

Bairro do Recife and with the creation of a museum. It, on the one hand, enhances cultural customs and intangible heritage, and on the other, blends popular traditions and urban life through an 'integrative design' that includes the architecture of old buildings, museography and digitised content, considering it as a platform connected with the territory for the dissemination of local culture.

Paço do Frevo uses many expedients derived from good international practices including domestic scenarios linked to Brazilian popular cultures, physical interactivity and blackboards to encourage active participation of the public or floor displays, making the audiovisual image prevail and the creation of a synthetic space in which container and content provide users with new multisensory experiences and go beyond the aseptic 'white cubes' that have characterised the art spaces in the last century.

Re-manufacturing, re-cycling and up-cycling as alternative to the concept of disposable items come into play in the building industry, through a creative process or together with new sharing and product/service methods. Some subjects are gaining interest: intersectorial and interscalar subjects, open research fields on urban mining and material bank, end-of-life or Design for Disassembling approach and for Durability/Flexibility, applied on the material and product scale in terms of reuse and recyclability, qualification procedures, traceability and material passport, but also concerning the definition of tools for the analysis of material flows and the quality of end-of-life products and decision support to verify the effectiveness and sustainability of circularity actions.

The concept of waste and remains changes from being a problem to being a resource, a true urban mining to reshape areas of the landscape; zero-waste regeneration strategies and methods of action that can be replicated in similar physical and environmental conditions are re-evaluated. The case study on the Former Manifattura Tabacchi in Naples presents an integrated and multiscalar project, capable of reinterpreting the material and immaterial aspects linked to the subject of waste coming from a selective demolition process: the reinterpretation of two issues (demolition of buildings and land and aquifer decontamination), apparently purely technical, in vectors capable of triggering a circular economy process, allows to consider, in an ecological term, waste as an active material of the project and above all to activate new forms of community and unprecedented urban conditions.

Waste and remains are also the subjects of the Designing Circularity experimentation. It investigates possible scenarios of circularity for the territory and the development of a project (an overlook) based, on the one hand, on the principles of circular economy to give new life to materials (new high-value resources, interconnecting different production sectors, Institutions and local actors), and on the other hand, on the concept of 'appropriate technologies' to the context (accessible,

economic and locally manageable) and to operators (in this specific case a farm, a biomedical and a building materials companies) to encourage virtuous development dynamics of an area rich in resources and characterised by high landscape values not yet fully exploited. The results of the research highlight how an intervention on the 'small scale' can promote local development, with results applicable also in other contexts.

The physical and social regeneration of buildings, in general, and of large residential complexes built in the suburbs between the 1950s and 1980s is certainly not a new subject but it is constantly evolving. It is driven by European policies and aimed at investigating the use and dissemination of innovative technologies that allow a new life to the artifacts: better energy efficiency and maximum circularity of non-renewable resources, enhancing the environmental characteristics of the climate, geographical and local productive context, to optimise the effects on the quality of life of the inhabitants are the main objectives.

With a systemic approach, specific up-cycling actions through the rational and programmed disassembly of the components and the selective regeneration of usable materials can favour an efficient management of resources, a reduction of CO_2 emissions and a greater durability of materials and components with relative reductions in production and consumption, in environmental impacts and in produced waste. The standardisation of types and construction systems, as well as that of the indoor and outdoor spaces, offer the potential that allows the development of suitable regenerative strategies and design strategies capable of responding to changing requirements, through a life-cycle conscious approach.

Two researches published in this volume deal with this issue. In-Up_Inhabiting the Upcycling is a concept created for the social housing of the neighbourhood Tor Bella Monaca in Rome. It proposes a 'replicable' model of environmental regeneration processes management (with a circular and local footprint) based on a construction site. Changing over the construction, it strategically changes its original function, transforming into solar shading devices or into new living spaces with the help of a basic element that modifies the volumes according to the new housing and environmental needs.

A different methodology, but with the same objectives in a 'circular' and 'reversible' perspective is proposed by another working group from Rome. The group identifies in the recovery of existing buildings the strategic opportunity to combine, always in a life-cycle approach, reuse (at the building scale, its systems, components and materials) and the design for disassembly. The methodology – defined from a theoretical point of view and applied to the case of the former IACP district of Torrevecchia in Rome – allows to create, by means of effectiveness level indicators, a reasoned, verified, measured repertoire that can be updated with the progress of the experiments.

The proposed methodology, on the one hand, responds to the quality and eco-

compatibility needs of interventions on buildings, characterised by the replicability of technological-applicative solutions in the national and international context, on the other, promises significant impacts in the social, economic and environmental areas through the definition of objectives useful for decision makers, designers, producers and deconstructors.

New natural and built environments, where the community continues its path towards the acknowledgment as an active part of the economy and social relations in a specific context that can restore an idea of democratic, inclusive and resilient territories and cities that by understanding ongoing socio-economic dynamics, renew and regenerate natural and built spaces, territorial and productive frameworks, vulnerable and fragile areas, they become an active connection able to answer the phenomena of 'progressive dispersion' and to increasingly pressing and imperative safety, inclusiveness, pandemic and emergency vulnerability issues with smart approaches, and human-centred at the time.

This is the case for Prato. Since 2013, it has committed in the systemic reinterpretation of its built environment – complex and full of overlaps between productive, residential and social fabrics – through medium-long term territorial governance policies based on sustainable development. And it is added into the network of European cities with the aim of leading the circular transition of cities, improving the human well-being and reducing emissions. The project methodology developed in 2019 is based on the awareness that environmental and energy sustainability can only take place if it is integrated with cultural, economic and social awareness of the interventions and if it implements naturalistic solutions as additional drivers for the transition towards circular economy and urban resilience.

The experimentation carried out by a research group from Florence on two macro lots identifies a series of design solutions that have the common goal of effectively overturning the relationship between impermeable and permeable surfaces: the reduction of soil consumption through densification and enhancement of existing buildings; the regeneration of the urban fabric by encouraging functional mixes capable of activating new social and economic activities associated with living; the improvement of energy performance through redevelopment actions on the building envelope and on the plants; the increase in soil permeability through volumetric equalisation and Nature-Based solutions.

The subjects of degrowth, shrinking territories and conservation and enhancement of the rural landscape – the result of (natural and anthropogenic) transformations due to social and economic dynamics and the prospective abandonment caused by climate change – are addressed in the case study of Antikythera, small island in Greece, a remarkable example of the Mediterranean cultural landscape. The debate on the future of these landscapes often recalls the controversial juxtaposition between environmental and conservation issues, although it is clear that

today more than ever it is necessary to deal with the original multifunctionality of these Mediterranean landscapes. If, on the one hand, it is desirable to consider agriculture again as a strategy of economic regeneration, on the other it is necessary to activate an integrated program of related activities that enhance the local identity and regenerate the rural built heritage through actions of connectivity, re-signification, participation and communication which, by reinterpreting the original ecological and economic balances, implement the resilience of the landscape.

The landscapes demanding for a 'new life' are also urban landscapes marked by the indelible scars of natural disasters such as earthquakes. After them, the temporary works transform the landscape of a city and prevent its enjoyment. We examine the possibilities given by these works to regenerate a landscape where the local community can identify itself since after the event there is a temporariness that still contains life and in which processes are developed and implemented, with the aim of securing people and artifacts.

Can scaffolding and centering take on a new 'set-up function', limiting the trauma of the event and activating a regeneration capable of restoring contexts in which to operate in a renewed way to make the city enjoyable? Starting from the Technical Data Sheets of the Temporary Works in the STOP handbook made by the Italian Firefighters Department, the research STOP-UP (Italian acronym of Technical Data Sheets of the Temporary Works and Potential Uses) – adding a design experimentation in the city of Norcia hit by the earthquake of 2016 – considers temporary works as elements generating living spaces, transforms technical works into complex elements which can be used as shelters and can trigger the involvement of the population to oppose to the processes of progressive dispersion.

A city that is 'organised' (instead of 'built') through bottom-up strategies and models, unscheduled 'spontaneous' actions carried out with minimal investments and on a small scale of intervention to slowly reactivate social processes after Covid-19, guaranteeing social distancing, and offering a 'new life' to neglected places and outskirts of the city. It provides several 'light' case studies taken from the international scenario. The common denominators were social inclusiveness, simplicity of implementation, temporariness, the 'micro' dimension, the informal image, but also the use of simple technologies, modular systems, cheap materials and recycled products. The good practices suggest a scenario in which the public space will resemble to an archipelago of self-sufficient micro-islands immersed in the urban fabric, 'multi-purpose' 'open-air' rooms with a temporary character set up with functional, flexible and essential solutions, where it will be possible to rediscover the sense of community and facilitate new forms of sociality.

The unforeseen circumstances that hit the planet during the Covid-19 health emergency have had disruptive effects for all production sectors, including the fashion industry which for decades has been one of the drivers of economic

growth. Suddenly, the fashion sector had to rethink products, services, and management processes following a new sustainable development and implementing new socially responsible business models, in the short and long run, instead of strategies aimed at quick profits. Future Thinking, Speculative Design and Systemic Design provide the tools necessary to outline future-oriented and critical approaches useful to list the possible guidelines of the complex fashion system to pursue sustainability objectives.

Different scenarios projected up to 2030 suggest that, in a first phase (already in progress), it will be necessary to resort to digitisation and resource efficiency, to optimise rapid prototyping processes and reduce waste. Subsequently, it will be necessary to focus on reuse and conversion at any scale, to avoid dead stocks, probably even speeding up the transition to an approach no longer oriented towards trends and seasonality. Finally, productions on demand will prevent the system from falling back into over-productions with terrible environmental and social impacts.

The volume contains many best practices, both at international and national level. The latter are characterised by eco-innovations for processes, products and cultures, typical and linked to the territory, essentially defining a real 'Italian way'. Fashion, as a powerful cultural lever, has the potential to influence the behaviours of significant critical masses, stimulate the creation of new of manufacturing activities and high-tech services, increase the competitiveness of businesses and create new highly skilled jobs while respecting sustainable development.

The papers published, although not covering all the fields of investigation, show how the academic world can make an important contribution ,with experimental research and critical essays, to the solution of the new climatic, environmental and health challenges that we are facing by implementing 'virtuous connections' among the different stakeholders (public and privates) of the building process and identifying the innovation drivers useful to spread the culture of social, economic and environmental sustainability that ensure, through conscious products and processes, a 'new life' for the built environment.

Recovery, reuse, recycle, up-cycling, refunctionalisation and zero waste are some of the implementation strategies to aim for in order to efficiently use the resources in a circularity perspective. Eco-innovation, energy efficiency, digitalisation, life-cycle, durability of materials and their performance, flexibility, multifunctionality, modularity, safety and healthiness.

We need to ask ourselves: if the road has already been mapped out, why is the new transition phase implementation delayed?

The reduced financial availability caused first by the economic recession of 2008 and subsequently by the recent pandemic emergency has slowed the much-desired ecological transition, but it can't be delayed any longer, as also con-

firmed by the 2021 recent IPCC report. Tools such as the 2030 United Nations Agenda and the Next Generation EU give us guidelines and financial resources that will unlikely be available in the future. Now more than ever a paradigm shift is needed. Though a multidisciplinary, systemic and interscalary vision, it should be able to deal with problems as if they were complex processes, activate projective simulations with the use of big data and implement structured strategies and actions that, on the one hand, can determine new balances adaptable to the unpredictable, continuous and constant change, and on the other, are respectful of our planet and of its non-renewable resources, but are also inclusive not to leave anyone behind.

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RE-INHABITED ISLANDS
Mapping a design model for resilient territories in the Mediterranean

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ABSTRACT
Facing the European challenge of rural land abandonment, reactivation strategies are implemented to counter the shrinking phenomenon and to properly address the issues of conservation and enhancement of the landscape, conceived as a result of natural and anthropic transformations, cultural and societal changes over time. The paper aims at drafting possible approaches for such a regeneration design, also through the case of Antikythera, Greece, a significant example of Mediterranean cultural landscape. Based on the interpretive analysis of the place and supported by case studies, possible design models are disclosed, according to the categories of connectivity, resignification, participation, and communication. Final considerations are introduced in order to contribute to the debate and to define the strategies for the regeneration of Mediterranean landscapes, improving their resilience.

KEYWORDS
depopulation, sustainable development, tourism, architectural design, Antikythera

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The decline of the population and the abandonment of rural areas have long become a major challenge in European countries, triggered by different factors (geographical location, political situation, financial conditions, social changes, environmental factors, accessibility etc.) and characterised both by common phenomena and by specific features and occurrences related to the respective areas. Regeneration strategies addressing the resilience of shrinking territories tackle the trade-offs between conservation and enhancement of the landscapes as the long-term results of natural and anthropic transformations, as well as cultural and societal perceptions. However, the tightening in the progress of events and the signs of an emerging awareness have introduced new meanings to the debate, bringing about an increased ambiguity of consolidated concepts, new opportunities and challenges to design approaches.

On the one hand, current research (Cramer et alii, 2018) has pointed out the threat that environmental issues, linked to phenomena such as climate warming, will intensify in the coming decades resulting in unforeseen consequences beyond repair for the local communities and the economically valuable activities attached to them. Changes in biodiversity, the degradation of the landscape, in/direct sea influence are some of the challenges associated with this threat which puts into question the definition, the goals, and the tools of a conservation strategy. On the other hand, under the influence of environmental, energy, and human health concerns, architects, urban designers, and landscape architects are nowadays called on to embrace the 'natural' dimension of territories perceiving them as both resource and site. The terms 'revival', 'reforestation', and 'rewilding' are increasingly gaining ground in contemporary design debates with the drive towards an architectural agenda for sustainability. The already blurred boundaries between the natural and the artificial acquire a new meaning with the surfacing awareness that conserving wildness in an increasingly humane world requires curatorial anthropic actions; a call for maintenance activities also to support the endemic species and habitats in fallow abandoned rural areas which offers a wider insight into the current understanding of environmental protection. Finally, the fight against the pandemic and the resulting habit changes entail a general rethinking of space in terms of distance, mobility, and accessibility, as well as of time in terms of work lifestyles and tourism.

In the light of this evolving context, the paper sets out to draft a revision of possible approaches and modes which argue in favour of a renewed comprehensive design of shrinking territories, mainly targeting the long-term abandonment processes due to social and economic dynamics and the prospective abandonment linked to climate change. Accordingly, the case study of Antikythera island, Greece is disclosed: a site of natural, historic, archaeological, and biogeographical value whose native landscape is the result of the millennia-long interaction of geology, ecology, and culture. Beyond the long-standing fascination associated with the Aegean islands in the travelogues that span from the Middle Ages to the present day, alluding to notions of myth and exoticism, autonomy, and remoteness (Fig. 1), nowadays the Mediterranean islands are

Fig. 1 | Map of the southern coast of Morea and adjacent islands (Costa Meridionale della Morea e Isole vicine), 1688 (source: Coronelli, 1688).

Fig. 2 | Top view of the Venetian castle of Kythera; Map of Antikythera; Top view of the fortress of Agios Georgios on Kefalonia island, 1823 (source: Bory de Saint-Vincent, 1823).

faced with ambiguity. Antikythera is undergoing a rapid depopulation owing to its isolated location, as one of the most remote, smallest, and underpopulated places in the insular Mediterranean (Fig. 2).

A typology of design projects, which argue for renewed comprehensive approaches to the re-enhancement of the place, involving multiscalar, multilayered, and multifunctional processes, is then discussed, following a specific mapping of morphological, environmental, and territorial conditions. In particular, key notions are introduced and analysed: the reactivation of a reconceptualised connectivity (physical and virtual, also based on ancient travel networks); the redesign of energy and natural infrastructures and man-made systems that acknowledge the local climatic conditions, topographic and landscape features, human dynamics and management actions; a rethinking of the agency of architecture in shaping large-scale geographies; the engagement of local communities in re-establishing a new sense of place. Prior to these actions, an analytical process is envisioned: for the identification of the specific issues and assets, problems and opportunities, of a given area. Attention is drawn to alternative ways of inhabiting remote insular areas which aim to integrate spatial, material, and formal attributes through progressive ways of tourism, socially and culturally sustainable.

Understanding the place: the case of Antikythera | As a first step towards the development of the reactivation design, an interpretive phase was carried out, aimed at investigating the cultural landscape of the island as the result of «[…] dynamic and collective cognitive and material processes, determined by the interaction between com-

munities and environment», and intended as a driver for the foundation of regeneration approaches (Oppido et alii, 2018, p. 620). The understanding process grounded on a multidisciplinary literature review and on a wide range of mapping and graphic restitutions also involving the time factor on a short- and long-term perspective, was conceived not only as a mere analytical endeavour but as a preliminary strategic design (Brown, 2008), starting with the systemic recognition of the place, and setting its environmental, economic, social, cultural, institutional, tangible and intangible aspects into a broader integrated perspective.

The interpretive process discusses, on the one hand, recurring features, common to the Mediterranean rural landscapes and especially the islands, providing a methodological support for referencing the proposal through the collection of similar experiences and case studies and simultaneously opening up perspectives for a scaling up of the design approach. On the other hand, it highlights the unique characters of the place, to be singled out as potentials rather than issues, as an unavoidable trigger for the said strategies, suggesting targeted regeneration paths to offer new modes of understanding, possibly offering a new reference for future interventions.

First, the 'islandness' condition emerges affected by the scale – Antikythera has a surface area of only 20.04 square kilometres (Fig. 3) – and is, given its remoteness, intensified by a very limited accessibility in terms of transportation. Accordingly, the depopulation problem here is shared with other small islands, which are, in contrast to the large ones, extremely fragile contexts in the contemporary world, affected by phenomena of urban and industrial concentration; for them, the main factors of space modelling have always been the relations with the mainland (Ciaccio, 1984). «Small islands fall back into a state of isolation every time their relationships with the mainland and with the outside world, for a variety of reasons, happen to be interrupted. In the islands, exchanges and isolation mark alternate phases of decay and progress» (Staniscia, 2013, p. 259).

Moreover, the concept of remoteness, which can be considered as a common issue with inland areas lacking accessibility, also bears the meaning of escape and reclusion and can be interpreted as an opportunity for certain forms of getaway tourism, especially in the current changing context due to the pandemic. A new scale and time to tourism has in fact been set (Ward, 2020) where the essential infrastructures refer to the digital connection rather than mobility and transportation, also disclosing new potentials for complying with sustainability goals (Niewiadomsky, 2020). Isolation, in addition, can become an opportunity for certain research activities to be developed on site far from the relation with densely populated and 'contaminated' areas, thus introducing also new forms of repopulation.[1]

The main controversial character of Antikythera, bearing its specific identity, was thus declined playing with its ambiguity, unravelling diverse shades of meaning and significance. Simultaneously, an attempt at recognising the place as belonging to broader physical and virtual systems was made. This attempt aligned with a 'holistic land-

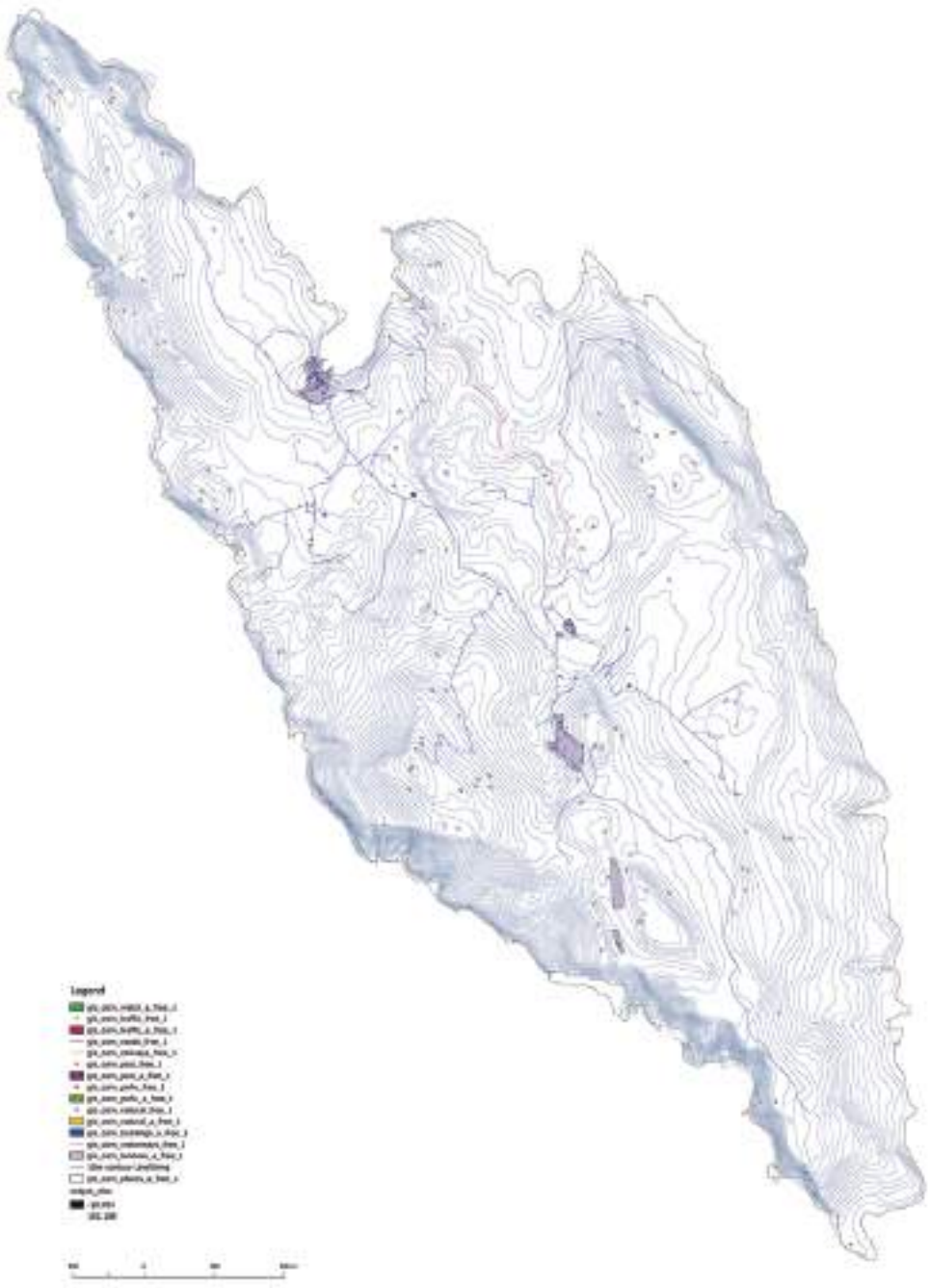

Fig. 3 | Map of Antikythera island (credit: Daglio, Kousidi, Sllovinja).

scape approach' which aimed to address the complexity of the landscape features of the area, understood as a mixture of natural, cultural and social features, and to put forward, from an architectural design perspective, «the study of processes and relationships and their links within the landscape, while at the same time build bridges between ecology and culture, past and present, experts and stakeholders» (Vogiatzaki, Pungetti and Mannion 2008, p. 357). Accordingly, landscapes are understood not as «[…] static backdrops or dependable environments upon which cultural practice is inscribed, [but as entities which] are themselves agents that take part in the constitution of the world. [In the Anthropocene era it is crucial] to rethink the status of the human among other species, nonhuman beings, and ecologies, [hence questioning] the temporal sovereignty of 'human time'» (Harmansah, 2020, p. 41). In fact, a deep understanding of the geographical location of the island in the middle of the Mediterranean reveals that it has, since ancient times, been the crossroads of commercial routes from antiquity to the Venetians as well as a natural hotspot, an important stop-over destination for migratory birds, including numerous raptor species, also thanks to the very low human impact (Figg. 4-8).

Second, the analytical phase highlighted the presence of rural terraces covering almost the entire surface of the island – now undergoing a rapid process of decline due to the abandonment of the agricultural and breeding activities – as one of the main features of the landscape (Bevan and Connolly, 2003). It is a common feature of the Mediterranean identity and heritage, testament of a historical interaction between man and nature, which has shaped the landscape as we know it nowadays. Several multidisciplinary studies demonstrate that the Antikythera terraces are currently under threat and subject to rewilding processes and to disruption and landslides risks harshened by the intensification of storms because of climate change. In fact, these widespread spatial structures bear the evidence of a long-term interaction and different degrees of correlation between terrace construction and human population (Bevan et alii, 2013). From a geological point of view, these structures reduce soil erosion phenomena (Bevan and Connolly, 2010) and, according to agronomy research, shrubs and wild vegetation quickly recolonise the agricultural land despite their abandonment, resulting in a rapid increase of the investments required to once again allow cultivation (Palmer et alii, 2010).

The argument about the future of these landscapes represents a remarkably clear example of the controversial juxtaposition between environmental and conservation issues: on the one hand, the idea that rewilding means that 'nature is taking back'. On the other hand, we are faced with a broader more complex system of negative effects on the ecosystem as well as the loss of a rich significant heritage (Agnoletti, 2014). However, the multifunctionality of these Mediterranean landscapes should be addressed. The goal of reinstating agriculture as a means of restoring the terraces and as a strategy for economic redevelopment, should thus be accompanied with an integrated programme of related activities aimed at enhancing the local identity and embracing the rural historical settlements, including the ancient windmills as an unavoidable com-

Fig. 4 | Antikythera: View of the Apolytares Cape and of the lighthouse on the southern coast of the island (credit: N. Patsiouris).

Fig. 5 | Antikythera: View of the lighthouse (1926) on the southern coast of the island (credit: N. Patsiouris).

Fig. 6 | Antikythera: View of the Kamarela beach (credit: N. Patsiouris).

Figg. 7, 8 | Antikythera: Typical view of the island's landscape; View of the Port (credits: N. Patsiouris).

ponent also for the definition of strategic approaches (Fig. 9). Finally, the intangible heritage was addressed highlighting, on the one hand, the cultural knowledge of crafts and skills handed down from one generation to the next and, on the other hand, a corpus of oral traditions and rituals as a fundamental piece of the deep and wide narrative of the island's cultural landscape, shared with the local system from Kythera to western Crete.

Rethinking design approaches | On the basis of the interpretative analysis of the place, rethinking design approaches are presented and supported by case studies, disclosing possible modes of intervention to be applied in similar Mediterranean landscapes (Fig. 10). In the context of introducing a revisited meaning, the design project should provide the framework for a rereading, rethinking and revaluation of contemporary activities connected with tourism, as the latter are regarded as active tools in sustaining authenticity and fostering a new sense of place. The redesign and reinterpretation of energy and natural infrastructures, as well as man-made systems that acknowledge the local natural and climate resources, topographic and landscape features may, in fact, offer new possibilities for the regeneration of insular Mediterranean areas.

Connectivity: unfolding overlapping systems of values and meaning | In the Mediterranean region, where landscape is viewed as an anthropic system, as one single continuum of urban fabric and natural areas, design recognizes the systemic dimension of the evolving structure of the relationships over time (Saggio, 2004). It is oriented towards the activation of a reconceptualised connectivity, physical or virtual, with the aim to mark the transition between the tangible and the intangible and to enhance spatial and symbolic connections. The revitalisation of underpopulated small islands in the Mediterranean involves the strategic development of visitation patterns of sites of historical, cultural, and natural significance. In this context, the architectural project needs to provide the structures that enhance the visitor experience by reveal-

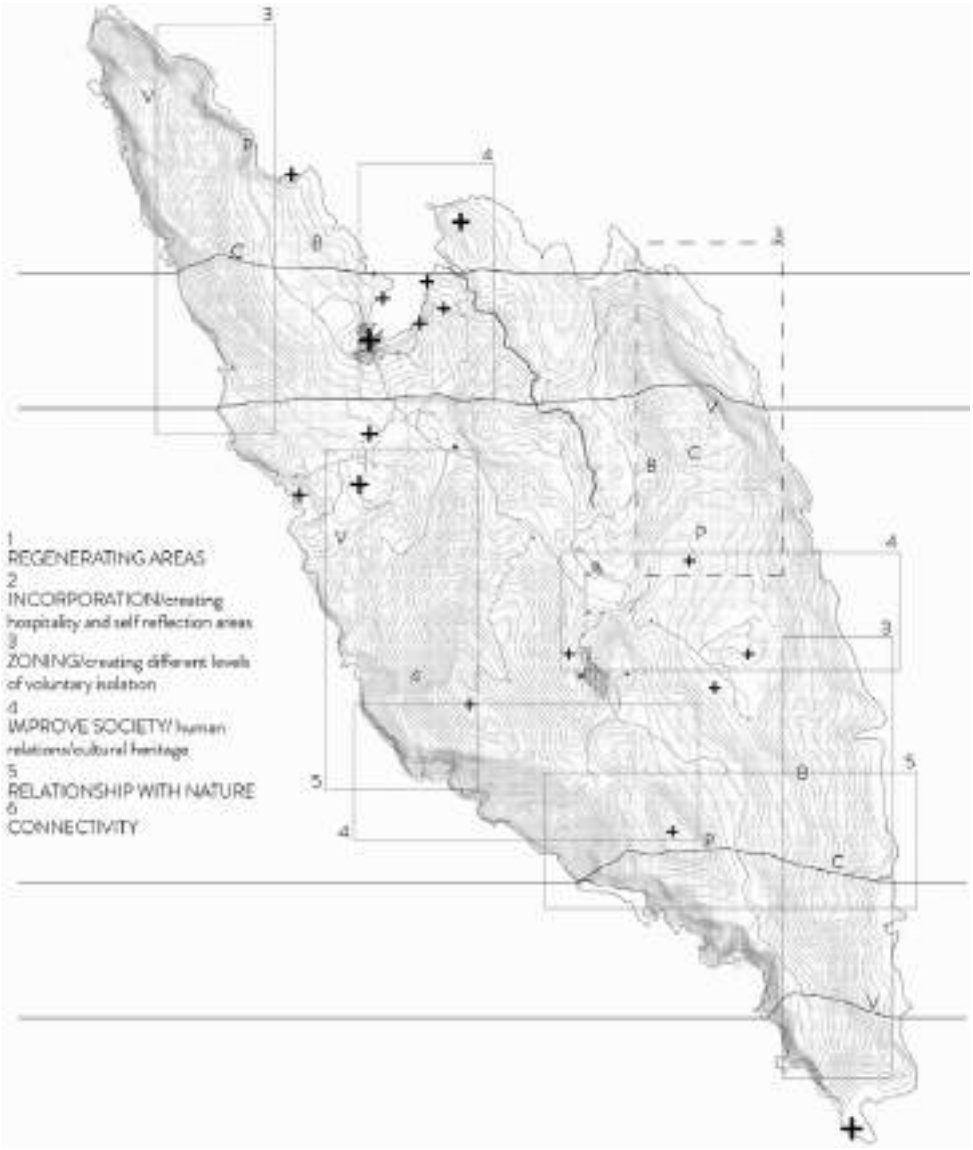

Fig. 9 | Antikythera: Strategic mapping of resources (credit: Charles, Daglio, Kousidi, Mounjid and Zera).

ing, rendering available, and intersecting places of interest present in that area. First, because it introduces systems that give order to the inherent features and elements of the landscape and contribute to their protection and conservation. Second, because it strengthens the links between the spatial and the symbolic and reveals the didactic character of the landscape. Accordingly, the following case studies are presented to

portray the connectivity approach first on a local scale and then simultaneously on a regional scale.

The design of a New Archaeological Park for the ancient city of the island of Milos (Cyclades, Greece) by Doxiadis+ architects (2017-ongoing), for instance, centers around the creation of a network of choreographed pathways and access points, aiming to reveal the multistratified character of the landscape which extends beyond its aesthetic, perceptive dimension. The landscape hence emerges as a system charged with archaeological/historical (medieval castle and villages, Christian catacombs, ancient town and harbour, churches) and natural/cultural (terraces, olive groves) values. The Tudela-Culip project at the Cap de Creus Natural Park, Spain by EMF Landscape Architects (2010), similarly, has aimed at the restoration of a site of natural, geological, and botanical value on the Iberian Coast, previously occupied by a private holiday village (Club Med) which ceased activity in 2003. The enhancement of a system of pathways and viewpoints, with the promotion of circular routes, so as to socially valorize both the natural and humanized layers of the place, the restoration of the ecosystem dynamics inherent in the area, and the reconstruction of the topography of the site were the project's main lines of intervention (Konaxis, 2018).

On a broader scale, the multiscalar view embedded in the connectivity approach, entails the attempt at encompassing the local holistic interrelations in continuity with a wider network of cultural and physical significance. The Phoenician Route, one of the Cultural Routes of the Council of Europe, connects different countries to reinforce the historical links created thanks to the ancient civilizations, thereby promoting the Mediterranean culture and establishing new relationships between man and the surrounding cultural heritage, as well as new pedagogical and responsible tourism models.

In the case of Antikythera, the archaeological heritage enhancement should be targeted to conceive new fruition modes following a connectivity approach: It should both strengthen the relations between the different sites (on land and underwater), devise new infrastructures and educational paths across the surrounding inland and water landscape, and make accessible the island's antiquities in a broader network of tourism and research facilities, including similar archaeological diving spots and underwater ancient remains in the central Mediterranean region. Given that the enhancement of the island's archaeological heritage may not be sufficiently prominent to attract visitors, it can benefit from a deeper integration with other modes of tourism to be developed on the island and acquire a new cultural significance, educational in-depth meaning and economic feasibility when belonging to a more comprehensive visit tour.

Resignificance: introducing new productive activities, valorizing local resources | Contemporary projects, such as the Roadmap 2050 – A Practical Guide to a Prosperous, Low-carbon Europe (2010) by the Office of Metropolitan Architecture (OMA) and the European Climate Foundation (ECF), have speculated that the southern Euro-

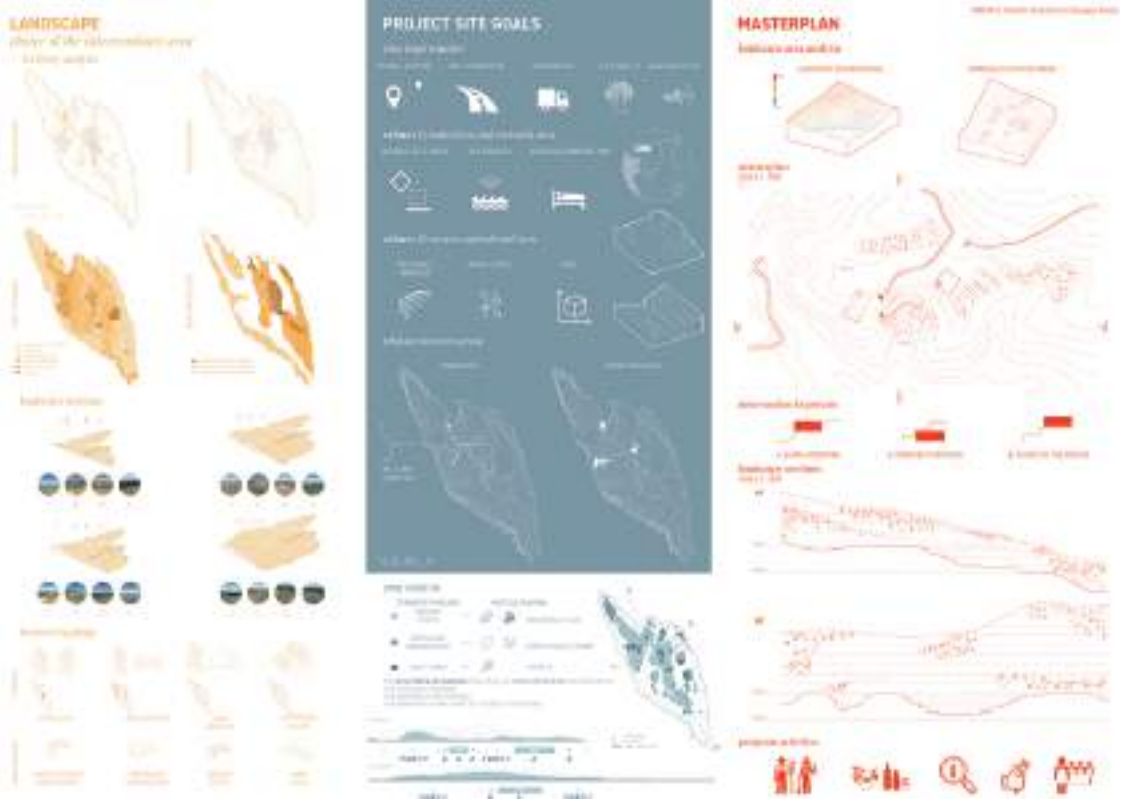

Fig. 10 | Antikythera: Rethinking agricultural activities through an eco-tourism perspective (credit: Daglio, Goi, Gronchi, Kousidi and Rivatta).

pean sunbelt regions may comprise a regional network, connected on the basis of their energy potential and common geopolitical issues, so as to draw upon geographic diversity with the drive towards sustainable enhancement (Willis et alii, 2016). In the context of the Mediterranean underpopulated islands, a renewed approach to the valorisation of local resources may hold the key to the introduction of new management production systems: these systems involve the introduction of new forms of economic activity, new functions and new management actions which may foster long-term investments and activate the connectivity among island communities in close proximity. At the core of this approach is the introduction of new activities or the interpretation of existing ones, both linked to the development of new meaning (Michalena, 2008): wind turbines in lieu of windmills (renewable energy), aquaculture in lieu of agriculture (production), ecotourism in lieu of agritourism (tourism).

The National Marine Park of Alonissos and Northern Sporades, Greece (NMPANS), for instance, has been at the center of the small-scale eco-tourism development program of the island of Alonissos with the aim to enhance its social and economic progress, by raising awareness regarding environmental protection and conservation in the local community and by generating revenue to be implemented in the management and conservation of the protected area. However, the protection and preservation of the natural richness of protected areas requires ‘a holistic policy’ that includes «[…] the development of necessary infrastructure, the proper organization of services ren-

dered, and the creation of competent administrative bodies […] followed by a general environmental protection policy» (Oikonomou and Dikou, 2008, p. 855), which considers the needs of the local and regional communities. The NMPANS model is then equated to «[…] a real brand that holds together, as in a mosaic, the naturalistic, sociocultural and tourist characteristics of the area» (Konaxis, 2018, p. 129).

Not limited to naturalness but perceived as a model of reinterpreted agritourism, ecotourism may be deployed as a model that leads to the empowerment of the local community of Antikythera, in line with a recent attention drawn on the potential of small islands in the Mediterranean to serve as ecotourism destinations (Scheyvens, 1999) due to the attractiveness of the landscape, the presence of natural protected areas and a high level of wilderness, owed to the limited low scale of human intervention and their geographical isolation. A further factor beneficial to ecotourism development is that on small islands the phenomenon of 'habitat fragmentation', which sees the dispersion of wild areas, understood as prospective ecotourism venues, across the archipelago, is not observed (Agius et alii, 2019). Given the geographical position of Antikythera island, its small size and its wide range of geohistorical features, such a model may introduce new nature- and education-based activities (Fig. 11), targeted on sustainable development, by drawing upon elements of the terrestrial and marine flora and fauna of the island (Tzanoudakis et alii, 1998). It may ultimately bring about the enhancement of the marine, the natural and the cultural heritage of the island, simply by placing different elements into a unitary system, thereby enhancing environmental awareness.

Participation: engaging local communities in new hospitality systems | The project should provide the framework for re-reading, re-thinking, and re-evaluating the archaeological and modern, tangible and intangible heritage of a given place, so as to introduce new connections with tourism, to sustain and preserve authenticity, and to foster a new sense of place. The revitalisation of underpopulated islands in the Mediterranean context involves the empowerment of local communities through their involvement in the design, administration, and maintenance of new types of tourism development mediated through archaeological and modern heritage. The participation of visitors in the daily activities of the local communities in order to acquire non-mediated experiences from productive activities, while reinforcing agropastoral touristic development (fishing, pastoralism, beekeeping), as well as from activities connected with tradition (rituals, customs, and celebrations), thus preserving intangible cultural heritage, are actions included in this strategy.

The ongoing Three Peak Sanctuaries project in the village of Gonies, Central Crete, for example, centers around the field of community archaeology, seen here as a strategy to regenerate the local community (Tsaravopoulos and Fragou, 2013). The project is targeted at a village of approximately 180 inhabitants which from the 1940s onwards has suffered from depopulation and decline and aims at the «[…] development of public outreach programs in collaboration with the communities themselves» (Kyr-

iakidis and Anagnostopoulos, 2017, p. 336). It embraces the in-depth and long-standing involvement of the local inhabitants in the planning process of community archaeology programs. It argues for the necessity of «[…]ground-up understanding of and involvement with local power relations and networks, rather than simply a good, top-down management plan» (Kyriakidis and Anagnostopoulos, 2017, p. 336) to ensure the sustainability of such programs.

With reference to the regeneration of Antikythera, recent studies have called for the development of heritage tourism, valorising the archaeological sites located on the island as a future resource of touristic activities. This engagement of «[…] local communities in heritage projects may […] enable cultivating an optimistic attitude for tourism development that is socially and culturally sustainable» (Fouseki and Alexopoulos, 2019, p. 1282). Conversely, the introduction of alternative tourism schemes centered on the participation of visitors and volunteers in the archaeological excavations active on the island «[…] is viewed as an opportunity to create a museum space for the exhibition of the moveable excavation finds. [The need of contextualizing] perceptions of archaeological heritage within wider perceptions of the place on which archaeological remains are located» (Fouseki and Alexopoulos, 2019, p. 1282) is considered essential in revealing 'alternative' archaeologies, histories and stories, which can be incorporated into the management of archaeological sites (Fig. 11).

Communication: introducing new narratives | A final approach to conceiving regeneration strategies relies on communication and the rethinking of the common imageries related to the place. However, a shared inclusive attitude should be enacted, beyond a mere commercial place-branding activity, targeting the spatial and social identity of the place possibly through a multidisciplinary and collaborative process (Rivas, 2015), especially for a long-lasting intervention (Fig. 12). Creativity has long been the trigger to start «[…] not only maintenance or improvement of the city, but full-blown actions of re-signifying the relationships, the bonds of symbols and values within communities and places, adding a sense of belonging and generating social capital, integration, and renewed trust» (Battisti, 2020, p. 85). Aimed at transforming abandoned territories in open air contemporary art exhibitions, such as in the case of Fanzara (Spain), Favara and Casacalenda (Italy), or at creating new local communities of artists, as in Le Bruc near Barcelona or Bussana Vecchia, Ostana (Italy) and many others.

In the case of Susak, Croatia, the strategies that have aimed to address the depopulation of the island involve the creation of new infrastructures (seafront development) and 'diffuse hotel' tourist accommodation also as a means to reactivate the historical economic activity of winemaking. With reference to the Domus Susak project, Stefania Staniscia (2013, p. 261) writes: «[…] the largely family-owned tourism business evolved, in the first years of the twenty-first century, into a form of Total Leisure Experience. […] Well aware of the island's tourist potential, the Cosulich family and his project grew ambitious: he planned on extending the vineyard to 100 hectares and

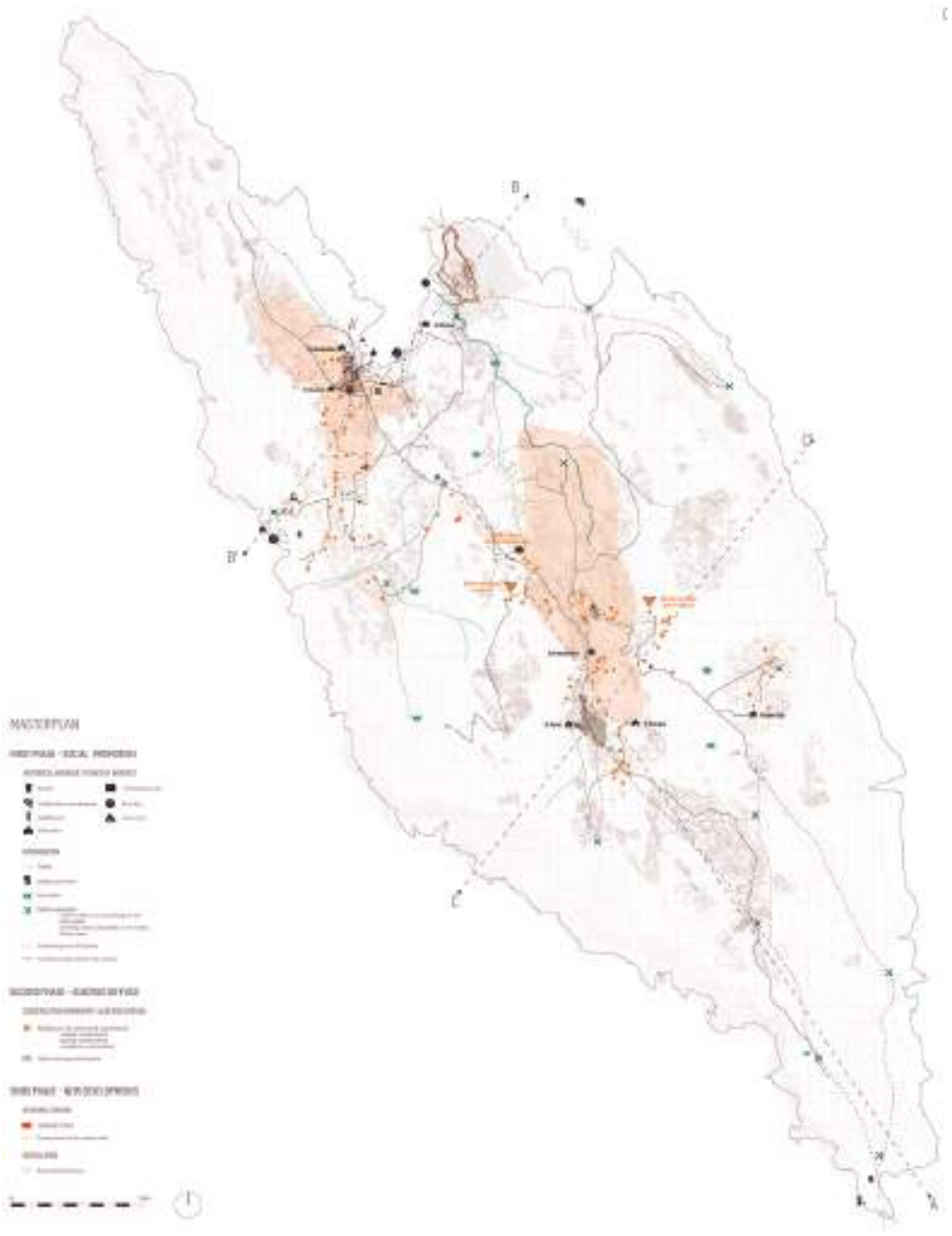

Fig. 11 | Antikythera: Formulation of integrated participation strategies to be developed through several phases over time (credit: Daglio, Iacobone, Kashchuk, Kousidi, Mendes-Silveira and Sokratous).

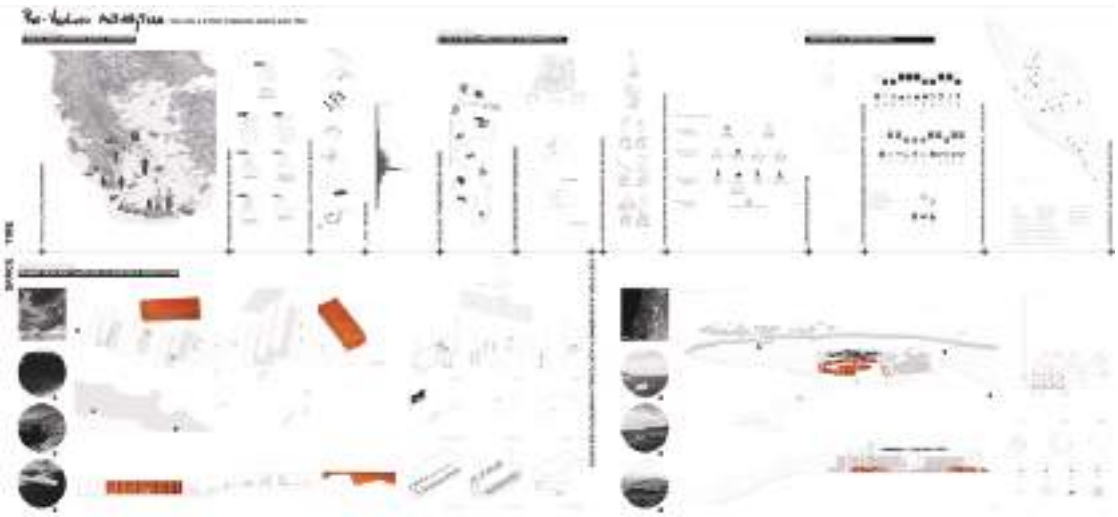

Fig. 12 | Antikythera: Narrating the intangible heritage through thematic itineraries in the landscape (credit: Daglio, Gutty, Kousidi, Palau and Sanogo).

transforming the island into an exclusive resort by buying and restoring uninhabited buildings and creating an 'albergo diffuso' […]. These ideas are in line with typical urban planning guidelines, aiming to both protect the environment and promote the development of infrastructures that may improve the territory's accessibility and appeal, with the goal of making the island attractive to the tourism market». Accordingly, the previously abandoned wine making activity was thus reinterpreted and communicated as part of a wider touristic experience.

In the case of Antikythera, the castaway experience due to the remoteness of the area can become the opportunity to provide new forms of transformational or escape tourism following in the steps of the ancient monks' spiritual retreats or the political exile.

Conclusions | Following the design-driven research outcomes on the Antikythera case study some more general considerations can be outlined to contribute to the regeneration strategies debate about rural depopulation and abandonment. As the pandemic has already underlined, the deployment of digital infrastructures may be regarded as a tool to broaden and strengthen this approach, offering a fundamental opportunity to support the design and implementation phases, to drive participatory processes and use innovative solutions to improve their resilience, to build on local strengths and opportunities; a strategy which has already been launched by the EU through programmes and policies from the EU Action for Smart Villages (2017) and been included in the European Green Deal (2020). In the quest to strengthen the resilience of Mediterranean landscapes even minor islands may be considered as significant test subjects to «[…]

generate lessons in positive landscape management», as clearer samples of the multilayered complex reality that are Mediterranean cultural landscapes. A reality which is nourished by the rich diversity and long-standing systemic interrelation between people and nature can offer multiple opportunities to reinterpret and retrace renewed ecological and economical balances embedding «[…] rural landscapes in their past cultures and encouraging the genuine empowerment of local people and communities in delivering distinctive future landscapes which reflect history and heritage» (Agnoletti, 2014, p. 290).

In the long run, particular attention is being drawn to the extended role of the architect, which entails the interweaving of knowledge and practices that intersect different disciplines, scales, contexts, stakeholders, and communities, originating from a «[…] collective experience that might hold the key to a new intuition for the multiple scales of climate change» (Coen, 2016, p. 39), also with reference to Mediterranean territories. As design is increasingly called to address the challenges in the long-term sustainable development of these territories, the need to embrace the notion of architectural organisms rather than of singular artefacts, plays a central role and demands the creation of new synergies between design and research.

Notes

1) On Antikythera, a climate change observatory, the PANhellenic GEophysical observatory of Antikythera (PANGEA), has already been installed, comprising a research infrastructure that monitors and records climate change, air quality and severe weather, supported by an ERC Grant; it is the first trigger of a possible broader redevelopment strategy. Further research initiatives linked to the area include: the Antikythera Survey Project – ASP (Trent University, University College London; Greek Archaeological Service; under the aegis of the Canadian Institute in Greece and the Hellenic Ministry of Culture; 2005-2010) which explored the long-term history and human ecology of the island – the 'complex ecology of humans, plants, animals and birds that have developed in tandem with the most recent phase of human occupation' – through combined interdisciplinary research methods, and the Antikythera Bird Observatory (Hellenic Ornithological Society) documentation project.

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THE EXHIBITION DESIGN FOR INTANGIBLE HERITAGE
Analysing the Paço do Frevo

Bianca Manzon Lupo

section
ARCHITECTURE

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ABSTRACT
The interventions in the built heritage seeking to insert cities in the globalised tourism circuits are a broad field of contemporary theoretical research. In Brazil, the Roberto Marinho Foundation has become an important agent for the creation of recent museums, by applying the perspective of the integrative design, that seeks to connect architecture, museography and content. This text will focus on the analysis of Paço do Frevo, an important case study on the application of this methodology for the treatment of intangible heritage. We intend to investigate the interest of private foundations in integrative design, reflecting about its possibilities and limits on the treatment of intangible heritage. The main documentary sources used were the architectural and museographic projects, complemented by the analysis of both museological plan and articles published in newspapers and specialised magazines in addition to the collection of semi-structured interviews of professionals responsible for the project.

KEYWORDS
heritage requalification, museography, communications technology, hybrid architecture, intangible heritage

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The interventions in the built heritage have become a broad field of theoretical research in recent decades. Multiple actions were carried out to convert historic buildings into museums or cultural centres, according to the phenomena of 'museummania' and 'museum boom' (Huyssen, 1995). Contemporary cultural production often appropriates the logic of production of cultural goods, aiming to favour constant innovation through aesthetic and technological experimentation. According to some authors, however, it is necessary to reflect critically on the excessive attribution of 'cultural uses to culture' (Meneses, 2009), which contributes to the dissociation of heritage to the daily life of the community, encouraging the establishment of exceptional and discontinuous relations with cultural traditions. This context is related to the insertion of cultural goods into the circuits of the globalised post-industrial service economy, characterised by the stimulation of competitiveness and specialisation of the cities, which have become objects of consumption (Harvey, 2013). The dissemination of architectural programs connected to the entertainment culture stimulates the need to occupy free time, so that museum spaces have become increasingly more complex and multifunctional, including restaurants, coffee shops, concert halls and bookstores.

The conversion of historic buildings into museums and cultural centres is a strategy to guarantee the economic sustainability of restoration interventions. Proving to insert urban territories in the dynamics of globalised tourism, the consumption of historic cities is connected to actions of recycling infrastructure and safeguarding historical and memorial values (Montaner and Muxí, 2014). The tourist phenomenon synthesises the contradictions of contemporary society, highlighting the tensions between global and local, homogenisation and memory, consumption and culture. Adapting old buildings to contemporary cultural uses becomes a strategy for requalifying specific areas with potential for economic appreciation, stimulating the international cultural tourism. These actions are frequently connected to the development of public policies oriented towards the inclusion of historical places on the UNESCO World Heritage List[1]. For some authors, the controversy over the recognition of cultural assets considered as World Heritage reflects the effort to ensure greater attractiveness, differentiation and competitiveness between cities in the context of globalised cultural tourism (Scifoni, 2003; Holanda, 2008).

In this sense, it is remarkable the establishment of private-public partnerships in this context, including initiatives undertaken by large companies and financial institutions interested in promoting social responsibility actions. As Medeiros (2017) pointed out, these processes have become more frequent since the 1990s and involve tax benefits, philanthropy, marketing, increasing the social image and the spread of 'soft power'[2]. The Brazilian context offers a rich empirical field to deepen the knowledge on this theme, with emphasis on the recent experience of the Roberto Marinho Foundation (RMF), a private non-profit institution linked to Grupo Globo, the largest media conglomerate in the country, which has developed initiatives of requalification for built heritage for implementing new museums that often use new communication

technologies for the interpretation of intangible heritage, such as the Culture House of Paraty (2004), Museum of the Portuguese Language (2006), Museum of Football (2008), and Paço do Frevo (2014). RMF is considered one of the main agents responsible for introducing the integrative design methodology in Brazil (Migliore, 2020; Hughes, 2015; Lupo, 2021). This concept depends on the collaborative work between architects, designers and curators for developing the museum narrative. According to Larissa Graça (2019), architect and manager of FRM projects on Heritage and Culture, «[…] architecture, museography and content must be integrated in the design process. We do not work with the idea of a building occupied by an exhibition, but we think of everything connected to the museum's concept». This methodology also intended to improve the durability of restoration interventions and to guarantee its financial sustainability.

The main objective of this article is to deepen the understanding of the integrative design process involving architecture and exhibition design, reflecting about three main questions: why are big communication companies interested in the integrative design model? What are its implications for the requalification of the built heritage? What are both open perspectives and limits of this approach for dealing with intangible heritage? The research adopted the case study methodology (Yin, 2001) to analyse the Paço do Frevo, an important representative case study on this problem in Brazil, subject of few academic studies. Paço do Frevo is dedicated to the characteristic rhythm of Brazilian regional culture, recognised as a National Intangible Cultural Heritage (IPHAN) and World Heritage (UNESCO). Its creation, that aimed to «[…] tell the story of frevo and its traditional characteristics throughout the year, not only at Carnival» (Paço do Frevo, 2021), was developed by Grau Arquitetura and the exhibition designer Bia Lessa. The main documentary sources that will guide this study are the architectural and exhibition design projects and the museological plan. As a complementary source, we can mention the research on periodicals and magazines specialised in architecture or in general media (Lapuente, 2016), in addition to the collection of semi-structured interviews of professionals responsible for the project (Duarte, 2004; Mattos, 2005). Although the limitations of this study inherent to the case study methodology, the analytical structure used in this article can be potentially expanded to other examples, contributing to the international expansion of this field of knowledge. This text is part of the doctoral thesis written by the author at the University of São Paulo. About future studies resulting from this analysis, we intend to expand the results then obtained with the investigation of other case studies in the Brazilian context, keeping as the main interest focus the relations between architecture and exhibition design.

The Roberto Marinho Foundation and the integrative design methodology | The integrative design is linked to the expansion and democratisation of access to knowledge connected to the so-called edutainment boom in the last decades (Lupo, 2021). To guarantee the visitor's immersion in the proposal, the connection between space

Fig. 1 | Main actions undertaken by the Roberto Marinho Foundation (source: Farroco, 2016).

and content is obtained through the integration between scenography and new information technologies. According to Migliore (2020), the integrative design depends on the collaborative work between architects, exhibition designers, curators, museologists and content consultants. The RMF can be considered the main agent responsible for the introduction of this methodology in Brazil (Fig. 1). Since its creation in 1977, it has developed actions related to three main areas of activity: Environment, Cultural Heritage and Education, with the aim of improving social inclusion. The actions then carried out include the development of awareness campaigns, restoration, approaching to intangible heritage, urban projects and, finally, the creation of museums. Regarding to the intangible heritage problems, RMF often values its pioneering approach in the Brazilian context, as shown by the recovery of the collection of the Escola de Samba Mangueira[3] (1997-1999), presented by the Foundation as «[…] one of the first organised experiences of conservation of intangible heritage» (Finguerut and Sukman, 2008, p. 134).

After the appointment of Hugo Barreto as RMF's Secretary General in 2001, the institutional actions went through a process of inter-sectorial integration. According to Larissa Graça (2019), «[…] we realised that simply restoring a building is not a sustainable action. So, we seek to connect material and immaterial heritage in some experimental interventions, such as the Culture House of Paraty». In this intervention, a 18th century house was restored by the architect Glauco Capello to host a Reference Centre for Memory and Intangible Heritage. The action sought to promote the candidacy of Paraty as a UNESCO World Heritage Site[4]. The permanent exhibition of the Culture House of Paraty was designed by Bia Lessa, also in charge of Paço do Frevo. Both actions dialogue with international debates on the affirmation of intangible cul-

tural heritage, which led to the publication of the Convention for the Safeguarding of Intangible Heritage (2003). The institutionalisation of intangible heritage in Brazil took place through the Decree nº 3551/2000, which created the Registry of Cultural Property of Intangible Nature and the National Program of Intangible Heritage, aiming to recognise, identify and preserve material and immaterial cultural assets; that is, traditional knowledge, parties, celebrations, forms of expression and places of sociability (Tamaso, 2007; Chuva, 2015). The Convention on the Diversity of Cultural Expressions (2001) contributed to the defence of the Brazilian intangible cultural heritage. In the 21st century, the structuring process of the museum field can be recognised after the approval of the National Museum Policy (2003) and the creation of the Brazilian Museum Institute (2009).

In this context, RMF proposed the implementation of «[…] a new typology of museums in Brazil» (Farroco, 2016, p. 4), whose main characteristic is «[…] the creation of narratives and experiences» (Graça, 2019). These museums, conceived as information centres, move away from material collecting practices in order to use scenographic and interactive resources. This model seems to be capable of catching the attention of a wide audience that was, for various reasons, not included in the museum space. In Brazil, this dramatic situation can be seen through the data provided by the Institute of Applied Economic Research (2010), which indicated that 70% of the Brazilian population has never been to a museum or to a cultural institution. Dealing with this context, FRM sought to approach the international exhibition design model headed by the American office Ralph Appelbaum, hiring him to design the Museum of the Portuguese Language, an example of connection between «the restoration of a historic building and the celebration of intangible heritage through the creation of a museum with an architectural program that guarantees the sustainability of the historic building» (Finguerut and Sukman, 2008, p. 233). The integrative design, in collaboration with the architects Pedro and Paulo Mendes da Rocha, can be considered an important aspect of this intervention. The museum was located inside the Light Station (São Paulo), built in 1867 by São Paulo Railway Company and listed by the three Brazilian instances of heritage preservation: Condephaat, 1982; Conpresp/DPH, 1991; Iphan, 1996 (Lupo, 2020).

In particular, RMF sought to conform this strategy to promote Brazilian culture globally, considering that «[…] Brazil is our origin and our source of inspiration. We believe that Brazilian culture has a contribution to make to the world» (Fundação Roberto Marinho, 2021). Some interventions made by FRM intend to create museum narratives that interpret Brazilian culture aspects, such as the Portuguese Language Museum, Football Museum, Paço do Frevo and Image and Sound Museum (not completed). Moreover, RMF has shown great interest in supporting Brazilian candidacies for the Unesco World Heritage list, such as: Ouro Preto (1980), Rio de Janeiro (Cultural Landscape Category, 2012), frevo (Intangible Heritage Category, 2012), Olinda (2013), Pampulha (Belo Horizonte, 2016) and Paraty/Ilha Grande (2019). Moreover, most of RMF's interventions deal with urban requalification projects undertaken by

municipal and state public policies, such as Nova Luz (São Paulo), Porto Maravilha (Rio de Janeiro) and Porto Novo Recife, which comprises the Paço do Frevo.

Paço do Frevo: musealizing intangible heritage | Paço do Frevo can be analysed within the context of retrofitting old buildings to the post-industrial economy, centred on the culture of leisure, services and entertainment (Bastos and Zein, 2010). The intervention involves three important points: reuse of built heritage, revaluation of frevo's traditional memory and creation of tourist attractions supported by large companies. Frevo is a rhythm that characterises the Brazilian regional culture born on the streets of Recife, at the end of the 19th century and early 20th century. The rhythm can be considered a phenomenon of resistance of the working class as a counterpoint to the elitist manifestations of carnival (Holanda, 2008; Sarmento, 2010). Initially developed in the so-called Pedestrian Clubs, this manifestation resembled the processions that took place during the Lenten period, when organised groups went down the streets carrying flags, singing and dancing. In the 1920s, the first carnival blocks contributed to consolidating frevo as a cultural tradition. Under the initiative of the Municipality of Recife, frevo was officially registered as a Brazilian Intangible Cultural Heritage by IPHAN in the Book of the Expression Forms[5] (2007), considering the richness of the artistic expression and the potential increase of international visibility of Pernambuco. In 2011, the Frevo Safeguarding Steering Committee aimed to insert the rhythm into the UNESCO's agenda, based on an initiative coordinated by IPHAN, Municipality of Recife and Secretary of Culture (Recife City Hall, 2012). In the following year, frevo was also legitimised as a UNESCO World Cultural Heritage.

The museum's creation was linked to the Integrated Frevo Safeguards Plan presented at UNESCO, which carried out the mission of «[…] consolidating frevo as a national and international cultural reference» (Carvalho, 2013, p. 9). More than a place for depositing material collections, the Paço intends to become a meeting place for actors, musicians, dancers and researchers. This project was an initiative of the Municipality of Recife, coordinated by RMF and managed by the Institute for Development and Management. Its creation was supported by IPHAN and Ministry of Culture through the Culture Incentive Law[6]. According to Hugo Barreto, general director of RMF, the idea was to create a place to experience frevo every day, so that tourists understand this rich manifestation (Barreto quoted in Markman, 2014). The institution's museological plan was conceived by representatives of RMF, Municipality of Recife and Secretary of Culture. Its conception faced the challenge of «[...] transposing a cultural expression from the street to a closed environment, [...] but we tried to transform this difficulty into content» (Lessa quoted in Arcoweb, 2014). As Bia Lessa explained: «[...] our intention was to create a museum where the participation of anonymous people was explicit, bringing to its soul the erudite and popular form of frevo formation. [...] It was an idea of a complete museum, where spectators could participate and contribute to the continuous movement of contents» (Lessa quoted in Carvalho, 2013, p. 19).

The Paço do Frevo develops «[…] a new museum concept: the playful, fun and interactive museum-school» (Finguerut and Sukman, 2008, p. 2). In fact, it intends to be «[…] an environment that stimulates the full exercise of experimentation, discovery, updating and safeguarding that seeks the convergence between art and education, tradition and innovation, thought and practice» (Esteves and Santos, 2018, p. 6). The institution is structured as a Documentation and Research Centre that privileges the digitalisation of documents and the development of temporary and permanent exhibitions complemented by educational activities. It is part of an extended set of museums connected to Brazilian popular culture, including Museu do Folclore Edison Carneiro (Rio de Janeiro, 1958), Museu do Homem do Nordeste (Recife, 1979), Museu Casa do Pontal (Rio de Janeiro, 1992) and Museu Mamulengo (Olinda, 1994). The Paço works in collaboration with other cultural institutions which house material collections about the rhythm, such as Fundação Joaquim Nabuco, Casa do Carnaval and Museu da Cidade de Recife. Its institutional program concerns some specific architectural infrastructure such as presentation stages, dance and music soundproofed rooms, laboratories and research areas, instead of conservation laboratories and technical reserves. Next, we will analyse the process of choosing the place to receive the Paço do Frevo and how the building's requalification architectural project sought to reconcile the proposed program with the architecture of the early 20th century.

New uses for the old Western Telegraph Company | The Paço do Frevo was installed in a building built in 1906, located at Praça do Arsenal da Marinha, in the heart of Bairro do Recife, which was the foundation area of the city in the 16th century and an area of historical importance for the emergence of frevo as a cultural manifestation. At the beginning of the 20th century, this area went through a process of urban renewal that would facilitate the access to the port area, despite the loss of the original urban fabric characteristics. However, from the 1960s, with the construction of the Suape's Port, the old Recife became obsolete and went through an emptying process. In the 1980s, Recife's government tried to reverse the environmental degradation through the so-called Bairro do Recife Recovery Plan, which was not successful mainly because of the lack of support by upper class for the project (Esposito, 2017). In 1981, Bairro do Recife was incorporated into the Plan for the Conservation of Historic Sites Protected by the Municipality. In the 1990s, a new attempt related to the strategic planning concept (Castells and Borja, 1996) was undertaken by the state government to recover this area. The main objective of the Bairro do Recife's Conservation Plan (1992-96) was «[…] to convert the local economy into a regional centre of modern services, commerce, leisure and culture for the city's population and to create a centre of national and international tourist attraction» (Lacerda quoted in Esposito, 2017, p. 81). In 1995, the zone was considered a Special Area for the Conservation of Historical Cultural Goods. Three years later, the architectural, urban and landscape complex of Bairro do Recife was also federally listed.

From the 1990s, the RMF collaborates to make some requalification actions in the old port area, trying to make it attractive for cultural tourism, such as the project Cores da Cidade (1993-1994; 1998-1999) and Light in the Old Recife (1999-2000). Some specific projects headed by RMF have implemented cultural uses in old historical buildings, as we can see by the restoration of Teatro Apolo (1996-2000) and Instituto Cultural Banco Real (1999-2000). Despite these initiatives, the Bairro do Recife still had a great number of empty properties. In 2010, the mega sporting events hosted by Brazil – in particular the Confederations Cup (2013) and the World Cup (2014) – intensified the interest of some political and social agents in the recovery of Recife's seafront, so that the urban operation was implemented to create a metropolitan tourist and cultural complex, including the following initiatives: Centro de Artesanato de Pernambuco (2012), Santander Cultural Recife (2014), Cais do Sertão (2014) and Paço do Frevo (2014).

The building chosen to host the museum was built at the beginning of the 20th century by the British Western Telegraph Company, which ended its activities in 1973 (Fig. 2). The building is included in the Architectural, Urbanistic and Landscape Complex of the Historic Centre of Recife and it is listed in federal and municipal instances (IPHAN and Special Zone for Cultural Historical Goods). It is also an important building for the history of communications in Brazil; installed in its structure, there is a cable that connected Brazil to Europe for 65 years. The building was an example of the late English neoclassical style inspired by the Renaissance. The good resistance of architecture over time can be explained because of its «[…] constructive excellence and the high quality of the materials» (Carvalho, 2013, p. 58). The restoration project was commissioned to Grau (Group of Architecture and Urbanism), coordinated by

Fig. 2 | Paço do Frevo (source: idg.org.br/).

Fig. 3 | Architectural section (source: bit.ly/3wu05Ag).

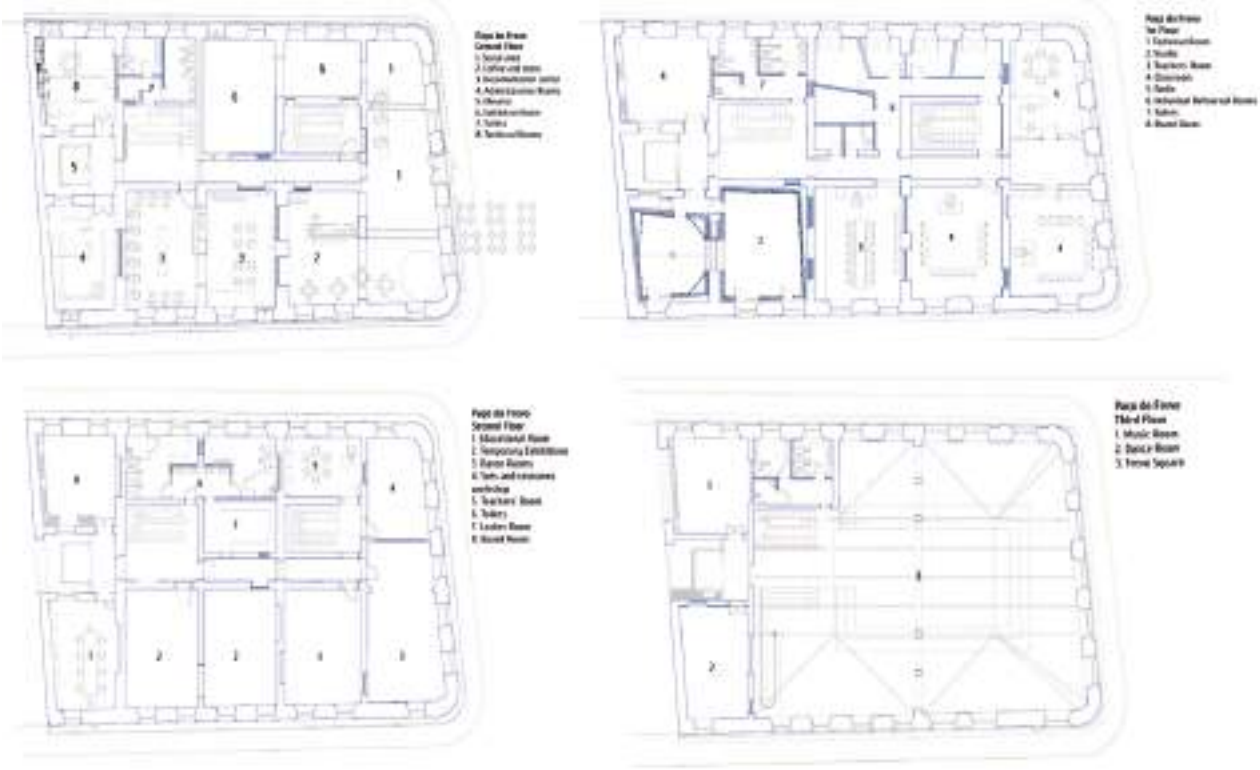

Fig. 4 | Architectural plans (source: Carvalho, 2013; elaborated by the author).

architects Felipe Campelo and Ronaldo L'Amour. The office, established in 2001, is specialised in dealing with built heritage. The architects restored Mãe de Deus Church (Recife, 1997-98), Cine Teatro Guarany (Triunfo, 2004) and Mercado São José (Recife, 2014). When the office was hired, the building that would host the museum had already been chosen, as well as the architectural program. According to the architect's testimony, «[...] RMF presented the program distribution proposed by Bia Lessa» (L'Amour, 2021). Nevertheless, the architecture and museography projects were designed independently. As the architect recounts, «[…] we worked separately. [...] We only saw the exhibition design when it was ready» (L'Amour, 2021). The building had wide solid brick walls, set with lime-rich mortar, which was found in apparently good condition. However, the disuse contributed to the degradation of the building, including the loss of windows and wooden floors, the oxidation of the iron structure and the dismantling of the metal roof. Moisture, both air salinity and pollution (organic and inorganic) also contributed to the oxidation of the building's iron. Therefore, it was needed to restore the façades, to replace the infrastructure and to requalify the interiors. The building's ground floor was in a rather uncharacteristic state, painted blue instead of the original neutral tone, retrieved through prospecting studies.

The intervention followed the principles of conservative restoration, since «we seek to maintain the original characteristics of the building. Furthermore, the program should adapt to the building» (L'Amour quoted in Lessa, 2014). Internally, the intervention maintained the original arrangement, keeping the main features of the original typology (Figg. 3, 4). Given the oxidation of the metallic structure, it was made a structural reinforcement by applying a carbon fibre blanket over the slab with a liquid reagent, which achieves a resistance equivalence to reinforced concrete after hardening. The elevators were installed in an existing ditch, responsible for natural lighting, without tearing the historical slabs. Furthermore, as the building has never been modified for new uses, the architecture preserved its authenticity. The additions of brick masonry and the 2 x 2 cm blue tiles installed on the ground floor were removed. During the mapping and prospections, a boarded-up frame was found and, based on this model, it was possible to duplicate the original missing frames. On the top floor, it was decided to implement new frames. This design solution resulted in a museography input, that created the multipurpose space Frevo Square, that includes a lookout on Recife landscape. According to L'Amour, «[…] Bia Lessa wanted to put an entire glass and printed texts on this glass, with the city as a background» (L'Amour, 2021).

The Paço do Frevo is characterised by its programmatic variety and support for educational activities. On the ground floor, there are reception areas, bar, shop, documentation centre, the permanent exhibition and technical areas. The first floor includes educative rooms, soundproof recording studios and a radio station. On the second floor, there are two dance rooms, dressing rooms, a space for scenario creation and an area for temporary exhibitions. On the third floor, there is the main exhibition area and two projection rooms dedicated to music and dance. As it is shown in Table

Program	Ground Floor	1st Floor	2nd Floor	3rd Floor	Total	%
Exhibition area	61,20 sqm	——	80,33 sqm	416,51 sqm	558,04 sqm	37%
Circulation area, technical, sanitary, and administrative areas	123,17 sqm	139,74 sqm	96,40 sqm	47,8 sqm	407,11 sqm	27%
Education and research	79,85 sqm	79,24 sqm	112,2 sqm	——	271,29 sqm	18%
Radio, studio, dance, and music room	——	109,72 sqm	92,45 sqm	——	202,17 sqm	13%
Lobby, coffee, and shop	62,47 sqm	——	——	——	62,47 sqm	4%
Total area	326,69 sqm	328,70 sqm	381,38 sqm	464,3 sqm	1501,08 sqm	

Table 1 | Architectural program and area calculation, Paço do Frevo (source: Carvalho, 2013; elaborated by the author).

1, the exhibition areas occupy only 37% of the building; technical and administrative areas, 27%; education and research areas, 18%; studio, radio, dance and music rooms, 13%; lobby, coffee and shops, 4%. As we can see, the architectural program favors the development of laboratory activities related to the frevo culture, instead of an exhibition or conservative spaces. These actions sought to interpret principles historically coined in the context of heritage preservation, considering the materiality and documentality of the building as a historical testimony and trying to adapt the new program to the pre-existent characteristics.

The museological staging of everyday life: the frevo set design | The Paço do Frevo project sought to provide the building with the necessary infrastructure for its new cultural destination. The discretion of the architectural design contrasts with the expressiveness of the scenographic apparatus, designed by Bia Lessa. She started making exhibition sets in the 1990, after working as theatre director and actress for a long time. The main principle that guides her interventions is the «[…] transformation of content into form» (Lessa quoted in Soares, 2016). The Paço do Frevo museum set recovers important elements of other projects by Bia Lessa, such as the exhibition Brazilian Like Me – Like Neither Who? (São Paulo, 1999). This narrative contains a sequence of thematic rooms close to contemporary art installations. For example, to involve the visitor in intense chromatic sensations, totally red or white rooms were created. After this project, she was invited to create the exhibition design of the Brazilian Pavilion at the Hannover Expo (2000), organised by the National Commission of the 5th Centenary inside the Pavilion of the Nations of Latin America. According to Lessa, «[…] we chose to present a pavilion without just one way, where visitors could create their own path, choose what they want to see. A pavilion that could be visited for 24 hours, in which the images would not be repeated» (Lessa quoted in Folha de São Paulo, 2000).

The scenic setting was created with a double approach: a low-tech model based on popular Brazilian cultures and high-tech experiences based on the 'black box' exhibition model (Cifuentes, 2011). There were also multiple interactive approaches, including physical (hands on), mental (minds on) and cultural (hearts on) experiences (Wagensberg, 2006). The pavilion's façade was a 'hands on' experience: a big panel with movable wood boards on which the visitor could write messages. Mental interactivity allowed visitors to individually watch deep content in digital monitors. Cultural interactivity was applied in some scenarios dedicated to Brazilian regional cultures, retrieving the repertoire of domesticity by providing crockery, saints and decorative objects. Some games, such as the finger football, favoured the visitor's affective connection.

In 2000, Lessa also designed the module Baroque Art at the Rediscovery Exhibition (São Paulo, 2000). Organised by the Associação Brasil 500 Anos Artes Visuais[7], this exhibition brought together an impressive number of artistic and anthropological objects related to Brazilian culture. The scenographic approach was imposed by the organisers to attract a large audience[8]. In collaboration with the curator Myriam Ribeiro and the architects Pedro and Paulo Mendes da Rocha, this set intended to emotionally interpret Brazilian Baroque. The narrative started from the so-called Forest, which showed European sculptures taken to Brazil in the 16th century, followed by the exhibition of indigenous sculptures. Then, there was a large carpet of handmade crepe paper flowers, made by prisoners of the Pavilion of the Devotees of Carandiru Prison, which evokes the popular processions of Corpus Christi (Salvat, 2011, p. 9). According to Lessa, «[...] the set design is a monochromatic rug that seeks movement, the waves typical of Baroque […]. It is a scenography true to this spirit, which instigates the five senses» (Lessa quoted in Gonçalves, 2004, pp. 122-124). The last space, Chapel, created with rounded wood walls recalling the Nossa Senhora do Rosário Church (Ouro Preto). Dimmed lights, colours and smells were combined to a sound installation that recovered «[...] liturgical songs that had accompanied us during this journey» (Salvat, 2011, p. 12). At the end, there was a blackboard on which visitors could write with chalk. The device contained shelves that supported bottles of Jesus pink soda, traditional in Brazilian Northeast. On the ceiling, photographs of the carnival designer Joãozinho Trinta were projected together with videos of samba-school spectacles.

This megaevent is commonly associated to the entrance of several professionals that worked with theatrical scenography in museum design, such as Daniela Thomas, Felipe Tassara and Bia Lessa (Curvo and Amorim, 2018). After this exhibition, RMF selected Daniela Thomas and Felipe Tassara for designing both Football Museum and MIS-Copacabana, and Bia Lessa for projecting both in Culture House of Paraty[9] and Paço do Frevo. The Culture House of Paraty anticipates some of the subsequent RMF's interventions, which started to implement exhibition spaces inside restored buildings. This initiative sought to boost Paraty's candidacy process to receive the title of UNESCO World Heritage, just like other actions undertaken by RMF, such as the seminar Paraty – Urban Planning and World Heritage (2001) and the publication of the book.

Fig. 5 | Reception (source: fabiofrutuoso.com.br/).

The History of the Gold Path in Paraty (2003). The architect Glauco Capello coordinated the restoration of a historical residence from 1754. In the exhibition areas, Bia Lessa «[…] sought in the population's orality its guiding axis» (Finguerut and Sukman, 2008, p. 261). The scenic setting incorporated aspects of local art and everyday objects. As she explained: «[...] inside the windows, instead of gold objects, we presented poor objects full of experience and meaning. In the pictures, we represented the people of Paraty by notorious personalities and ordinary citizens» (Lessa quoted in Miranda, 2008). Furthermore, the project proposed the city panorama as a museum object, stimulating the visual connection between interiors and exteriors.

In Paço do Frevo, «[...] Bia Lessa wished to include people in the museum's content, leaving a space to fill in the museum's dialectic, that is, a certain incomplete field of reflection» (Barreto quoted in Paço do Frevo, 2021). The graphic language is based on the red colour, recovering the etymological origin of the term 'frevo', which derives from the verb 'ferver', which in Portuguese means 'to boil' (Arcoweb, 2014). The museum narrative begins at the reception, where the walls were completely painted red with white writings of frevo characters' names, representing the importance of each person in this collective action (Fig. 5). This room walls are covered with short videos, and it is also visually connected to Praça do Arsenal, where ephemeral frevo's manifestations use to take place. As Lessa explained: «[…] transposing a cultural expression from the street to a closed room was the most difficult challenge of the project, but we tried to transform this difficulty into content» (Lessa, 2014). In addition, «[...] our intention was to create a museum where the participation of anonymous people was explicit, bringing in its soul the erudite and popular forms of the frevo's practice. […] The intention was not just to exhibit frevo. It was important to create a space for the diffusion, construction and learning of this Brazilian artistic expression» (Lessa quoted in Carvalho, 2013, p. 19).

The corridor that leads to access the elevator was converted into an exhibition display of photos related to frevo's memory, approaching the model of the 'white cube' (O'Doherty, 2007). The first exhibition room allows the visitors to fully immerse in the frevo's narrative, disconnected from the spatiality of the original architecture.

Fig. 6 | Exhibition room, ground floor (source: bit.ly/2TYQT8m).

There is a timeline elaborated with the anthropologist and historian Maria Lucia Montes and Leonardo Dantas, designed to connect frevo's history to the main socio-political events of the 20th century. The information can also be found in the Book of Time, which plays a frevo song when touched. The walls became a large blackboard on which visitors can write with chalk, just like at the Rediscovery Exhibition. The overlapping layers of chalk from the visitors' intervention create a strongly expressive language, perhaps referring to the universe of graffiti and street art, which contrasts with the white corridor (Fig. 6). On the floor, there are analogue clocks that show the time of different cities in the world, connecting diverse cultures in time and space through frevo. On the roof, there is an artistic installation with strips, inspired by the popular 'pau de fitas' dance (Fig. 7). Lessa also created an additional ornamental element composed by male and female figures from juxtaposing bathroom boards, that is, ordinary industrial objects applied to popular daily life.

On the third floor, there are two private rooms disconnected from the outside where short movies are played. Inside, there was a visual installation on the walls, composed by small mirrors with an orange border, very popular in the 20th century popular Brazilian culture. At the entrance, the Glossary of Carnival is an exhibition with oddities concerning the frevo universe inside small boxes that can be opened by visitors. It preceded the apex of the museum narrative: Frevo Square, a multipurpose space dedicated to the physical experimentation of the rhythm (Fig. 8). The programmatic indefiniteness recalls the concept of the 'grey box' (Foster, 2021), concerning the flexible architectural design able to receive diverse cultural manifestations. This room resembles the Language Square at the Portuguese Language Museum. On the walls, images and texts about frevo are shown. On the roof, the lighting solution recovers the aesthetic supersaturation present in Brazilian traditional cultures. A raised platform, which met the principle of reversibility of intervention, created a gap in with the central stage, improving presentation visibility. From this platform, visitors can also watch to frevo performances at Praça do Arsenal (Fig. 9). This architectural element works as an exhibition device that displays banners of frevo associations (Fig. 10). According to Lessa, «[...] the banners are always high, over the public. We made

Fig. 7 | Timeline, ground floor (source: bit.ly/3djUBiW).

an inversion and placed them under the floor, so that the visitor is obliged to look down and revere them» (Lessa, 2014).

Final considerations | The Paço do Frevo can be considered an exemplary case of requalification of the built heritage, dealing with the Bairro do Recife Requalification Plan by creating a museum that connects cultural uses to the intangible heritage. The intervention must be interpreted within a context of enhancing cultural tourism in the city of Recife, aiming to insert it in the dynamics of globalised culture. The museum also dialogues with the institutionalisation of intangible heritage and with the legitimisation of frevo as a cultural heritage. At the same time, it proposes a set of actions to increase the permanence of cultural events linked to frevo. The global approach to frevo was connected to the objectives of the RMF, interested not only in the economic revaluation of Bairro do Recife, but also in promoting the image of Pernambuco carnival as a tourist attraction. After all, «[...] Paço do Frevo was not intended for this perspective of safeguarding, it was born as an anchor, as an attempt to attract people to the city» (Lyra, 2016, p. 101). The institution, born from the idea of promoting Recife's carnival 'all year round', creates a contradictory situation concerning the original characteristics of the cultural event, converting it into an object for tourist consumption. On the other hand, this intervention expands the possibilities of experiencing the cultural rhythm, contributing to keeping this cultural manifestation alive. The incorporation of frevo into mass culture can also be seen from the creation of the Frevo's Radio, trying to raise frevo to the category of Brazilian mass culture objects such as football and telenovela. The Paço do Frevo achieves the goal of promoting audiovisual products – Grupo Globo's main expertise – to the status of museum collections.

Paço do Frevo is a museum designed according to the dynamics of globalised society, supporting processes of educational and cultural democratisation, cultural goods digitalisation and international promotion of local cultures. During this study, we foresaw the adaptation of the traditional frevo culture to the mass cultural consumption. This museum shows an interesting process of blending popular traditions and urban life, creating an interurban system of cultural circulation. The intervention values, from different perspectives, the collective and anonymous artisanal culture. To this end, it was designed a hybrid form of popular culture through a new exhibition format using new communication technologies. For some authors, Paço do Frevo can be considered a kind of 'showcase of frevo', which mixes old and new features to synthesise, didactically, the main elements of traditional culture. However, the project cannot be reduced to this aspect, mainly because of the educative and research functions prevalence in its own architectural program. In this sense, the school-museum also tries to establish a connection with the various social actors presented in Bairro do Recife, such as the Comunidade do Pilar and the Central Única das Favelas, reinforcing its intrinsic complexity in addition to creating a tourist information point.

The museological plan analysis demonstrated that the institution is not dedicated to material collecting practices. On the contrary, the museum operates supporting the digitisation of material collections from other partner institutions. Paço do Frevo intends to focus information and to connect practitioners, researchers and curious people interested in frevo. So, it can be considered a platform of «[...] solidarity and collaboration, developing a popularisation and articulation role with other networks» (Lyra,

Fig. 8 | Frevo Square, 3rd floor (source: bit.ly/3sMwIax).

Fig. 9 | Frevo performance in front of the Paço (source: revistacontinente.com.br/).

2016, p. 110). The lack of institutional autonomy derived from this approach can be considered its main limit. The conception of museums as reference centres is a central feature of RMF museums, present also at the Brazilian Football Reference Centre (Football Museum) and Tomorrow's Observatory (Museum of Tomorrow). Given the absence of material collections, both ancient architecture and its location in the Bairro do Recife aim to guarantee authenticity and legitimacy to the intervention, symbolically connecting the frevo's origin at the Recife's streets to the Paço itself. From the museum, it is possible to see orchestra performances and the passage of frevo groups in the streets. In this sense, the Frevo Square emerges as a synthesis space (Davallon, 1999), capable of connecting architecture and museography by creating a stage for the realisation of multiple activities that would contribute to the development of frevo's culture, renewing possibilities of interpreting the museum narrative. This space is surrounded by a vibrant atmosphere, colourful and full of curiosities that allow an interesting approach to the rhythm, stimulating active visitor's participation.

At Paço do Frevo, the integrative design did not occur, so that architecture and museography were conceived independently. As a result of this process, in the exhibition rooms, the scenography overlapped the architectural space, compromising the visualisation of the historic building due to the supersaturation of decorative elements. In turn, the characteristics of the old building became more visible in the technical areas, circulation or educational rooms, whose compartmentation fits to the ancient building distribution. The final intervention assumes a certain character of hybrid architecture, mixing old exteriors with contemporary interiors. Still, the appeal to scenic theatricalisation approaches Paço do Frevo to the concept of multimedia museum, that is a «[...] container that concentrate fascination and attention to focuses materialised

Fig. 10 | Detail of the exhibitor under the raised floor (source: fuiserviajante.com).

by artificial light, information, experimentation and interaction» (Montaner, 2012, pp. 44, 45). The exhibition design is associated with the post-modern aesthetic sensibility, creating spatio-temporal overlaps in rooms densely saturated with expographic elements, different from the supposed neutrality of modern museography.

As mentioned in this study, the Paço do Frevo museum can be connected to some strategies previously experimented by Bia Lessa. The designer often works with a great number of expographic elements, encouraging visitors' immersion by integrating all possible architecture elements: floor, walls, windows and roofs. Lessa's designs usually incorporate artistic and anthropological objects that are not presented as a part of the museum collections, but as scenic elements. Furthermore, one of her main affective engagement strategies is the appreciation of the «[...] ordinary man, common hero» (Certeau, 1998, p. 28). The presentation of 'each one' and 'nobody' as nameless heroes, who deal with a common destiny imposed on everyone daily lives, configures a philosophical field that presupposes a universal relationship based on a referential similarity that gives credibility to the narrative. Indeed, the representation of anonymous crowds aims to rescue community bonds considering the global solitude context.

The fascination for appearance is capable of stimulating visitors' curiosity and desire of discovering, so that the exhibition design operates through an anticipation effect strategy. Bia Lessa's scenarios explore the regime of representative mediation, seeking to achieve the so-called «[...] aesthetic efficacy [that is] the suspension of any direct relationship between the production of art forms and the production of a determined effect on a determined public» (Rancière, 2019, p. 57). In this context, the museum can welcome any form related to the profane world, dedicating itself to propose new ways of circulating information and themes of political discussion. Lessa's

museography operates on a unique selection of objects from everyday life, intertwining heterogeneous logics since the objects seen in the exhibitions are signs arranged by the author's design. The syntactic – rather than semantic – function of the elements in museography is valued, as it can be seen from the placement of words on the Paço do Frevo' walls and roof. In this respect, there is no separation between artistic and common objects. The exhibition design precisely tried to create a new narrative fiction, showing what is rarely seen in different ways of connecting singular and common, appearance and reality.

These effects are obtained from representing objects with a strong affective character. The staging of the popular, artisanal or industrial is characterised as a kind of 'consensus museography'. Therefore, we understand the consensus as an «[...] agreement between senses, between a sensible way of presentation and a regime of interpretation. It means that, whatever our differences and ideas, we perceive the same things and give them the same meanings» (Rancière, 2019, p. 67). It dialogues, therefore, with the context of economic globalisation, bringing the universe of popular and artisanal cultures closer to technological development. The exhibition rooms become full of objects and images from the everyday life. The exhibition language is based on the multiplication of ordinary and easily recognisable elements, alternating interpretations of regional syntaxes to high-tech culture. The rooms show a certain contradiction in relation to the struggle against mercantile inevitability, sometimes incorporating traditional elements or industrial objects. This approach creates a 'calmed synthesis' between contrasting universes and has important implications for the construction of a Brazilian national identity in the 21st century. As we see, the ordinary merchandise became the protagonist of the Lessa's exhibition spaces, considered as a main strategy to connecting to the mass public.

In Paço do Frevo, the designer adopted diversified resources that make up her expository vocabulary: domestic scenarios linked to popular Brazilian cultures, manual interactivity, whiteboards to encourage active public participation or floor displays (adopted in Hannover, for example). Furthermore, there is a certain repetition of the structure of other interventions made by RMF: panels with images projected in short videos, the connection of the museum's theme to the historical cultural context (as in the Culture House of Paraty), presenting events reported by media (just like the Football Museum or the Museum of Tomorrow), using a timeline (as in the Museum of the Portuguese Language), the prevalence of the audiovisual image and the creation of a synthesis space where both architecture and museography collaborate for developing multisensory experiences (such as Exaltation Room at the Football Museum). In this sense, the Paço do Frevo can be considered a synthetic intervention that incorporates elements presented in both Bia Lessa and RMF previous experiences, assuming the celebration of popular culture as closely related to the processes of desecrating the art object and the collapse of the 'white cube' model, traditionally linked to the modern spaces of art.

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Notes

1) The list of World Heritage Sites was created by the Convention for the Protection of World Cultural and Natural Heritage (1972).

2) The concept of 'soft power' comes from the theory of international relations, it describes the ability to indirectly influence the interests and ideological behaviour of individuals.

3) The action included the recording of oral memory testimonies, the setting up of a permanent exhibition and the creation of a reference centre for the 'Mangueira' Samba School.

4) The FRM supported the Paraty – Planning and World Heritage seminar (2001) to promote the city's inclusion in the UNESCO list.

5) The following Brazilian cultural assets were registered as intangible assets: the making process of 'viola de cocho' (Mato Grosso do Sul), the craft of Baianas do Acarajé (Bahia), the Círio de Narazé (Belém do Pará), the Kusiwa art of Wajapi Indians (Amapá), the Samba de Roda (Recôncavo Baiano) and the Frevo (Pernambuco).

6) Law 8.318/1991 became the main element of articulation of Brazilian cultural policy, allowing private companies to sponsor several cultural projects in exchange for tax compensation, visibility and getting closer to their public.

7) Later converted into Brasil Connects, the Associação Brasil 500 Anos was formed on the initiative of former banker Edemar Cid Ferreira, president of the Fundação Bienal between 1993 and 1997. Ferreira became known for adopting a more spectacular style than his predecessors, expanding the media actions associated with the Bienal to attract a broader audience.

8) The scenography of the Mostra do Redescobrimento, according to Ferreira, «[…] was an imposition and I think I did it right. Most of the forty healers were against it. A lot of people don't like it, but the people like it» (Barros, 2003, p. 6).

9) In 2017, Paraty received the title of Creative City by UNESCO for Gastronomy. In 2019, the city was awarded by UNESCO the title of World Heritage Site in the category Mixed Site – Culture and Biodiversity.

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RESIDUALS AS RESOURCE
Urban strategies for the former Manifattura Tabacchi in Naples

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ABSTRACT
The state of abandonment of many Italian territories declared Sites of National Interest (Siti di Interesse Nazionale – SIN) reveals the absence of a shared urban planning strategy leading to rethink the need for non-renewable resources, indispensable for the urban ecosystem. This research – conducted within the Department of Architecture at the University of Naples 'Federico II' with Cassa Depositi e Prestiti – reconstructs the political, administrative, and urban events that affected the former tobacco factory Manifattura Tabacchi in Naples, now in a state of abandonment. The research aims to identify zero-waste regeneration strategies and outline new best practices for waste management in the regeneration project of open and built spaces in order to ensure a landscape made up of new ecosystems networks. The research, therefore, proposes a set of actions applicable both in new design processes and in the control and management of the life cycle of existing buildings.

KEYWORDS
urban regeneration, wastescape, urban mining, C&D waste, recycling/up-cycling

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In the whole Italian territory, there are fifty-eight Sites of National Interest (Siti di Interesse Nazionale – SIN). More than one thousand hectares of land in Campania region – particularly in the western area of Bagnoli-Coroglio and in East Naples – are contaminated. In the eastern part of Naples, several institutions have presented plans for the renewal of over five hundred hectares and remediation plans for about two hundred hectares. These data, published by the Ministry of Environment and Protection of Land and Sea (MATTM), led to a reflection on the condition of soils and highlight the absence of a common strategy of urban planning on the national territory. This condition is shared by many Italian areas, disused industrial and logistics areas, sites on the edge of large infrastructural systems or large disused commercial areas: 'wastescapes' (Amenta and Attademo, 2016). These underline the lack of propulsive and shared urban strategies towards a sustainable development able to safeguard non-renewable resources such as soil, or land, which instead is a necessary element for the urban ecosystem and an essential resource to ensure biodiversity as well as an indispensable quality to implement natural and urban life.

As Vittorio Gregotti wrote, before transforming a support into a column, a roof into a tympanum, before placing stone on stone, man placed the stone on the ground to recognize a site in the midst of an unknown universe: in order to take account of it and modify it (Gregotti, 1983, p. 27). The earth itself is the primary surface of contact, distribution of forces and represents the basis of every project. Modifying the land is the first action of men to manifest the appropriation of space and thus affirm their presence. But it is precisely this action of 'modification' – understood as alteration and tampering – that has determined a critical condition for the environment in recent years.

Throughout Italy, economic and production changes have left a constellation of urban ruins and industrial wastes that require an increasingly specific confrontation with the project of architecture: «La dismissione interessa contesti dove è la città che viene a mancare o dove appare, essa stessa, in una condizione di dismissione, i processi di contrazione dei perimetri urbani […] delineano un fenomeno in espansione che […] fa pensare che le strategie progettuali di intervento non abbiamo più la forza di dare nuova forma a intere parti di tessuto, ma possano agire puntualmente grazie a trasformazioni interstiziali, lavorando nello 'spazio tra le cose'» (Setti, 2017, pp. 11, 12). Giulia Setti's statement – from the recent publication about decommissioning in Italy and Europe – invites to rethink the role of architectural design, which often finds itself intervening in places that are the result of «[…] processi poco ordinati con implicazioni spaziali multiple e spesso contradditorie» (Bianchetti, 2017, p. 195).

The study and the comparison of some international projects such as Buckthorn City in Hoek van Holland in Holland by West 8, South Park Plaza at Queen Elizabeth Olympic Park in London by James Corner Field Operations and examples of Italian urban regeneration such as Parco Dora in Turin by Peter Latz, the complex management of the regeneration project of the former Falck area in Sesto San Giovanni (first design by Renzo Piano, reworked by Norman Foster & Partners in 2020), up to the re-

cent project for the Scalo Farini competition in Milan Agenti Climatici by OMA, show how the way of thinking urban design has changed. In these projects, it is possible to recognize various kinds of waste that have altered the urban ecosystem in different ways: large abandoned industrial buildings waiting for new uses, marginal urban spaces often considered dangerous and not integrated into the physical context; residual areas close to infrastructural systems and, finally, the critical condition of polluted and toxic soils waiting for possible forms of re-naturalization. With different approaches, West 8, James Corner, Peter Latz, Renzo Piano, and the OMA group have transformed these criticalities into a new set of resources: waste – material and immaterial – is integrated into a new vision of the urban and architectural project where recycling becomes the primary focus of the urban strategies. In these projects, physical, environmental, social, and economic transformations activate circular processes in which the landscape becomes a network of ecosystems able to support actions of production and transformation.

Working in these contexts means weaving together complex issues that go beyond the mere physical decommissioning of former industrial buildings. Environmental, social, cultural, and political aspects have a central role in defining new and possible future strategies. Reusing existing spaces may seem like a banal, already-seen action, but it is necessary to take care of the environment, to mend disconnected urban fabrics, and restore a new urbanity in those places that have been abandoned and degraded for too long. Since the 1980s of the 20th century, the reuse of urban spaces has been the focus of architectural and urban debate. In recent years, academic research has focused on the preservation of hybrid and transitional forms of landscape. These new forms are capable of absorbing changes in the territory and adapting them to processes of re-use and remediation. Through theoretical statements, academics have often proposed the reuse of existing buildings thanks to innovative design experiments, avoiding waste of land and of non-renewable energy; the experience we have in practice makes these operations increasingly complex. In order to quickly respond to these urgent issues, the action of tabula rasa is the preferable and fastest one. Starting from these considerations, the Department of Architecture at the 'Federico II' University of Naples in collaboration with CDP – Cassa Depositi e Prestiti, a financial institution – is conducting research[1] in the eastern area of Naples, in particular in the site of the former Manifattura Tabacchi. This essay intends to define new management strategies for the urban project that rethink the role of Construction and Demolition (C&D) waste in the landscape design where the soil becomes a resource for a process of urban regeneration.

The research proposes a new gaze that considers the integrated and multi-scalar project capable of reinterpreting material and immaterial aspects of waste. Academic studies debated consumption of land, recycling of urban parts and processing of waste materials. Yet, they remain lacking adequate regulation. This condition generates unresolved urban scenarios, made of scattered fragments. Major investors own the land, limiting the access to public and green spaces which have become indispensable to the

Fig. 1 | The nature among the abandoned buildings of the former Manifattura Tabacchi of Naples (credit: M. Ascolese, 2020).

Fig. 2 | The abandoned void of the former Manifattura Tabacchi area in Naples (credit: M. Ascolese, 2020).

city's daily life, especially following the latest closures due to the pandemic situation. The research proposes a substantial rethinking of waste[2], which from being a problem becomes an occasion for 'urban mining': a resource to reconfigure fragments of landscape and reinterpret technical actions. The final aim is to identify a design methodology applicable to cases with similar physical and environmental conditions.

The former Manifattura Tabacchi is an abandoned and degraded area. The industrial structures still inspire a certain archaeological monumentality, while vegetation has conquered spaces-in-between, suggesting new reflections on waste at different scales of the transformation process (Figg. 1, 2). The research focused on two aspects necessary to trigger a process of urban regeneration: the demolition of buildings and the remediation of soils and aquifers. In an ecological vision, technical issues become a means of activating a process of circular economy in which waste is an operating material of the project. The main actions to start a circular process are selective demolitions; a process of 'soil handling' thanks to an in situ management of demolition materials; the organisation of the construction site phases. This last aspect guarantees continuous accessibility to the area by the community.

As Eleanor Beaumont affirmed, «[…] land is the assimilation of countless layers and threads, many man-made, some etched by conflict, capital, ecocide, some buckled or melted under human neglect and abuse» (Beaumont, 2020, p. 3). Thus, the project intends to precisely investigate the layers of the ground that define its physical and material consistency but which over time have been strongly defaced, altered, and polluted by human actions. The land is both a 'recycling' material and a catalyst for actions. These transform waste into a material capable of restoring nature back to contaminated soils; that is a form of 'up-cycling' (Stockhammer, 2020).

The area of the former Manifattura Tabacchi in Naples is deemed 'fragile'[3]: a site that, due to a sudden breakdown, could collapse abruptly and without warning, causing lacerations and interruptions in the closest urban context. Due to this peculiar characteristic, these areas require latent transformations; these are yet capable of reinforcing those fragments of landscape, reconnecting communities through renewed conditions of urbanity.

Three points define the methodology of this research: physical and environmental knowledge of the area and infrastructural networks; systematization of regulatory and implementation references on the land use and remediation and management actions; development of a BIM-oriented strategy for defining a semi-automated process for the management of construction and demolition waste. The research aims to identify new

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Fig. 3 | Map of East Naples with the identification of the perimeter of the area SIN East Naples Italian Law 426/1998 (credit: M. Ascolese, 2020).

Fig. 4 | Plan of the former Manifattura Tabacchi, current status (credit: S. Piccirillo and S. Tordo, 2020).

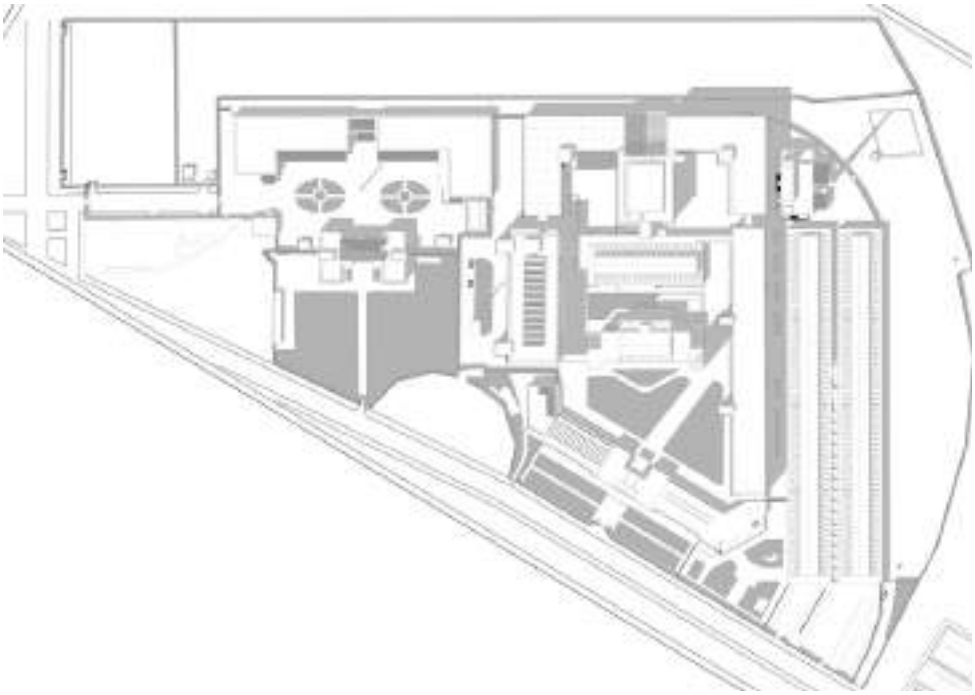

Fig. 5 | Fragments of urban residues, some in-between spaces (credit: M. Ascolese, 2020).

Fig. 6 | The emptiness of former industrial buildings (credit: M. Ascolese, 2020).

best practices for waste management in the regeneration project for open and built spaces to ensure a landscape made up of a new network of ecosystems. The research, therefore, proposes a set of actions applicable both in new design processes and in the control and management of the life cycle of existing buildings.

The former Manifattura Tabacchi in Naples: from waste to 'urban mining' | The Cirio complex in San Giovanni a Teduccio, the former Redaelli plant, the abandoned sites of Feltrinelli and Snia Viscosa, the former Q8 area, the former Corradini and Municipale del Latte plants, together with the former Manifattura Tabacchi define the complex and articulated scenario of the area of East Naples (Fig. 3). A vast part of the city that laps the ancient center of Naples and extends as far as the Vesuvius. A complex territory made up of a growing number of former industrial areas, once representative of a working-class sense of community for post-war Italy, but today a 'terrain vague' (de Sola-Morales, 1996) consisting of some fragments of industrial archaeology often inaccessible because of contaminated grounds. Among these residential buildings there are many new or reused production halls inhabited mainly by the Chinese community. It represents most of the populations currently present in the area and it is devoted to trading. Despite the forms of marginalization and often discomfort that characterize this area, several manifestations of public and private interest recognize this part of the city as an opportunity to rethink Southern Italian peripheries: a new – but already obsolete – political and urban planning slogan.

The Gianturco district, in the eastern part of Naples, represents a focal point for the geographical position it occupies. The proximity to the Centro Direzionale (the business center of the city), the infrastructural system of Piazza Garibaldi, and the eastern part of the ancient city are points of particular interest to start a reflection on the area. Numerous toxic lands, industrial waste, and abandoned sites on the edge of the infrastructural arteries or fragments of the buffer green zone characterize the district. Before the industrial transformation, numerous waterways made the eastern site swampy and inaccessible. Subsequently, it assumes a new configuration consisting of massive infrastructural systems: they represent both the primary connection with the railway and the port and a highly representative presence in the urban landscape.

The fragmentation of the urban fabric and the uncontrolled growth are the direct consequence of the industrialization process. The first production nucleus in the future area of the Manifattura Tabacchi dates to the early 20th century with the Salin factory, of which the only surviving structure is the Pontecorvoli tower. The industrial plan of 1918-22 marks the boundaries of the area yet keeping a strong connection with the port, the railway, and the vast flatland to the east (Del Prete, 2012). The Manifattura Tabacchi was founded in the 1930s as a project of the fascist regime, but it came into operation only after the Second World War. After opening in 1956, the area became one of the primary centers of tobacco production in southern Italy. It represents a new centrality capable of guaranteeing a safe job for over two thousand workers.

It is also an industrial complex with an almost entirely mechanized cycle. At that time, the Manifattura Tabacchi was a very innovative structure for the methodology of production and the surrounding facilities: in addition to workspaces, the complex housed rooms for more than one hundred workers' children, an infirmary, a large communal kitchen, a refectory, and a laundry.

In 1998 the complex fell in disused. In the same year, the Southern Association of Industrial Archaeology and the Planning Department of the City of Naples signed an agreement. It provided for a census of assets of archaeological interest and guidelines for reuse and conservation. In 2004, the new City Plan[4] only partially absorbed these indications, which would have been fundamental to avoid indiscriminate soil consumption. Although the urban planning provisions foresaw a regeneration plan for the industrial buildings, today the area is almost entirely in a state of degradation and inaccessibility (Fig. 4). As in many other Italian territories, the investigation of soils has revealed high rates of pollution. In fact, from the end of the 1990s, the area belongs to the site of national interest Napoli Orientale (SIN Napoli Orientale, Italian Law 426/1998). This condition requires soil and aquifer remediation to ensure new accessibility.

In 2010 Fintecna Immobiliare Srl, the company that owns the site, presented a Regeneration Plan to the Municipality of Naples to start a regenerative process in the area. The project, entrusted to Mario Cucinella Architects, covers 170,000 square meters and 590,000 cubic meters, comprised of both new constructions and renovation of existing buildings. The project aims at preserving the memory of the industrial area through the maintenance of the most relevant industrial plots and the integration of new buildings (housing, commercial office buildings, student residences, schools, and a covered market). It intends to define a new urban fabric that grafts into the surrounding areas building new relationships. The open space, equipped for parking and recreation space, is the authentic social glue of a fragmented and scattered fabric. Between 2009 and 2010, Fintecna presents two Characterization Plans. In 2011, the company starts the Emergency Safety Intervention, completed in 2012. In 2018 CDP Immobiliare (Cassa Depositi e Prestiti – formerly Fintecna) submits to MATTM the Project of Permanent Safety of the area, approved in 2019.

The processes of deindustrialization and decommissioning, together with economic and productive transformations, have determined the critical conditions of the former Manifattura Tabacchi and of the nearest urban context, like many other national and international sites[5]. In twenty years, slow and ineffective bureaucratic practices have transformed the area into a fragile, marginal, and residual territory: a 'drosscape' (Berger, 2006). This abandoned area is still a place of political and urban reflection (Figg. 5, 6), a place of theoretical and practical speculation which reflects on a new circularity for the area to mend fringed pieces of the city and give back new urban scenarios to the community. Often, these areas are wastescapes result of transformations that have turned them into warehouses, parking lots, exchange nodes, enclaves, abandoned containers. That's why cultural, architectural, urban, and political opinions need

Fig. 7 | The project by Mario Cucinella Architects and LAND, 2010 (credit: Cucinella Architects and LAND).

to elaborate new reinterpretations for these areas that, starting from waste, are understood as necessary parts to the functionality of the city. The reactivation of these urban fragments requires complex processes that mitigate different skills and knowledges. Often the first actions of transformation are the less visible ones: that call for a rethinking of space and soil layers, remediation of large portions of the landscape that cannot be reduced to a pure technical space (Secchi, 1986, p. 23), that is, to transform it to ensure a new life to the urban scene.

Urban reactivation strategies | The project by Mario Cucinella Architects with LAND studio (Fig. 7) proposes the definition of a new urban system characterized by the re-use of some existing buildings and the construction of new blocks which, together with the system of external spaces, reconnect the area of the former Manifattura Tabacchi to the surrounding fabric. The total volume of demolitions is more than 7,000 cubic meters, a considerable amount that puts in crisis the complete disposal and opens the possibility of recycling and re-use.

The data on Italian waste production from the ISPRA report (2020b) tell that about 45% of non-hazardous waste production comes from C&D waste. European Commission[6] evaluated these data and will consider by 2024 the possibility of re-establishing the limits for recycling operations of building materials. In Italy, the presence of many available raw materials, the low cost of landfill disposal, and poor practice of re-use materials have slowed down the recycling of construction and demolition materials, impacting the quality and performance of the final product. The characteristics of the materials, the type of demolition, and economic issues influence the recycling and re-use of materials. The absence of harmful or dangerous substances is one of the first data to be verified; progressively, it is appropriate to evaluate the degree of inhomogeneity of the materials, a property that influences the type of demolition (if it is selective or not). This has direct repercussions on the processing and the dismantling facility and consequently on the characteristics of the final product. Finally, there is the temporal issue that involves different management of the processing and construction phases as well as specific considerations on the type of treatment of materials that depend both on the availability of space and economic resources.

Italian and European regulations impose strict performance requirements on materials, substantially influencing the contemporary architectural design, which on the one hand must respond to the obsessive regulatory overproduction of the construction industry, and on the other must produce works with a high degree of sustainability and maintenance. In more complex sites, these conditions make operational interventions not easily controllable in the different phases of the project requiring continuous double-checks with multiple aspects in an increasingly reduced time frame.

How to intervene in these contexts has become an urgent issue in the contemporary debate. It requires a new balance between the authorship of the project, the definition of figures with appropriate skills and techniques, and the construction of tools suitable for decision support. All these aspects should be absorbed and integrated into urban transformations. The enormous amount of information that is necessary for the systematization of the project requires new operational support tools for management and control. The research has synthesized these aspects with the use of Building Information Modeling (BIM). While the field of design and construction widely uses this methodology as a tool to understand industrial buildings, this research uses it for the management of demolition and decommissioning operations. It proposes the definition of a semi-automated process for the management of C&D waste as the identification of a supportable to control the life cycle of buildings. The objective is to activate a digital workflow to identify the C&D waste in a circular process. The operational phase has reworked the plot of the former Manifattura Tabacchi in BIM and associated with them a semi-automated process to define in advance the amount of waste produced in the demolition phase. The BIM tool also provides the quantity and quality of produced waste and foresees recycling actions to be integrated into the urban regeneration process.

Another substantial issue for the regeneration project of the area is the condition of soils and aquifers. Surveys[7] conducted in selected points show non-compliance for metals, PAHs, heavy hydrocarbons, making these soils polluted and requiring remediation to reduce risks for the users. Combining these data with those inferred from the BIM analysis, the research proposes a design approach that can minimize waste through a project based on a circular action of recycling in a zero-waste philosophy. The treatment and regeneration of scraps in situ from demolished buildings allow their reuse as materials for 'capping' a remediation strategy for the soil and aquifer. Therefore, the land becomes the urban element capable of absorbing changes: from waste, harmful for the community, to a new resource capable of absorbing and metabolizing possible transformations. The outcome is a new recycled form of soil that welcomes the possibility of public space, which becomes a necessary goal for the entire project. Referring to the concept 'cradle to cradle'[8] the research proposes a recycling process where materials as agents, «[…] nutrients in a global metabolism, without ever being discarded as useless substances that are of no value» (Hebel, Wisniewska and Heisel, 2004, p. 11).

Conclusions | In the research, waste plays a central role in both a metaphorical and physical meaning. In the first case, the abandoned area of the former industrial complex has been considered as waste since it is excluded from the territory and inaccessible by the community; in the second case, waste is the discarded product, not reusable, toxic, and harmful for the environment and the inhabitants. Urban waste is an indispensable substance to rethink the relationship between different natural elements, trigger new networks of ecosystems, feed production processes and reactivate new forms of landscape (Rahmann and Walliss, 2016). The actions to rethink these wastes go beyond technicalities and introduce comprehensive regeneration strategies capable of assimilating and translating silent transformations into new transitional landscapes, diverse forms of community, and conditions of urbanity.

The case of the former Manifattura Tabacchi in Naples is both a pretext and a paradox: on the one hand, it raises the possibility of new solutions, while on the other one, the bureaucratic systems impose loopholes that are difficult to untangle. The result is still too uncertain in a path that unfolds between theoretical aspects and operational practices. The research invites us to look at waste, and 'wastescape' with a new gaze, able to put at the center of the contemporary cultural debate the need for sustainable development, the importance of non-renewable resources, but especially the need to think the consumption and production in a more integrated way.

Nature asks us to make new choices and to answer questions. Nature itself reveals a landscape that requires a transformation which pays attention to transitional and resilient forms. The international research scenario proposes new circular economy processes: 'cradle to cradle, de-growth, deep-ecology'. These can redefine new life cycles for the environment, reduce consumption, integrate recycling actions, and enhance resources with new experimental solutions. But these processes lead to a 'decoupling'

condition (Swilling et alii, 2013). Although they ensure a circular economy process by reducing the non-renewable resources, it is necessary to deploy a considerable amount of infrastructure and resources to obtain these results: this does not fully coincide with growth and individual and collective happiness (Easterlin, 1974). From the analysis of the case studies, recycling and remediation processes are central to the contemporary urban debate and applied in different forms in the project – urban park, soil remediation, and soil management – in the Italian context, the difficulty of implementing the project is increasingly evident: administrative procedures focus on practices and not on the quality of space. So, in the end, we should try to answer this question: are we ready for these new forms of transition?[9] Perhaps the answer lies precisely in the ability to activate a new way of looking at these buildings that is inclusive and capable of imagining transformations as complex processes, as an articulated order of urban actions capable of producing new conditions that could adapt to continuous and constant change.

Notes

1) The research 'Studio su processi sostenibili per la razionalizzazione degli impatti ambientali delle demolizioni selettive nel complesso della ex Manifattura Tabacchi di Napoli, volto alla valorizzazione del vuoto negli interventi di rigenerazione urbana', Scientifis staff: F. Rispoli, M. Giammetti, with the collaboration of a technical-operational commission composed of M. Losasso, M. Rigillo, F. Rispoli (DiARC) and by E. Gentilucci, A. Cammarata, M. Ciaburri (CDP Immobiliare).

2) «Waste is what is worthless or unused for human purpose. It is a lessening of something without an apparently useful result; it is loss and abandonment, decline, separation and death. It is the spent and valueless material left after some act of production or consumption, but can also refer to any used thing: garbage, trash, litter, junk, impurity, and dirt. As we have seen, there are waste things, waste lands, waste time, and wasted lives» (Lynch, 1990, p. 146).

3) «Esiste anche un significato figurato di territorio, secondo cui esso può essere definito come luogo delle 'relazioni'. […] Un territorio fragile sia un territorio in cui il sistema delle relazioni si 'rompa' bruscamente, senza preavviso» (Campione, 2013, p. 152).

4) The amendment of the City Plan describes part of the area of the former Manifattura Tabacchi as zone D (Settlements for the production of goods and services) – subzone Da (Settlements for the production of goods and services – redevelopment) and subzone Db (New settlements for the production of goods and services); zone F (Territorial Park and other facilities and installations on an urban and territorial scale) – subzone Fc (New Park).

5) See the document of the Italian Ministry of the Environment and Protection of the Territory of the Sea about SIN (Siti di Interesse Nazionale) – Remediation Procedure Status, February 2020.

6) Waste from construction and demolition operations is a stream monitored by the European Commission, which has set, in article 11 of Directive 2008/98/EC on waste, a target of 70% preparation for re-use, recycling and other material recovery by 2020, including backfilling operations using waste as a substitute for other materials. By 31 December, 2024, the Commission will consider introducing new targets for preparation for reuse and recycling of construction and demolition waste (ISPRA, 2020a, p. 42).

7) Data taken from the Permanent Safety Project, proceedings ex art. 242 Italian D.Lgs.152/06, 2018.

8) It is Walter R. Stahel who is creditated to have first coined the term 'cradle to cradle', an expres-

sion later turned into a well known principle by the architect and former student of John T. Lyle, William McDonough (Hebel, Heisel and Wisniewska, 2004).

9) Compare the recent lecture given by Prof. P. Viganò entitled Are We Ready for the Transition? Gazes, Values, Projects within the seminar The City As a Renawable Resource in the PhD School 2021 – Urbanism, Iuav Doctorate, Scientific Director Prof. M. C. Tosi.

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IN-UP_INHABITING THE UPCYCLING
Regenerative strategies for inhabiting the process

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ABSTRACT
The massive expansion of the suburbs in Italy between the 1950s and 1980s, characterised by the construction of subsidised public housing estates, has necessarily given way since the 1990s to physical and social redevelopment of large peripheral complexes. Starting from the project of technological, typological and energetic-environmental recovery of architectural artefacts and, more specifically, of public residential buildings, the contribution investigates the theme of regeneration by presenting the results of a project experience developed on the occasion of the RELIVE2020 design competition-workshop. The project proposal, through a systemic approach capable of providing a decisive contribution to regenerative processes, prefigures a replicable model of a resilient, inclusive and low environmental impact city.

KEYWORDS
regenerative processes, ERP neighbourhoods, systemic approach, circular economy, habitable building site

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In Italy, the process of urban growth took an important turn after the Second World War, from the construction of the smaller Unrra Casas neighbourhoods to the more substantial extensions of the INA-Casa settlements. This first expansion of a subsidised nature was characterised by certain elements of settlement recognisability deriving from the small urban dimension, capable of grafting itself onto a context that was originally agricultural, of which it maintained the textures and boundaries. In this context, the low population density and the physical proximity of the housing types, generally terraced and organised in blocks distributed around a central public space, favoured neighbourly relations and the seamless succession of private and collective spaces[1]. These were the years in which, alongside the emergence of requirements linked to the concept of individual well-being, the affirmation of collective well-being and the relative minimum thresholds, there was a need to protect the physical integrity of the environment, supported by research into environmental impacts and ecological issues (Gangemi, 1988). The growing demand for low-cost housing led to the design of a large amount of housing with interventions characterised by the presence of large, equipped axes that innervate 'large-scale' building nuclei. The construction of the large residential dimension of the 1970s refers to an urban architecture that, like the phalansteries of Fourier's utopian socialism, is conceived as a separate organism, self-sufficient and autonomous with respect to the consolidated city.

As construction practices, which had been used until then in residential interventions, progressed, a profound mutation of the building models of the working-class neighbourhood was generated, an evolution of the ideal of architecture of the modern movement. Italian Law 167/1962 marked the transition from the concept of council housing to that of public housing, with a significant increase in the quantity of buildings. With the abandonment of the morpho-technological prescriptions of the INA-Casa files and the introduction of the Piani di Zona, the large scale became the new paradigm of the Italian suburbs. Large-scale interventions, facilitated by the processes of prefabrication and the policies that promote their construction, give a monumental character to the suburbs of this period, completely revolutionising their language and social dynamics. The megastructure regulates collective life and the growth of the city in high-density urban contexts and is often composed of complex buildings with an urban value capable of radically revolutionising the relationship between open and built space and the conception of scale relationships themselves[2]. The massive expansion of the suburbs that took place in Italy until the early 1980s has necessarily given way since the 1990s to physical and social redevelopment of large suburban complexes.

The deep transformation of the culture of design that has taken place since the Second World War is reflected in the cities, which absorb the accumulation of different technical policies and approaches to the building process. At the same time, there is a programmatic environmental sensitivity, at the basis of the design concept, based on the concepts of environmental design which permeate many neighbourhoods. To date, a substantial percentage of Italy's building stock is made up of suburban building

Fig. 1 | View from via Archeologia of the R5 section of the residential complex (credit: I. Coletta, 2020).

Fig. 2 | View of the M4 section of the residential complex (credit: I. Coletta, 2020).

complexes, characterised by the need to redevelop and regenerate extensive urban areas on the fringes of consolidated cities, where forms of spatial and social decay manage to advance, in the delay, sometimes the absence, of operations to counteract the definition of prospective scenarios and treatment actions.

The up-cycling of industrialised systems | The urgency to produce an increasing number of low-cost housing has encouraged the use of heavy industrialisation building systems that have inevitably marked the suburbs since the 1970s, profoundly changing their essence through the creation of buildings with a complex urban value, becoming an opportunity for experimentation and a 'laboratory of modernity' (Di Biagi, 2006). Within the concept of 'building system', intended as a set of correlated and interacting choices on an architectural, technological and organisational level (Sinopoli and Tatano, 2002), a key role is played by the concept of assembly, which allows to define new production and design strategies in the field of building industrialisation, capable of radically modifying the traditional theory-practice relationship that has become a paradigm of reference for contemporary building design (Perriccioli, 1995). Technological solutions that take shape on a formal and structural level in the definition of modular systems that allow cities to be conceived as a three-dimensional space and that at the same time, due to their adaptability to multiple and changing situations, show a significant potential for reversibility in the construction or assembly processes (Vitale, 1995), still preserving innovative characteristics.

Assembly-based executive techniques are now enriched with new design values, based on the concept of flexibility, reversibility and adaptability: characteristics such as module, repetition, construction system, standardisation, in fact, assume a key role in regenerative processes, allowing the experimentation of new forms of living and a redevelopment oriented according to the principles of circular economy, able to design new urban scenarios, facing planetary emergencies (Bellini and Arcieri, 2020), and safeguarding the materiality of products in which to recognise the cultural value (Nardi, 2001). Serial reproducibility, the progressive passage from quantitative indices to a set of quality standards and the introduction of the concept of sustainable demand (Sinopoli and Tatano, 2002), confer new technical qualities, guarantee greater reliability and speed in the production and realisation of building products. In addition to the issue of well-being, whose conditions are now precarious in many urban peripheries, the effects of climate change affect overall environmental safety, for which a conscious approach is essential, capable of combining human intervention and natural resources (Tucci, 2020). The built heritage, as a non-renewable resource, and its management become central to the cultural debate, making the transition from the current linear economy to a circular economy necessary.

In the European building sector, the management of the built heritage starts with its individual parts. The reuse of materials and the use of waste of various kinds, even if it comes from environmental needs, give rise to a new experimental approach that identifies the use of second materials as the key resource of the project. The up-cycling process makes it possible to invert the usual sequence of transformation of materials and to enhance the identity of the existing building, giving rise to a second life that is compatible and consistent with the existing structure, through the rational and planned dismantling of components and the selective regeneration of usable materials. The possibility of proceeding according to the criterion of disassemblability favours the reuse of materials and goes as far as the recovery and reuse of elements and specific components of building artefacts ensuring efficient resource management, minimisation of emissions and maximisation of the durability of materials and components, with a consequent reduction in production and consumption, environmental impacts, and waste generation (Campioli et alii, 2018).

Public housing districts are therefore suitable for experimenting with design strategies capable of responding to changing needs through a conscious life-cycle approach. The possibility of local reuse of disused materials in the same context of reference generates balanced integration with the built environment, giving new meaning to the pertinent open spaces (Valente, 2004). From this point of view, within the regenerative process, the industrialised building can be seen as a resource from which to draw material which, through closed-cycle strategies and solutions, finds a second life and new uses, recovering the material culture of the place. It opens, therefore, a wide field of research and technological experimentation aimed at investigating and encouraging the adoption and dissemination of innovative tech-

nologies that allow the regeneration of existing neighbourhoods in neighbourhoods, capable of enhancing the environmental characteristics of the climatic, geographical and productive context in which they are inserted, with effective effects on the quality of life (Cangelli, 2015). Up-cycling applied to building and architecture makes it possible to rethink the usual practices for managing building processes and to define new, innovative ones capable of identifying new paradigms for sustainable construction and collective living, citing as examples the work of ARCò, Arturo Franco, Izaskun Chinchilla, Lot-ek and Superuse Studios.[3]

The contribution is part of this vision with the aim of investigating the theme of regeneration by proposing practices starting from the project of technological, typological and energy-environmental recovery of architectural artefacts and, more specifically, of public residential buildings, presenting the results of a design experience of urban regeneration developed on the occasion of the RELIVE2020[4] design competition-workshop, promoted by SITdA (Italian Society for Architectural Technology) and dedicated to Under 40s. The project takes its cue from European deep retrofit experiments and develops from the assumption that it is possible to trigger a process of urban regeneration by improving the quality of living. The project proposal aims at overcoming the paradigm of the suburbs as an area outside the city by means of a systemic approach capable of providing a decisive contribution to urban regeneration, prefiguring a replicable model of a resilient, inclusive city with a reduced environmental impact, which considers both the current conditions and those potentially achievable in the near future.

Through the adoption of environmental, spatial and constructive devices suited to the new needs of living, a model is proposed for the upgrade of residential neighbourhoods of subsidised housing according to the syntactic dimension which refers to the artefacts and the rules of their assembly, the pragmatic dimension to the performance and functional aspect of the environments and artefacts, the semantic dimension to their social, emotional and aesthetic meaning (Zucchi, 2006, p. 72).

Regenerative project for the urban compartments of Tor Bella Monaca in Rome | The aim of the project proposal is the redevelopment of the ERP buildings in the R5 and M4 compartments of the Tor Bella Monaca District in Rome (Figg. 1, 2) and the regeneration of the entire urban area. The subdivisions, designed by architect Pietro Barucci and engineer Elio Piroddi, have a clear urban layout, with in-line, tower and courtyard building types, constructed using heavy industrialisation techniques, with structures made of banches and predalles and prefabricated sandwich panel infill panels (Figg. 3, 4), now characterised by a significant decline in performance. The repetition of the typology and construction systems, together with the standardisation of the spaces inside and outside the building, have the potential to allow the development of appropriate regenerative strategies. The solutions at the basis of the project have been studied following the principle of replicability with the intention of adapting to both

Figg. 3, 4 | Prefabricated sandwich panels façade and corner solution of the residential complex (credits: I. Coletta, 2020).

compartments and proposing themselves more generally as possible guidelines for future regeneration projects in peripheral areas.

The residential part of compartment R5 is placed in the context as a curtain between the consolidated city and its natural part, developing in length for about 700 metres and perimeter on three sides of the courtyards that open on the eastern side with the intention of ensuring wide perspectives towards the Roman countryside. This clear division gives rise to two environments of a profoundly different nature from a functional point of view and relegates the building complex to a condition of marginality, as the last built element before the open countryside, a condition that is

Fig. 5 | Plan concept (credit: M. Castigliano, 2020).

even more marked by the positioning of the entrances. Social interactions are therefore 'pushed' towards the interior of the courtyards and clearly separated from the public ones of the city, compromising interactions and social mixité. The regeneration hypothesis takes on this condition of margin and closure to imagine a scenario in which the buildings become the pivot of a public space that is a door to the countryside, visually permeable and physically traversable through spaces and paths returned to the community in innovative configurations.

Within the built environment, public spaces constitute a key system (Losasso, Leone and Tersigni, 2020) for effective regeneration strategies in terms of climate change adaptation. The open space represents one of the most significant resources of the expansion of Tor Bella Monaca; the large size of the buildings corresponds to a significant presence of green spaces, typical of the buildings of the 80s and which clearly distinguishes the public peripheries, where the articulation of open space becomes a unifying element of the residential neighbourhoods (Di Biagi, 2001). The intervention on these spaces allows the development of strategies and actions that consider perceptive, aesthetics, identity aspects, but also of programmatic, processual, multiscalar and temporal character (Gioffrè, 2018).

From the urban point of view, the regenerative strategy intends to reverse the current enclave condition of the area, especially of the north-eastern compartments (Fig. 5). This condition is generated by the physical distance, by a poor distribution of services, mainly concentrated in the south-east area, and by the infrastructural barriers placed between the expansion of the public city and the pre-existing settlement systems of Torre Angela, Tor Bella Monaca and Torre Gaia. Through slow and sustainable mobility and the creation of a network of parks, the project intends to introduce

the public housing estate into the urban dynamics of the city. A cycle network connects the green areas in the dense urban fabric with the large parks that act as climate buffers (Fig. 6). The intention is to introduce a set of redevelopment actions capable of intercepting instances of a multi-scalar and multi-disciplinary process and at the same time limiting the inconvenience to residents caused by the transformations. The idea is that of a building site which, modifying itself during the process, remains partly permanent by strategically changing its original function, transforming itself into solar shading devices or into new living spaces, through the aid of a basic element that allows the adaptation of new volumes to the different living and environmental needs.

Inhabiting the process: timetable for a new philosophy of living | The project introduces a model for managing alternative regenerative processes within the debate on the theme of redevelopment of the suburbs and in particular of subsidised housing projects carried out with technologies typical of heavy industrialisation. Starting from a model of circular economy based on the concept of up-cycling that allows the functional-spatial, performance-energy and environmental improvement

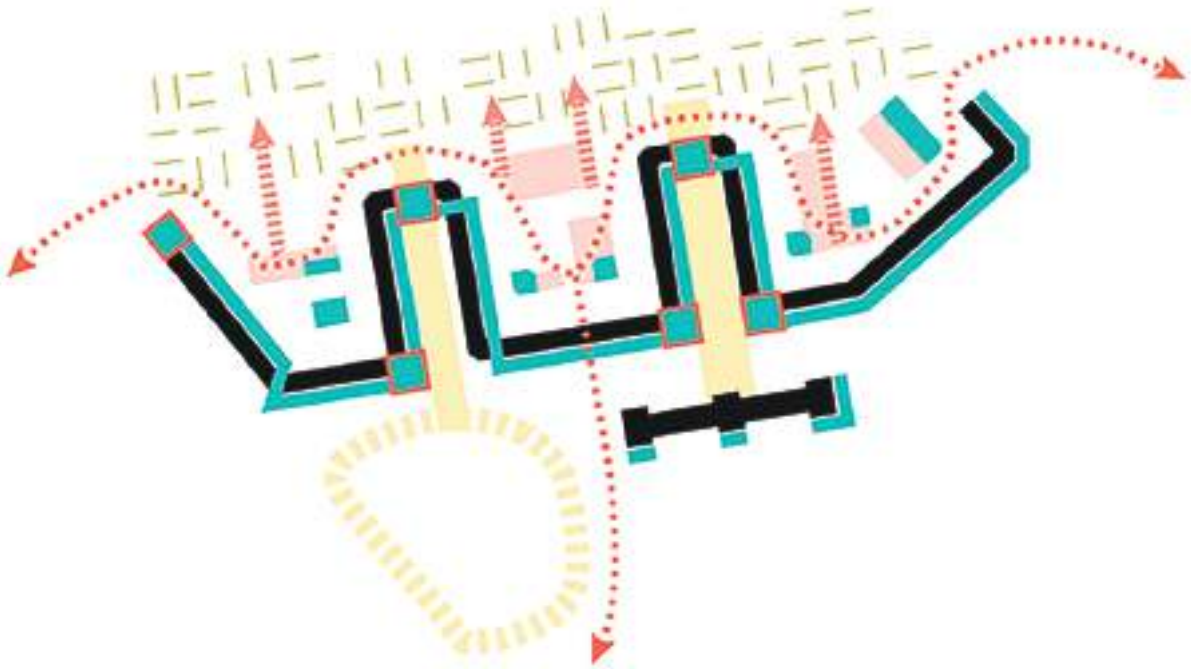
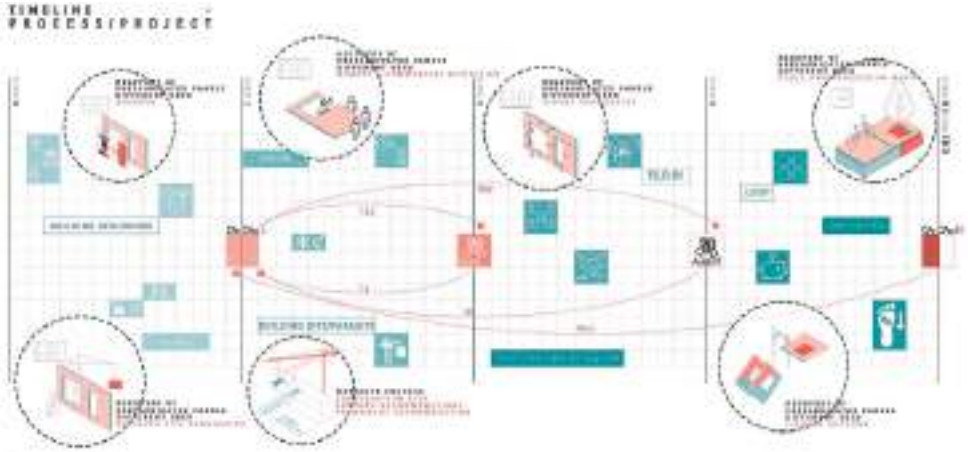
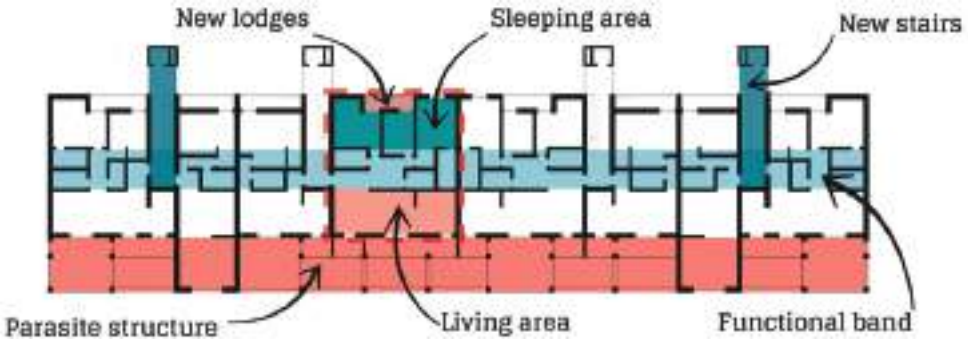


Fig. 6 | Open space concept (credit: M. Castigliano, 2020).





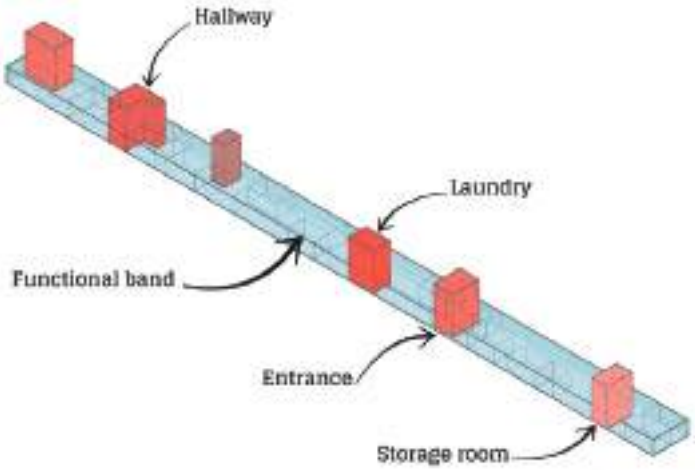


Fig. 7 | Project/Process Timeline (credit: E. Bassolino and I. Coletta, 2020).

Figg. 8, 9 | Cell-type of the Living Unit and possible distribution configurations and Functional band solution (credits: I. Coletta and M. Gallotto, 2020).

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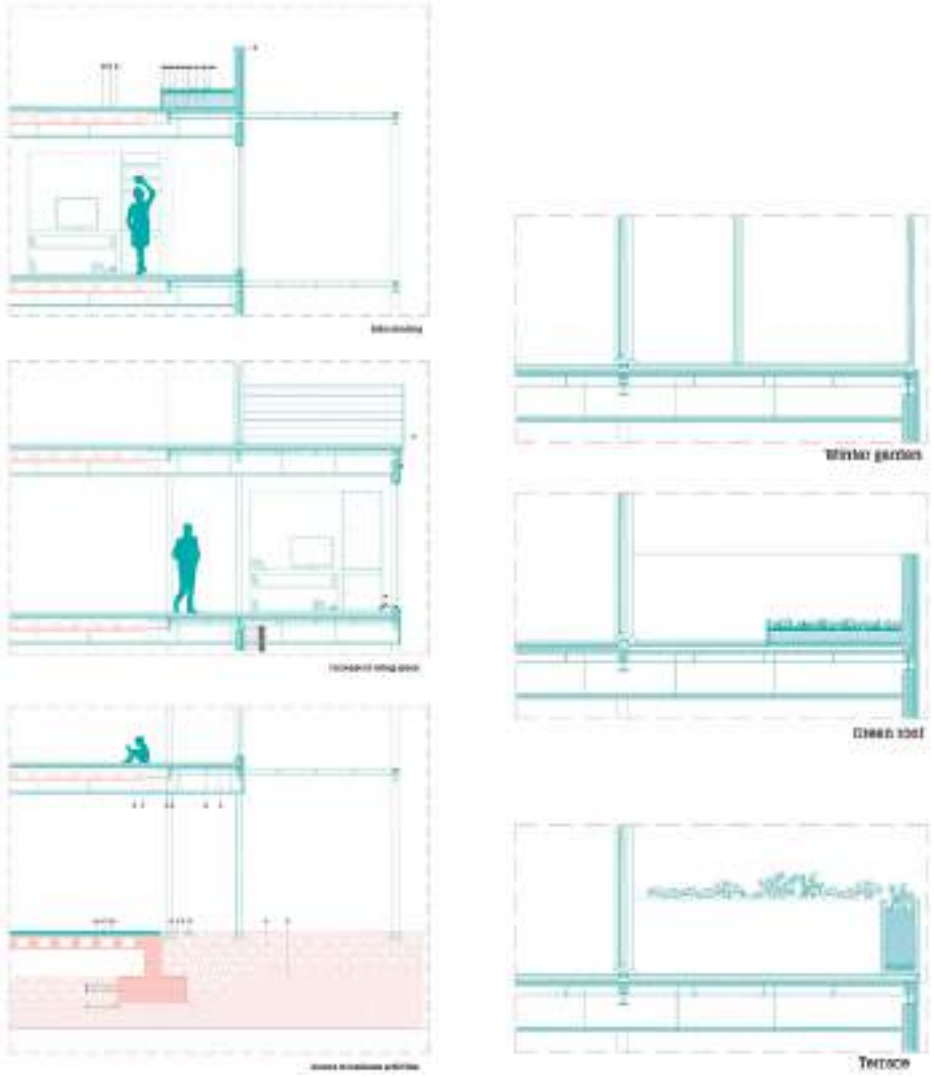
Fig. 10 | Selected part of the prospect with cycle and pedestrian passages and terraces on high levels (credit: A. Bernieri and S. Tedesco, 2020).

of building organisms, with the aim of being converted into architecture for sustainable collective living. The process envisaged aims, on the one hand, to achieve functional-spatial and technological improvements in terms of the performance of dwellings, and, on the other hand, to contain the shock that a long and complex operation of transforming inhabited places could generate for a neighbourhood community. As well as causing discomfort, the consequent substitutions of accommodation are also a logistically and economically complex operation due to the density of the neighbourhood. Therefore, through the direct involvement of the community in the design of new residential and collective environments, with a view to a significant reduction of the ecological footprint of the site, and the optimisation of the 'ecological productivity' of the housing system (Tucci, 2020), the aim is to give rise to a regenerative process from below, capable of activating dynamics of social cohesion and addressing the current critical issues.



Figg. 11, 12 | Technological detail of the additional element on the façade: Living space solutions; Open space solutions (credits: R. Bosco, M. Gallotto and S. Tedesco, 2020).

The building complex is severely marked by a high degree of obsolescence, which together with the changed housing needs in place make it necessary to find solutions capable of improving its performance conditions by ensuring indoor and outdoor improvement. The design solution that has made it possible to deal with the criticalities posed consists of an additional element on the façade, essential for establishing a relationship with the new context that did not exist before and for expanding the living space, leaving all the permanent functions linked to domesticity enclosed in the existing macro-object. The project foresees the juxtaposition of a light structure to the façade of the building, with the function of a mobile construction site, which is configured as a 'parasitic' element, allowing the insertion of prefabricated volumes in the

building and which at the same time lends itself as a passive device to control solar radiation, modifying itself morphologically and functionally according to exposure.

The process consists of a sequence of events (Fig. 7), originating from the idea of a continuous, liveable and non-invasive construction site, capable of conserving and recovering, in its own evolution, elements of the construction system, scraps from demolition and processing, defining a process of total up-cycling. The first sequence of operations, identified by 'time 0', involves the start of the building site phases and the construction of a housing site: a new building, consisting mainly of a structural steel skeleton and a core of services (vertical connection systems, kitchen modules and bathroom modules), capable of accommodating prefabricated modules. In these, the first groups of users involved in the redevelopment process will be able to arrange their own furniture, transforming the aseptic prefabricated modules into familiar elements, identifying their own lifestyle and way of being.

The technological and energy retrofit of the buildings takes place in 'time 1'. After the first families have moved into the site-housing, the dismantling of the prefabricated façade elements, the demolition of the internal partition elements and the laying bare of the structural elements begin. This is followed by the construction of the steel structure of the 'parasite yard' planned to be built adjacent to the existing building. The building site acts as a provisional structure as it is functional for the execution of the building site operations and contributes to the reconfiguration of the façade and the functional-spatial upgrade of the entire complex.

At 'time 2', once the retrofit operations have been completed, the groups of users, temporarily housed in the site-housing, return to the portion of the building that has been upgraded, by moving the prefabricated modules that have already been customised by crane. The replacement of the stairwells in the corners with two new vertical connections, positioned in continuity with the existing ones on the courtyard elevations, makes it possible to replace the existing 45, 60 and 70 square metre single-facing flats with double-facing flats, larger on all floors and with loggias on the courtyards. The result is better natural lighting and greater thermo-hygrometric comfort, thanks to the possibility of transverse ventilation, while at the same time adapting the spaces to the new living requirements defined by today's lifestyles. A functional strip runs through the centre of each apartment, containing services, hallways, entrances, etc., acting as a filter between the open and private areas (Figg. 8, 9).

The completion of the 'parasitic' structure becomes an opportunity to reformulate the public space: some of its parts are designed to be freely accessible, without interfering in any way with the privacy of the residents. These passages are deliberately detached from the façade behind and screened by brise soleil. The aim is to transpose the concept of the path vertically, while creating new and more stimulating visions of the urban and rural landscape. Two access points, located at the heads of the new element, connect the deck with the street and lead, through a system of stairs and balconies, to collective vegetable gardens 'in boxes', built in the roof, and to an urban terrace, ob-

tained by selective emptying of parts of the building (Fig. 10). This operation, together with the passages provided on the basement, favours natural ventilation and also creates new opportunities for socialising. The basement part of the parasite structure forms a portico which offers striking views in height and allows access to the commercial part, to the new accesses to the residential building and to the workshops for the construction and recycling of the elements recovered in the first phases of the construction site (Figg. 11, 12).

'Time 3' foresees the repetition of the whole process, starting with the placement of new prefabricated modules on the housing site, the relocation of other households, and so on, i.e. the initiation of a loop of replicable operations until the end of the redevelopment process of the whole complex.

Environmental quality and technological innovation in the up-cycling process | The redevelopment and regeneration of the area involved the definition of a synergic technological-environmental approach to make the building complex more efficient in terms of reducing heat loss, energy consumption and the rational use of natural resources. The proposed intervention, which is based on a holistic design process from the construction phases to the management and maintenance phases, envisages the reduction of waste and the reuse of construction waste, in order to minimise the ecological footprint throughout the entire life cycle thanks to the hypothesis of a technological and energy retrofit of the entire building, with the idea of creating an nZEB building complex, using natural and zero-km materials.

In the hypothesis of a conscious development and conception of the whole building process, the project for the redevelopment of the existing building includes the definition of an environmental strategy based on the exploitation of natural resources. Through the design and addition of the parasitic system of volumetric addition, an attempt was made to control and maximise the contribution of natural resources at the same time. In fact, the infrastructure placed in adherence allows, sometimes through overhangs, sometimes through shading systems, to control and optimise the solar factor also thanks to the dimensional variability of the depth of the element which is defined according to the orientation.

In addition, in order to exploit the contribution of natural ventilation, it was decided to provide each apartment with double facing (cross ventilation), as well as emptying some rooms on the ground floor and in the front of the building, in order to avoid the barrier effect due to the shape and size of the buildings in the area, and to allow greater permeability to summer air flows. In concert with the passive strategies for the building, a redevelopment of the open spaces has been proposed in order to guarantee the improvement of the well-being conditions of the users, also in view of the increase in temperatures due to climate change. Actions aimed at increasing vegetation in the green areas, as well as de-paving the paved areas inside the courtyards in order to increase the permeability of the soil and encourage evapotranspiration phenomena

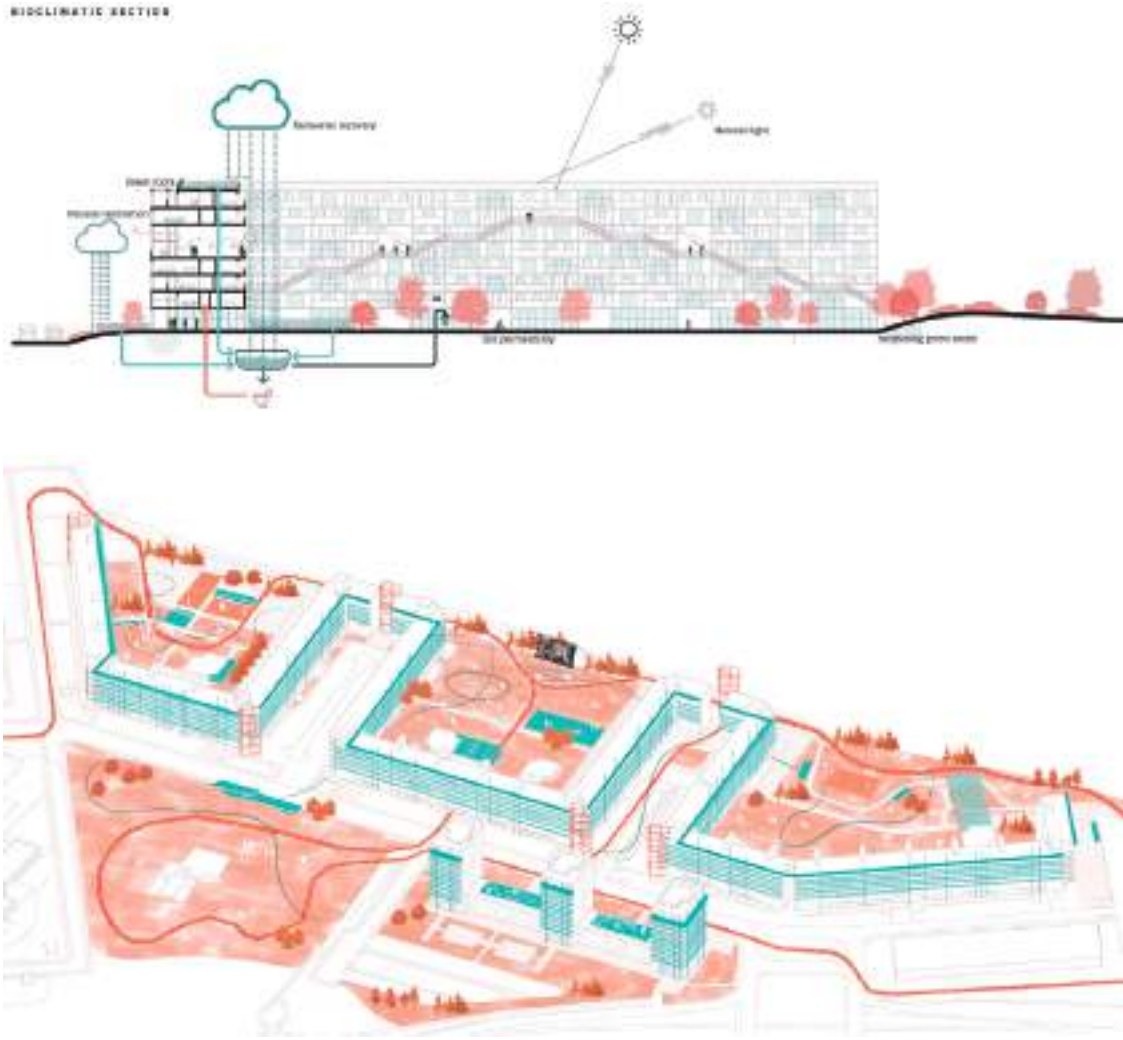


Fig. 13 | Bioclimatic scheme for the study of the project (credit: I. Coletta and S. Tedesco, 2020).

Fig. 14 | Project axonometry (credit: A. Bernieri and S. Tedesco, 2020).

that will reduce air temperatures during the summer season, could also guarantee a favourable impact on temperature control inside the accommodation, with a clear improvement in indoor and outdoor comfort conditions.

The waste from the processing, together with part of the prefabricated modules of the existing shell, find new life within the process with new functions and qualities. In particular, the variety of façade modules will give rise to paving slabs, in some cases already equipped with holes for new planting. These will also be used as street furniture or for outdoor recreational and sports activities, as well as signage in the vicinity of the archaeological area of the reinterred Roman villa in Via Archeologia, as support for information panels, reconstructions and Virtual Reality tours of the villa, in order to create dedicated educational paths. In addition, the up-cycling action and the addition of the parasite would provide for the implementation of rainwater recovery systems for both domestic and irrigation use, as well as the provision of green roofs to

improve the passive performance of the building and the integration of systems for the exploitation of natural resources (Fig. 13).

With the further aim of triggering a 'virtuous circle' with a positive impact on the socio-economic dynamics of the neighbourhood by activating employment processes, the project includes workshop spaces for processing recovered materials. In-Up_Inhabiting the Upcycling is a concept (Fig. 14) for the development of a management model for the conception and implementation phases of environmental requalification and regeneration processes, based on a continuous construction site capable of being self-sustaining and at the same time of being inhabited as it evolves, triggering new forms of natural resource management, circular and local economy and a new way of living in the community from the very first phases, also following the consequences of the Covid-19 health emergency. Triggering such reuse dynamics is both environmentally and economically advantageous, even more so than recycling: since the latter cannot be carried out on site, it generates additional costs for processing, especially transport. Although up-cycling actions are limited by the capacity to transform materials without prior recycling, they represent an important contribution to sustainable development and to a renewed vision of peripheral contexts today visibly marked by a highly compromised type of building.

Acknowledgements

The contribution is the result of a common reflection of the authors.

Notes

1) There are many neighbourhoods linked to the memory of post-war reconstruction, such as QT8 in Milan, Tuscolano and Tiburtino in Rome, the latter of which is the manifesto of architectural neorealism and the ideology of INA-Casa.

2) This important period included integrated and 'self-sufficient' neighbourhoods such as Gallaretese in Milan (1969/1970), ZEN in Palermo (1969-1973), villaggio Matteotti in Terni (1970/1975), Corviale in Rome (1972-1974), Sorgane in Florence (1962-1980), and Giudecca in Venice (1980-1982).

3) For further information see the webpages: ar-co.org; arturofranco.es; izaskunchinchilla.es; lotek.com; superuse-studios.com [Accessed 24 February 2021].

4) The SITdA Workshop referred to is 'Architettura e Tecnologia dell'Abitare | Upcycling degli edifici ERP di Tor Bella Monaca a Roma'; Project: In-Up_Inhabiting the Upcycling; Team: CaFé – Campania Felix_ with M. Leone, E. Bassolino, A. Bernieri, M. Castigliano, I. Coletta, M. Gallotto, S. Tedesco ('Federico II' University of Naples) and R. Bosco, P. Ferrara ('Luigi Vanvitelli' University of Campania).

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THE GREAT OPPORTUNITY
If not now, when?

Francesco Iodice

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ABSTRACT
For years we have witnessed, almost helplessly, the great wounds of the suburbs, the abandonment of entire historic centres, or entire urban settings, in favour of a sterile and unmotivated race for new constructions, occasionally or rarely of architectural and good technical quality. It is time to get to the root of the problem. To be clear, not everything can and must be recovered. We should clarify, we should use in an intelligent way this new sensitivity that is emerging and these enormous new economic resources that will be made available. The moment of recovery should be accompanied by a sharp reflection on how and what to recover. The Green New Deal should be seen not only as an opportunity for sustainable development, certainly important, but as a turning point on how to understand and how to imagine 'new' cities and consequently architectures that are their bodies. We should not fear modification and change which are inevitable for any urban fabric or reality. Knowing how to link modernity and tradition, with an authentically contemporary look.

KEYWORDS
recovery, urban regeneration, modification, identity, opportunity

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The body of the city, and therefore its architecture, are affected by the passage of time in a very specific and particular way. It has been clear for some years now that the main road to pursue, in the coming decades, is certainly not to build in an indistinct and indiscriminate way, but to recovery, regenerate, reuse. For years, we have witnessed, almost helplessly, the great wounds of the suburbs, the abandonment of entire historic centres, or entire urban settings, in favour of a sterile and unmotivated race for new constructions, occasionally or rarely of architectural and good technical quality. It is time to get to the root of the problem. To be clear, not everything can and must be recovered. We should clarify, we should use in an intelligent way this new sensitivity that is emerging and these enormous new economic resources that will be made available. The moment of recovery should be accompanied by a sharp reflection on how and what to recover.

The Green New Deal and Renovation Wave (European Commission, 2019, 2020) should be seen not only as an opportunity for sustainable development, certainly important, but as a turning point on how to understand and how to imagine 'new' cities and consequently architectures that are their bodies. We should not be afraid of the modification and change that are inevitable for any urban structure or work of architecture, as has always occurred in history. Knowing how to link modernity and tradition, with an authentically contemporary look. The 'traces' of the past, the built environment, in this case, become the starting point for new ideas, also clearly not final. Rewriting on an already written text is not only possible but even inevitable. Modification, belonging, context, identity, specificity, are words that seem to presuppose a pre-existing reality to be preserved by transforming it, passing down its memory with the traces founded on the basis of the previous traces. A reality that appears in the physical form of a geography whose cult of knowledge and whose interpretation provide the backbone of the project (Gregotti, 1991, p. 36).

In my opinion, the goal is to work on some fundamental issues in order not to waste a great opportunity. On the one hand, to recover, in a massive way, also thanks to the latest incentives put in place by the State, the immense architectural quality heritage we have, both historical and contemporary, both public and private. Interventions that restore, in addition to greater a structural and energy efficiency, the deeper meaning, the identity, the soul of those architectures. On the other hand, having the courage to demolish everything that makes no sense, to recover both in terms of historical-urban identity and architectural quality. I refer also and above all to a series of neighbourhoods born in the various Italian urban suburbs in the period of maximum building speculation and which after a few years showed all their brutality. Operating in this way would bring several advantages. Portions of land would be definitively freed from 'bad construction', first of all, returning the land that has been taken away from nature over the years; and where the place and conditions require it, building new quality public and private works, without occupying new land. This methodology would allow to recover a sustainable urban quality, restoring the identity and the be-

Fig. 1 | Green Belt by Gilles Clement – Coloco, Tripoli, 2006-2011 (source: jnc.be).

longing of places or areas of cities that are now ghost towns. «Raising the imageability of the urban environment means facilitating its visual identification and structuring» (Lynch, 1969, p. 48). This essay will suggest a possible way of investigation.

Urban regeneration and sustainability | The socio-economic transformations of recent decades encouraged not only the accentuation of inequalities, but also a progressive weakening of social and political activism, and therefore of the core element of the relationship between urban planning and the community. The experience gained with specific interventions like the Citizen Participation Contracts showed how the citizens' participation is essential to reach shared solutions. In this new world people are asked for private solutions to problems of social origin, instead of solutions of social origin to private problems (Bauman, 2011, p. 21). Solutions capable of identifying and developing sustainability policies where environmental, social and even economic interests find a balance. Urban regeneration represents an opportunity to solve problems such as the lack of identity of a neighbourhood, the total lack of public spaces and the high building density that makes it impossible to create green areas and even planting trees along the sidewalks.

Recover abandoned spaces by production processes or restore a new environmental, economic and social quality in degraded neighbourhoods, perfectly responds to the concept of the sustainable city, limiting urban dispersion and reducing environmental impacts in the built environment (Musco, 2009, p. 12). Discouraging non-urbanised land consumption raises the question of direct and indirect out-of pocket costs for the environment, which cannot be underestimated if we want to be sustainable: it is mandatory to manage the territory with appropriate urban planning tools, in order to stop new constructions using inadequate building stock regeneration programs. In fact, the State and local authorities hold real estate holdings valued at over 400 billion euros, more than 20 percent of Italian GDP: an extraordinary but poorly managed wealth, which seems to have moderate returns, because of management costs that are

twice as high as those of private citizens. Assets placed in strategic places no longer providing wealth or utility to the community but, if properly valued and managed, they can produce great social and economic benefits, representing an asset to be used as a strategic driver for attractive local and development opportunities.

The redevelopment of existing real estate assets is a priority to guarantee citizens the quality and safety of living and, in addition to promoting research and technological innovation, can establish the role of the architectural project as a tool for welfare policies and development of the cultural and social values of the Italian Territory. Architecture should respond to these new needs, returning to represent its natural ethical value which is to contribute to the civil development of the country, interpreting, through the quality of projects, the new needs of citizens, but bearing in mind that such a complex project requires different skills and functions. It requires synergy with institutions, universities, urban planners, builders, environmental and cultural associations. All believing that there is no other way to rebalance the city, the territory and the protection of the landscape, if not that of starting a large plan of requalification and renovation of the construction sector with is lacking quality, through an extraordinary process of urban regeneration. Everyone, especially in Italy, needs to overcome the taboo of demolition and reconstruction: the costs to refurbish buildings that are not adequate for the seismic risk and not sustainable in terms of energy conservation are higher than a full reconstruction. In specific cases, it is best to demolish some walls, also erasing the bad results of a non-specific planning of the 1960s, creating at the same time schools, kindergartens, sports facilities, and cultural centres.

In Europe there are many examples of bad suburbs demolished and rebuilt as new integrated urban neighbourhoods, spaces equipped with the latest technology but above all places where citizens gather and identify. The suburbs must no longer be seen as marginal places of the historic city, but should be considered as urban areas to be integrated into the building and social fabric of the city. There is now an awareness of the closure of a post-war historical cycle, lasted over sixty years, and characterised by a disorganised expansion that we can no longer allow. This is why it is necessary to focus on the renewal of the existing elements so as not to consume further and land, to solve energy problems, to protect the landscape and to boost the entire Italian economy.

According to Secchi (2013, p. 30), we need to go back to reflecting on the spatial structure of the city, recognising the importance of the shape of the territory while building on it. Give again urban spaces a greater and more widespread porosity, permeability and accessibility; design them with ambition, taking into account the quality of the cities that preceded us and think again about the size of the community. These above-mentioned initiatives are also to be implemented by replacing blocks, parts or entire neighbourhoods built after the Second World War, characterised by very poor-quality buildings, inadequate both for anti-seismic and hydrogeological standards, and for the quality of the facilities and for reducing consumption.

Fig. 2 | Zeche Zollverein by Rem Koolhass-Oma, Essen, 2010-2014 (credit: Zollverein Das Magazine).

Fig. 3 | The High Line by Diller & Scofidio, New York, 2004 2011 (source: designcurial.com).

Fig. 4 | South East Coastal Park by FOA, Barcelona, 2004 (source: miesarch.com).

Fig. 5 | Tate Modern by Herzog & de Meuron, London, 1995-2000 (source: archello.com).

This is an ambitious but inevitable project: in a future that can no longer be postponed, a heritage of about 90 million constructions built in the last 60 years (ArchiWorldNetwork, 2018), will be inadequate and will have to be replaced by a planning for several decades ahead. The approximately 120 million constructions that make up our urban structure are made up of: a) about 30 million rooms, built in over 3,000 years of history and which constitute the very identity of Italian civilisation, to be considered as a 'unique and unreproducible' asset 'to be revitalised, re-functionalised and reequipped; b) about 90 million rooms, buildings that make up the urban and non-urban outskirts, characterised by very poor architectural and construction quality, generally not anti-seismic, also built in inadequate geo-environmental areas and with outdated systems and unsustainable materials, lacking primary services, which in the next few years will be – after exhausting their economic cycle – totally obsolete and will have to be replaced.

In facing the issues of recovery and enhancement of outskirts with complex programs, it is necessary to pursue, also through the use of private resources, the objectives of widespread redevelopment of public spaces, rehabilitation and restoration of degraded areas, functions and activities for collective services and equipment, aimed at favouring the processes of inclusion and social development. Intervening in complicated contexts in the so-called 'abandoned places' to try to create an urban identity and consequently a social consequence is not at all easy.

The city is a plural city. It is a plural reality, par excellence. The social and urban identity that is locally constituted is actually multiple, the result of the interaction of different subjects and processes, each of them bearing different identities. The identity of an urban context, of a 'neighbourhood', is the stratification of different identities, including both 'locally sourced' and defined or imposed from outskirts identities. The very idea of 'neighbourhood' is extended here, as some urban sociologists tend to emphasise. A 'neighbourhood' is not a mere creation, but is a knot of stories, nodes of networks, spatial conformations, practices, etc. with a multiple and evanescent identity. For this reason, although it exists in the common sense, it is not easily identifiable as such, as a reified entity. Although some spatial conformations (the urban fabric, the prevailing building types, the historical phases that led to its construction, etc.) can also be clearly identified and defined, and are often the reference for the life of its citizens or its patrons, a 'neighbourhood' is still difficult to define.

The challenges posed by urban regeneration are actually more immaterial and more oriented towards generative social action. A good work of urban regeneration requires high costs and professionalism. Urban regeneration policies and programs do not only involve building actors, but require complex and long-lasting social projects, which should be designed to support, first of all, the most vulnerable sectors of the population, with specific interventions within wider plans. There is no regeneration without adaptation of public infrastructure and equipment, and subsequently without interventions capable of improving the living and working conditions, of citizens.

Fig. 6 | Superkilen by Topotek 1 + BIG Architects + Superflex, Copenhagen, 2011 (source: detail-online.com).

Fig. 7 | Guggenheim Museum by Frank O. Gehry, Bilbao, 1997 (source: guggenheim-bilbao.eus).

Fig. 8 | Bridge Park by Michael Van Valkenburgh Ass., Brooklyn, New York State, 2009-2011 (source: city-parksalliance.org).

Fig. 9 | Madrid – Rio by West 8, Madrid, 2006-2011 (source: archello.com).

Fig. 10 | Portello Nord by Studio Valle, Milano, 2003-2005 (source: comune.milano.it).

Fig. 11 | EWHA Womans University by Dominique Perrault, Seoul, 2004 2008 (source: archdaily.com).

Fig. 12 | Metropol Parasol by Jurgen Mayer H. Architects, Siviglia, 2004-2011 (source: architetturaresiliente.com).

Fig. 13 | City of Arts and Sciences by Santiago Calatrava, Valencia, 2002 (source: architectureandlandscape.wordpress.com).

Fig. 14 | Science and Innovation Park by Ratti Associati, 2018 (source: lifegate.it).

Consequently, there is no urban regeneration without huge public investments. The inadequacy of urban policies has often led to fail to achieve what are considered to be the two main objectives: economic growth and the achievement of equity and social integration conditions (Vicari Haddock and Moulaert, 2009, p. 19).

The possibilities offered by NextGenerationEU | This is the moment we have been waiting for thanks to a portentous instrument such as the NextGenerationEU. It is a temporary instrument for recovery of 750 billion euros, created within the Covid-19 pandemic and which will help to fix, among others, the economic, social damage, consequences of the coronavirus pandemic to create a post-pandemic Europe that is more sustainable, digital, resilient and better suited to face present and future challenges. The mechanism for recovery and resilience, at the heart of NextGenerationEU, and will provide 672.5 billion euros in loans and grants to support reforms and investments made by Member States. The goal is to mitigate the economic and social impact of the coronavirus pandemic and make the economies and societies of European countries more sustainable, resilient and prepared for the challenges and opportunities of the ecological and digital transitions. Member States are currently preparing their Recovery and Resilience Plans, which will allow them to receive funds within the Recovery and Resilience instrument.

Specifically, the Italian Plan allocated 191.5 billion euros investments, financed through the Recovery and Resilience Facility, the main instrument of the NGEU. But

it should be specified that further 30.6 billion euros are expected to be part of a complementary fund, financed through the multi-year budget variance approved by the Council of Ministers on 15 April 2021. Among the objectives to be achieved there is the renovation of public and private buildings, improving their energy efficiency through thermal insulation, heating and cooling systems and self-generation of electricity, as well as monitoring consumption by users. The target set by the EU is to double the efficiency rate of buildings by 2025. A process started with the Italian Superbonus, a measure that, as stated in the PNRR document, is intended to be extended from 2021 to 2023. For the first time after decades, we are faced with truly impressive figures which, if well managed, as we all hope, will entail the necessary and by now unavoidable ecological change.

At the same time, they will make it possible to recover all the architecture of historical and artistic value of the many historical centres that could be repopulated and become again the beating heart of the cities. Too often abandoned and degraded by an unbearable ignorance. At the same time, we could recover a series of smaller towns, especially inland areas which, with their peculiarities, are part of that Italian cultural identity known all over the world. A delicate issue, but of great importance, will be the recovery of the former urban suburbs, which over the years have become the new centres of large cities, but where often there still are the usual problems of lack of services, picnic areas, places for sport and free time.

Another fundamental issue will be the recovery in terms of sustainability of former abandoned industrial areas: once in the outskirts of the cities, they have now become an active part of the cities, even if very often left to complete neglect and abandonment. The European resources of the Recovery Found will be a very rare opportunity to finally recover these abandoned areas and compensate, even if partially and with a long delay, the population living near these complicated places and that over the years has paid a very high price in terms of quality of life and deaths deriving from the often harmful emissions of these places. Very often the industrial areas are closely linked to the territory in which they are located, making these places even more important and absolutely deserving of being able to have a new life, even better if at the service of that same territory. When a large factory is decommissioned, it is an opportunity to transform that place and give it a new identity, so that it can offer experiences, services, spaces for free time or, even, new residences. Regenerating a former industrial area means reviving an entire area, enriching the city in which it is located and giving new value to the territory.

There are many virtuous examples around the world of sustainable recovery of these areas. From places associated with death and suffering have been transformed into places associated with vitality and well-being, or from spaces of strong social degradation to places of culture, becoming a driving force for economies and sustainable territorial development. There is nothing that cannot be changed by conscious and informed social action, endowed with purpose and legitimacy. If people are in-

Fig. 15 | Toyota Woven City by BIG Bjarke Ingels Group, 2020 (source: big.dk).

formed and active and can communicate from one part of the world to another; if the contractor assumes its social responsibilities; if the media becomes the messenger rather than the message; if political actors react to cynicism and restore the confidence in democracy; if culture is rebuilt starting from experience; if humanity feels intergenerational solidarity by living in harmony with nature. In fact, the rapid urbanisation process of recent decades has emphasised a series of problems that affect the quality of life of the citizens: the decrease of public spaces, the deterioration of infrastructure, the difficulty in organising public transport. For this reason, public participation is essential. 'Stabilising' and 'controlling' the expansion of the cities is one of the objectives that must be pursued to reduce the environmental impact on the area surrounding urban agglomerations. The land is a limited resource that should not be wasted, and, above all, its balance should be respected. The city needs its territory as an 'ecological support', it can draw resources from it and release its residues in it (waste, products resulting from energy transformations and different types of production). Without a context that fulfils this function, the city could self-sustain like any other ecosystem.

Conclusions | Participation between public and private is not achieved only through the organisation of thematic commissions, exhibitions and the production of graphic and audiovisual materials to be distributed to the community, but through a broader action to support and encourage initiatives such as partnerships and collaborations. International experience has shown that urban regeneration is possible thanks to the combination of all local factors and the involvement of the community. The relationships between city and territory encourage interaction between different subjects, such as urban planning, economics, ecology, environmental sustainability. Thanks to the integrated approach, the European and international planning systems have adopted tools that combine environmental policies with government action. The subject is to think of new construction systems in the city, to improve the quality of urban living, making choices

of sustainability and continuity with the history and identity of the places, designing the 'city of tomorrow': a sustainable, intelligent, inclusive city that is also able to bring values linked to personal and collective memory. When Zumthor (2003, p. 42) thinks of architecture, images spring up inside him; many are related to his training and his practice as an architect; others have to do with his childhood; he still seems to feel the door handle in his hand, that portion of metal configured like the back of a spoon.

Then the question is 'if not now when'? The attached images (Figg. 1-15) illustrate possible scenarios. They refer to projects and architectures, even very different from each other, and starting from a bold urban regeneration often linked to the recovery of abandoned industrial sites rather than degraded marginal areas of large metropolises quickly became an iconic element of the cities, generating places for sharing and social well-being. From these few examples it is easy to understand how a good urban regeneration, also made of modifications and replacements or a good and critical building renovation carried out in continuity with the history and identity of the places can only generate enormous opportunities for every citizen, in terms of usability of new spaces, they are an economic driver. We are facing a portentous convergence, there are ideas, technologies, sensitivities, and perhaps as never before, even great financial resources. Great opportunities lay ahead both for resources and for new sensibilities that were unthinkable only a few years ago and must absolutely be grasped with great foresight and intelligence.

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ENVIRONMENTAL CERTIFICATIONS IN BUILDINGS
How sustainable are green buildings?

Milagros Defilippi, Alexis Dueñas

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ABSTRACT
Over the last decade, urban growth in Peru has been high, leading to a renewal of the face of cities. This process is complex due to two issues, the expansion of cities and the renovation of old blocks. The first case verifies the presence in the city of different buildings with sophisticated technological applications (smart building) and the second case the control of energy and water consumption (green building). The research described the use of the database of registered projects and buildings underlying the GBC (2013-2018), using statistical analysis tools that determined patterns and trends, in terms of credits completed or met according to LEED categories. Finally, it analyzed energy, water, and other criteria that influence sustainability through MCA (multi-criteria analysis) using a double MAS type input. Green buildings contribute to environmental sustainability through site selection, use of tools to reduce energy consumption, and features that promote low emissions. They contribute less in terms of social sustainability, compared to other certifications such as BREEAM. Core and shell, New construction or Existing building are registered under the 'low carbon' and 'carbon neutral' initiatives, mostly satisfying the aspects addressed in the 'energy & atmosphere' criterion. However, they have a low match in eco-efficiency issues, especially with respect to water.

KEYWORDS
green buildings, LEED, environmental sustainability, ecoefficiency, sustainable development

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The strong growth of the construction sector in developed and emerging countries has not only affected its economic growth, or the welfare of the inhabitants, it has also had effects on the level of environmental impact, causing more waste, significant increases in energy consumption, water and raw materials (such as steel and iron). In Table 1, we can see how the latter raises concern of scientific measures and pressures to environmental load, and in the area of construction, a wide range of environmental certifications (Quesada, 2014). It is also considered a more important goal directed at increasing sustainability in structural designs (Pongiglione and Calderini, 2016). Nowadays, ecofriendly construction considers ecological effectiveness as an essential condition or value in modern building construction process, i.e., aimed at obtaining not only environmental certifications, but above all, ensuring environmental sustainability based on the qualitative characteristics of buildings and surrounding areas (Mkrtchyan and Lokhova, 2017).

Such certifications diversity can be grouped into three types. The first, includes methodologies that tend to appreciate performance with the credit system, such as LEED and BREEAM Macias and Navarro (2010). The second is related to eco-efficiency input/output ratios, as in the case of the CASBEE method, which analyzes the results of the construction process in terms of the value of the product or service per unit of environmental burdens. Finally, are nested matching tools such as GBTool, employing hierarchical trees, which distinguished areas, categories and criteria. These authors also refer to the methodology proposed by ISO (ISO/TC 59/SC – Sustainability in Building Construction), which is based on the green methodology, a new building certification method (Cornejo Cárdenas, 2017).

There is a vast literature on sustainability from a theoretical perspective (Pearce and Atkinson, 1993; Allenby, 2012; Sachs, 2015). An option to determine the environmental sustainability of buildings is through life cycle analysis (García-Torres, Kahhat and Santa-Cruz, 2017; Huedo and López-Mesa, 2013). Another option is the use of the systemic sustainability array (MSS), as well as as those that obtain the analysis observations with multicriteria environmental performance indicators – MCA (Cornejo Cárdenas, 2017; Castillo Haeger and del Castillo Oyarrzún, 2015). Similar variants have been developed on environmental assessments for the construction as vectors of analysis process: sustainable construction criteria and management of safety criteria applied to housing as in the case of housing of Mexico (Ramos et alii, 2016).

Certificates as for example, projects with LEED are based on aspects such as climate and quality of the construction environment, techniques and materials for construction and control of environmental burdens (energy, water, light and thermal comfort), benefiting the environment and, at the same time, with an increase in the cost of the initial investments. However, there are several cases that refer to important and interesting rates of return for this type of projects (Ribero et alii, 2016). In Table 2, advances in sustainability assurance, for different methodologies, have made it possible to extend the practice of individual certification into larger buildings or dwellings,

Organizations	Methodology
BRE (Building Research Establishment)	BREEAM Multi-Residential
USGBC (U.S. Green Building Council)	LEED-Home
GBCe (Green Building Coucil Spain)	GREEN New Edification: Residential and Offices
JaGBC (Japan Green Build Council) JSBC (Japan Sustainable Building Consortium)	CASBEE for New Construction
Association QUALITEL	Quality Habitat & Environnement

	LEED ND (2009)	BREEAM (2012)	GS COMMUNITIES
COMPONENT	Smart Location and Networks (25%)	Governance (9%)	Governance (19%)
	Neighbourhood Patters and Design (40%)	Social/Economic Well-being (42%)	Design (9%)
	Green Infrastructure and Buildings (26%)	Resources and Energy (22%)	Habitability (16%)
	Innovation and Design Process (5%)	Land use and Ecology (13%)	Economic prosperity (18%)
	Regional Priority (4%)	Transport and Mobility (14%)	Environment (28%)
			Innovation (9%)
CERTIFICATION	110 points	100 points	110 points
	+80 (platinium)	+70% excelence	75% world leader

Table 1 | Types of certifications or seals green buildings according to their origin – Organization (based on Quesada, 2014).

Table 2 | Environmental Certifications for sustainable neighborhoods (based on Blanco, 2016).

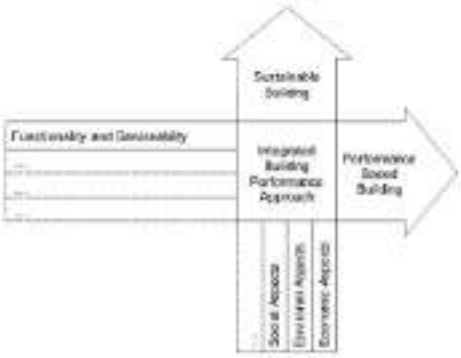
such as a complex of buildings, and even neighborhoods set (Blanco, 2016). That is the case with LEED ND (2009) and BREEAM Communities (2012) or Green Star Communities (2012-2015) certifications.

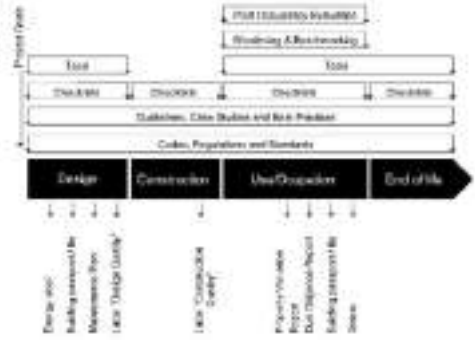
The question is whether such programs will effectively and efficiently control environmental loads and pressures and thus contribute to environmental sustainability.

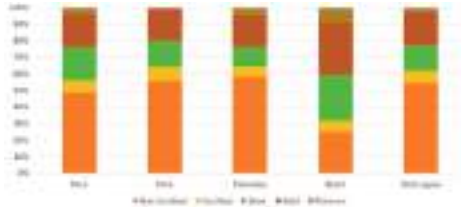
Several criticisms have poured into certifications suggesting that it is better to make decisions based on quantitative assessment systems, as it is the case with life cycle analysis (LCA) and life cycle cost (LCC) analysis (Lützkendorf, 2010) that have postulated a synthesis of sustainable and eco-efficiency buildings. In both cases, there are supporters and detractors; both highlight the importance of further research in this field of knowledge (Fig. 1). In this sense, is important to mention the urban growth of the past decade, which has renewed the face of cities, for example Lima is the one that has most changed, also Trujillo in the North, and Arequipa in the South. This process is not only the expansion of cities into new lands, it is what urban planners named as 'urban erosion' referring to the change in land use. This process has also led to the renewal of old houses and entire neighborhoods, where today we find buildings up to 30 and 40 levels (considering basements and upper levels). Many of them emerged thanks to sophisticated technological applications, giving rise to smart building; others seek to control the energy and water consumption as the green building. Like many environmental certifications such as ISO 14000, LEED has experienced a significant growth in different regions of the world. In Latin America, LEED has had an important development in Mexico with more than 2000 projects, followed by Chile with 407, Colombia with 300, and a Brazil with 32 projects (GBC, 2018), and in this trend, Peru did not make a difference, registering 154 projects (Fig. 2).

The growth trend, typical of this type of environmental certification collected by the ISO 14000 family as green stamps, occurs at different speeds. We observe that in Chile and Colombia they have higher speeds than those recorded by Peru or Brazil. At the regional level, the trend is growing, however, Chile and Colombia have entered in a downward cycle probably due to other new certifications, which make the interest to achieve a certification LEED decay over time. In this regional context, Peru's case is qualitatively different for two reasons. First, the growth curve shows a more toned-down slope for the first years of the time series (Fig. 3), acquiring rapid growth in the period 2014-2017. It is possible that, in the medium term, the trend is still maintained in terms of growth and resilience, this thanks to the decision of the national Government to promote sustainable buildings with attractive loans for 'techo propio' (own roof) type houses.

The present study has a theoretical intended to establish the levels of real and technically reliable sustainability of green building. In another way, the high initial costs have positive rates of return in the medium to long term, suggesting that it is a sustainable investment for the environment and for the economy also. In another way, the studies explore the conceptual perspective developed theory by Allenby works (2012) regarding the limitations of technology in environmental sustainability, as well the theoretical prospect of the economy (Pearce and Atkinson, 1993; Sachs, 2015), leading to a discussion of whether or not the technology available today warrants long-term environmental sustainability. In this context, the study developed aims to determine the environmental sustainability of buildings built with LEED green certifica-







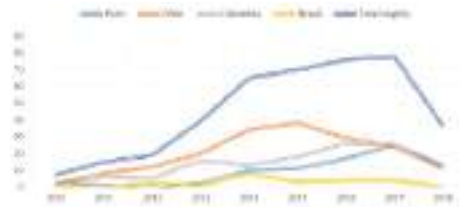


Fig. 1 | Integration of philosophy of sustainable building and eco-efficiency by Lützkendorf (2010).

Fig. 2 | Certifications granted by LEED levels according to countries (based on usgbc.org).

Fig. 3 | Certification paths LEED according to countries for the period 2010-2018 (based on usgbc.org).

Fig. 4 | Categories deemed certification LEED applicable to various types of constructions – GBC 2018.

tions, referring to the impacts in the environment. For this purpose, it is necessary, first, to estimate using multi analysis, green building environmental sustainability certified with LEED. Secondly, identify the most used strategies by the eco-design to achieve environmental certifications, and finally, to assess the impacts on the environment arising from the green building certified with LEED.

It should be noted, that LEED considers four progressive levels of certification, based on 100 points, in addition to 6 points for design innovation and 4 points in Regional priority. A building is categorized as ‘certified’ if it achieves 40-49 points, ‘silver’ if is certified with 50-59 points, ‘gold’ if gets 60-79 points, and ‘platinum’ if scores 80 points or more. The project will use the database to record projects and certifications granted by Green Building Consul-Peru through December 31, 2018 (Fig. 4). The collected information is related to the evaluation criteria, recorded in the

scorecards of the projects, and are available from the new.usgbc.org/ website. This database showed the credits obtained by the project, in their different categories: energy, water, design, environment, among others, which determined the environmental impacts in terms of water and energy consumption with the help of the environmental matrix of the MSS type, using the MCA tool (Tab. 3). The procedure used in the research believes to a development by stages, is shown in the Figure 5. To ensure the representativeness of the study, a procedure shows under simple random sampling (SRS) considerations, which considered the following expression, where $D = B^2/4$ and at the error limit of the estimate of the proportion of loans affecting sustainability with respect to the total of credits.

$$n = \frac{Npq}{(N-1)D + pq}$$

$$B = 2\sqrt{V(\rho)} = 2\sqrt{\frac{pq}{n-1}\left(\frac{N-n}{N}\right)}$$

Applying the expression to estimate the sample size is 3.69≈4 for each of the main building types. Since its inception, LEED certification has been a benchmark for the design and construction of smart, environmentally friendly, high-performance buildings. This considers certification of an important variety of buildings, ranging from new construction and renovations, existing buildings, commercial interiors (structure and facade), schools, health centers, commercial establishments, and neighborhood development. According to the GBC, to date there are more than 418 thousand sqm, and pretends to have an impact on very specific aspects of sustainable construction. In this context, green certifications in the national market are increasing and the trend is still the same until the end of the decade. Certificate applications show us precisely this trend from two perspectives. The first from higher LEED certified buildings and another from the wide range of building types they require, that detail can be seen in Figure 6, shows that 40% of certifications and/or requests are concentrated in the Core and Shell type, followed by New Construction with 24%, and Existing Buildings with 12%. This distribution is not coincidental, and relates to the trends experienced by the construction sector, focused on new buildings and large scale remodeling of pre-existing buildings.

Figure 7 illustrates the relationship among buildings with certifications and buildings without certification. Success rates are high (0.48), in the areas of Commercial Interiors, Healthcare and Retail-Commercial Interiors. They are lower in the Core and Shell and Existing Buildings types. This means the relatively complex interventions such as the Healthcare and Retail-commercial Interiors have for their design and technical requirements, greater probability of achieving certifications. On the other hand, buildings with less complexities, with less demanding design and less technical requirements have a lower probability of success (Fig. 8).

Dimension or Parameter	No consider	Encasement	Fairly	Outstanding	Fullfillment	Value
Enviromental Sustainability						
Land use						
Water						
Air						
Energy						
Ecology						
Social Sustainability						
Cohesion						
Mobility						
Economy Sustainability						
Connectivity						
Efficiency						

Tab. 3 | Matrix of the array of systemic sustainability (based on Cornejo Cárdenas, 2017).

Strategies identified in green certification: A look from the designers and real estate management | What are the strategies followed by real estate operators in the field of LEED-type environmental certifications? Is it therefore true that the greater the complexity, the more successful the certification? These are some questions that are important to answer in order to describe the behavior of agents in the Green Buildings market. Table 4 presents the compliance level of the maximum payable credits for each category or criteria of LEED certification, according to which there are important differences between building types, mentioning that Commercial Interiors, Core and Shell, and Existing Buildings have the greatest number of criteria satisfied in its entirety. The buildings with lower levels of compliance are New Construction, Retail-New Construction and Schools-New Construction.

By the compliance levels, the Sustainable Sites [SS], Water Efficiency [WE], Innovation [ID] and Regional Priority [RP] criteria have the highest average, ranging from 0.73 to 0.96. differences are seen in Energy & Atmosphere [EA], Material & Resource

[MR] and Indoor Environmental Quality [IEQ] criteria. The coefficient of variation, shows the relationship between the standard deviation and the arithmetic mean, which shows high levels of dispersion for the EA and MR IEQ criteria, and less dispersion in RC, SS, and WE. Based on the last paragraph, one might think that operators tend to focus their efforts on location selection and design techniques to make it environmentally friendly, to improve water consumption efficiency, design innovations, and regional credits. Only two aim for a real rate of contribution of the environmental sustainability of the building. Energy efficiency is important in the context of climate change, as is finding more sustainable materials and resources, which decreases consumer pressure about the ecological footprint on the planet.

Towards a sustainability model | Sustainability can be seen from various perspectives. One of these is to consider the technical, social, and economic measures that affect the well-being of the individual. On the selected sample of LEED-certified buildings, demonstrated different approaches that have different levels of incidence and make dif-

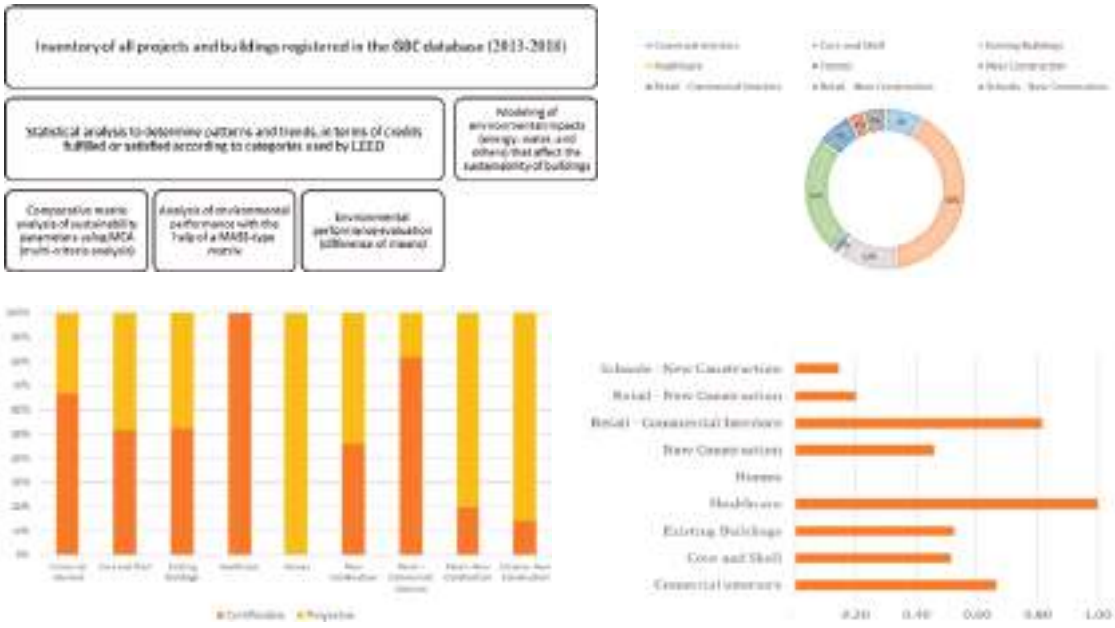


Fig. 5 | Detail of the methodological path developed in research.

Fig. 6 | Distribution of buildings (including projects in process or archived) according to types of intervention LEED.

Fig. 7 | Applications for certification according to State by types of buildings LEED, includes projects in process or archived (based on GBC, 2018).

Fig. 8 | Rate of success according to type of building LEED.

Types of Building	Sustainable Sites (SS)	Water Efficiency (WE)	Energy and Atmosphere (EA)	Material and Resources (MR)	Indoor Environmental Quality (IEQ)	Innovation and Design (ID)	Regional Priority (RP)
Commercial Interiors	1	0.55	0.68	0.29	0.25	1	1
Core and Shell	0.93	1	0.54	0.46	0.53	1	1
Existing Buildings	0.62	0.57	0.63	0.2	0.13	1	1
Healthcare	0.5	0.56	0.26	0.44	0.08	0.67	1
New Construction	0.92	0.8	0.17	0.43	0.45	1	0.75
Retail — New Construction	0.71	0.73	0.35	0.07	0.29	0.33	1
Schools — New Construction	0.88	0.91	0.7	0.31	0.5	1	1

Tab. 4 | Compliance level of credits according to criteria or categories of certification LEED.

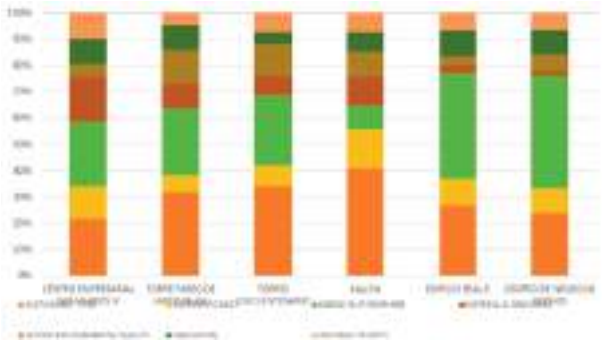


Fig. 9 | Levels of importance of the criteria fulfilled in obtaining a certification LEED to a group of buildings.

ferent comments. For example, the criteria of Sustainable Sites affects between 20% and 30% of the achieved credits, the Water Efficiency criteria have extreme relevance to the sustainability, only affects 7-15% of appropriations made in the certification. A better performance can be seen in the Energy & Atmosphere category that explains between 9% and 43% of the credits achieved in the certification process (Figg. 9-11).

Sustainability theory should not be ignored, special care should be taken for the issue of resource consumption, where material recycling practices, use of renewable resources with sustainable extraction are important, also performance improvement in the use of such resources (eco-efficiency practices). The item of Material & Resources has a low importance to obtain credits, and extends the range of 2 to 17%, that makes

it practically in a marginal criterion. Cities, buildings tend to incorporate important structural elements in favor of insulation; therefore, LEED certification considers a special indoor space environmental quality standard. This criterion will have between 3 and 13 p%. Finally, the innovation criteria and regional priorities. In the first (innovation) has a range of 4 to 10% of the allocations, and the regional priority criterion shows a ratio of 5 to 10%. Following the methodological considerations exposed by Cornejo Cárdenas (2017) a comparative table with the results of the environmental matrix MASS, with the use of the MCA evaluation was made, can be seen below. The results presented in Table 5 for LEED performance in all types of environmental construction are high and represent 53 and 63% of total sustainability.

Performance in economic sustainability represents 25% of total sustainability. Social sustainability constitutes, for the analyzed cases, between 13% and 20%. The differences in environmental sustainability are significant between Core and Shell and other building types, while in social sustainability between New Construction and other certifications. In terms of economic sustainability, lastly, the differences between Core and Shell compared to other building types are given. Around green buildings there are various interpretations related to sustainability, many are unfair and exaggerated evaluations insofar as they attempt to extend the macro of the sustainability assessment to the building and within it to a particular element (a building), which continues to be an aspect in the micro scale of sustainability (Lützkendorf, 2010; Macias and García-Navarro, 2010). The question should not be generalized, whether green buildings are or are not sustainable, since such an assessment would be performance in the economic sphere to measure the effects of the decision to invest in the construction of a sustainable building to contribute to national GDP or GDP per capita.

In this perspective, the cost of the investment and its impact on the long-term growth prospects of the sector have also been considered (Wan, Liu and Lai, 2017). One should not only focus on assessing the environmental impacts on the social environment, and from the triple bottom line perspective (Huedo and López-Mesa, 2013; Quesada, 2014; Dias-Angeloa, Jabbourb and Calderaroc, 2014) analyze its effect on social sustainability, measured as access to housing, services, and or improvement of assets as a result of lower placelessness (Castillo Haeger and del Castillo Oyarrzún, 2015). Recently, sustainable approaches have extended to hotel management and the design of tourist complexes, while environmental aspects cover energy, water, material resources, and the effectiveness of solid waste management (de Oliveira Menezes and Kindl da Cunha, 2016). These issues receive less interest from real estate agents and designers, as indicated by our results, and agree with the theoretical considerations exposed by the author of Structural Sustainable Design (Pongiglione and Calderini, 2016).

In this context, the proposed study approaches the microscale of sustainability and the behavior of typical cases to draw conclusions with respect to three aspects of interest. The first one is related to the behavior of buildings on the three areas of sustainability (economic, social and environmental) also in a qualitative way to estimate their performance.

Fig. 10 | Cronos-Bussiness Center – Certification level: Gold-2017 (credit: usgbc.org).

Fig. 11 | Torre Cincuentenario – Certification level: Gold (credit: ulima.edu.pe).

The second, would involve a debate on the contribution of green buildings in the area of eco-efficiency, especially in energy and water policies, and jointly the implementation of low carbon policies or carbon neutral philosophy (Wan, Liu and Lai, 2017). Lastly, the efforts, of the entrepreneur or the head of the household, should be

Dimension/Parameter	Building types		
	Core and shell	New construction	Existing building
Environmental Sustainability	**10**	**16**	**15**
Land use	2	4	2
Water	2	4	3
Air	2	2	4
Energy	2	2	4
Ecology	2	4	2
Social Sustainability	**2**	**6**	**3**
Cohesion	1	3	1
Mobility	1	3	2
Economy Sustainability	**4**	**8**	**6**
Connectivity	2	4	3
Efficiency	2	4	3

Tab. 5 | Performance of buildings LEED according to the model of triple sustainability (economic, environmental and social) by types of buildings.

evaluated from the perspective of supporting their nation to comply with the Paris-2015 agreements (Ribero et alii, 2016).

It shows that green buildings certified by the LEED platform, contribute significantly to environmental sustainability, due to the choice of sites, the use of mechanisms for reducing energy used and other aspects that promoted the reduction of emissions. However, they contribute less in terms of social sustainability, as LEED criteria focus more on buildings than on the surrounding environmental impact, unlike other certifications such as BREEAM. Buildings, Core and shell, New Construction, or Existing Buildings fit within the framework of 'low carbon' and 'carbon neutral' initiatives, and largely meet Energy & Atmosphere requirements, although they make little contribution in terms of eco-efficiency, especially in the water issue. Finally, the fringe value of criteria such as Material & Resources and Indoor Environmental Quality means that government building may be in favor of green buildings, likely discouraged by other low-cost initiatives (Mi Vivienda Verde – My Green Home). This is because the state, on the issue of sustainability, prefers an alternative system to a certification of an established system, which is more expensive or low cost-benefit.

About the green building perspective, several items must be considered, for example, integrated the management risk in the building life cycle, means, incorporate a

new category addressed to control of environmental risk, focusing on the control of fire and its emissions, with LCA or EIA tools (Martin, Tomida and Meacham, 2016). The main purpose is to determine the environmental sustainability of buildings constructed with LEED green certifications, in terms of environmental impact, it is concluded that buildings contribute significantly to environmental sustainability and to a lesser extent to economic and social sustainability. The highest cost of green buildings is an average of 35%, more per square meter.

About the strategies used by designers to achieve environmental certifications, it has been determined that investors and developers of projects certified with LEED tend to give priority to the Energy and Atmosphere criteria followed by the Sustainable Site criteria and the fulfillment of Regional Priority, all of which have high levels of Innovation. Difference strategies depending on the building type, building proponents are closer to New Construction or Existing Building than those who favor Core and Shell building. Multi-Criteria Analysis (MCA) has been useful, not only to determine the level of environmental sustainability of green building certified with LEED, also because it has allowed to assess the impacts of the satisfied criteria in the care of the environment that generate these, concluding that more complex buildings have major environmental impacts than simpler interventions. Therefore, given the significant positive effects on the land related to the choice of the project site and the decrease in water consumption (energy eco-efficiency) and lower emissions of pollutants (low emission). Under this aspect, we can also appreciate considerable differences between the three types of buildings studied.

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DESIGN EXPERIMENTATION FOR BUILT ENVIRONMENT'S CARE

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ABSTRACT
In view of the necessary change towards reduced land use, reuse of built environment and urban regeneration, this research-action looks at the redevelopment of peri-urban and complex urban areas, where the contributions of different subjects converge towards the circular reuse of spaces and buildings, opening new scenarios for the regeneration of cities. The cooperation with university research and public administrations planning is central to the methodology used for the proposed project experimentations. This provides opportunities for action on urban systems for the future of citizens. The documented design experiments focus on abandoned residential, industrial and management architectures, subject to the application of environmental control techniques, technological retrofit, formal re-design and development of new social opportunities.

KEYWORDS
design research, environmental control, urban regeneration, sustainability, public engagement

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In Italy, in the year in which the Ministry for Environment, Land and Sea Protection changes its name to Ministry for Ecological Transition[1], it is clear how relevant it is to discuss circular economy, reuse of built heritage and energy efficiency in cities and territories. In particular, the built environment's care and the consequent improvement of the quality of life and the relationship between man and nature are central in the current change of direction reported in this contribution. The awareness of being in a finite system of resources has taken place at various levels all over the world for several decades, but the application of the necessary measures is still ongoing because of conflicting interests in today's societies and by a naïve – or deliberately superficial – confidence in the development of new technologies as a solution to the problem. The examples meant to explain these issues are related to the Italian context, but turn their gaze to the rest of Europe too by making comparisons with successful projects in terms of results. The debate focuses on overcoming the technicality in addressing the topic of the recovery of existing buildings and the 'implosion of cities' described by Renzo Piano (Vv. Aa., 2014). This question can be answered with the direct involvement of research institutes and universities in the preliminary phases of recovery interventions within the delicate systems of existing districts, among which the suburban, public residential and disused industrial ones stand out for their complexity.

Universities, places of innovation by definition, can guide the res publica to achieve these common objectives in complex contexts, also encouraging the definition of partnerships with private investors or, as in the cases reported, with the contribution of public funding. The aim is the transformation of cities and landscape with an environmental and social approach (Rossi Prodi et alii, 2013) by using research methodologies in the architectural technology field. Strategic design experiments, developed in cooperation with public administrations, Universities and managers of existing building complexes, should therefore be preparatory to the definition of urban implementation tools and projects according to the Urban Acupuncture Theory (Lerner, 2014; Casagrande, 2014), but keeping a holistic vision of the urban system.

Recycling: approach development | The conversation about working in a finite resource system is recently back to the centre of the debate on the development of architectural technologies, as shown by the works and words of the Pritzker Architecture Prize 2021 winners, Anne Lacaton and Jean-Philippe Vassal (Mayoral Moratilla, 2018, p. 29). Renzo Piano shares the same view, and in 2013 he started the experimental project G124 with the idea that the growth of cities must be implosive instead of explosive, healing the Italian suburbs where to the social, environmental, and ethical components are added the economic burden, becoming unsustainable to expand infrastructure away from the built centres.

The projects and experiments of these architects are based on the idea that it is possible to take care of the built through an in-depth analysis of the buildings with an ethical approach that evaluates the immaterial dimension of architecture, among which

Fig. 1 | Rooftop Housing before the retrofit on the left and after on the right, by Studio Albori, Milan (credit: Studio Albori, 2007).

Fig. 2 | Cité du Grand Parc before the retrofit on the left and after on the right, by Lacaton & Vassal e Frédéric Druot, Bordeaux (credit: Anne Lacaton & Jean-Philippe Vassal, 2016).

the social sphere clearly reflects its degradation (Jacobs, 1961). Looking back to the values that should inspire the interventions in the cities, although these define the direction, the need for economic funds and project management skills remains. In the past decades, this led to a widespread trust in technicality[2] as a solution to this dichotomy, so central as to be the driving force of incentives and programs for urban redevelopment and construction industry on the national territory. On the other hand, the recent experiments generated by the cooperation between institutions, individuals and Universities show that research itself is an interdisciplinary method suitable for delicate interventions in the urban fabric.

At national level, as in the European scenario, the residential heritage is the object of renewed interest to identify strategies for better social and environmental conditions using funding as a driving force, provided for energy upgrading and structural security of existing buildings. Looking at the development of legislation, this is a chance we must be able to take in response to an urgent need that is anything but obvious. Even the most recent national funding, the Superbonus provided by Italian Decree n. 34/2020 (Decreto Rilancio), is limited to punctual interventions for energy efficiency. A national intervention that opens up new opportunities but lacks a holistic design vision of the building complex and its urban system. The socio-economic conditions and the technical-constructive characteristics of the large residential heritage, from the immediate post-war period until the early eighties, are recently subject to physical degradation. In the last years this determined an in-depth reflection on requalification, also because their recovery will constitute, in the medium term, a significant percentage of the activities in the construction field, much more than new building interventions. Unfortunately, the redevelopment of these areas is not so profitable, and the change of building use requires long and complex bureaucratic procedures.

In the 1990s, a new approach to urban growth inside the city was adopted. To cope with this change of direction and the financial resources needed for its implementation, special legislative devices, such as the Programmi Complessi[3] focused on the

need for regeneration of residential areas, are born. Applying an integrated logic to the redevelopment, these overcome the single functionality of the Piano Regolatore Generale (General Town Development Plan) and open the way to the functional mixité able to enrich the social and economic cities and, more urgently, the suburbs. The failure of many applications of such tools is affirmed by the same initiative of the Ministry of Infrastructure that introduces, with Italian Law n. 134/2012, the so-called Piano Città to take the lead on urban policies that had no funding for over ten years. The 2000s experienced a boom in construction, stimulated by a strong expansion in residential demand. The building regulations on housing, a tool that should ensure quality standards, has become a limit to architectural research and it is one of the major impediments to the interpretation of new needs. Regarding European residential construction, in 2018 Anne Lacaton stated that: «However, today the residential architecture and layout of the units are not very different from those of the 60s and 70s. In my opinion, the public debate should focus on materials issue and on how to deal with a change in life of building in 50 years» (Mayoral Moratilla, 2018, p. 24).

Among the winning design experiments, especially in Northern Europe, we find cohousing as an innovative shared way of living (Lietaert, 2007; Nicol, 2012). In Italy, cohousing projects of public initiative do not find a clear regulation that can support and guide their implementation. The analysis carried out by the Department of Architecture of Florence[4] in 2013 highlights that 57% of cohousing projects in Italy reuse existing buildings: an innovative model of public-private partnership and an effective instrument of urban regeneration through the reuse of public real estate (Bellini et alii, 2015).

An example of a mere technical regulation with predictable poor results is the Rooftop Housing by Studio Albori in Milan (Fig. 1). Encouraged by the regional law for the recovery of roofs for residential use, they built new apartments with a contemporary visual language such as the elevations of two municipal residential towers of the 80s. The implementation phase encounters several difficulties that the municipality itself had to remedy, negatively affecting the final architectural result and the objectives set by the intervention programme. Redevelopment projects of buildings in residential districts, worthy of the Mies van der Rohe Award in 2017 and 2019 respectively, are the Cité du Grand Parc by Anne Lacaton & Jean-Philippe Vassal and Frédéric Druot built in Bordeaux in 2016 (Fig. 2) and the Kleiburg Deflat by NL Architects and XVW Architectuur built in Amsterdam in 2016 (Fig. 3). In the case of Kleiburg, the prize was awarded for the first time to a redevelopment project, demonstrating the relevance and potential of the topic of the recovery of residential heritage.

Besides the change of Europe's political borders, in 2019 Collective Architecture recovered the Woodside Multi Storey Flats in Glasgow, 3 public residential towers of 22 storeys, each built in the 60s (Fig. 4). After an initial social analysis, the strong sense of community encouraged the Administration to abandon the initial demolition project. The intervention takes the lead in the United Kingdom for the energy performances achieved above the British regulatory standards, proving to be at the forefront

Fig. 3 | Kleiburg DeFlat after the retrofit, by NL Architects e XVW Architectuur, Amsterdam (credit: NL Architects, 2016).

Fig. 4 | Woodside Multi Storey Flats after the retrofit, by Collective Architecture, Glasgow (credit: Collective Architecture, 2019).

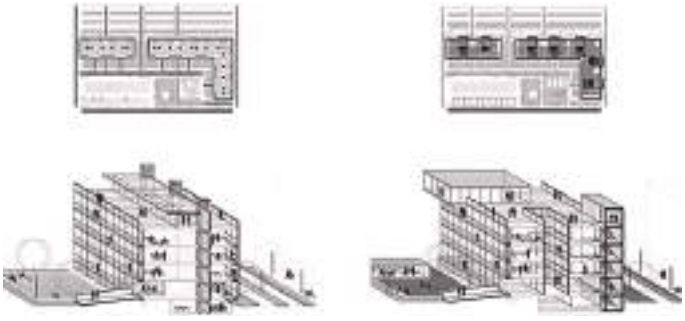


Fig. 5 | Soft retrofit on the left and medium retrofit on the right, Casale Caletto (source: S. Paris and R. Bianchi, 2018).

at international level. As in the case of Collective Architecture, sensitivity to the current environmental crisis (Flora and Dye 2015) and the experience of such projects can give an impulse to professionals to set a research team on sustainable design within the structure (Collective Energy).

Complex contexts such as these stimulate the project towards innovation, making clear the need for an interscalar and interdisciplinary experimentation support which can be found in Universities. For instance, Renzo Piano affirmed his confidence in university experimentation by choosing young students from various Italian University Institutes (Pellizzari, 2020, p. 10). Among the points of the G124 philosophy, there is also the commitment to obtain European funding through strategies that involve university research and public administration. Thanks to this, it was possible to develop the research funded by the Tuscany Region and commissioned by Publicasa to the Department of Architecture of the University of Florence, titled Tools and Methods for the Supply of New Social Housing Models in the Context of Processes of Valorisation of Public Real Estate Assets, to provide new social housing models and energy saving techniques through project outcomes of Cohousing in Rete[5] workshop. Leoncini, director of Publicasa S.p.A., highlights how this collaboration allowed the public structures to be at the forefront, becoming a support to innovations and to the raising of quality standards (Bellini, De Santis and Macchi, 2014, p. 5). The collaboration between university research and public administration planning is central to the methodology followed for project experimentations (Barberis and Cattaneo, 2019). The outcome of the research was presented in 2015 as part of international study days organised by the Department of Architecture of the University of Naples (Acampora et alii, 2015). The aim is to allow municipalities to meet the needs of social categories that are not fulfilled in the current public housing heritage, through tools and methods of design support that can interpret the present creating a new logic of living (Acampora et alii, 2015).

Paris and Bianchi (2018) carry out research activities on existing public residential housing, defined as ‘experiments’ to verify the possibility of operating following an innovative idea of the living culture, addressed to the managers of the public residential patrimony. Among their case of studies, the complex in the medium-density district of Casale Caletto in Rome and the complex of intensive economic and popular building in Le Vele district of Latina, both made in the 80s, are emblematic. The adopted experimental procedure demonstrates how energy-environmental sustainability of buildings can become effective only if combined with economic and social one. In this sense, local authorities, associations and citizens were involved in figuring out what were the social disadvantages related to the degradation of buildings as well. They have defined an abacus of interventions of ‘soft’ and ‘medium’ retrofit (Fig. 5) with different degrees of impact on buildings and citizens based on the economic availability of the managing institution. In terms of energy, technological solutions have been catalogued according to different level of resources used for their realisa-

Fig. 6 | Senator Renzo Piano's room G124, tutor and young architects of the G124 group, Rome (credit: C. Morelli, 2014).

tion to ensure the internal comfort of the building. Experimentations are currently being carried out in agreement with the public institution.

Project experimentation can take different forms, from field research to reflections in the University circle, to the 'artisan' work as that of Renzo Piano in his room in the Senate (Fig. 6). Although the actions of G124 have often been translated into real DIY laboratories, in many cases the young architects and students involved in the project team have not been attached to the present but have left ideas for the future. In Padua, the students divided the project in three phases that corresponds to the growing scale of work and the increasing number of participants involved. The last phase concerns an architectural project experimentation and an urban strategy, based on a feasibility study for the introduction of various functions oh the neighbourhood to be inserted around a new town square. The experience shows the lack of foresight of the Institutions towards a design experimentation that lays the foundations for a future optimal planning instead (Pellizzari, 2020, pp. 70, 71). Given the complexity of urban and design issues of built heritage, an interdisciplinary approach is necessary as well as the tangible cooperation between public administration and research, especially in a European vision. Therefore, these processes can give an impulse to the participation for the new Horizon Europe 2021-2027 competitions in order to provide wealth to the citizens in a sustainable vision for the future of cities and environment.

Recycling for the care of living | In recent years the increasing quantity and reliability of data on global damage, produced by modern science, has been pointed out to politicians by the new generation[6] and cultural[7] environmental movements. On the one hand, the urgency, where accelerations and stalls accompany this transition that invests reasoning on science and political forms (Campanella and Gagliasso 2020, p. 19), on the other hand, the strategic choices that descend from a cultural discontinuity still in progress that highlights the distortion between the magnetic attraction exerted at all levels by the topic of environmental sustainability and the poor results achieved until now. In order to make some progress, we need sustainability perspectives that require non-standard scientific and political reasoning, prediction of possible scenarios,

restoring quality, making them more sustainable, less energy-intensive and less polluted with processes and tools that allow us to deal with the global crisis by making 'more with less' (Berni and Boeri, 2012). Anne Lacaton suggested that the idea is not to do less, but rather to establish a hierarchy and do more; that is why working on existing conditions is another parameter we consider; less material means less risk of degradation; we aim to minimise the structure and partitions, allowing people to add refinements at the end of the process (Mayoral Moratilla, 2018).

For this reason, besides identifying criticality and possibilities to define new punctual and urban strategies for recycling, the participation of the University in the analysis phases of the areas generates a widening in the debate and new reflections for public administrations (Regione Toscana, 2019). In fact, The University can provide overall proposals for a true integration of areas that have shown potential for new models and new qualities of use. In the current practice of public housing managers, it is possible to record a progressive introduction of decisional support tools and virtuous practices in the intervention on the built. These suggest possible directions of research aimed at greater efficiency in the planning of redevelopment activities of the public housing stock. Thanks to the conscious use of technology in research, the proposals follow different perspectives on recycling issue; they materialise according to the design keys of the selective conservation of existing heritage, of its adaptation and volumetric and functional increase, of its environmental and physical sustainability, so that historical stratification and progressive innovation find the most appropriate ways to conciliation and expression.

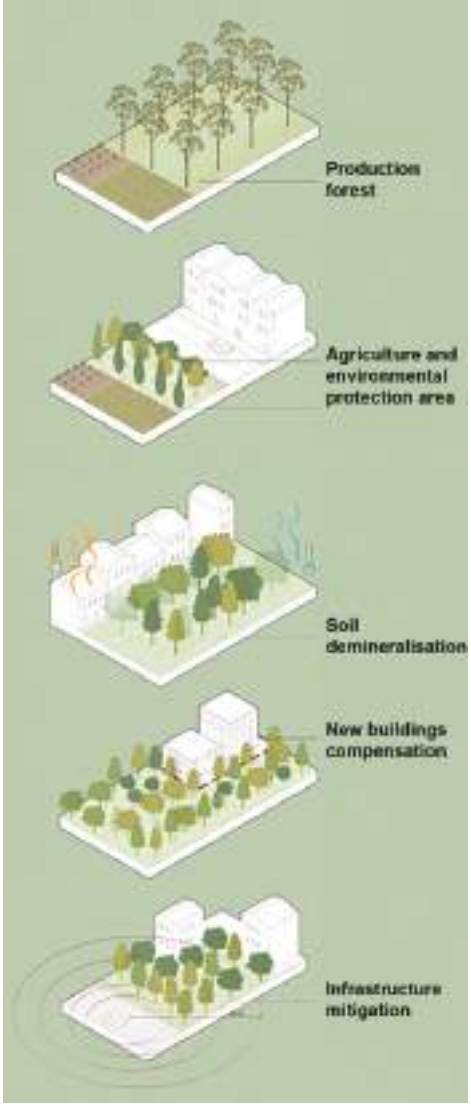
Circular city roadmap: the city of Prato | The research finds its area of experimentation in the city of Prato and in the enlightened vision of its administration that pays attention to the issues of sustainability and the consequent future vision for its citizens. The identity of the City of Prato, since medieval times, has been shaped by its industrial vocation, but it is in the nineteenth century that the city is transformed due to an important industrial development, which still makes it one of the most important textile districts at European level. Giacomo Becattini (2015) highlights the value of the place of industrial districts such Prato. The consciousness of places also depends heavily on good administration of the urban territory and it can be threatened by capitalist penetrations that generates monotony and homologation in the industrial districts (Becattini, 2015). The demographic and economic growth of the Second World War has been characterised by a substantial immigration from southern Italy that doubled the resident population. This process has accelerated the birth of a social mixité that lasts (with a prevalent immigration from China) and a great urban growth in various directions.

Since 2013, the Prato Administration has been engaged in the organic reinterpretation of the urban fabric, complex and full of overlaps between productive and residential fabric. A programmatic work on some instruments and related interventions (partly in the phase of realisation[8]), which inserts Prato into the European network of circu-

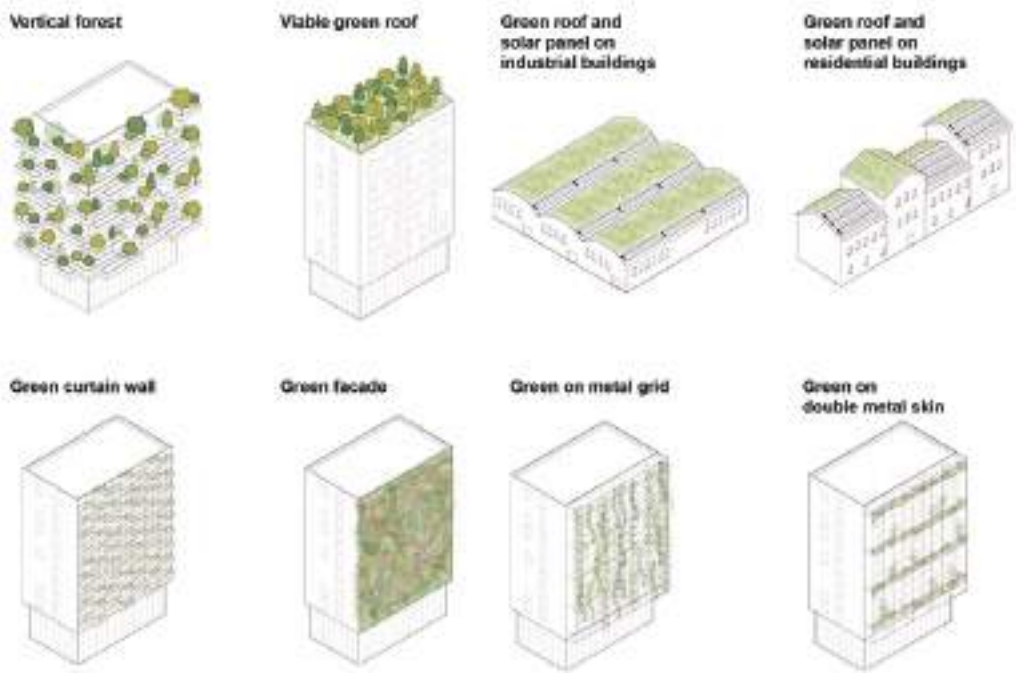
Fig. 7 | 'Green Prato – Urban experimentation between ecology and reuse', Luigi Pecci Center, Prato (credit: Prato Municipality, 2019).

lar cities[9] that are committed to driving the circular transition of cities, improving human wealth, and reducing emissions (Urban Agenda for the EU, 2020). The strategic framework of the Operational Plan produces an overall urban vision of the city starting from the identification of the strategic role that Prato plays in the regional and large metropolitan area. The general framework identifies the strategic issues on which the policies of governance of the territory and the choices of urban nature were directed: reuse, practices of re-cycling; Prato as City of Manufacture of the 21st century, alongside the textile-fashion district, where further supply chains have been developed, representing as many strategic sectors for the territory, in particular the ICT and agri-food and food sectors; major projects and strategic areas, urban innovation projects for the creation of Prato Brand; a new House Plan and the interaction between urban and welfare policies; environmental, agro-environmental and ecological issues, control and generative matrix for both morphological and functional recovery of the settlement system, adapted to face the pressing challenges posed by economic transition and climate change; the public space, in the logic of promoting an idea of Public City open and citizen-friendly (Barberis and Cattaneo, 2019).

In 2016, within the program Prato al Futuro, the Administration launched a virtuous path of communication and participation to guide the drafting of the new Operational Plan. A dense program of moments and places, physical and virtual, where to meet citizens, associations, professionals, entrepreneurs, and share the general vision of a social, cultural and economic development of the city of Prato. The aim is to carry out actions



Figg. 8, 9 | Prato Municipality, Operational Plan: Toolkit of buildings' interventions; Toolkit of actions (credits: Prato Municipality, 2013).



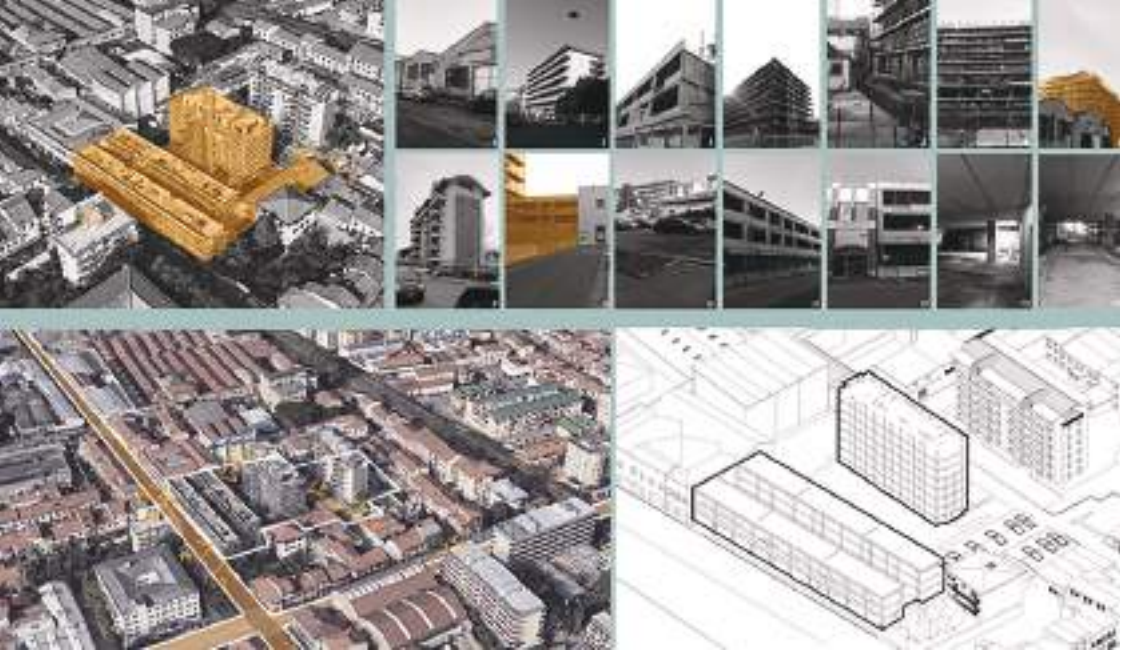


Fig. 10 | Ex-Valore Area in Prato: current state (credit: A. Kuzniatsova, 2019).

through shared governance models that facilitate the relationship between supply and demand. The Operational Plan for Prato aims at recovery and circular economy as an engine of change, using tools and processes that propose a cultural review of the old urban planning based on the concept of mono-disciplinary rationalist matrix. An urbanism that breaks the old patterns to forge new relationships with sociology, architecture, sustainability, art and economy, aiming at a two-dimensional management of the territory to become culture of the city (Donati, 2019). Consistent with this new cultural vision, the urban tool is displayed in an exhibition at the Luigi Pecci Contemporary Art Centre titled Verde Prato – Sperimentazioni Urbane tra Ecologia e Riuso, proposing three focuses of the Plan: Ecology, Re-use and Going Public (Fig. 7).

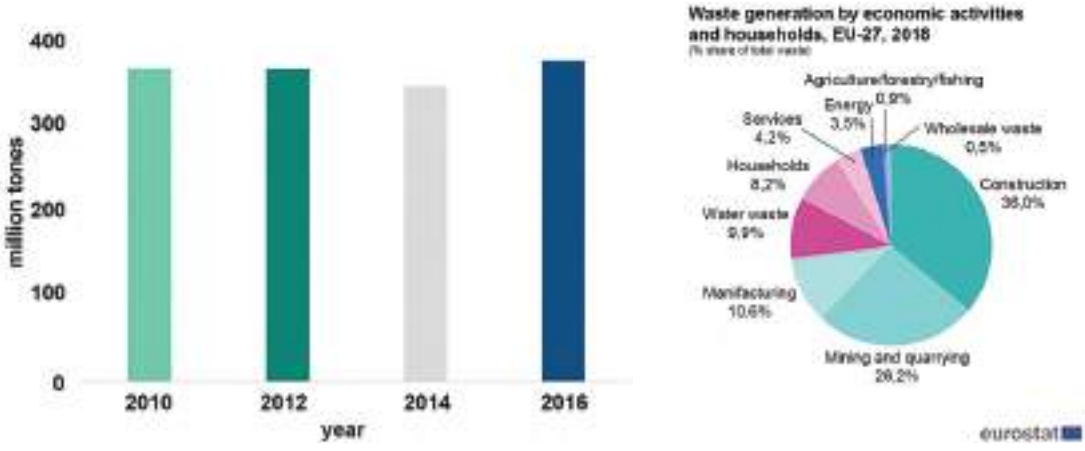
Since 2019, the Operational Plan has acquired its definitive effectiveness as a new municipal urban tool, proposing actions both in public and private sector. The premises of the Plan, to contribute to a healthy and resilient city thanks to the Nature-Based Solutions in architecture, have been realised in the launch of the project Prato Urban Jungle in July 2020. A co-design project on 3 pilot areas for sustainable and inclusive development, realised by the City of Prato with European funds of Urban Innovative Actions, involving Stefano Boeri Architetti Studio and the botanist Stefano Mancuso of the University of Florence. The Prato Operational Plan is characterised by its being an exportable model of new planning, rooted in the most advanced urban metabolism (Cattaneo, 2019, p. 119) which can be summarized as follows: ability to overturn the anachronistic logic of urban development regulations; strengthening of the implicit vocation of avant-garde manufacturing; experimentation of a new ecological, resilient and dynamic urban shape, based on the promotion of the natural component within the city.

In this context, bearer of a new cultural vision and an urban model for smart cities, lays the experimentation of the present research, aiming at defining recurrent criticali-

ties and models of participation compatible with new processes and instruments of urban regeneration. The methodology applied to case studies anticipates design solutions in accordance with the trends analysed in the international panorama, in order to verify and suggest applicative perspectives to the Municipality of Prato: intervention strategies for the reduction of soil consumption through densification and valorisation models of existing buildings; regeneration of the urban fabric through the encouragement of functional mixité able to start new social and economic activities associated with living; improvement of the energy performance through actions of requalification of the building envelope and systems engineering; increase of the permeability of the soil through interventions of volumetric equalisation and Nature-Based Solutions (Figg. 8, 9).[10]

The methodology shows a systemic approach based on the awareness that environmental and energy sustainability can take place only if integrated with economic and social sustainability. The implementation of the experiments implied an in-depth analysis phase, in agreement with the technical offices of the Municipality, with the Public Estate Management Board and the citizens, to become aware of the social difficulties associated with the conditions of urban degradation and the state of maintenance of buildings. The consistency of the building and the levels of degradation were acquired starting from the digitisation of the original design materials and, through inspections, it was possible to proceed to a precise check on the state of deterioration together with the outdoor spaces, strictly linked to the effects of urban and social degradation.

The research is still in the process, so we can only talk about expected results in the context of ongoing intervention programmes[11]. The application of experimentation on several case studies, agreed through actions planned resulting from the Protocollo



Figg. 11, 12 | Generation of construction and demolition waste 2010-2016; Waste generation by economic activities and households 2018 (source: Eurostat, 2019).

Figg. 13, 14 | Design experimentation for the Ex-valore Area in Prato, Macrolotto 0 (credit: G. Brullo, S. Contino and L. Da Rold, 2014; A. Mengana, I. Pieri and A. Venturoli, 2018).

d'Intesa Laboratorio Prato, signed between the Department of Architecture of the University of Florence and the Municipality of Prato, is a useful operational tool for the Administration to access funding programmes and to promote public-private partnership processes. The Memorandum of Understanding also involves the European Policy Office for projects such as Horizon 2020 on sustainable mobility, smart cities and reuse policies: through the University, the Municipality of Prato can apply for substantial contributions at national and European level (Urban Agenda for the EU, 2020). The shared needs of research and training with an interdisciplinary approach gave birth to the Città di Prato University Centre, where research and training projects are carried out, showing how it is possible to open the academic world to a productive relationship with economic and cultural heritage of local society.

Recycling the unfinished: Macrolotto 0 | The case study is in a district of Prato called Macrolotto 0, renamed as the Prato Chinatown, just behind the ancient city walls. An area of about 44 hectares, without any public space, which the City Council has been paying attention to for a long time, proposing measures to improve social and economic cohesion, but without sacrificing the value of multi-ethnic contamination and the innovative charge of functional mixité. The City Council member Valerio Barberis believes that cities are attractive places for opportunities that open up to innovation, economy and research, but they are also fragile places where poverty, social segregation, the effects of climate change and pollution arise (Franzoia, 2019). Barberis himself had the foresight to address the Department of Architecture of the University of Florence, explaining the need for support from the academic world to the public administration. The required design experiments, necessary before intervening in such a complex context, have attracted European attention by obtaining the honourable mention in the category of developing projects for the retrofitting of cities with over 50,001 inhabitants in 2019 (CESBA, 2019).

In the 60s and 70s this area, structured as a city-factory, was one of the productive engines of the Textile Industrial District, where productive activities and housing coexisted but over time the productive buildings have been abandoned and it has been made a sporadic and random reuse with rare examples of a respectful regeneration of local values and with many speculative interventions. It was Bernardo Secchi in mid-90s who coined the term Macrolotto 0, during the drafting of the PRG (General Town Development Plan) for the Municipality of Prato, with the aim of defining a paradigmatic urban fabric for the genesis and development of the Prato textile industry in the post-war period. The mixité of Prato is one of the places where you can better understand the physical and economic characterisation and the urban fabric that it generated. Secchi understood that it was time to abandon the concept of zoning to apply the concept of network instead to create new and transversal links in the growth of the city, creating a set of productive, residential, commercial, infrastructural and leisure activities in a continuous and virtuous mix. A PRG at times 'visionary', disregarded

Fig. 15 | Macrolotto 1 before the intervention and after (credit: Prato Municipality, 2013).

by the successive political management, responsible for an exponential and careless growth of new productive areas with the consequent abandon of the old district.

Nowadays Macrolotto 0 is one of the main urban areas in Europe for concentration of migrant families with Chinese origin[12]. Despite its relatively central location, the district presents the typical features of suburban areas (Fishman, 1987): building and urban degradation, lack of public spaces, lack of services to the person, streets without background and other physical barriers (to the north the railway station, crossed by few narrow underpasses, to the west the ring road and the San Paolo district).

The case study is one of the results of the widespread speculative substitution: the ex-Valore area (Fig. 10), which bears in its name the irony of its fate. Two skeletons in reinforced concrete that stand out with their grandeur of unfinished work on Via Filzi, the main road in the neighbourhood. The area, with its strategic position at the entrance of the district and strictly connected to the city centre, is also one of the most strident faces of housing speculation and real estate stagnation in the city: one of the many interventions of building replacement that have taken over during the years, increasing the process of architectural disqualification and urban degradation. After the acquisition of the existing factory in 2008 by Società Valore S.p.A., a project is developed for the creation of 3 new buildings: two buildings in the line, six storeys high for residential use and a building with a gallery, three storeys high, for commercial use. In 2010, the old factory was demolished and works on the new construction site began. After various vicissitudes, one of the two residential buildings and a portion of the commercial building was completed, leaving more than 50% of the planned work in the form of a structural skeleton, including two underground parking levels. The intervention has a poor architectural value and a bad constructive and spatial organisation due to superficial design and planning. The total abandonment of the area has led over the years to an abusive occupation of the building site, with the consequent degradation of the near area.

At the time of birth, unfinished works are already considered as waste. Marc Augé (2004) argues that new modernity has no longer time to build history but only removable rubble to make way for reconstruction. Architectural skeletons in which the interruption of the construction process has determined a condition of unfinished with the

dominant presence of the structural frame. The Italian landscape and beyond is full of buildings wrecks[13], evidence of a market economy often wicked and careless that affects the degradation of cities and landscapes. In these cases, the skeletons are made of materials, such as reinforced concrete and steel, difficult to recycle (Cao and Romagni, 2016, p. 11). In 2016, approximately 374 million tonnes of construction and demolition waste were produced: the largest waste stream in the EU in terms of weight (Fig. 11). In the survey updated to 2018[14], the waste produced for construction and demolition is a real burden in the field of special waste produced in Europe (Fig. 12).

According to the Action Plan for Circular Economy[15], construction and demolition are defined as priority areas by the European Union, while the recent Waste Directive Framework set a target for recovery of 70% by 2020. «The major obstacles to circular economy concepts are economic ones, due to the lack of demand for recovered waste» (Wahlstrom et alii, 2020, p. 45). If we start from the consideration of rejection, intrinsic in the essence of unfinished works, then we need to think of an even more serious criticality, as associated with an unhealthy consumption of resources with an interrupted life cycle that can only burden further the size of the ecological footprint. A common factor to overcome many of these challenges is the role of the client, but «[…] while research has been carried out on the role of clients to improve the results of economic and sustainability projects, there were fewer in the circular economy field» (Adams et alii, 2017, p. 119).

The applied design experimentation addresses the most advanced suggestions and reflections on the circular economy, in the idea of transforming traditional production-consumption-disposal processes into strategies to reuse, repair, renew and recycle, not only on the scale of the product and material, but especially for the unfinished works, to replan the very essence of the urban fabric and turn what is normally considered as waste into a resource (Figg. 13, 14). Unfortunately, in most cases, we are used to deal with the problem of the skeletons of unfinished works only from the point of view of the emergency and not of the project. This study, therefore, emphasises the importance of recycling by focusing on the waste and, in this specific case, the unfinished work as a resource and starting point for a responsible project to reuse. The analysis phase was carried out with a sequence of activities that, from investigations and cognitive analysis of the morphological, typological, and technological characteristics of the artefact, has led to the development of design and construction strategies of intervention that offer themselves as models to take out the inherent potential of the unfinished work.

Starting from the critical issues that emerged, design solutions have been selected to create a new pedestrian permeability, add value to the plant-related component in open spaces, propose residential types according to new housing needs with low-cost smart solutions, volumetric additions with dry technologies to create and give value to new functions and new opportunities for economic development of the district, exploit natural resources using solar technologies properly. The project as a safeguard tool,

which doesn't only concern the constructive or aesthetic aspect of a work, but also how it will feed itself once brought back to life. Consistent with the objectives of the Plan, some possible scenarios have been verified in order to reinterpret the unfinished work proposing the reuse of the abandoned building skeleton with hybrid spaces solutions to promote the social mixité and create new welcoming and innovative living spaces (Figg. 13, 14). The design experimentation is connected to a system of public interventions[16] – that have been carried out or still in progress – within the district aimed at promoting the satellite activities already existed for the construction of a new HUB of creativity. Project destinations generally consist of a functional mix, which associates residences, social services, co-working, crafts, and retail trade. The strategies developed by the new plan aim to give value the area of Macrolotto 0 as a creative district, encouraging the inclusion of cultural activities in the existing productive fabric, increasing the provision of services of the territory and the permeability of the blocks, often so dense as not to have uncovered surfaces.

Urban forestation for an eco-industrial district: Macrolotto 1 | The size of the factory city is a peculiarity that, in recent years, has not only changed the faces of the city but also that of the economic dynamics associated with the productive districts. In the economic frenzy of the 80s following the historical settlement of Macrolotto 0, at the edge of the city it was born the largest Italian private industrial parcelling called Macrolotto 1. A system that shows its functional fragility in a few years when the change of scene of productive and social economies turns the industrial area into a wholesale one for ready-to-wear Chinese fashion: today more and more traders from all over Europe come to Prato, choose the products and leave again on the same day (Galullo and Mincuzzi, 2019). The process of Chinese reindustrialisation in this productive district has made the value of its land rent soar dramatically.

Giulio Giovannoni analyses and describes the complexity of the phenomenon, using the Anglo-Saxon literature of urban economy of the 'hundred percent location'[17]: the suburban sheds cost twice as much as the houses in the centre (Giovannoni, 2019, p. 92). A transformation that characterises these fragments of cities as places of lively social life, overlapping land and demographic density and intensity of use. The post-industrial productive structures are therefore an important opportunity for the care of the city, as places with an economic, social and productive potential: in terms of recycling and strategies for smart cities, they are offered as new spaces for design experimentation able to reprogram typological corrections for more innovative practices for the fruition of the city.

For the new Operational Plan, the University has collaborated through international research and workshops[18], facing with a multiscale approach the category of areas that Maurizio Bradaschia (2003) defined as 'middle town', where new forms of urbanity take place. The analysis and in-depth interdisciplinary reflection conducted on this case study have favoured the process undertaken by the municipal administration to

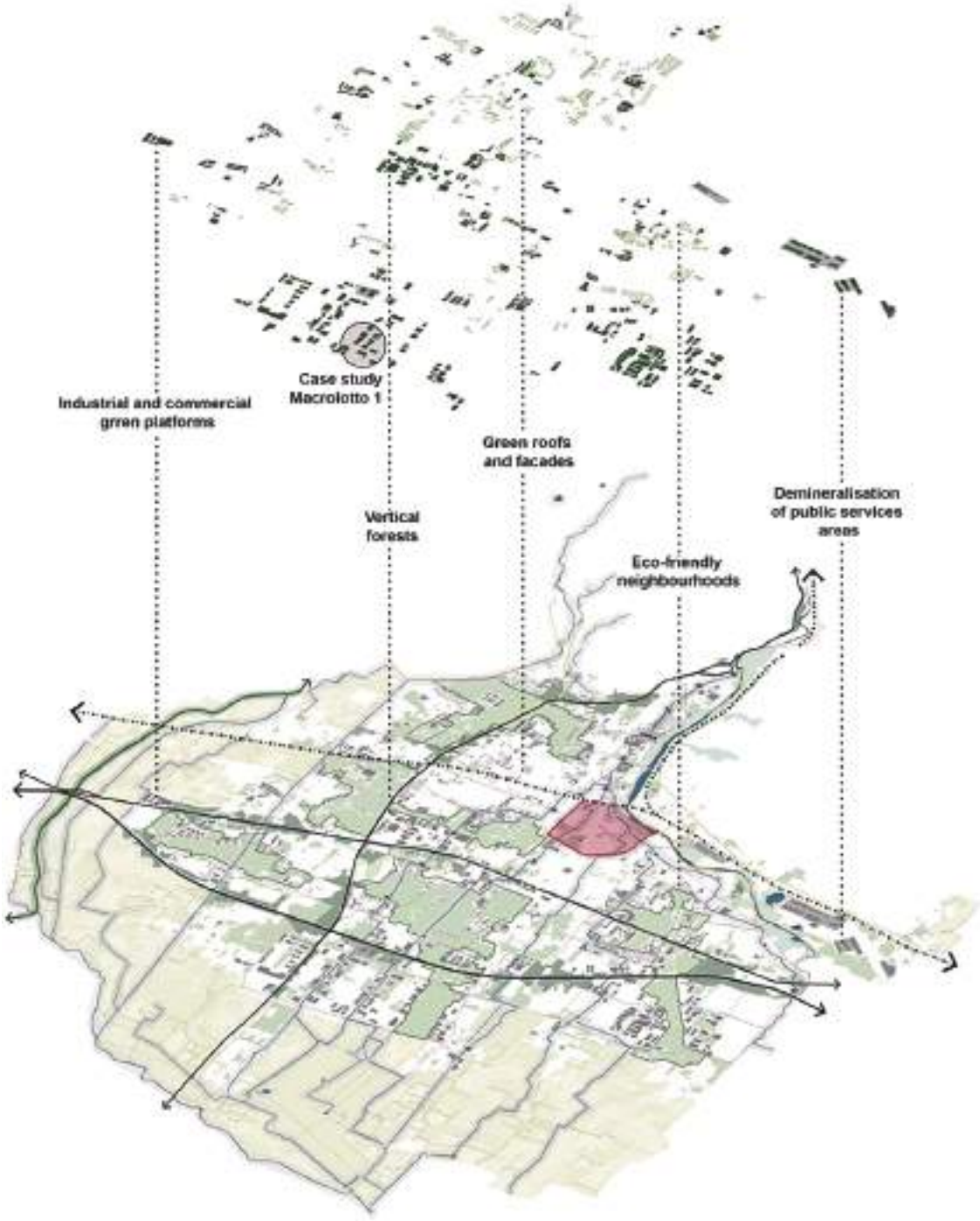


Fig. 16 | Operational Plan, urban forestation action plan, Prato (credit: Prato Municipality, 2013).

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Figg. 17, 18 | Design experimentation for Macrolotto 1, Prato (credits: Laboratorio di Architettura e Ambiente, 2019; F. Giovannini, R. Ilmer and M. Petrolini, 2019).

transform the new urban tools in an opportunity to broaden visions for future transformations by interpreting, on the one hand, the needs arising from economic and social inputs and, on the other hand, adapting them to the environmental one for a sustainable development. For this reason, the city of Prato has developed the Action Plan for Urban Forestation to address the new Operational Plan strategic guidelines and provide the city with a renewed environmental and contemporary quality. The increase of wooded areas, especially in areas with higher urbanisation rates, gives the city spaces and corridors of life capable of growing biodiversity through processes of re-naturalisation (Fig. 15) among which Macrolotto 1 becomes the role of sample area (Fig. 16) for urban demineralisation. These interventions are facilitated by the possibility of re-naturalising portions of land through the partial demolition of the sheds that increases the gross useful area by 40% distributing it in height up to 30 metres.

Incentives for such changes are granted as long as the new set-up provides for the application of Nature-Based Solutions on clear land surfaces and buildings, while the burdens deriving from these transformations will be reinvested in the environmental requalification of roads and public spaces, according to a general masterplan managed by the municipal administration. The case study then becomes an experimental platform of a new urbanity and a resulting new landscape, in which the need for a volumetric increase comes to reprogram the settlement from single to hybrid functional, validating the effectiveness of condensation processes with vertical development to propose innovation on forms of use, spaces, type-morphologies, fabric for a balanced and resilient urban density (Figg. 17, 18). In this context, the resilient city model assumes a restoring meaning that is coordinated with the speed of socioeconomic change; on one side, it encourages adaptation to climate change,

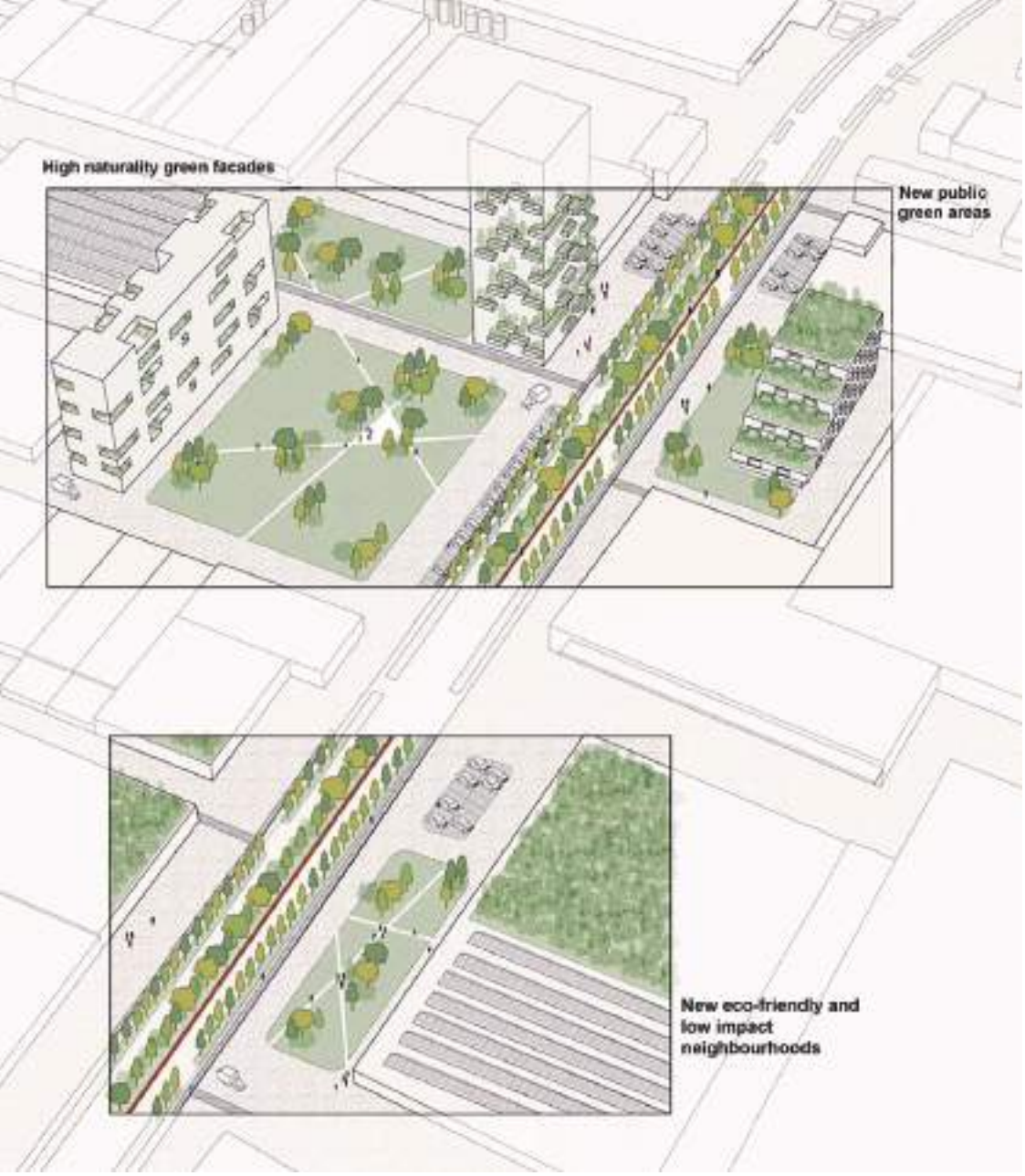

Fig. 19 | Operational Plan, actions for urban forestation, Prato (credit: Prato Municipality, 2013).

facing which cities are proving to be increasingly vulnerable, and on the other side, it promotes a better quality of life.

The applied design experimentation has addressed the problem from the urban scale of the neighbourhood to the detailed one identifying, with a 'per pixel' operation, a series of sample experiences to apply detailed design verifications that can facilitate the sharing of intent between public planning and private initiative. A punctual and widespread strategy of redevelopment proposals through functional mixité solu-

tions and innovative models to inhabit working and commercial spaces currently confined in places designed for production. All the proposals have a common aim: to subvert the state of the soil overturning the relationship between impermeable and permeable surfaces. The green system is the leitmotif of the new planning (Fig. 19): the new ecological net re-establishes the pedestrian connections between new interventions, bringing back quality and liveability to that disturbing and insecure scene of the present urban 'non-places' (Augé, 1993), dominated by a traffic circulation reserved only of trucks and cars.

In the design experimentation a general change of scene emerges, mainly determined by the process of humanisation on the urban fabric. Thus, factories become towns proposing a smart city model with solutions able to reduce the ecological footprint. The proposed compensatory measures aim to safeguard the connecting elements and to value public space in terms of accessibility, inclusion, architectural quality and perception. Working on the interfaces (exploiting the spaces between fences and industrial sheds) to define a new hierarchy of routes that encourages pedestrian and cycle mobility, enhancing the interstices and creating new exchanges and places of relationship. The demineralisation process applies not only to road sites and spaces between the lots, but especially in the buildings redevelopment projects that, through partial demolitions and additions, break the rigid planimetric scheme and the skyline of the area. This, with the use of Nature-Based Solutions and renewable energy resources, tends to reduce urban heat islands, drain the abundant rains with an organic and natural system, restore a healthy balance between urban landscape and natural environment and encourage energy efficiency.

The keywords of the design experiments are: 'interfaces', parts of the building (facades, coverings and roofs) which, although belonging to the private sphere, have direct consequences on public space; 'interstices', for an open space organisation aiming at creating a new collective green system in continuity with the city and the agro-food areas of the plain (with an intensification of greenery, urban furniture elements and materials essential to the perceptive urban quality increase); 'interconnections', for the creation of a network of sustainable mobility-oriented routes in continuity with existing cycle-pedestrian routes; 'interferences', for the realisation of activities to support the progressive specialisation of the area for marketing of textile products (showrooms, wholesale spaces), for catering, retail, temporary residences and accommodation. The material and construction details of new volumetry are designed, using dry technologies, for a program attentive to the life cycle of the building and the use of environmentally friendly materials. The technological solutions go from double skin solutions for vertical closures to the use of renewable sources for the energy needs of buildings, up to strategies for the collection and recycling of rainwater[19]. The comfort and quality of interior spaces are ensured by studies on natural light based on the orientation of the buildings. Besides, the presence of lodges and patios with selected plant species allows for a controlled lighting

throughout the year and contributes to cool down the temperature in the summer.

Final considerations and future developments | From analysis to planning, design experiments create visions to present ideas in a stimulating but simple way: the potential of buildings and areas is revealed by transmitting, at an emotional level understandable to all, the feelings that you would experience in a place if it were reinterpreted. These qualitative results are useful for administrations to innovate and integrate urban planning instruments and participate in European funding calls. From a financial point of view, measuring the feasibility of the intervention proposals will be the next step developed with the disciplinary contribution of the economic evaluation of the project. This type of analysis, since the project experimentation phase, can facilitate public administrations to propose attractive opportunities for public-private partnerships, aiming at promoting sustainable environmental and social action.

The intrinsic complexity on creating methods and standards for cooperation between scientific research and public administrations requires constant updating and innovation. The examples of collaboration here described have been actualised in fragile contexts at urban, technological and social levels. The success of such interventions, the approach to design, the theoretical and empirical research can be the basis for articulating and structuring a methodology for similar actions in Italy and Europe.

Notes

1) The Italian Ministry for Ecological Transition is the government authority responsible for the implementation of environmental policy (D.L. 22/2021). It used to be called Ministry for the Environment, Land and Sea Protection which was born in 1986 (Ministero della Transizione Ecologica). [Online] Available at: minambiente.it/pagina/competenze [Accessed 20 January 2021].

2) «A solution can be defined as purely technical when the modifications it requires do not leave the field of natural sciences and therefore do not commit to a negligible extent the moral resources or the system of values that inspires the action of man» (Hardin, 1968, p. 1243).

3) Programmi Complessi become operational at national level thanks to Italian Law 179/92 on Programmi Integrati and Programmi di Riqualificazione Urbana, law 493/93 on Programmi di Recupero Urbano and invitation for tender in 1998 for Contratti di Quartiere, reconfirmed with a second programme in 2002, promoted by the Ministry in the field of urban recovery following the acknowledged inadequacy of many urban areas for lack of infrastructure and reduced urban quality.

4) Tools and Methods for the New Social Housing Models Offer in the Process of Valorisation of Public Real Estate, Research of the Department of Architecture of the University of Florence for Publicasa S.p.A., Financing Tuscany Region, Integrated Development Project 5.2 – Abitare Sociale in Toscana, April 2013.

5) An experience that saw the involvement of a group of teachers, assisted by researchers and external experts, as part of the activities of the Laboratory of Technological and Environmental Design of the School of Architecture in Florence. The workshop deals with the relationship between innovation, creativity and project, supporting the concrete possibility supporting the concrete possibility of increasing and promoting the integration of experiences between academic research and public entities.

6) The Swedish activist Greta Thunberg was counted among the ten most influential people in science in 2019 by the magazine Nature (Schiemeier, 2019).

7) Climate Clock by Gan Golan and Andrew Boyd, an itinerant environmental installation that marks years, months and days before Earth reaches the point of no return. Exhibited in 2019 in Berlin, 2020 in New York, 2021 in Paris.

8) Since 2014 there have been several instruments and funding in synergy, activated on urban transformations of the city of Prato: DUP (Single Programming Document), PAES (Sustainable Energy Action Plan), PUMS (Urban Plan for Sustainable Mobility), PIU (Urban Innovation Project), PRIUS (Extraordinary Programme for Urban Regeneration and Suburban Security, DPCM 25 May 2016), URBES ISTAT Report, Immigration Guidelines, Digital Agenda, Smart City Plan, Project 100 Squares.

9) The Declaration on European Circular Cities was officially launched at the 9th European Conference on Cities and Sustainable Cities, Mannheim 01/10/2020 (Circular Cities Declaration, 2020). [Online] Available at: circularcitiesdeclaration.eu/cities/prato [Accessed 20 January 2021].

10) The European Commission defines Nature-Based Solutions: «Solutions inspired and supported by nature, which are cost-effective, provide environmental, social and economic benefits at the same time, and contribute to building resilience. These solutions bring, in a more diversified way, nature and natural characteristics in cities, territories and marine landscapes, through locally adapted interventions, efficient in terms of resources and systems» (European Commission, 2021). [Online] Available at: ec.europa.eu/info/research-and-innovation/ [Accessed 20 January 2021].

11) The first results of the research (still in progress) have been used to participate in the invitation to tender called National Innovative Program for the Quality of Living, in cooperation with the Municipality of Prato (art. 1, paragraphs 437 and following, Italian Law n. 160 of 27/12/2019 – Currently under evaluation – May 2021).

12) The foreign resident population represents the 21.72% of the total residents. The Chinese community is the main foreign community of the city and one of the fourth largest in Europe (Municipality of Prato, 31/12/2019).

13) In Italy in 2019, 546 unfinished building works were registered only for public works sector of national interest (Ministry of Infrastructure, 2019).

14) Waste Generation 2018 data are provided by Eurostat. [Online] Available at: ec.europa.eu/eurostat/statistics-explained/index.php?title=Waste_statistics [Accessed 20 January 2021].

15) The ETC/WMGE report provides a detailed analysis underlying the AEA briefing on Construction and Demolition Waste - Challenges and Opportunities in a Circular Economy, 13 January 2020 (Agenzia Europea per l'Ambiente, 2020). [Online] Available at: eionet.europa.eu/etcs/etc-wmge/products/etc-reports/ [Accessed 20 January 2021].

16) Public projects financed still in progress: Covered Market Macrolotto 0, third pilot area of the Prato Urban Jungle Project with European funding from Urban Innovative Actions; PIU Prato Media-Library Bar, Coworking and Piazza and PLAYGROUND PIU with funding POR FERS 2014-2020 – Urban Innovation Project (PIU).

17) Location with the highest exposition to market customers, higher sales, and/or the highest values of land and rents (American Marketing Association Dictionary). [Online] Available at: marketing-dictionary.org/o/one-hundred-percent-location/ [Accessed 20 January 2021].

18) The Intermediate City – Towards a New Urbanity is the title of the international design workshop held in Florence, promoted by the DIDA of the University of Florence together with DPA ETSAM, Universidad Politécnica de Madrid and in collaboration with the Municipality of Prato and the support of Conser S.c.c.p.a., 2-7 October 2017.

19) As part of the strategies for energy and environmental improvement (APEA Protocol – Ecologically Equipped Production Areas) the district of Macrolotto 1 is provided with a water recycling

centralized system: the production of recycled water from civic and industrial wastewater is distributed through a 12-km-long industrial aqueduct and it is used as fire defence, in textile production cycle, in cooling towers and toilets services of the district.

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REVERSIBLE DESIGN IN THE REUSE OF EXISTING BUILDINGS
Experiments on public housing districts in Rome

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ABSTRACT
European policies are increasingly driving the redevelopment of existing assets within the construction sector. The aim is to boost material and non-material resource efficiency while promoting circularity as well decarbonising. This contribution sees the refurbishment of existing buildings as providing a strategic opportunity to combine design for disassembly and reuse (at the building, system, component and material level) with a 'life cycle' approach. A 'circular' and 'reversible' analytical and design methodology is theoretically defined and verified. This is done by applying this methodology to concrete cases (public housing – ERP – districts in Rome) of funded research and using a set of indicators to quantify the achieved level of effectiveness. This effort reveals original perspectives on how the application of Reversible Building Design to existing buildings can be transferred to the national context.

KEYWORDS
material resource efficiency, design for deconstruction, up-cycling, reversible building design, reuse

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The scope of activity in the construction sector has entirely changed since 2016, shifting from an emphasis on new construction to redeveloping existing assets. The Italian construction market also transformed between 2008 and 2018. Ordinary and extraordinary maintenance carried out on existing structures increased from 56% to 73.6% of all activity (Camera dei Deputati and CRESME, 2019). There has thus been a patent need to integrate examples linked to this kind of transformation with the urgent call to reduce land and resource consumption and use. This, in turn, has affirmed an 'eco-logic' based on the 3 Rs (Reduce-Reuse-Recycle) which is capable of bringing about a new type of virtuous cycle (Life Cycle Redesign). This new logic sees the process of superimposing or creating 'new elements that grow from within (around, below or above)' existing structures as the most sustainable types of design activity.

The built environment offers enormous potential for increasing material and non-material resource efficiency and this is now recognized at the EU level (European Commission, 2014). Life cycle and circularity concepts also support the wider objective of decarbonising and have implications for material resource efficiency. These concepts will be key drivers in building renovation looking towards 2030 and 2050 under the EU Renovation Wave strategy (European Commission, 2020). The goal is to move the construction sector towards an up-cycling approach to the built environment. This, in turn, will reflect the best possible links between resource use, energy efficiency and quality of living.

The international debate | Debate within the current technological culture surrounding this research has focused on 'adaptive reuse' (Wong, 2016), which is viewed as a key strategy for enhancing existing structures. This approach springs from and is based on a multidisciplinary knowledge of the built environment which drives continuous experimentation in terms of grafting, adding and layering. Within contemporary theory and practice, adaptive reuse – also referred to as 'remodeling', 'retrofitting', 'conversion', 'adaptation', 'reworking', 'rehabilitation' or 'restructuring' – means that «[...] the function is the most obvious change, but other alterations may be made to the building itself such as the circulation route, the orientation, the relationships between spaces; additions may be built and other areas may be demolished» (Plevoets and Van Cleempoel, 2011, p. 155). The Plus method, derived from Druot + Lacaton & Vassal's experience in France and applying the Open Building approach, sees a building as potentially flexible, extendable and transformable. This approach is achieved by using dry stratified construction methods and on-demand additive prefabrication. The technical and operational frame of reference is clear. The goal is to ensure functional independence as well as assembly and disassembly (as used in superelevations, add-ons or adaptive, reversible and independent exoskeletons).

From an adaptive perspective, it is therefore possible to outline three levels of intervention with regard to existing structures. Firstly, there is light renovation which involves minimal superficial actions aimed primarily at solving energy-related issues.

Fig. 1 | The Resource Rows housing complex in Ørestad (DK), designed by Lendager Arkitekter (2015-2019), features reused wall facings on the building envelope; these were cut from the walls of an unused industrial building and consist of prefabricated, framed, multilayer panels (credit: Lendager Architekter, 2019).

This can be done by enhancing casing performance (e.g. thermal and acoustic improvement) or with facade restyling. The later may be executed through replacement, substituting obsolete elements (e.g. adding a new skin or re-cladding) and wrapping or encapsulating a surface with a second skin (over-cladding).

A second level of intervention involves various degrees of activity (including medium and deep renovation or high-level renovation as in the Netherlands, e.g. the NPR – National Prjis Renovatie). These kinds of intervention efforts involve extensively transforming buildings and addressing everything from the functional distribution of space to partial micro-demolition, functional unit transformation and distribution schemes (in terms of access, common functions and so on). It may also include increasing building volumes with add ins/ons (e.g. winter gardens, solar greenhouses or enclosed loggias linked to the facade; superelevations linked to coverings; new, contiguous, connected structures linked to the existing building). Thirdly, extreme-level interventions involve extreme make-overs or stripping activity executed via replacement, dismantling or deconstruction.

Such interventions aim to reuse existing building components to the utmost, restore original project functions and maintain any associated micro-climatic behaviours in order to create more efficient living spaces. Efforts have been made along the same lines to reduce the use of raw materials within the construction sector. This has been done by implementing strategies that make it possible to 'close off' waste material flows. In fact, construction sector waste accounts for 25% to 30% of all waste generated in the EU, making it essential to step up the use of primary and secondary material sources. At present, only 12% of construction materials come from secondary sources while the building sector overall accounts for 50% of all materials used at the Community level (ECESP, 2020).

Three factors prove critical, therefore, to ensuring material resource efficiency in the construction sector. From an 'urban mine' perspective, one issue is the need to accurately quantify the local-level availability of recycled component materials. In this context, materials coming from both construction and other industrial-sector production chains come into play. This information is also essential for planning material procurement within the sector, effectively integrating multiple sources and making the most of secondary sources. With this in mind, the REBUILD Project – REgenerative BUILDings and products for a circular economy (Ajayabi et alii, 2019), coordinated by Exeter University, is a relevant example of recent research in this area. This project set out to quantify the material stocks incorporated into existing buildings in urban areas which could be exploited via circular actions (e.g. reuse of the building or selective demolition aimed at component reuse and material recycling). The design outcomes of such processes have generated solid results in the context of other long-term investigations in this area. Lendager Architekter, for example, have considered producing standardised (potentially industrialisable) facade components with recycled wall facings (Fig. 1). Some researches have alternatively focused on mapping industrial-waste mate-

rial resources for use in architecture (van Hinte, Peeren and Jongert, 2007). Others have integrated this effort with quantifying available material stocks that could be incorporated into the built environment (Baiani and Altamura, 2019).

Secondly, specific tools aimed at identifying and maximising the potential of selective demolition processes, such as pre-demolition audits, have also proved indispensable and strategically important and are now backed up by specific Guidelines established by the European Commission (2018). Based on the methodologies developed, these kinds of audits can further eco-effective management of waste materials (Altamura, 2015).

Implementing targeted strategies into technological efforts has proved a third critical factor needed to maximise material resource efficiency. Initial analysis in this area was developed in the 1960s by N. J. Habraken. This analysis identified components linked to cities and buildings based on their varying durability levels. This research also affirms Brand's (1994) Shearing Layers of Change principles. In the context of the relationship between main and secondary elements (6S), Brandt identified 'faster strata and slower strata' in terms of degradation. Brand went so far as to argue the need to, «[…] Give people buildings that they can easily adapt to changing requirements or uses with inexpensive materials. For a long lifespan of a building, the change of the 'faster' layers should not be hindered by the 'slower' layers» (Brand, 1994, p. 21).

The Open Building principle has been – and remains – fundamental in defining contemporary Design for approaches. It has proved important because of the need for interscalarity and maintaining an openness to diverse solutions for separating components with varying life cycles. It also remains vital because of the need to define flexible, resilient and collective systems in relation to the Open City, Open Buildings and Open Systems. The broader Designing out Waste (DoW) approach (TRL and WRAP, 2010) was first implemented on a large scale during the building of the London 2012 Olympic Park by the Olympic Delivery Authority (Altamura, 2015). This approach advocates the use of a systematic set of strategies: Design for Reuse and Recovery; Design for Off Site Construction; Design for Materials Optimization; Design for Waste Efficient Procurement; and Design for Deconstruction and Flexibility.

The impact of Design for Deconstruction and Flexibility on technological planning has been so significant that it has recently led to the development of a specific design approach: Reversible Building Design or RBD (Durmisevic, 2018). RBD focuses on reversibility – and therefore flexibility. It allows enhancing existing assets in terms of their space, structure (understood as a system of products) and materials (Fig. 2). In this context, «[…] Buildings designed with three dimensions of transformation open opportunities for a great palette of new value propositions of buildings and its [their] systems, products and materials» (Durmisevic, 2018, p. 1). A fundamental step in defining a reversible building is to identify the various aspects which encourage a transition away from linear structures (that end up in landfills) to circular ones. Firstly, a circular building features spatial flexibility in terms of adaptability

(and identifying the minimum core of space needed). Secondly, it reflects structural flexibility (via the technical and functional independence of its components). Thirdly, is has physical flexibility in terms of having different material strata with separable components (which are linked by connections that can be disassembled). RBD is a key driver of the circular economy within the construction sector and this approach highlights the need for design based on the different phases of a building's life cycle. It also encourages reuse scenarios by adopting assembly-disassembly (Design for Disassembly; Guy and Ciarimboli, 2008) solutions for use in relation to building systems, components, replacement materials, updating, integration and deconstruction activity (Durmisevic, 2019).

The goal of the research[1] considered here has been to apply the Reversible Building Design approach to existing buildings, with a special attention to public housing (Edilizia Residenziale Pubblica – ERP) districts in Rome. This clearly involves considering the 'connectors' which comprise the physical links[2] between elements. These have implications for component behaviour and technical issues that emerge over the building life cycle. Moreover, they also help shape innovative architectural spaces and introduce the possibility of creating new types of configurations.

The use of a Design for Deconstruction approach in interventions focusing on existing structures is particularly innovative since it aims for high material resource efficiency. It is also ground breaking in applying Design for Disassembly (either spatially or technically) to create additions, undertake up-cycling (functional, technological, environmental or energy-related) and carry out reversible actions with reused deconstruction-derived materials and components (Melton, 2020).[3]

Interventions on existing structures, like adaptive reuse, can maintain the identity of a building system they are applied to in terms of its values and resources. Such activity may involve approaches guided by distinguishability, reversibility, compatibility and minimum intervention[4]. It may also involve adapting the 'building on the built' principles associated with more restrictive conservation projects. Reversible Building Design consistently highlights that «[…] Disassembly, adaptability and reuse form the nucleus of three dimensions of reversibility and as such determine spatial and structural levels of reversible buildings» (Durmisevic, 2018, p. 2).

Research methodology | The research methodology is based on the life cycle approach as applied to the building system, its components and its materials. This is further integrated with design strategies which enhance material resources while reducing material consumption and waste from a circular perspective. Life Cycle Design ensures an apt intervention approach which considers the whole life cycle perspective. This means adopting 'adaptable reuse' principles in an integrated and interdisciplinary way, thus guaranteeing that the useful life of systems, components and materials endures over time. Interventions involving addition, grafting or integration with an existing structure are therefore in synch with circular processes. Such processes see dura-

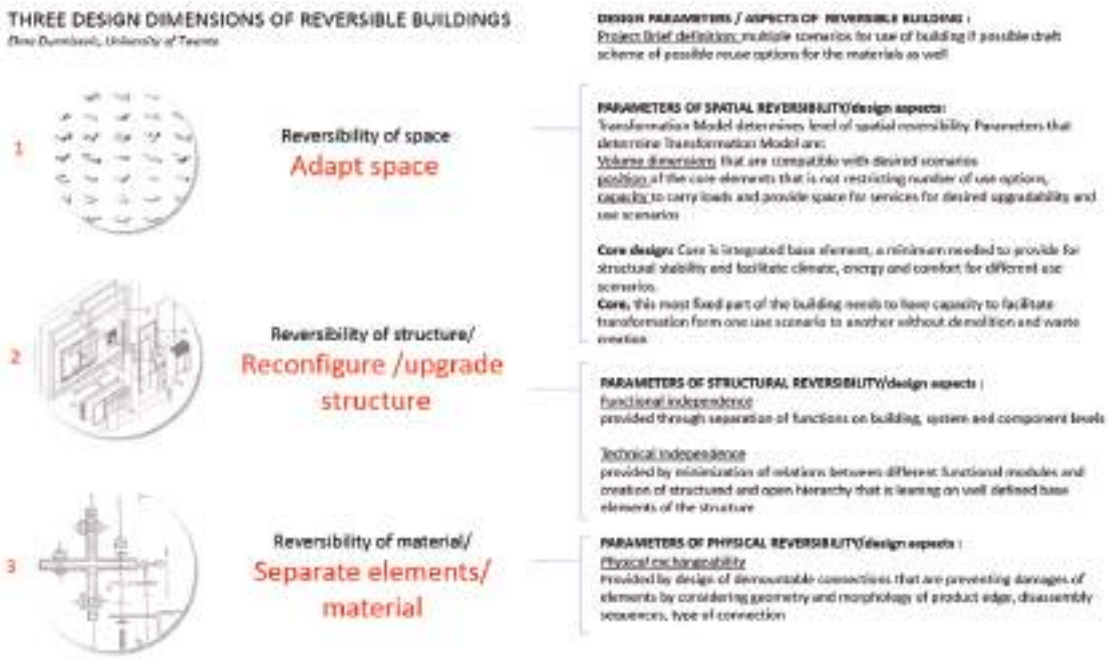

Fig. 2 | The three dimensions of reversibility and their related parameters and requirements (source: Durmisevic, 2018).

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Fig. 3 | The recovery of 530 residential units in the Quartier du Grand Parc, Bordeaux designed by Lacaton & Vassal, Druot and Hutin in 2017 (credit: Lacaton & Vassal).

Fig. 4 | The recovery of the Tour Bois le Prêtre, Paris 17°, designed by Druot and Lacaton & Vassal (2011): the project reflects a process/scheme that highlights the envelope's deconstruction phases and the reconstruction of additional spaces (credit: Lacaton & Vassal).

Fig. 5 | The recovery of 709 housing units in the Saint Hilaire Towers, Lormont, designed by Lan Architecture in 2015 (credit: Lan Architecture).

bility[5], adaptability[6], deconstruction[7] and up-cycling as key principles guaranteeing resource efficiency while also contributing to decarbonisation (GBC Italia Circular Economy Working Group, 2020). The actions proposed afford 'juxtaposition' (e.g. of organisms or architectural parts) or 'completion' (i.e. the 'integration' of parts due to missing elements or adjusting and defining a morpho-typological and functional unit). They may also include additions (in terms of a physical and functional extensions) and the 'grafting' of components (which integrate, complete or stratify the existing structure involved). The above activities taken together guarantee durability over time. They also assure the intergenerational transfer of identity and memory which is physically shored up by the built environment.

Before

After

Fig. 6 | The Harvest Map indicating the area around the former IACP site in Torrevecchia (Rome) used to identify 'mines' for materials to integrate into project activity; the map also provides a comprehensive framework of the materials to be added or removed from the building in developing technical solutions (credit: S. Baiani, P. Altamura, E. Fauda Pichet, S. Lucci and R. Menaguale, 2020).

A specific objective of this research is to integrate basic circular strategies in component reuse and recycling with design strategies for disassembly that allow continual recovery over the building life cycle. These basic strategies ensure that the objectives of cost containment and reducing short-term environmental impacts are both met. To this end, «Using salvaged building materials in place of new materials can be an effective means of conserving natural resources, and reducing embodied energy, a well as having tangible economic benefits» (Kernan, 2002, p. 6). The durability of such strategies is achieved through a Design for Deconstruction (DfD) approach which ensures that both recycled and new materials can be recovered while minimising waste production and damage over time. DfD makes it possible to guarantee the reversibility of an intervention on different levels based on specific requirements[8] (Altamura, 2015). This ensures that the spatial set-up of a building can be reconfigured without demolition and that the systems used (including the operating ones) are accessible, replaceable and integrable. It also ensures that the functional strata with their different components are easily separable via fixing and connection systems that have a wide degree of dimensional flexibility.

The technological solutions adopted thus allow for the potential future recovery of components and materials for reuse and recycling at every phase of the building life cycle (over the short, medium and long term). This potential can be fostered by preparing maintenance or graphic communicative plans in the form of 'as built' drawings, which highlight disassembly methods. On the basis of the aforementioned approach, the methodological phases which may be adopted can be outlined as follows:
– Analysis of the existing building's life cycle, highlighting transformations from its origin to current state (this is done by evaluating how building use has evolved);
– Constructive analysis of the existing building and characterisation of its overall system. This includes decomposition to identify the subsystems and components suitable for recovery or recycling;
– Quantification of the materials present in the existing building (in terms of volume and weight);
– Estimating the embodied CO_2 in the existing materials using relevant databases[9];
– Outlining alternative intervention scenarios for redefining the accommodations, introducing/increasing common spaces and supplementary services and identifying planned demolitions and new construction activity;
– Estimating the weight and volume of materials to be removed from the existing building, the volume of material required for an intervention and the volume of the related embodied CO_2;
– Creating a Harvest Map with a maximum radius of 25 km around the intervention site that lists and identifies sources for materials. Mapping of identified waste materials (in terms of dimensional parameters, quantities, production frequency, cost and so on); this information should be drawn up by researching local companies (in desk mode), subsequently contacting them via questionnaires and carrying out inspections in-person to see waste materials (Altamura and Baiani, 2019);
– Selecting potentially recoverable materials for the intervention drawn from demolitions or identified on the Harvest Map;
– Identifying the technical structures that will house on-site recovered materials or those identified through the Harvest Map;
– Defining processes related to planned demolitions, replacement and material recovery from the existing building;
– Calculating the shares (percentages by weight and volume) of on-site reused/recycled materials and components versus those coming from off-site;
– Defining the technological solutions to be adopted for the various elements needed with a view to deconstructability; this means focusing, in particular, on the building envelope which may need retrofitting; the 'passive' bioclimatic control devices introduced are also of interest and should be checked for energy effectiveness.

Measuring the intervention effectiveness levels may be carried out using the following quantitative indicators of circularity: 1) the share of demolition materials recovered by weight, broken down by the circular technical option applied to them (and

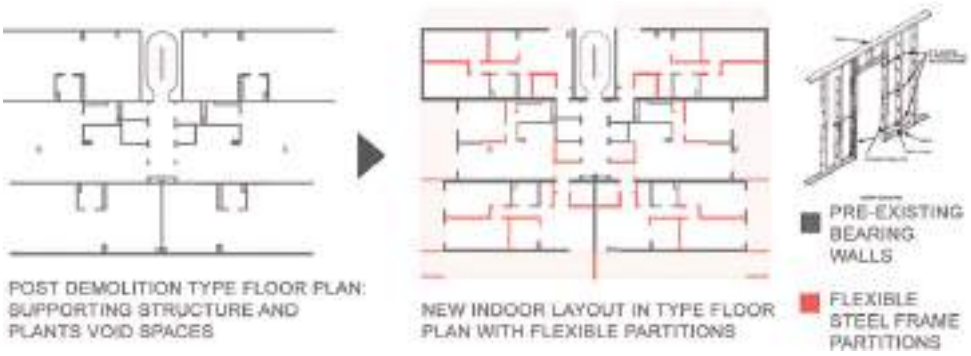


Fig. 7 | The flexible adaptive design of the 'Torri del quartiere di Torrevecchia' (Rome) is achieved by cutting select panels and inserting reversible metal systems; it allows for a demolition-free way of extending housing surfaces (credit: S. Baiani, P. Altamura, N. Bonomi, E. Gianvenuti and A. Ruggiero, 2020).

considered in order of preference relative to environmental impacts: on-site reuse, off-site reuse, on-site recycling, off-site recycling); 2) the overall and specific recycled content used in relation to each project material used; 3) the share of disassembled materials and components used by weight as a proportion of all project materials (excluding operating systems); 4) the distance travelled to procure the materials used; 5) the embodied CO_2 maintained by conserving existing building materials; 6) the reduction in embodied CO_2 achieved by using on-site components or recycled and recovered materials procured off-site compared to a reference intervention made with new materials and standard products. On the one hand, the above indicators measure savings in terms of raw materials and waste production. On the other, they also measure environmental impacts in terms of reduced climate emissions due to component and material level recovery processes and reduced transportation.

The methodological approach employed in this research is partly aligned with the mandatory on-off criteria introduced at the national level in Italy by the Italian Ministerial Decree on Minimum Environmental Criteria for Green Public Procurement for Interventions on Public Buildings (Ministerial Decree 11/10/2017). This decree provides specific thresholds for indicators 1 to 4 above by setting standards (measured in terms of weight). These include the goal of 70% recovery of demolition materials, 15% recovery of recycled materials and 50% recovery of components that can be disassembled at the end of their useful life. The use of extracted, collected, recovered or processed materials coming from within 150 km of the construction site must also account for at least 60% of the total materials used. In focusing on these indicators, the research aims to show the potential for significantly increasing the aforementioned thresholds by using specific design solutions and innovative processes. The methodology considered here also employs measures of embodied CO_2 (indicators 5 and 6) in order to highlight the contribution that the suggested

planning and processes can make toward decarbonisation. Furthermore, the methodology is aligned with the common European Framework Level(s) and the associated system of metrics for assessing building environmental sustainability. This framework also promotes a life cycle and circularity perspective, particularly in terms of its macro-level objective linked to Efficient Resources and Circular Material Life Cycles and the related indicators.

Implementation of the methodology in design investigations on former IACP public housing in Torrevecchia, Rome | The Design for Deconstruction methodological approach adopts design and construction strategies aimed at achieving high levels of material resource efficiency. This approach has been applied and verified in different locations in Rome which reflect diverse materials and construction systems dating from different historical periods. Research has specifically focused on a series of public housing (of the former Istituto Autonomo Case Popolari – IACP) high rises in Torrevecchia, Rome. This setting has presented a number of constraints, including a restricted ability to transform building materials and adaptively reuse them in ways that can meet local demands. This is because the cast concrete slabs and tables comprising the building, which were originally made on-site, are very limiting in the face of modern requirements.

The first phase of the investigation involved gathering knowledge about the site in terms of the changes and transformations that led to its current state. Evaluating the building's evolving use has highlighted a series of transformations which have affected the existing structure at different points in its life cycle. These changes are mainly related to past needs to expand overall living space. A building's life cycle can be analysed by reading and understanding its construction system. This also makes it possible to understand its peculiarities and limits. In terms of the architectural and construction aspects of the building under consideration, it was made using a heavy and prefabricated system in reinforced concrete. This was completed with panels made off-site, limited interior insulating materials and plaster finishes.

A comparative assessment was also subsequently conducted to consider the potential effects of resulting demolition waste (in terms of volume/weight). The overall material requirements were also considered under more or less 'invasive' intervention scenarios in terms of expanding demolitions/additions. Under these scenarios, various operational choices led to different comparable options based on redefining the housing, introducing/increasing common spaces or living services and identifying components to eliminate or integrate. However, each scenario commonly reflected the guiding technical requirements that interventions be totally reversible, low cost (in terms of environmental, energy and economic impacts) and material minimising (in terms of weight and types of materials used).

Estimates were done on materials to be removed from the building in terms of weight and volume, and associated embodied carbon was included in these measure-

ments as well. Estimates were also made in terms of the volume of materials needed to execute each different scenario (these materials were selected based on a set of performance criteria that included maximum decarbonisation). This made it possible to come up with a matrix of technical systems, components and materials which permitted considering 'materials to look for' versus 'materials to let go'. The Harvest Map was consulted to this end to identify supply 'mines' (Fig. 6). Defining technical systems for each of the options identified (addition, integration, grafting, replacement) has made it also possible to evaluate which existing elements could be recovered and reintroduced over the building life cycle. It also affords systematising processes of disassembly, micro-demolition and material or component replacement and recovery. It additionally permits calculating the material/component shares (in terms of percentage by weight and volume) which may come from on or off-site sources. This all made it possible to develop technological solutions while applying a 'circular' and 'reversible' view of the various elements involved. In doing this, particular attention was paid to the building envelope and the 'passive' bioclimatic control devices to be introduced. To this end, verification of energy effectiveness took place as well. Various alternative intervention scenarios were developed based on combining the identification of materials available in-situ with the different design solutions. These different scenarios included:

– Redistributing internal spaces with an eye for greater flexibility, while maintaining the existing shafts; this would also involve rethinking the internal articulation of space by replacing brick partitions with reversible metal systems; this scenario guarantees flexibility and adaptability while expanding housing surfaces without any demolition (Fig. 7);

– Increasing the number and size of existing openings by the selective removal of the building's precast, pre-existing, concrete panels and inserting shade systems made of recycled materials, thereby ensuring interior comfort;

– Adding external spaces to the housing by inserting external overhangs using X-LAM panels and light-weight, self-supporting structures; these would be anchored to the supporting concrete tunnel using reversible systems; the panels would articulate with the building envelope according to the degree of sun exposure while integrating vertical and horizontal shielding elements (Fig. 8);

– Technical, architectural and energy-related retrofitting of the building envelope by creating a 'skin'; this could be fabricated by enhancing locally sourced waste materials with a pattern or diaphram that varies according to the facade's exposure to the sun; such a system would thus create an envelope with variable porosity in relation to facade exposure; it would also integrate processing waste from the steel and high-performance glass production chains (Transparent Insulation Materials – TIM), ensuring optimisation of passive systems (Figg. 9, 10);

– Creating bioclimatic greenhouses and spaces to serve as thermal buffers using components recovered from the deconstruction of the pre-existing building; these structures would rely on the disassembly, restoration and reuse of existing fixtures which had to be removed because they were inefficient; these structures are also based on the reassembly

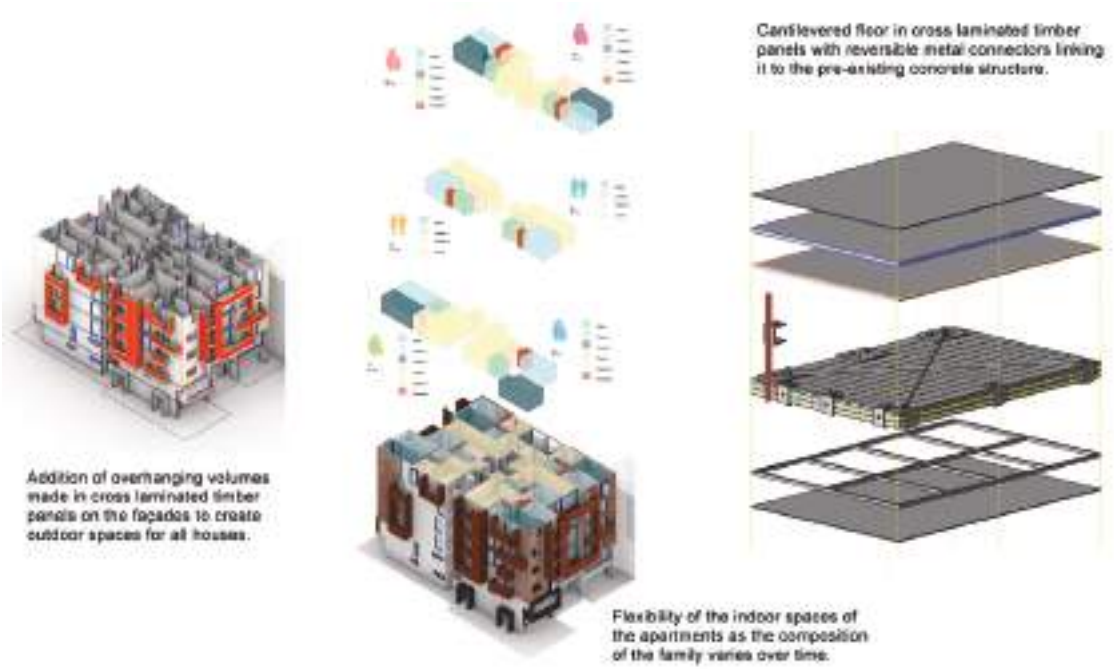
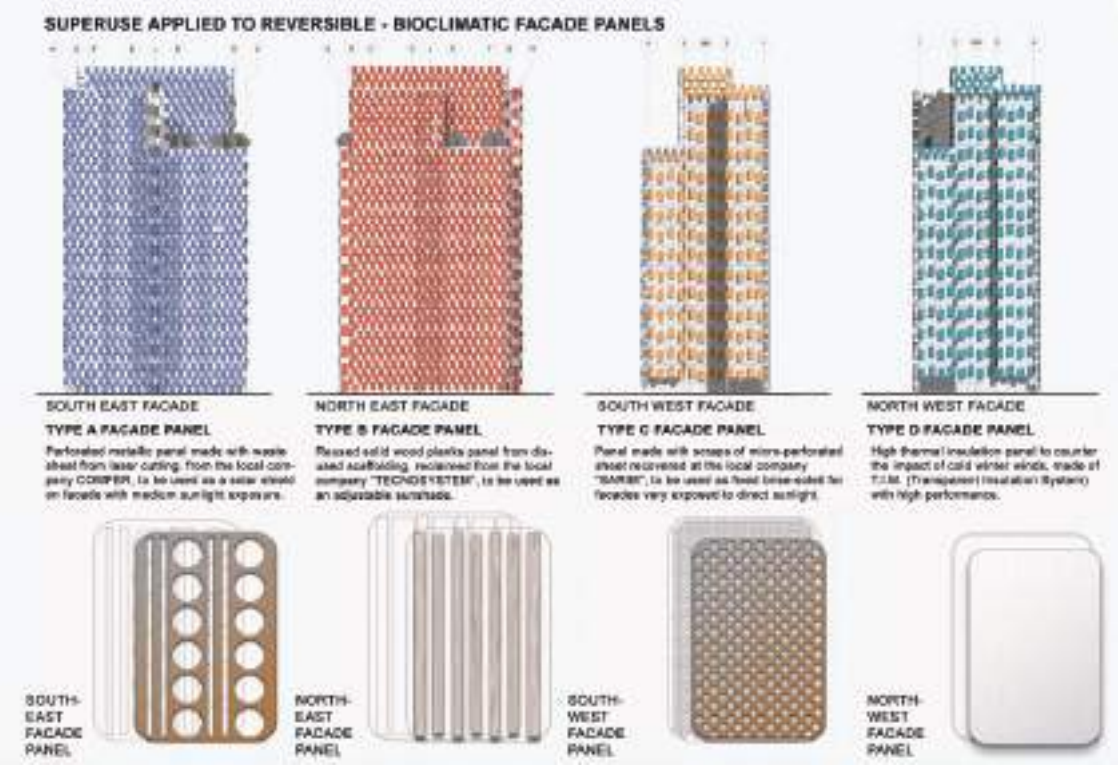


Fig. 8 | Adding external spaces to the 'Torri del quartiere di Torrevecchia housing' (Rome) proposed by inserting external overhangs using X-LAM panels and light-weight, self-supporting structures; these elements are then anchored to the supporting concrete tunnel using reversible systems; the panels, deployed on the envelope according to sun exposure, integrate vertical and horizontal shielding elements (credit: S. Baiani, P. Altamura, A. Barontini and S. Volante, 2020).

and redesign of the metal parapets removed from the facades; the integration of these steel components into the floor construction creates two types of differently shaped bioclimatic greenhouses with similarly effective passive operation (Figg. 11, 12).

Discussion of the results and research limitations | The design actions carried out in the former IACP housing in Torrevecchia in Rome reveal different facets of the research methodology as applied to the redevelopment of public residential buildings in early obsolescence. Different scenarios and levels of intervention (extensive, intermediate and light) were defined. These scenarios are coherently aligned with the existing structure's highly complex support system which is ostensibly limited in terms of flexibility and integrations. The building also does not comply with current standards or meet the needs of the people living there.

This research allowed particular investigation into deconstruction methods allowing component reuse. It also afforded case-by-case evaluation of the potential for component reuse and redeployment while paying attention to how to connect materials to the existing building. This permitted verifying the applicability of the guiding principles and requirements, 'gauging' intervention actions across various levels and evaluating the efficiency of newly designed systems. The potential drivers (Morgan and Stevenson, 2005) that favour adopting a DfD approach are clear. These include the obvious impacts in terms of reducing raw material extraction and landfill disposal as well as concomitant economic and environmental benefits. On the other hand, there



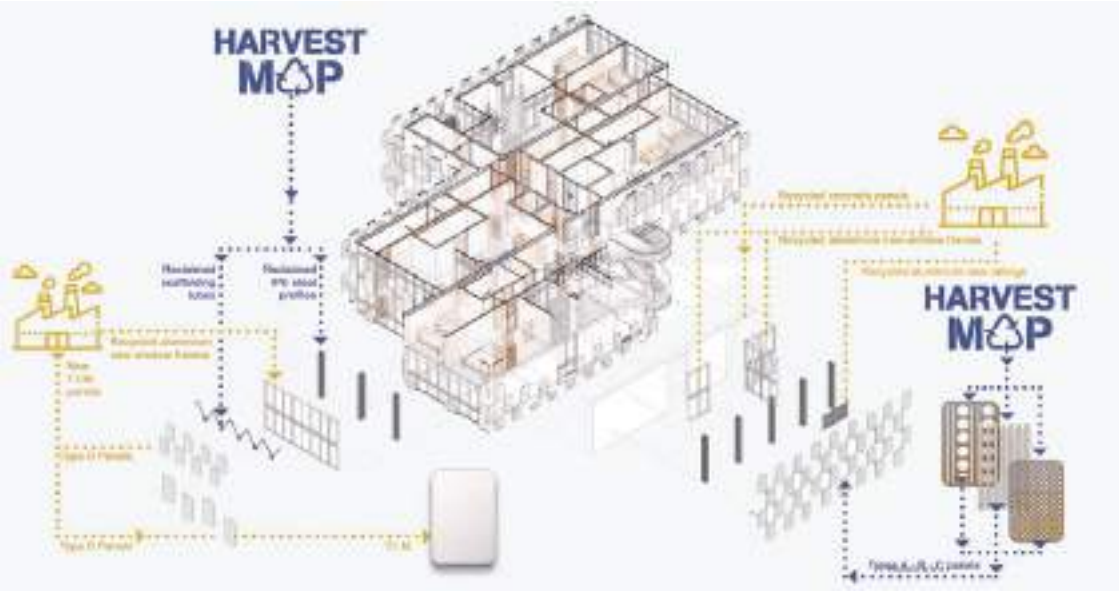


Fig. 9 | Intervention on the building envelope on the 'Torri del quartiere di Torrevecchia' (Rome), using lightweight panels made out of metal waste materials. The system has variable porosity adjusted to facade exposure: panel A | shielding system; panel B | adjustable shading system; panel C | strong shading system; materials were sourced from a high-performance glass supply chain (credit: S. Baiani, P. Altamura, L. Felicioni and G. Grossi, 2020).

Fig. 10 | Process of deconstructing and then integrating the reused panels with differential porosity; they are used to shield the differently performing facades; the materials were identified using the Harvest Map created for the area around the Torrevecchia site (credit: S. Baiani, P. Altamura, L. Felicioni, G. Grossi, 2020).

are limitations to note as well. Regulatory indications are restricted and do not cover the deconstruction phase of the building process. This poses difficulty in terms of gauging the effects of construction market innovations on related supply chains as currently called for in Europe. Such changes, might, in fact, promote new professional skills and differentiation in re-manufacturing processes.

From a technical point of view, other barriers emerge that limit recovery potential from the start. This is due to the complexity of the connectors used in prefabricated systems which may reduce the possibility for component reuse. There are also problems due to storage and handling which may result in a preference for lower-cost new materials over recycled ones. Above all, limited knowledge on technological alternatives to traditional concrete or steel has led to difficulties in the acceptance of mixed systems. This limited knowledge is also linked to the need for a better understanding of new modes of procurement and re-manufacturing.

From the point of view of achieved effectiveness levels, the results were measured in terms of quantitative indicators. These confirmed the methodological research choices and investigations undertaken in the Torrevecchia case. The resulting insights were as follows: 1) the share of demolition materials recovered by weight exceeds the 90%-level. In the case of the concrete panels to be removed, 100% recovery is achieved under an optimal scenario. This involves 10% on-site reuse of this material, 45% on-site recycling and the remaining 45% being sent off-site for recycling; 2) recycled/recovered materials comprised 20% overall of all intervention materials, but this percentage was higher for some specific materials (metal, wood); 3) disassembled materials and components comprised 70% of all intervention materials by weight; 4) materials came from within an extremely small radius of from 5 km to 50 km away from the site. In fact, some of the materials were ‘zero-km’ ones obtained via on-site recovery; 5) the level of embodied CO_2 was maintained by preserving an expected 50% on average of the existing building; 6) the level of embodied CO_2 during the intervention was also reduced by 15% to 20% on average through the use of recovered and recycled materials.

Conclusions and research perspectives | This contribution offers a point of view which, although well-anchored in the most advanced international research and design experiences, also opens up some innovative perspectives. These have grown out of the applied experience of transferring Reversible Building Design to existing buildings. In doing this, we consider the specific logic of national and, above all, European level construction systems within specific housing sectors such as public housing. In this context, the up-cycling needs of the built place suggest a common urgency to pay attention to this issue at the international level.

The positive impact of the present contribution resides in presenting a synergistic vision which draws on circular strategies of action focused on an existing structure. This made it possible to identify important technological approaches and options and

building a reasoned, verified, measured and updated knowledge base aligned with current investigative advancements. The framework considered makes it possible to validate some operational choices. This, in turn, brings the various players involved closer to engaging in an innovative and complete building process in line with the circular and integrated vision guiding our activity.

This research contributes to the strategic development of low-energy/low-cost solutions aimed at circular reversible building. It also promotes innovative options in terms of regeneration activity guided by a circular perspective. It further involves introducing superuse, reuse, re-manufacturing, up-cycling and recycling of materials and building components. This strategy, in turn, also addresses the need for quality and eco-compatibility as well as increased collaboration among actors involved in the construction chain. The research results also help to define eco-effective materials-management methods over a building's life cycle while demonstrating the validity and replicability of the technological options applied. Such options may evolve from comparative studies or by identifying key intervention strategies for existing structures via reuse and reversible envelope systems. The results here also support systematising potential modes of application as well as evaluating their practicality in Italy in light of existing standards and the strong potential offered by urban resource flows.

The innovative nature of described investigations lies in verifying the feasibility of reuse within the actual urban sector rather than in the context of an experimental architectural project. The aim is to build a set of data that can be used by designers and added to or updated by individual users through tools such as the open-source Harvest Map platform. This platform supports the basic mapping of available material and construction resources in a select setting. This information may guide the choice of intervention methods in the future, have significant impacts in terms of innovation and create a decisive role for stakeholders. A fundamental cross-cutting aspect in all phases of research was that we chose to validate and evaluate interventions using a set of internationally-shared indicators of circularity. These indicators promote the analysis, interpretation and in-course verification of results. Data systematisation will allow building a framework of replicable and applicable solutions as results continue to be refined.

Prototyping the different envelope options using additive production (3d printing), in order to verify the technical flexibility of the choices made, represents a step forward. This also allows further assessing the feasibility, compliance and reversibility of the connection systems linking additional and existing structures as based on the different material scenarios developed. The aim is to reach Technology Readiness Level (TRL) 4[10]. A fundamental phase in validating the achieved results will involve applying Life Cycle Assessment (LCA)-based tools which are compatible with Building Information Modelling (BIM). These can be applied to the envelope system developed by drawing on locally-sourced materials noted on the Harvest Map. This will afford measuring material resource efficiency while also supporting decision-making processes. The aim is to evaluate the effectiveness and efficiency of exploiting complex

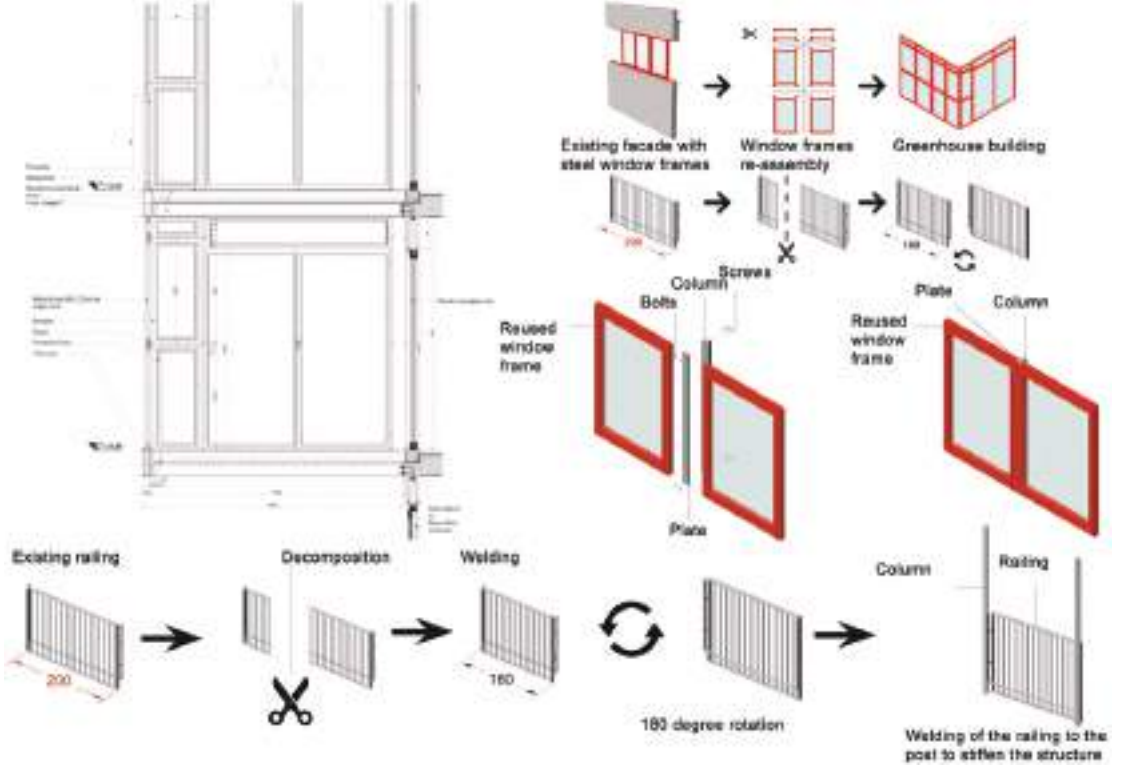


Fig. 11 | Outline of the process involved in constructing a bioclimatic greenhouse using recovered components that were 'disassembled' from the building in the Torrevecchia area under redevelopment (credit: S. Baiani, P. Altamura, N. Bonomi, E. Gianvenuti and A. Ruggiero, 2020).

and heterogeneous secondary raw material stores ('urban mines') in line with EU targets in this area. The research results will also allow expanding project-support tools systems with closed-loop building materials. This will involve integrating the aforementioned tools with those for mapping recoverable products and materials from a circular perspective. Such information may further flow into the community information system on raw materials (Raw Materials Information System – RMIS).

An expected outcome is to define a Nearly-Zero-Impact approach in terms of materials used as applied to existing structures, building processes and component production. This will further drive the development of a timely, interdisciplinary, intervention methodology which has strong applicative potential at both the national and international level. In order to ensure consistent impacts across the social, economic and environmental spheres, the research results aim for a high degree of replicability in terms of the outlined processes. Their enormous potential can also be highlighted by setting objectives that are useful to decision makers as well as supply chain operators (designers, producers, de-constructors).

Notes

1) The Research Group at Sapienza University in Rome grew out of a PhD thesis entitled 'Eco-effective Management of Construction Materials in the Life Cycle of the Building – Tools for the Pre-

Bioclimatic greenhouse
Detail in scale 1:20
Section E-E' south-west side

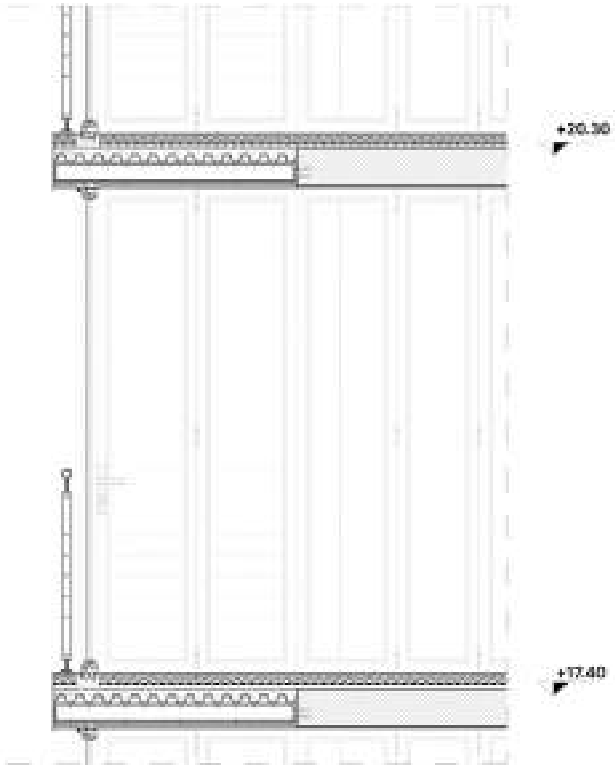


Fig. 12 | Verification of the energy performance of the bioclimatic greenhouse added to the building under redevelopment in Torrevecchia (credit: S. Baiani, P. Altamura, D. D'Olimpio, M. Avena, S, Ghadiri and M. Scacciatella, 2020).

CALCULATION OF THE ENERGY PRODUCED BY BIOCLIMATIC GREENHOUSES

SOUTH - WEST GREENHOUSE
Semi incorporated
Direct sun gaining type

	VALUE	MEASURE
Surface of the windows	8,789	mq
Frame structure surface	1,872	mq
Effective solar radiation gaining area	6,907	mq
Annual global solar radiation	443,23	kWh/mq
Collected solar energy (Qi)	2,050,95	kWh/mq
Coeff. glass transmission (t)	0,8	-
Coeff. absorption (a)	0,7	-
Amount of heat absorbed (Qa)	1.184,474	kW
Amount of heat absorbed (Qa)	1.084,74	kW
Thermal capacity of cement (Cp)	0,34	mc
Thermal mass volume (V)	63,3808	mc

NUMBER OF DAYS		DAILY GLOBAL SOLAR RADIATION	MONTHLY GLOBAL SOLAR RADIATION	MEASURE
30	novembre	2,47	73,30	kWh/mq
31	dicembre	2,07	64,17	kWh/mq
31	gennaio	2,54	78,74	kWh/mq
28	febbraio	2,78	77,84	kWh/mq
31	marzo	3,23	100,13	kWh/mq
15	aprile	3,27	49,05	kWh/mq
TOTAL GLOBAL SOLAR RADIATION PER YEAR			443,23	kWh/mq

CALCULATION OF THE ENERGY PRODUCED BY BIOCLIMATIC GREENHOUSES

SOUTH - WEST GREENHOUSE
Incorporated
Direct sun gaining type

	VALUE	MEASURE
Surface of the windows	18,787	mq
Frame structure surface	3,303	mq
Effective solar radiation gaining area	15,484	mq
Annual global solar radiation	480,40	kWh/mq
Collected solar energy (Qi)	6,451,05	kWh/mq
Coeff. glass transmission (t)	0,8	-
Coeff. absorption (a)	0,7	-
Amount of heat absorbed (Qa)	4.084,17	kW
Amount of heat absorbed (Qa)	4.084,17	kW
Thermal capacity of cement (Cp)	0,34	mc
Thermal mass volume (V)	108,16	mc

NUMBER OF DAYS		DAILY GLOBAL SOLAR RADIATION	MONTHLY GLOBAL SOLAR RADIATION	MEASURE
30	novembre	2,70	81,00	kWh/mq
31	dicembre	2,39	74,09	kWh/mq
31	gennaio	2,59	80,21	kWh/mq
28	febbraio	3,03	84,84	kWh/mq
31	marzo	3,33	103,23	kWh/mq
15	aprile	3,17	47,58	kWh/mq
TOTAL GLOBAL SOLAR RADIATION PER YEAR			480,00	kWh/mq

vention, Reuse and Recycling of C&D Waste' (lit. Gestione Eco-efficace dei Materiali da Costruzione nel Ciclo Vita dell'Edificio – Strumenti per la Prevenzione, il Riuso e il Riciclo dei Rifiuti da C&D) by P. Altamura (2013) and with E. Cangelli and S. Baiani serving as Tutor and Co-Tutor, respectively. This paper, and the cases discussed here, are the result of research funded by Sapienza University. This research has included projects on 'Closed-loop Building Materials – The Harvest Map as a Project Tool – First Application in an Urban District in Rome 2018-2020' and 'Subtraction, Addition and Insertion – Design for Reuse and Design for Deconstruction in Projects Involving Existing Structures 2020-2022'. The aforementioned research was developed by the Research Group and involved interdisciplinary collaboration supported by the 'Sapienza' Design Factory Laboratory.

2) The issue of the connector as a determining linking element stands out as the most important factor influencing a structure's disassembly potential. In this context, there are six relational models which define several different types of assembly modes: closed, layered, locked, flat and open (Durmisevic, 2019).

3) Juxtaposition, completion, addition, stratification and grafting are some of the interventions which have emerged out of contemporary debate and a balanced consideration of alterable multi-strata structures which disallow adopting operational systems or rules and generalizable technical options. A number of existing public housing projects suggest how reversible additions can be combined with a low-cost approach. Some of these projects include: the recovery of 530 housing units in the Quartier du Grand Parc in Bordeaux by Lacaton & Vassal, Druot and Hutin in 2017 (Fig. 3); the transformation of the Tour Bois le Prêtre in Paris XVII by Druot and Lacaton & Vassal in 2011 (Borne, 2018; Fig. 4); and the recovery of 709 housing units in the Saint Hilaire Towers in Lormont by Lan Architecture in 2015 (Fig. 5).

4) Distinguishability refers to an intervention that may modify the original 'vision' of a structure by creating additions that fill in gaps while avoiding falsification. 'Reversibility' refers to the possibility of removing any intervention if it becomes altered or when the technology employed proves outmoded, as well as in cases where functional-regulatory adjustments are needed. In order to maintain the authenticity of an element (in terms of materials or in structural or figurative terms), the intervention must be guided by the goal of 'minimum intervention'. This aims to preserve materials, restore an overall vision and renew the functional aspects of an asset. Physical, chemical and perceptive compatibility is a cross-cutting requirement. It involves considering the material and figurative integrity of an existing element which, in turn, may be mediated by the use of new materials and technical additions.

5) Durability is the condition that a built asset, or any of its components, fulfil the functions dictated by the service environment over a specified period of time without the need for unexpected maintenance or repair (ISO 17738-1:2017). A durability scenario involves planning for the useful service life of a building and its elements, promoting a medium to long term design overview of the main construction components and considering any related maintenance or replacement cycles (GBC Italia Circular Economy Working Group, 2020).

6) Adaptability is the ability to change or modify a product, system or module, rendering it more suitable to a particular purpose (ISO 6707-1:2017). An adaptability scenario provides for extending the overall useful life of a building. This is done either by facilitating the continuation of its intended use or by designing and building flexible construction systems that allow the transformation of in-use spaces (GBC Italia Circular Economy Working Group, 2020).

7) Selective deconstruction is a systematic approach to removal which facilitates the operable separation of components and materials. This is done in order to plan disassembly interventions and their associated costs. It also provides for recovering as many intact, undamaged, uncontaminated, adjacent materials as possible and maximising their potential reusability and/or recyclability (UNI/PdR 75:2020).

8) These requirements are linked to the various levels of intervention and are identified for each system and component. They include: spatial distribution structure (adaptability); supporting structure (chemical, physical and perceptual compatibility); stratification of the envelope (separations based on the useful life of the components and materials); access to components (manoeuvrability); assembly (parallelism); connections (reversibility); quality of components (durability); materials (recyclability); casings (substitutability at different times); and operating systems (disassembly).

9) The main database used for evaluating embodied carbon is the Inventory of Carbon and Energy (ICE) by Geoffrey Hammond and Craig Jones, available at circularecology.com/embodied-carbon-footprint-database.html [Accessed 16 March 2021]. More specific values in terms of national production are found in the product sheets in Giordano (2010).

10) Prototyping will take place at the Modelling and Prototyping Laboratory of the Faculty of Architecture, Sapienza Design Factory (SDF). It will also involve contributions at varying scales from other laboratories linked to Sapienza University (e.g. the Materials and Structures Testing Laboratory of the Department of Structural Engineering and Geotechnics [DISG]) and other external partners.

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DESIGNING CIRCULARITY
The circular economy for landscape and territory

Elena Montacchini, Silvia Tedesco, Nicolò Di Prima

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ABSTRACT
A farm, a biomedical company and a building materials company, an area with a high landscape value, some agricultural and food waste to be optimised, a team of researchers and a class of design and architecture students. These are the ingredients of the Designing Circularity experience. The article illustrates a field research activity and an educational experiment focused on identifying circularity scenarios for the territory and the development of a project based on the principles of the circular economy, with an appropriate technology approach. The result is that grape marc becomes bricks and hazelnut shells become insulating panels. The experience generated results for all the players involved: the companies strengthened their industrial symbiosis strategies; the university took responsibility for co-processing circularity scenarios and territorial development; the students developed a critical sense and the ability to design in close contact with real 'challenges'.

KEYWORDS
circular economy, appropriate technologies, from waste to resources, industrial symbiosis, territorial development

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The movement towards a circular economy, which is an integral part of the European Green Deal, is one of the key actions that the worlds of research and industry are called upon to address, not only by prioritising the concept of the second life of materials and products, with the consequent implications in terms of industrial symbiosis but also by rethinking processes and designs capable of implementing circularity strategies on the territory, on all scales. The aim of the article is to illustrate Designing Circularity, an experience between research and teaching, conducted in the field, which has made it possible to activate new synergies between stakeholders in a specific context: a small area situated in the Monferrato hills (Piedmont, Italy) which has become the location of practical experimentation with circular processes. The experience described here aims to be part of the debate on some central issues for the transition to a Circular Economy (CE): how to activate/encourage CE practices in a given area? How to accompany those who promote such practices in local contexts? What role can be played by universities and research in these processes of implementing circularity?

The research and teaching approach focuses on two key concepts which form the reference scenario: on one hand, CE, which requires not only the rethinking of the useful life of materials, their second life, but also the (re)consideration of the links between sectors, institutions and local stakeholders; on the other hand, technologies appropriate to the context and the stakeholders. The Designing Circularity project, incorporated into a master's degree in Architecture for Sustainability and in Systemic Design, responded to the needs of real organisations (a farm, a biomedical company and a building materials company) and identified new local circularity scenarios and the development of a project based on the principles of CE. The critical analysis of the results allows us to highlight the limits, potential and prospects of the experience, in terms of the applicability of CE to design and the expressive and communicative possibilities linked to the re-use of materials.

The reference scenario and key concepts | Field research and educational experimentation activities cover two main themes, Circular Economy and Appropriate Technologies, both connected to an idea of promoting local development and optimising a territory's resources. It is possible to identify different principles under the conceptual umbrella of CE (Blomsma and Brennan, 2017; Homrich et alii, 2018), strands of thought, strategies of action. In this context, CE is understood both as a strategy to optimise the use of resources and turn waste into a resource, also on a local scale, and as a form of collaboration between sectors, institutions and local stakeholders, capable of reducing environmental pressures while promoting the socio-cultural and economic development of the territory. The optimisation of resources and the reuse of waste is widely debated in literature and is a crucial element in the definition of the concept of CE, as «[...] economic system that replaces the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes. It operates at the micro-level (products, companies, consumers),

meso-level (eco-industrial parks) and macro-level (city, region, nation and beyond), with the aim to accomplish sustainable development, thus simultaneously creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations» (Kirchherr, Reike and Hekkert, 2017, p. 229).

At micro-level, with particular reference to the specific context of the research, agri-food waste can play an important role, as most of this type of waste is a by-product that can be potentially used as secondary raw material in a variety of industrial processes (Giordano, Montacchini and Tedesco, 2019). Several studies focused on the development of new building products from agri-food waste, such as hemp, straw, olive waste or other plant fibres, can be found in literature (Madurwar, Ralegaonkar and Mandavgane, 2013; Liu et alii, 2017). These types of waste can be reused for the production of thermal insulation materials (Liuzzi, Sanarica and Stefanizzi, 2017), bricks (Raut, Ralegaonkar and Mandavgane, 2011), plaster or concrete (Prusty, Patro and Basarkar, 2016), etc. A vision of CE that founds the concept of reintroduction and optimisation of underused and/or wasted resources in the current development model can also be a vehicle for the rethinking of new strategies for local land development, thanks to partnerships between sectors, institutions and local stakeholders (Quaranta, Andreopoulou and Salvia, 2018).

To develop new strategies starting from the territory's own resources, we have to think in terms of Appropriate Technology (Schumacher, 1973). Technology that is appropriate to the context and stakeholders is understood as a tool for (re)designing production processes on a local scale, accessible both economically and operationally to the populations directly involved. In the 'circular' sphere, this means, for example, starting from the most problematic and widespread waste in the reference territory, imagining solutions capable of transforming it into resources for that territory and its inhabitants using processes and technologies that are accessible, economical and entirely manageable at local level. A CE that incorporates the principles of Appropriate Technology consequently becomes a paradigm that brings environmental, social and economic sustainability onto the same level (WCED, 1987).

The specific context and practices of circularity in action | The Designing Circularity experience is part of the activities of the Technology Research Team (RT) of the Department of Architecture and Design (DAD) of the Politecnico di Torino, which has been working in collaboration with small and medium-sized enterprises on the development of technical elements, components and technologically innovative materials for architecture and design for years, with the support of the Innovative Technology Systems Laboratory (LaSTIn). The experience described continues on from the research carried out in the All You Can't Eat cluster, aimed at the optimisation of agri-food waste in the building sector. The aim of the research is not only product experimentation but also the identification of circular and intersectoral supply chain scenarios that can promote the development of local economies at 0 km (Giordano, Montacchini and Tedesco, 2019).

In Designing Circularity, the reference stakeholders – with whom the DAD's RT collaborates within the framework of a Memorandum of Understanding and joint research projects[1] – are three entrepreneurs, responsible for a farm (Azienda Agricola Fratelli Durando), a biomedical company (NobilBio Ricerche srl) and a building materials company (Sarotto Group sas). Three Piedmontese companies, located between the provinces of Asti and Cuneo, in an area of considerable landscape value, rich in resources to be exploited, linked to typical local products, particularly grapes, hazelnuts and wheat. The stakeholders involved, who already operate on the basis of a logic of circularity, are united by their interest in experimenting with new spheres of research and by their desire to support a local network that can generate benefits not only for the activities of each of them but also for the territory as a whole.

The promoter of this project is Azienda Agricola Fratelli Durando in Portacomaro (AT), which operates in the agri-technical sector – specialised in the cultivation and processing of hazelnuts and cereals, and in the production of wine – but also in the field of hospitality and tourist accommodation. Besides being active in sustainable business policies, aimed at reducing the environmental impacts of harvesting and processing and at optimising agricultural waste, the company recognises the benefits of working in compliance with the CE principles, also for the promotion of the local territory, benefits of an economic, environmental and social nature, which it sees as a continuation of its activities. The company sees the CE as a goal to be pursued, but also to be published and disseminated, and the territory becomes the field of action of this idea, the physical space in which and for which circularity takes shape.

Azienda Agricola Fratelli Durando networks with another local company, NobilBio Ricerche srl (Portacomaro, AT), which specialises in the surface treatment of medical devices and in the production of biomaterials, to which it supplies waste from the wine-making process for the study of the properties of molecules of plant origin (grape polyphenols) in the regeneration of bone tissue. Sarotto Group sas of Narzole (CN), a building company that has been working with the DAD's technological research team on the development of eco-compatible building materials derived from agri-food residues for many years now, is an integral part of the network and is currently experimenting with casing elements made of concrete and hazelnut shells supplied by the Durando farm. Local stakeholders see the CE as extremely advantageous and compatible with the reference territory. So how can we support those who promote CE practices at local level?

In this context, Designing Circularity translates into a project with several goals, in which the University takes on the role of 'vector' to support partnerships of industrial symbiosis, leading projects for the promotion of a territory via the optimisation of waste as a resource, and to make the principles of the circular economy visible and communicable through teaching, research and the transferral of knowledge, actions that are tangible and can be used in other contexts.

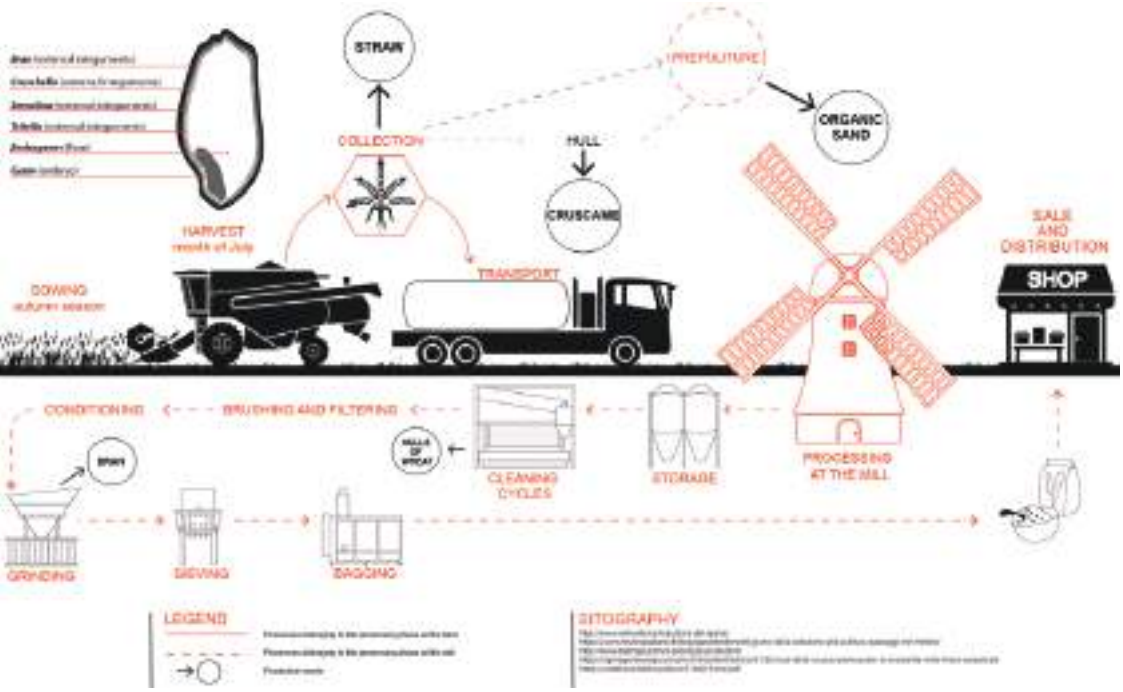

Fig. 1 | Example of a supply chain analysis of wheat flour production (credit: S. Roggia, M. Ronco and M. Salomone).

Designing Circularity, between didactics and experimentation | The Designing Circularity project has been incorporated into a Master's Degree Course for Architecture and Design students[2] focused on the development of the CE in design disciplines. The course has been conceived to develop knowledge of principles, methods and tools related to the CE both from a theoretical and an applied/experimental point of view. Designing Circularity has given students the opportunity to tackle the direct application of CE theories, working on a real case at micro-level, with businesses within the territory that are already linked by practices of circularity and interested in implementing local circular economy processes. The course has provided an opportunity to explore issues related to the varying needs of the stakeholders, such as exploring possible new synergies between the three companies and other local activities in terms of CE, with the aim of consolidating and expanding the network of 'circular' players; designing a micro-architecture to optimise the landscape and as a symbol of the promotion of local circularity practices and sustainable innovation. These needs, expressed by the stakeholders within the area, combined with the different educational goals envisaged as part of the course, have become the focus of two exercises proposed to the group of students.

Fig. 2 | View of the Monferrato hills during the visit to F.lli Durando with a group of students.

Developing circularity scenarios for the territory | The educational aim of the first activity was to develop the capacity to promote new business models based on the idea that one company's waste becomes another's resource (closed-loop), while keeping the value of the material at the highest possible level (EMF, 2015). This aim intersected with the need of local companies to explore new possibilities for synergies and stimulate networking between new local players. The decision was made to focus the research activity on the three agri-food production chains (wine, hazelnuts and wheat) in which the F.lli Durando company operates. The methodological approach was taken to the study of the supply chains of hazelnuts, wheat, and grapes for the production of wine, with the aim of understanding the phases that usually characterise 'linear' production, i.e.: without processes aimed at recovering and recycling the material: from the field, to harvesting, to processing, to the finished product. Investigation into the processes that generate waste, identifying the type, percentage and quantities potentially available (Fig. 1), was crucial in this sense. In order to estimate the availability of waste at regional level, based on the average production of finished product, data from ISTAT (the Italian Institute of Statistics) and ENAMA (the Italian Agency for Agricultural Mechanisation) and data obtained by searching for keywords (e.g.: waste,

by-products, yields per hectare hazelnut/vine/rice, etc.) online were used as reference.

The potential for optimising waste with a view to extending its useful life of waste was subsequently explored, both in terms of technological and biological optimisation (Bocken et alii, 2016). Several fields of application were considered, including construction and design. The survey outlined a framework of examples of reuse and recycling, classifiable in two categories: on the one hand, commercial products and implemented solutions, and on the other hand, experimental materials, the result of studies and research. The tools used for the survey were virtual libraries (e.g.: Matrec, Material Connexion, etc.) and the main platforms for scientific dissemination (e.g.: ScienceDirect, Google Scholar, etc.). Lastly, using one or more types of waste from the supply chain assigned as a reference, concepts of technical elements and materials for architecture or 'products as services', functional to the activities carried out by Durando, Nobil Bio and Sarotto, were developed, imagining new links between the three companies and other possible players.

The students' proposals were varied. Grape marc and lees, by-products of the winemaking process, were turned into bricks, textiles for screening the sun, dyes for the construction industry, photovoltaic panels and bioplastics, paper for leaflets, labels and packaging, as well as food supplements. Hazelnut shells and cuticles were transformed into soundproofing panels, building blocks and outdoor furniture, while hazelnut twigs and branches obtained from pruning were turned into thermal insulation panels. As far as wheat is concerned, straw was used to imagine insulating elements for the building industry or wrapping for the packaging sector. Germ and bran were reused in the cosmetics sector. In other cases, the reuse of waste was planned as part of recreational/experiential workshops for the self-production of low-tech handcrafted products such as coloured pencils made from lees and marc, soap made from hazelnut shells and sponges made from straw.

The design concepts represent different scenarios for the optimisation of waste or products that have reached the end of their life and indicate the possible closed cycles of their circulation among different companies in the area. The proposals represent a circularity linked not only to materials but also to the specific know-how of each company, with a view to collaboration and industrial symbiosis. While continuing to be purely hypothetical, the concepts reveal the multiple potential of recirculation of resources, outlining possible new circular business models (Linder and Williander, 2015), and are representative of the possible experiments that can be activated among local players.

Circularity applied to the enhancement of the landscape | The didactic goal of the second exercise was to develop an architectural project in compliance with the principles of circular design (Moreno et alii, 2016) applied to the construction sector (Benachio, Freitas and Tavares, 2020), using an Appropriate Technology approach, optimising and offering visibility to the use of local materials and waste from the agri-food

supply chains and other manufacturing companies in the area. The practical case of application responds to the intentions of F.lli Durando and NobilBio to create a viewpoint on a piece of steeply sloping land owned by F.lli Durando, offering an extensive view of the Monferrato hills, accessible from the provincial road that runs alongside the land. The idea of the viewpoint originated from the desire of the companies to provide a public place where people can stop and enjoy the local panorama, appreciating the rural landscape (Fig. 2). Aimed at the local community, tourists who are passing through and customers of the farm, the viewpoint also intends to symbolise a bridge between agricultural tradition, care for the land and sustainable, circular innovation.

A number of architectural design circularity criteria were identified for the design of the viewpoint, based on the five phases of the life cycle of buildings identified by Benachio, Freitas, and Tavares (2020): Project Design, Manufacture, Construction, Operation, End of Life. Particular attention was requested in relation to: 1) the Manufacture and End of Life phase phases, envisaging the use of by-products and waste materials (Nußholz, Nygaard and Milios, 2019) or at least materials that are recycled and recyclable at the end of their life (Sanchez and Haas, 2018); 2) the Project Design phase, reasoning in terms of Design for Disassembly (Leising, Quist and Bocken, 2018) and design by modules (Kyrö, Jylhä and Peltokorpi, 2019); 3) the Construction and Operation phase, designing in terms of waste reduction and reasoning on the durability of materials and components, encouraging their replacement with a view to preventive maintenance (Adams et alii, 2017).

Other design indications were taken from the circular design principles of Moreno et alii (2016), the result of a combination with the principles of Design for Sustainability defined by De los Rios and Charnley (2017): Design for Resource Conservation, Design for Reliability and Durability, Design for Extending Product Life and Design for Resource Recovery. Indications were also given with regard to design in terms of Appropriate Technology (Amirante and Gangemi, 1988), particularly in relation to the use of accessible technologies that did not require the use of advanced instrumentation for the processing of semi-finished products (cutting, drilling, foundations) and the assembly of components. Other design indications refer to fundamental criteria such as accessibility, usability and safety, in compliance with the logic of Inclusive Design and Design for All. Lastly, some landscape enhancement requirements were indicated. The project had to respond to the need to be a distinctive element and visual attraction, while being integrated and harmonised with the context, the environment and the landscape, enhancing and supplementing the view of the Monferrato hills and establishing an emotional link with them.

Based on these requirements of circularity, sustainability, functionality and expressiveness, a call for bids was drawn up in agreement with the partners of the Designing Circularity project. The designs presented at the end of the course were judged by the partners according to the criteria defined in the call, particularly favouring formal expressiveness, technical feasibility and adhesion to the landscape restrictions imposed

by the region. The design selected will be realised by the companies involved in collaboration with the winning group of students (Fig. 3). The 19 resulting designs are very different from a formal and expressive point of view, but several common features emerged in relation to the choice of construction materials, the technologies required for the processing of the semi-finished products, the systems used for anchoring to the ground and the joints between the elements (Figg. 4, 5). Comparing the projects with respect to the principles of circular economy applied to the construction sector by Akhimien, Latif and Hou (2021), some recurring circularity aspects and some critical issues emerged.

The design choices most in line with the Principles of Circularity (PoC) suggested by Akhimien, Latif and Hou (2021) concern the use of accessible and reversible connections between the different elements, favouring the choice of nuts and bolts over welds, glues and nails. This facilitates assembly and disassembly processes and simplifies the reuse of individual components and elements. Also, in terms of connections, standardised components were largely preferred to specific custom-made components. The modular design approach was also favoured, facilitating the possibility of reusing components at the end of their life and minimising waste. Another recurring element, in line with the PoC, concerns anchorage to the ground, with a preference for reversible screw foundations.

A more critical element concerns the choice of building materials. Generally speaking, the load-bearing structures proposed were made of wood or steel, with laminated beams and posts made of deal, poplar, maple, beech, larch and oak, or recycled and new steel girders. In some cases, the short supply distance of these raw materials was mentioned as an important element in terms of sustainability. Materials made from industrial waste were used only for railings and roofing or flooring and, to a minimal extent, for the padding of some seats. The materials proposed are pallets, disused vineyard posts made of wood or corten, twigs and branches from the pruning of hazelnut trees and vines. In one case, the reuse of disused wine barrels was proposed. In two cases, straw and hazelnut shells were used for seating. In only one case were hazelnut shells used for the production of bricks and, in another case, rice husk panels were used for flooring. In only one case was a recycled material used as the predominant material and this was a recycled plastic fabric used for seats. In general, only 50% of the designs succeeded in incorporating by-products from local production chains into the project. Only in two cases were hypotheses explicitly indicated for the reuse of end-of-life materials.

The analysis of the design proposals reveals a further consideration that combines dimensional and expressive aspects. On one hand, most of the designs tended to propose solutions involving the use of a large amount of material in proportion to the function required, i.e.: that of offering a shortstop next to a panoramic viewpoint. The micro-architectures show a tendency to be oversized. This prompts us, as researchers/teachers and designers, to place more emphasis on one of the key principles

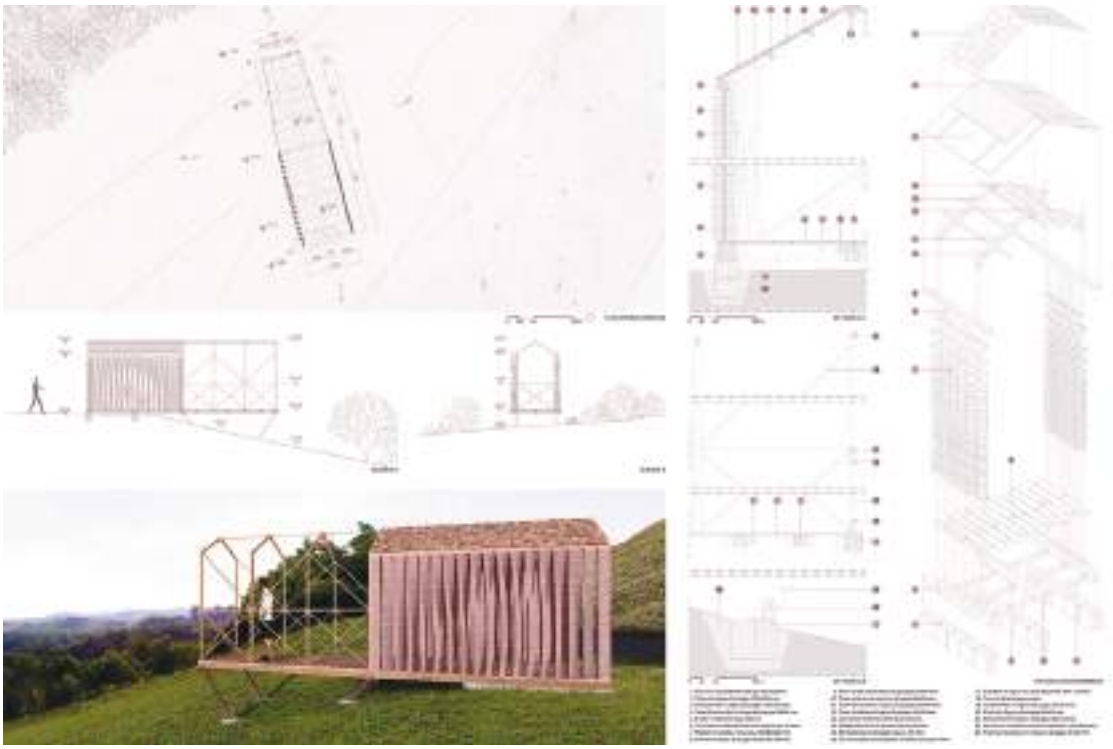

Fig. 3 | Design board of the viewpoint proposal of the winning team (credit: M. Gherardi, C. Goia, A. Marchesi, M. Puglielli and W. Tonelli).

Next page

Figg. 4, 5 | Comparison tables of the viewpoint design concepts (credits: see note 2).

of the CE, which is to design with a reduction in the consumption of material from the concept phase. This oversizing is undoubtedly linked to the need to draw attention to the viewpoint, making it visible, because the idea of the project partners requires it to be seen as an attractive element, acting as a sort of totem, representing the idea of environmental sustainability and promoting circularity.

In this sense, a general overview of the designs allows us to see whether and to what extent they have succeeded in explicitly conveying the principles of sustainability and circularity. While, as noted, the designs were developed in line with many of the principles of circularity from a technological point of view, this circularity was hardly ever explicit from a compositional/aesthetic/expressive point of view. In a sense, the waste from the supply chain, where used, has been so well integrated into the architecture as functional elements that its expressive and representative charge of circularity has taken a back seat. Consequently, this design experience opens up a


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Politecnico di Torino
Course DESIGNING AND DEVELOPING
CIRCULAR ECONOMY-2020

19 "BELVEDERE"
STUDENTS' PROJECTS

LOCATION
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number of reflections on the 'visibility' of circularity. If the aim of the project, as in this case, is also communicative, it could be effective to emphasise the fact that the materials are living a second/third/fourth life, perhaps trying to 'tell' more about their history, their origin.

This activity highlights how the transition towards a circular economy requires the development of new technologies for architecture and better processes for optimising materials and resources, opening up the possibility of new business models that encourage collaboration and the exchange of resources and skills between companies operating in very different sectors. At the same time, however, it is necessary to work on making the potential of this approach understandable, both socially and culturally, in order to respond to the need to use the resources of our planet more responsibly. As we all know, the challenge of circularity also, and most importantly, begins with the design activity. In this sense, it is important to consider methods and approaches for transmitting and experimenting with these principles in the training courses of those who are going to be designing the environment we live in tomorrow.

Final considerations and possible future developments | The experience brought results for all those involved: the university 'open to the territory' has taken on the responsibility of co-processing circularity and territorial development scenarios together with other local stakeholders; the companies were able to draw on diversified knowledge, with the final result of opening up new prospects for circularity and industrial collaboration; the students developed a critical sense and the ability to design circular economy scenarios in close contact with real 'challenges', global challenges promoted at international level and, at the same time, supported by local actions. The paper highlights how new projects based on the principles of circularity may be able to activate or strengthen networks of producer-stakeholders interested in stimulating virtuous development dynamics in an area rich in resources and characterised by a significant landscape value that has not yet been fully exploited.

The paper deals with a very topical issue, at the heart of the actions promoted by the 2030 Agenda (optimising local resources, rethinking the concept of waste, promoting low environmental impact architecture). The results of the research show how 'small-scale' intervention can promote local development, with results that can also be transferred to other contexts. The article provides ideas to fuel the scientific debate on the transition to alternative socio-economic models to those currently adopted, capable of directing actions towards closer interaction between the parties involved, optimising the use of resources, promoting synergies between production processes and cultural and social contexts. The article also looks at how to transmit this knowledge and the principles of circularity from an educational point of view, a debate that is as necessary and urgent as ever in order to equip future planners with new tools suitable for a circular transition.

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Notes

1) Examples of the same partnership include: CIBUS (CIrcular economy in the BUilding Sector from agri-food waste), research developed within the framework of the Bando Talenti della Società Civile (Civil Society Talents Call) promoted by Fondazione Giovanni Goria and Fondazione CRT, aimed at investigating the effects of the circular economy model on the design of innovative cross-sectoral processes between agriculture and building; Monferrato – Nut...urally – Mon-Nut, a research project within the framework of the 2014-2020 EAFRD programme, which aims to optimise hazelnut waste in the food, biomedical, cosmetic and construction sectors.

2) Students and Work Groups: G1_ J. Barbero, B. Benanchietti, R. Giannuzzi, A. Peluso; G2_ E. Campana, R. Cito, L. Clemente, L. Sanzo, S. Vialardi; G3_ M. Gherardi, C. Goia, A. Marchesi, M. Puglielli, W. Tonelli; G4_ S. Degiacomi, M. G. Pozzo, G. Mana, C. Morani, O. Palazzolo; G5_ K. Babenko, A. Barra, F. Calorio, C. Finotti, G. Fiocca; G6_C. Oceane Sido Lasseur, A. Perucchietti, L. Sanz Allona, Z. Emre Silan; G7_ R. Biondi, M. Leo; G8_C. Rampa; G9_ S. Candido, L. Cassina, E. Deffacis, E. Ferrero, G. Ferrero, V. Schio; G10_ D. Fossà, L. Gallinati, I. Giubellino, F. D. Moldovan, M. Troppino; G11_M. Barbirato, F. Innocenti, V. Nallo; G12_ B. Aimar, G. Autretto, J. Bono, G. R. Latina, M. Martina; G13_ A. Benigno, S. Biancifiori, F. Iacoboni, C. Massucco, A. Parvis; G14_ A. Barbato, A. Farina, T. Uriel Monteu Cotto, C. Patti, S. Valentini; G15_ B. Armano, M. C. Capocotta, M. Di Mauro; G16_ S. Roggia, M. Ronco, M. Salomone; G17_ E. Cerra, S. Fasano, V. I. Fissor, L. Insinna, V. Martone; G18_ A. Cavallini, S. Cavallini, R. Morgoni; G19_ C. Campolmi.

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STOP (-UP) THE DESTRUCTION
A design upgrade for the regeneration of devastated sites

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ABSTRACT
After an earthquake, the devastated/uninhabited city receives a new occupation: the provisional securing works that transform the image and the use of the places. One wonders about the possibility of considering these works as elements of regeneration of a landscape in which the community can still recognize itself. It is possible to re-read this type of interventions from an architectural point of view, interpreting them as parts of an installation capable of making the city usable. The investigative paper is supplemented by a design experimentation carried out in the city of Norcia, hit by an earthquake in 2016. In particular, from the securing project of the Monastery of Sant'Antonio, a generalization of the possibilities of intervention has been reached with the aim of rethinking the STOP-UP Vademecum cards (where STOP-UP stands for Schede Tecniche delle Opere Provvisionali e Usi Potenziali, that is Technical specification of Provisional Works and Potential Uses).

KEYWORDS
earthquake, devastation, dwelling, provisional works, stop cards

Maria Masi, Architect and PhD Candidate in Philosophy of Architectural Interior at the Department of Architecture – Department of Humanities of the 'Federico II' University of Naples (Italy), investigates on the condition of the post-disaster city and, particularly, on the possibility of identifying design practices aimed at avoiding abandonment and ensuring continuity of living. Mob. +39 333/30.44.930 | Email: maria.masi@unina.it

The structure of a place is not a fixed, eternal condition. The continuous and often rapid changes of space, however, do not imply the loss of the genius loci; the stabilitas loci is a necessary condition for human life (Norberg-Schulz,1979, p. 18) but the places have the ability to receive different contents, determined by the events that over time affect their social and physical structure. It is possible to consider time as a set of instants, of infinite temporariness of different lengths, which individually influence the life of a place and characterize a precise historical moment. The subdivision of the life of a space into 'temporariness' is not always evident: some of them represent an apparent void in the historical sequence in which destroyed, namely devastated parts of cities or entire territories are emptied. Earthquakes are part of the devastating temporariness that cities suffer: these traumatic events, totally unexpected, transfigure territories; they mark the memory of the place and of its community, influencing a piece of history. One would tend to see these events as real catastrophes, which stop time, destroy territories, annihilate human beings. Not surprisingly, the reflections on these places avoid dealing with the temporariness defined by the devastation and tend to focus their attention between the image of the past (as it was) and the projections on the future (as it will be), eluding the present condition. Temporary, unstable and difficult to define, this is considered a time in itself, extraneous to the life of the place and suspended from judgment and reflections on its future (Ferlenga and Bassoli, 2019, p. 274).

In this time, the city is a wounded body, but still alive. The trauma can be reread, in this sense, as a pretext for regeneration, since it returns changed contexts in which to operate in a renewed way. The anthropology of disasters has observed that there is a revelatory power within the traumatic event: in these liminal conditions, a particular energy is released which finds its space in the suspension from the norm, suggesting the possibility of unprecedented scenarios (Ferlenga and Bassoli, 2019, p. 274). Rereading the trauma as an opportunity for regeneration, capable of giving a second life to places, means rethinking the current practices implemented for the devastation, means designing a temporariness endowed with intrinsic beauty. Architecture is therefore called to respond wherever an event upsets the built order of a community. Where populations lose the implicit functions of dwelling, the architect's task is to restore, through the design and reinterpretation of a semantically renewed space, the processes of orientation and identification (Norberg-Schulz, 1979). Architecture has the duty to structure significant and non-fragmented places; to promote proposals aimed at regenerating the relationship between humans and the built environment compromised by trauma.

The Meantime | The suspended time[1] of the post-disaster is inevitably linked to a 'before' and projected towards an 'after', but it welcomes a temporariness that still contains life. The trauma strips parts of the territory and leads to the brutal relocation of its population elsewhere. In these situations, the present seems to be cancelled and a scenario that we can define as 'empty' opens up. The emptying of these places is an effect of the destruction also generated by the need to secure the ruined factories. In

the absence of humans, there is space for temporary works that perform purely technical and functional tasks, which seal portions of the city held together by a new skin.

Currently, the works that 'occupy' this time interval support the building and attempt to hold together the fragments of physical destruction. The provisional works[2] to secure buildings insist on the image and use of the places. What we observe in the devastated cities is a completely new landscape, overwritten, with an autonomous aesthetic: «[...] new, more abstract figures cover the crumbling buildings: harnesses, belts, wooden beams, yellow or red fireproof boards, pipe trusses – dense joints like hatches overwrite the architectural features of the facades» (Tagliabue Volonté and Bassoli, 2017, p. 75). It is a silent landscape, yet, it is the real one, which will characterize these cities for a very long time and which will inevitably influence their reconstruction. «If we have been able to detect it, redesign it and tell it, we can say that this landscape is already the new city» (Tagliabue Volonté e Bassoli, 2017, p. 75). Therefore, the city is not destroyed but transfigured, it is covered with a new skin, wrapped in a dress overwriting it with new life. Today, it communicates new messages, makes room for new elements that offer themselves as new references, new orientation systems for the population. What has just been described belongs to the condition of Meantime: a present time where the dialogue between memory and waiting is renewed.

The Meantime is the time in which it is possible to develop design practices that allow human beings to implement the necessary processes so that it is possible to continuously inhabit the destroyed places. The scaffolding, the shoring, the ribs, «[...] take on an exceptional symbolic character, precisely because they represent a help in a delicate moment and enclose the energy and the possibility of redemption» (Tagliabue Volonté and Bassoli, 2017, p. 25). This way of reading the provisional works leads to some reflections on the concepts of temporariness and provisionality. The provisional – from the Latin pro-videre, to look forward, to see beyond – arises in anticipation of future interventions. A change of perspective is therefore proposed for these works, assigning them a meaning other than temporary. Anything occurring in a specific limited time is temporary, like the projects in the destroyed places. Continuing to consider these works as provisional, keeps offering an altered and partial vision of their potential. These are indeed elements that do not only freeze the destroyed reality of places, but can also allow for a regeneration. These works, if thought of as temporary, can participate in the overwriting of the urban pattern (Corboz, 1983), be part of the physical stratification of places and their figurative memory. In this 'apparently truncated' condition, there is a different operation (Marini, 2010) useful to guarantee continuity of living over time in all the destroyed places, starting from the reinterpretation of the role of the technical works that populate them.

STOP | The 2009 earthquake in L'Aquila marks a fundamental point for reflections on provisional works. The quake not only did compromise the viability and safety condition of the buildings, but also the usability of the routes through the inhabited areas. In

particular, for the historic center of L'Aquila, the need for rapid intervention to safeguard these assets was immediately evident; we found ourselves in a position to act on a large scale and in critical operational scenarios, which required speed, effectiveness and, as far as possible, uniformity of action (Ministero dell'Interno et alii, 2010, p. 39). Numerous urgent technical rescue interventions were necessary and the establishment of the Fire Brigade Provisional Works Coordination Unit responded to the need to implement massive and extensive operations to secure buildings in Abruzzo hit by the April 2009 quake (Ministero dell'Interno et alii, 2010, p. 39).

From these premises, the intuition arises of creating a vademecum, which can be used in the field by operators, and be of support to operational decisions, as well as an instrument for enhancing and capitalizing on the observations and suggestions for improvement put forward by the technicians during the operations. The vademecum made it possible to systematize the very rich know-how of the National Corps and to define the necessary uniformity of language and executive techniques (Ministero dell'Interno et alii, 2010, p. XVI). In order to capitalize on the lessons learned from this experience, a publication was drawn up by Professor Stefano Grimaz of the University of Udine, in collaboration with the Ministero dell'Interno (the Italian Interior Ministry) and the Corpo Nazionale dei Vigili del Fuoco (Italian Fire Fighters Corps). This publication, meant to be used as a reference for future similar scenarios, was entitled Manuale delle Opere Provvisionali (Handbook of Provisional Works). The urgent technical intervention in seismic emergency expresses the logical and technical-scientific path that has supported and guided the coordination team during the provisional works. The publication is divided into two volumes, the Handbook and the Vademecum STOP, which respectively address the technical illustrative and operational components. While the Vademecum contains the entire collection of STOP cards developed for the various types of intervention, the Handbook has the main function of illustrating and explaining the design choices reported in the Vademecum (Ministero dell'Interno et alii, 2010, p. XVI). The publication describes the principles that have guided the standardization of provisional works, in relation to the specific damage they are applied to (Fig. 1).

The handbook contains the systemic description of the design criteria adopted for the individual provisional works, the illustration of the methods of use of the cards in the field, the detailed presentation of the executive operations relating to the construction of a provisional work to highlight critical issues and solutions adopted (Ministero dell'Interno et alii, 2010, p. XVI). The need to standardize building securing operations as much as possible has suggested resorting to a pre-design of these works for reference scenarios. In this sense, the STOP Vademecum can be interpreted as a catalogue of pre-set works in response to performance needs and as a function of technical variables observable in the field. It is organized in technical sheets with drawings, schedules and tables that represent a reference to find safe and standardized solutions in a short time. Given the need to secure buildings in a limited time, uniform solutions

Fig. 1 | Frontispiece of the Manuale delle Opere Provvisionali (Provisional Woks Handbook) and the Technical Shett of wooden retaining shoring.

Fig. 2 | Church of Sant'Agostino, Norcia (IT), December 2019.

have been devised in terms of construction methods and techniques. The choice of materials is also simplified by considering factors such as rapid availability and manoeuvrability.

The cards were structured following the key points of the reasoning to implement in the field and organized according to three steps: choosing the work type based on a preliminary identification of the kinematics to be guarded; sizing, with the help of appropriate abacuses and tables; executing, supported by warnings on global and local critical issues to be managed, with indications on the construction details to be adopted, to eliminate or to control structural problems (Ministero dell'Interno et alii, 2010, p. XVI).

New decor-active order | The safety projects carried out starting from the application of the cards described above offers a complex system that changes the face of places (Fig. 2). It is possible to re-read this type of interventions from an architectural point of view, interpreting them as parts of an installation capable of making the city usable, renewing its story, and temporarily adding up to its plan. Designed and applied at a later time for the construction of the architectural corpus, temporary works reread the characteristics of what already exists: they highlight the peculiarities of the space for which they are designed and work critically on the memory and meaning of the same (Saitto, 2017, p. 141). They can be interpreted as bearers of decor[3], of a new dignity that the still wounded city demands and deserves.

The recognition of these structures is not always guaranteed as, to the injured eye, the metal and wooden meshes are the mirror of structural damage. We can define this system as the skin of the city that covers what already exists, pointing out tears and landslides, while denying the history and opening a new dialogue with the urban space. Its narration depends on the technological and linguistic catalogue that the operations of securing offer. Analyzing the seismic events that hit Emilia-Romagna in 2012, Nina Bassoli detects, designs, and talks about the technologies used by the Fire Brigade and the Civil Protection, showing a large 'stylistic sample'. In the most damaged and unsafe areas, a cast of the building seems to overlap the stuccoed curtains of the buildings. The relief of the elements gives an image of great strength and expressiveness. The shoring makes palaces resemble fortresses, like vigorous medieval buttresses (Tagliabue Volonté and Bassoli, 2017, p. 75).

Therefore, new perspectives and new landscapes open up, conditioned by the safety apparatus that becomes precious encrustation, narrative plot underlying the story (Saitto, 2017, p. 138) expressed by a waiting city. There are several attempts to document the transformations that the territory undergoes in the immediate post-disaster. In many cases these operations concern photographic stories where the photographer's gaze immortalizes an objective present condition, offering an interpretation of reality. This is the case for the photographic enquiry carried out by Michele Nastasi, published in Suspended City: L'Aquila after the earthquake (2015). The photographer's work represents L'Aquila in its condition as a city of the Meantime: a landscape of set

Fig. 3 | Identification of the crossing axes based on the strategy of Entering: the city becomes an element of connection between the internal life and the new settlements outside the walls.

Next page

Fig. 4 | Points of interest intercepted by the first crossing axis.

Fig. 5 | Points of interest intercepted by the second crossing axis.

Fig. 6 | Points of interest intercepted by the third crossing axis.

up ruins. The collection of photographs does not document the tragedy of the earthquake, but offers the vision of a living city; if this is a wounded body, the safety interventions can be considered prostheses, bandages, dressings and that is why the photographic reportage, by analogy, was accompanied by illustrations of body parts and surgical implants made by Alessandro Busseni, who immediately show the analogy between provisional works and the medical imagination (D'Alfonso, 2015, p. 126).

These prostheses are the raw material the architect has at hand for the transformation and the project in the Meantime. He also undertakes a preventive operation, since it is aimed at preventing or reducing abandonment, a concrete example of taking care, which cannot pursue forms of balance. Rather, in the face of uncontrolled chaos and the impossibility of restoring a lost order, [it must be the spokesperson for] a new contemporary harmony by adding to the disorder, setting an unknown agreement between the opposing parties (Giardiello, 2017, p. 76). The positioning of the scaffolding and all the safety measures, as provocative actions of increasing complexity, of densification, can reactivate existing spaces, qualify them and [induce the human being] to otherwise lost actions and reactions (Giardiello, 2017, p. 92).

Norcia, city of the Meantime | The city of Norcia is identified as a concrete case of a city of the Meantime, set up by the apparatus of provisional works: an urban center living awaiting for new possibilities, where a research design experience has been conducted[4]. The city of San Benedetto suffered three earthquakes: on 24 August, 26 October and 30 October 2016, with a magnitude intensity of 6.5 which produced the main

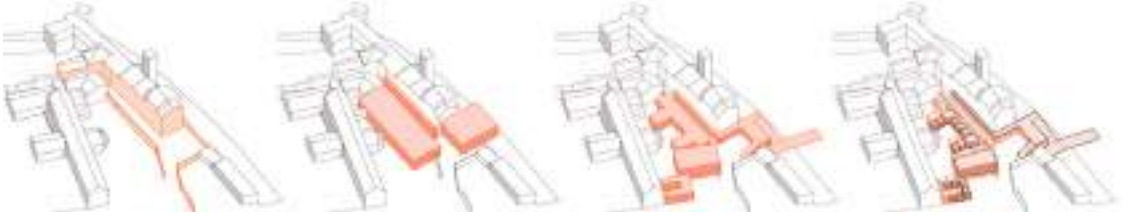
damage. Although the earthquake did not cause deaths, the historical, artistic and religious heritage was mostly lost: the Basilica Church of San Benedetto completely lost its shape after the collapse of the central nave and the eighteenth-century bell tower; the roofs of the Co-Cathedral of Santa Maria Argentea and the Churches of San Francesco and Sant'Agostino collapsed; the Sanctuary of the Madonna Addolorata and its bell tower were totally razed to the ground. Deeply damaged from a structural point of view, the Benedictine Convent of Sant'Antonio is currently uninhabitable while preserving ancient manuscripts and evidence of Benedictine work over the centuries, trapped under the rubble. Portions of the medieval walls were razed to the ground.

As in other Italian situations, the life of the city became polarized immediately after the trauma: the evacuation operations started in the days immediately after the third quake, the community was relocated to new sites designed ad hoc, out of the red zone. Before 2016, Norcia was a small village enclosed within its walls. The strong introspection meant that the movements from the seven access gates to the city were all facing the central squares, marked by the facades of the ancient churches which, with their roofs and high bell towers, represented landmarks along the internal streets. Each sign in the city was a symbol as well as a narration of that precious picturesque village. Today, the signs have increased and are symbolizing something that happened. Norcia changed its story by adding to it. The collapses generated breaks in the fabric; the historical routes have been replaced by alternative routes which, crossing the city, connect it to what is developing outside. Around the walls, there is a new reality characterized by areas that host temporary homes.

These, considered new poles, have 'forced' the city to open and look beyond the medieval layout. All the activities in the historic center have been transferred to temporary structures outside the walls and the internal roads have been replaced with paths entrusted to the ring road. The imposing entrance gates, a memory of the medieval city that closes for protection, today appear covered with a support pad with steel reticular structures and wooden decks.

On the Porta Romana [Roman Gate], a new yellow wooden base welcomes tourists with all the useful information: suggestions for a good butchery, tracing the pre-existing activities in the new circuit around the walls, etc. The roofless churches today have a shiny metal roof, higher and wider than the previous one: it is a new landmark that reflects the sun's rays and dazzles the horizon against the backdrop of the green Monte Vettore. On the side façade of the Church of Sant'Agostino, the metal tubes stop the entrance, while along via Anicia they alternate space and new shadows. Those who skirt it, almost without realizing it, approach to enjoy the coolness or walk away looking for a ray of sunshine. The wooden props on the facades redefine the margins of the old parvises, which today are an opportunity for parking in the historic center.

In the city of the Meantime, the preceding signs give the story a melancholic guise; the new skin remembers the trauma and the loss acquires a new meaning. In Norcia,



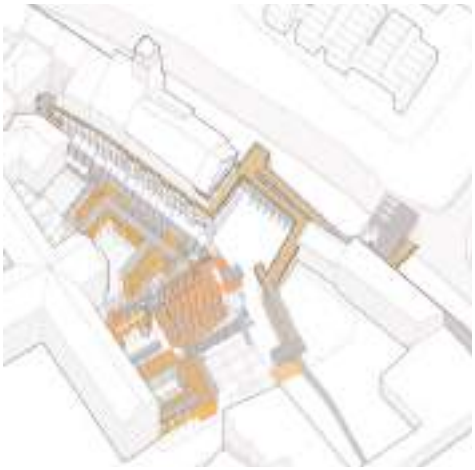


Fig. 7 | Concept and genesis of the project: fragile margins and safety measures.

Fig. 8 | Project axonometry: habitable tectonic system.

Fig. 9 | Masterplan.

the extensive damage to the cultural and religious heritage shapes up a city that Paolo Rumiz (2019), in Il Filo Infinito, comes to define as blasphemous.

The structure of the Monastery of Sant'Antonio incorporates a section of the northern city walls. The earthquake of 30 October 2016 caused a sudden shift of the floors. For this reason, the monastery, still standing after the damage of the earthquakes of the same year, was definitively considered unusable. The religious community that used to live there, very active in the area, was forced to leave these places and found hospitality in the Monastery of Santa Lucia in Trevi. From the beginning, the stay in the host convent was seen as temporary, waiting to be able to return to Norcia and share the post-emergency suffering with the population. The city is the protagonist of an event that defies the split between communities and rubble: the nuns chose to stay inside the walls and agree to live in a temporary settlement among the ruins of the structure of Santa Maria della Pace. This gesture stands in absolute contrast to the proce-

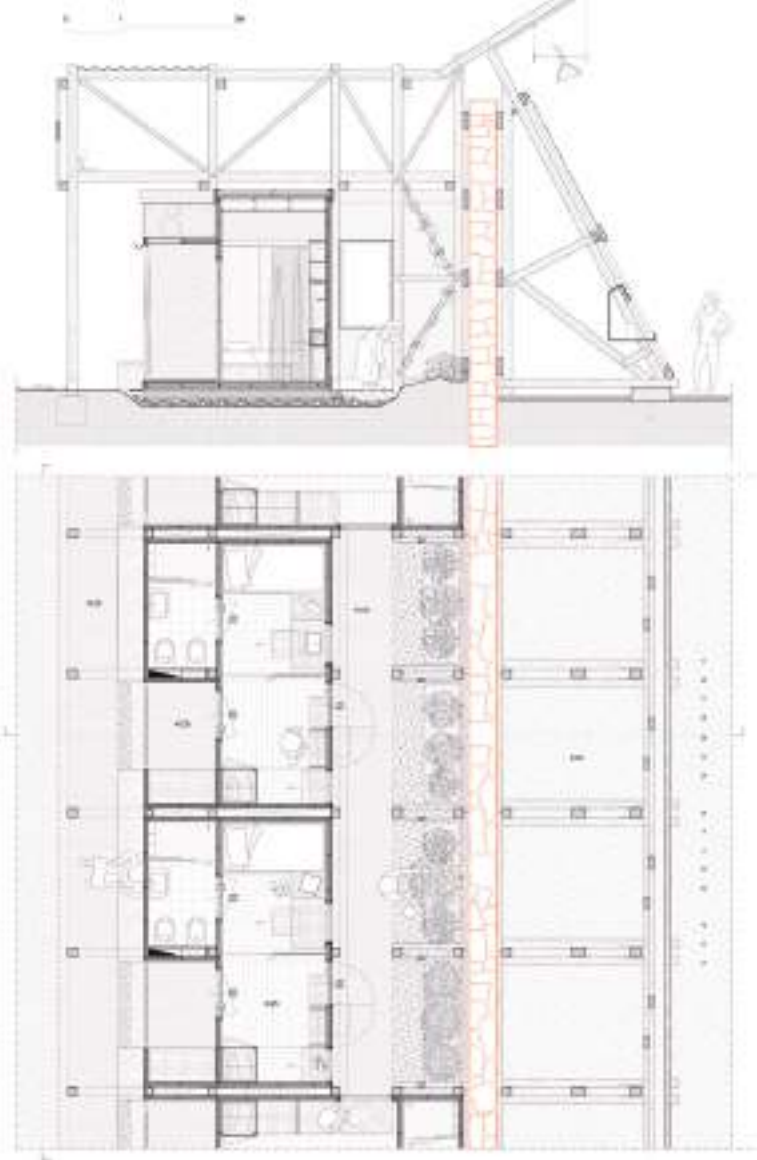


Fig. 10 | The safety system and the convent cells.

dures that usually take place in Italy in post-disaster situations and triggers a short circuit in the practice of the second emergency. This is not an external settlement, consisting of prefabricated houses with a front garden, fences and streetlamps, but the assembly of standard containers, like the technical ones of civil protection. In this intervention we do not see the separation between temporary works and life: in equipping the metal tubulars with bells, the Benedictine nuns of St. Anthony demonstrate the possibility of coexisting with trauma and bring about a recovery. The new Norcia is a city made of rubble, collapses, scaffolding and props.

A project for the temporary regeneration of Norcia | The description of Norcia as a city of the Meantime opens to the possibility of outlining a regenerative strategy which, starting from the provisional works, considers the body of the city as an element of

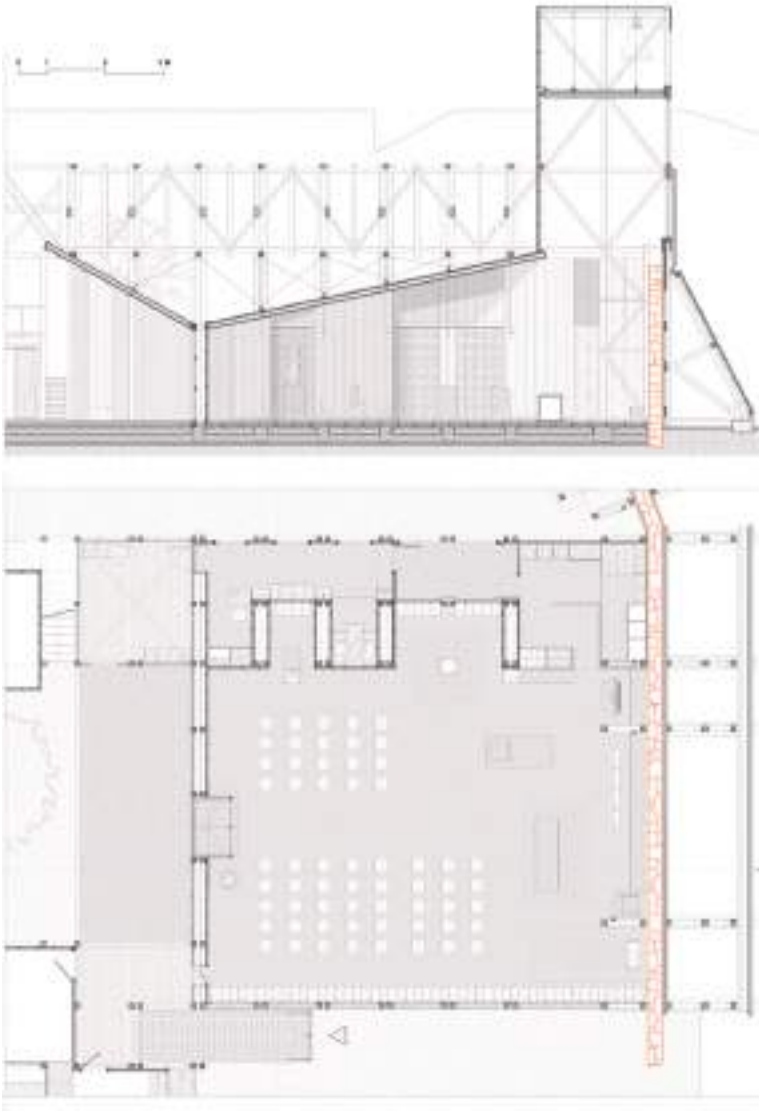


Fig. 11 | The safety system and the church.

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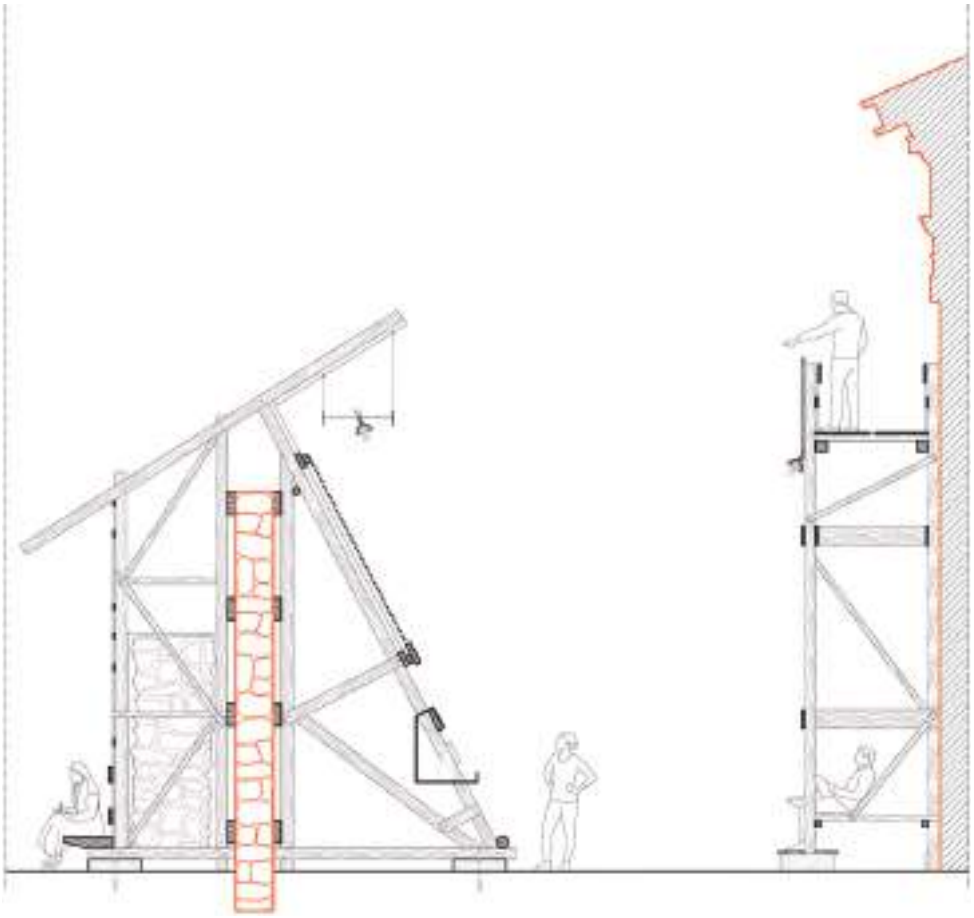
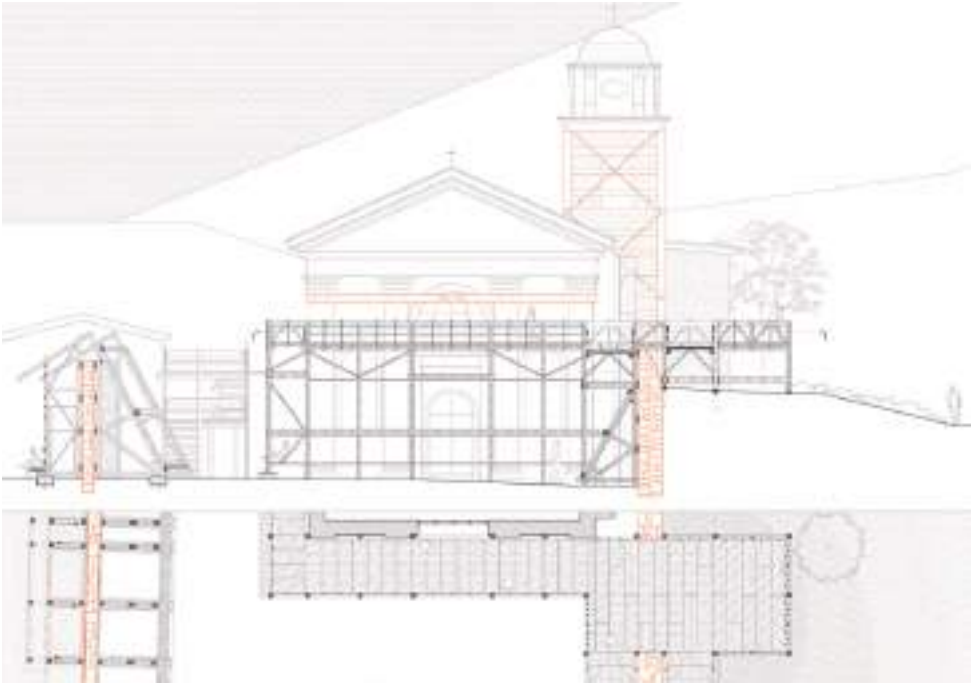
Fig. 12 | The safety system and urban layout.

Fig. 13 | Temporary redesign of the façade of the church of Sant'Antonio Abate.

connection between the internal life and the new settlements outside the walls. An operation that allows the population to continue to recognize themselves and, in a new way, re-locate themselves within the historical fabric and re-discover it (Fig. 3). Following a process of continuous rediscovery of places, three axes that cross the whole city, intercept the squares with transfigured edges, join different points and connect what has been relocated to the outside are identified. The first axis connects the historic center with Stefano Boeri's multifunctional center. Crossing Porta Meggiana and intercepting Corso Sertorio, this new path leads to the exit towards Porta Romana (Fig. 4). The second axis connects the system of Piazza San Benedetto and the set up Porta Romana, reaching the external prefabricated buildings destined for restaurants (Fig. 5). Finally, the third route connects the prefabricated buildings for the shops and butchers in via della Stazione with the civil protection containers, crossing Porta Asco-



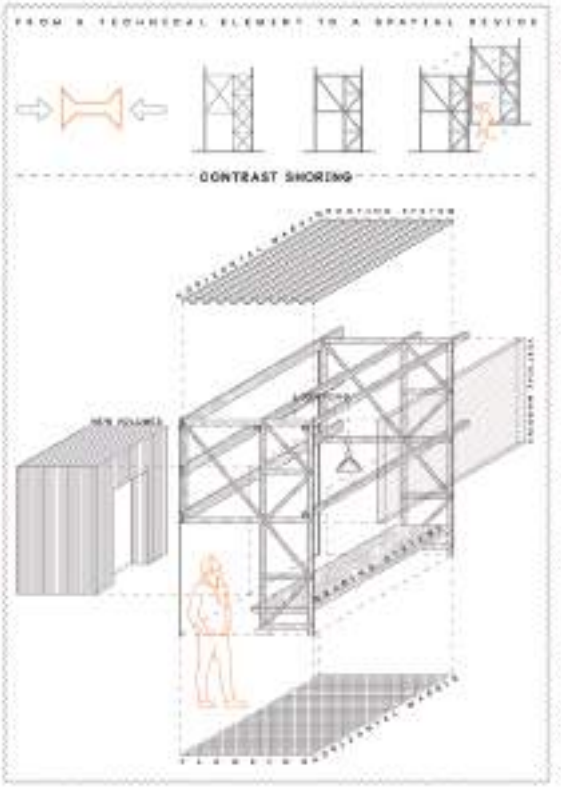


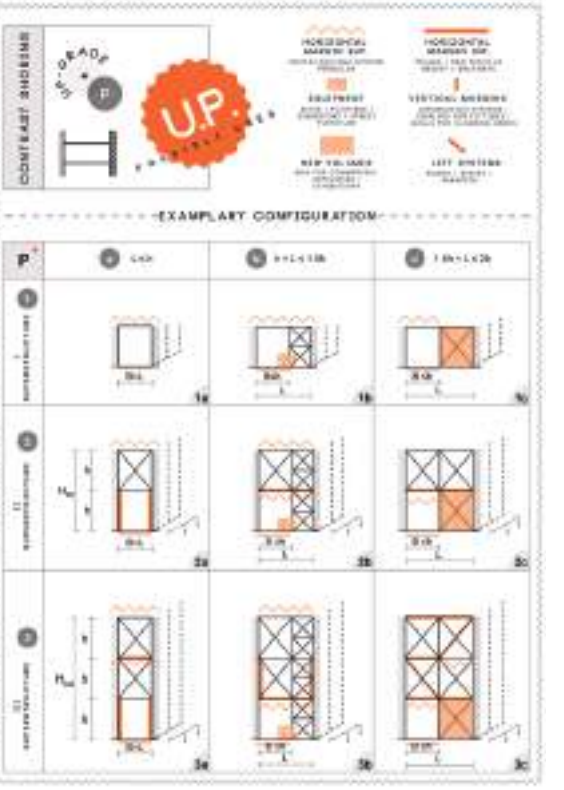
lana and the new passage near the Benedictine Monastery of Sant'Antonio. The head of this third system currently houses the temporary container monastery of the Benedictine nuns, the historic monastery and the adjacent church, a part of the red zone and the new opening in the perimeter walls (Fig. 6).

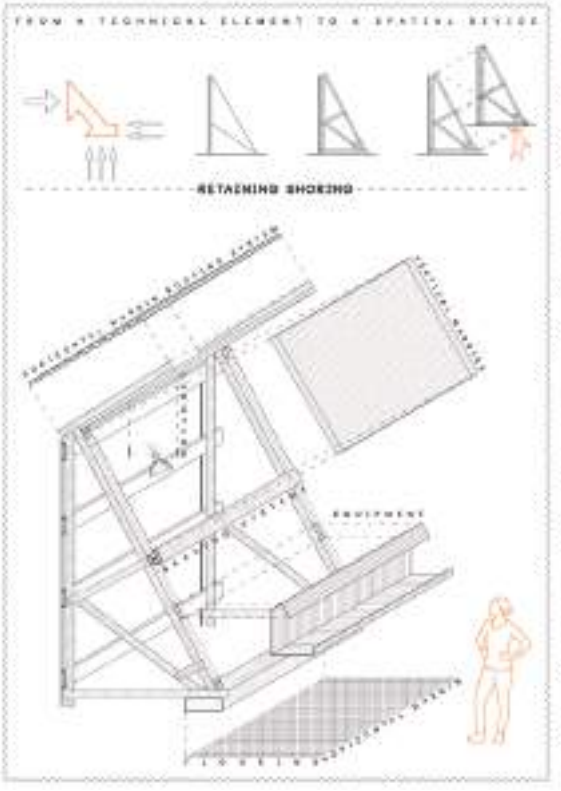
The project is linked to these themes and makes it its starting point, accepting the request for a temporary monastery by imagining a new role for the provisional works, currently necessary to preserve the integrity of the Church of Sant'Antonio Abate. In this sense, the work presented is an attempt to demonstrate that it is possible to design with temporary works by re-reading them in terms of use (Fig. 7). The project considers the margins to be preserved and overcomes the idea of securing it by transforming it into a space-generating element, habitable. The work starts from the identification of voids as in the classic type of the convent. The system of cloisters organized by degrees of intimacy is identified and the space between the body of the building and the provisional works is considered habitable. The safety device develops over the sections to be preserved: the walls of the private garden to the south, the monastery wall, the new opening in the historic walls, the red area to the north and the building of the historic convent. The walls are not considered as separating elements of an inside and an outside: the project rather looks at the double system that this sign generates (Fig. 8). If, on the one hand, it was decided to reorganize the open spaces of the convent, the cloisters, on the other hand, the urban open space system, the new squares, the ascent through the door and the connection with via Circonvallazione were redesigned.

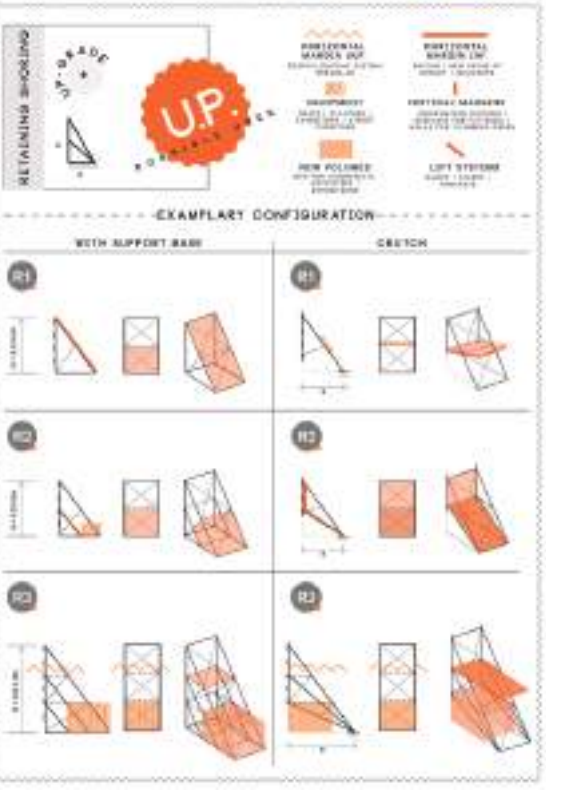
The new enclosure, developed around the crumbling wall, holds together this double level of design: a system of voids, characterized by different degrees of intimacy (Fig. 9). Access to the monastery takes place through the body of the securing works, which take on thickness and define the threshold. The gaze opens onto the first void of the monastery: the garden. A porch filters access to the kitchens, which visually relate directly to the cultivated area. The body of the refectory, set against the perimeter wall and set back from the kitchens, generates a covered service access. The equipment brought by the provisional apparatus develops into the garden: containment crates for the conservation of collapsed stones, wooden seats and shelters. The portico, which welcomes the visitors, accompanies them up to the second open space. The cloister, designed in relation to the existing building, houses the nuns' cells on the perimeter. The degrees of intimacy multiply if we observe how the cells aggregate with each other and the space they occupy in the provisional system. The void between the cell and the wall is transformed into another cloister, with a different level of introversion, guaranteeing the nuns a space characterized by greater privacy (Fig. 10).

The church is the center of the composition. Its edges are configured through the use of the main materials of the project: stone and wood. The secured wall is fully visible and becomes a background elevation while a new wall is created from the stones to be preserved. Stored in metal cages, the stones are arranged in such a way as to filter the light allowing the entry of few reflections. The element that allows light to en-


FROM A TECHNICAL ELEMENT TO A SPATIAL DEVICE
CONTRAST SHORING


CONTRAST SHORING
U.P.
EXAMPLARY CONFIGURATION


FROM A TECHNICAL ELEMENT TO A SPATIAL DEVICE
RETAINING SHORING


RETAINING SHORING
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EXAMPLARY CONFIGURATION
WITH SUPPORT BASE
CRETCH

ter from above is the bell tower. On the outside, a system of wooden strips covers and hides the stones and on the short side, marking the entrance. The third margin is a complex space that houses the sacristy and, at the same time, the system of chapels (Fig. 11). In the case of the church, the work of securing becomes a spatial reticular from which the attic is hung. The shops are part of the system of public spaces that connects the religious community with the civil one. A system of equipment for display and sale defines the external perimeter of the shops and makes room for the thickness of the provisional works.

The exhibition system concerns the more public part of the project and works starting from the double safety system that faces one on via delle Vergini: on one side the wall of the former Monastery of Peace supported by props, on the other the uninhabitable Monastery of Sant'Antonio wrapped in scaffolding. This allows us to imagine the layout on two levels: a lower one for direct knowledge, a higher one in which one imagines being able to return information about the city that can be found directly due to the change of the point of view. The prop system becomes a support for display while the scaffolding is an element of use (Fig. 12). The lower horizontal currents that brace the shoring host displays to hang in which to show finds and fragments of damaged historical elements; on the upper diagonal braces a system of nets allows the hooking of tarps or banners. The high-altitude path obtained in the scaffolding of the monastery ends with an element of descent, an observatory straddling the red zone. Once again, a change of perspective occurs: you can enjoy the monastery garden view from above, getting to know the inaccessible area, following the progress of the evacuation or the reconstruction works. The opportunity to add an access to the historic system of Norcia's gates is given by the collapse of a portion of the city wall in correspondence with the square in front of the Church of Sant'Antonio. The physical limit that separated the city from the surrounding area is overcome.

Beyond the collapsed wall are now housed the temporary settlements of the Civil Protection and the prefabricated residential buildings. The passage represents the possibility of reconnection between the historic city and the expelled community. The new gate is not a single element but a system of walkways that cross the passage and accompany the visitor who enters from via Circonvallazione. The system climbs over the wall, overcomes the jump in altitude through a ramp that draws a new temporary elevation of the city towards the outside. At the end of the ramp, a platform guarantees a break to observe the territory from a new, higher point of view. From here the elevated path branches off on one side at high altitude along the façade of the church, on the other, it leads to the new square through other ramps. The high-altitude system that redesigns the facade of the church allows us to look inside and get to know the historic building from above

Fig. 14 | STOP-UP card for wooden contrast shoring.

Fig. 15 | STOP-UP card for wooden retaining shoring.

(Fig. 13). It superimposes a new layer to the rhythm of the elevation, it does not deny its history but renews and enriches it, even if temporarily. The structure of the ramps leading to the new square is the prop system that secures the wall of the private garden. The door system has two covered headboards marking the entrances.

Designing within the city of the Meantime means working with provisional works to generate habitable spaces. For this reason, every intervention for the Meantime is configured starting from a principle of temporariness. We cannot think that these interventions are a substitute for reconstruction, permanently modifying the values of the historic city. They give dignity to the space of the devastated city through a re-appropriation of the places by the community and accompany it over time to the reconstruction.

STOP-UP | The design experimentation conducted allows a general reflection on the possibilities of intervention in the places hit by the earthquake. The idea is to rethink the cards of the STOP Vademecum and transform them into a new application code called STOP-UP, an acronym for Technical Data Sheets of Provisional Works and Potential Uses. The expansion of the cards through the possible uses of the structures not only takes into account the need to compensate for structural damage, but also considers the provisional works as generating elements of living space. The proposed upgrade transforms technical works, useful for repairing, into complex elements capable of being repaired. Interventions that can be interpreted as an opportunity in a city with a renewed face, which opposes the processes of progressive dispersion of the population and activates their involvement.

For each alternative proposed as a technical response from the STOP card, the Upgrade provides for a different integration that takes into account structural and dimensional issues but which, at the same time, is able to exploit the opportunities that the system offers, re-reading the space generated by its deployment. (Figg. 14, 15). Overcoming the schematization linked to the analysis of structural behavior, the up-grade works on space and on how the individual elements are able to generate it. The work presented refers to the categories of the STOP cards with respect to the dimensional data and the number of elements to be repeated based on contingencies and works to propose, for each declination envisaged, an updated catalog integrated with appropriate design possibilities. The Up-grade works on three categories of supplementary elements: horizontal and vertical margins, lift systems and equipment. This change of perspective is transforming technical elements into habitable spaces useful for regenerating and assigning a new meaning to the places where they are located.

Notes

1) Regarding the concept of suspension, the Milan Triennale in 2018 launched a call to collect documentary and design material in order to understand the state of the places of suspended time and

the new balance of local communities affected by the recent Italian earthquakes. Some of the results of this initiative are collected in Ferlenga and Bassoli (2019).

2) The expression Temporary Works «[...] in the construction sector, indicates auxiliary works of a temporary nature, such as ribs, scaffoldings, shoring, excavation reinforcements, etc.». For more information see: Treccani – Enciclopedia online, *Opere provvisionali*. [Online] Available at: treccani.it/vocabolario/provvisionale/ [Accessed 14 July 2021].

3) A specification is proposed below for understanding the etymological differences between ornament and decoration: « [...] with reference to architecture, the two etymologies are independent. In Latin, 'to adorn' means to provide, arm, provide money or men […] and ornament was, in this sense, everything that was offered; while, by extension, to adorn could mean to adorn, or to embellish. Decorating comes from the simplest decere: being worthy, appropriate, so decor was all that corroborated these qualities» (Rykwert, 1993, p. 12). «The term ornamentum can be considered incorporated in the broader concept of decor, in spite of a current use of the two terms which sees decoration as something more frivolous than the first. [...] Decoration differs from ornamentation and cannot be considered superfluous because it is convenient, due to the formal interpretation given to the function, and from the point of view of the structural order, the appearance of the materials and their arrangement» (Saitto, 2017, p. 136).

4) The research starts from the Master's thesis work in Interior Architecture and Set-up conducted by the writer in 2019 at the Department of Architecture of the 'Federico II' University of Naples. The thesis entitled 'Abitare il Mentre – Il Progetto del Monastero Temporaneo di Sant'Antonio a Norcia' was followed by Proff. P. Giardiello (rapporteur) and M. Santangelo (co-rapporteur).

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AFTER LOCKDOWN
Light regenerative set-up and re-design of the public space

Roberto Bianchi

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ABSTRACT
The permanent side effects of the lockdown, due to the spread of Covid-19, left our cities empty and silent leading us to a reflection on their future and ours, in terms of public spaces for us to inhabit and regenerate. This essay describes a few case studies and their unique modalities of adopting 'tactical' set-up strategies, through bottom-up procedures and top-down solutions. These case studies could be an example of regeneration of the post-Covid-19 public space, according to an innovative idea of the 'culture of living' which gives a 'new life' to marginal or neglected places. This contribution wants to outline some distinctive features of the strategic actions which can be useful to those who deal with the enhancement, upgrading and management of places of common interest.

KEYWORDS
exhibit and public design, DIY, lockdown, temporariness, low-strategies

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The exceptional historic moment that we are experiencing gives us a chance to observe collective living from a different point of view. The permanent side effects of the lockdown, due to the spread of Covid-19, left our cities empty and silent leading us to a reflection on their future and ours, in terms of public spaces for us to inhabit and regenerate. American researcher Richard Florida, who studies social and urban dynamics, linked 'creative class' with 'urban regeneration', claiming that, after the pandemic phase, cities will be able to thrive through different and alternative forms of living in social spaces (Florida, 2003). In a recent interview, Florida said that we must experiment through the so-called 'tactical urbanism', a way of regenerating underused urban areas; he was thinking of parking lots, abandoned properties and all those spaces that can be converted for active public use (Molinari, 2020).

Coronavirus has accelerated trends that were already in place in many northern-European countries, where the city is imagined as an 'archipelago' of self-sufficient micro-districts and everything we need is within a short distance, on foot or by bicycle, according to the '15-minute' rule. These countries plan to upgrade peripheral empty urban areas through 'tactical' interventions – a new mode of action that is simple, cheap and quick to realise (Stefanelli, 2021). The socio-economic and healthcare crisis produced by the pandemic has heavily put to the test our cities and the overall quality of our life, on the one hand. On the other, it has offered an opportunity to rethink the 'porousness' of the urban public space quickly and strategically thanks to the redefinition and redistribution of the human density, the identification of new marginal areas needing an upgrade and the localisation of shared urban practices that guarantee new services and activities in communal spaces (Agnoletto, 2020). The young architects' collective, Orizzontale, which deals with the upgrade of neglected spaces, states that the events linked to the global diffusion of Covid-19 in the first half of 2020 caused, among other things, a sudden and explosive diffusion of temporary/adaptive/tactical intervention practices on our cities (Orizzontale, 2020)

Measures of domestic confinement and isolation, which were introduced with the aim of containing the spread of the virus, favoured two different aspects: the sense of community, through the unexpected rediscovery of private or semi-public spaces for social bonding such as balconies, walkways, courts, terraces and communal gardens which preserve, ease and trigger new forms of sociality; the necessity of finding quick and relevant set-up strategies which granted social distancing while activating new modes of intervention for the re-design of public spaces and the upgrade of the collective spaces in decay (Nicolin, 2020). The necessity of 'making space' has generated temporary strategies and additional insertion practices which materialised into strategic, hybrid, adaptive, flexible and cheap actions, opened to social interaction and functional promiscuity and characterised by their diversity. These solutions are reactive claims of public space which trigger a contamination effect, are quickly repeated and offer new scenarios of experimentation, reuse and upgrade of space itself. This kind of pop-up solutions has demonstrated the ability to accelerate change and act as

Figg. 1-5 | Orizzontale, 'Prossima apertura', Aprilia 2021 (credits: A. Vitali; courtesy of Orizzontale).

regeneration catalysts. The public space has been transformed in a great playground with a cheap connotation, subject to an essential system of predefined and juxtaposed elements, regulating the use of space and the layout of the paths.

There are numerous examples of urban actions, made internationally during the pandemic with minimum investments and small-scale interventions, which have promoted inclusiveness in temporary playgrounds as a regeneration strategy for collective spaces. Thanks to the UN support, numerous private nonprofit organisation, in agreement with local communities and authorities, have experimented with new models of itinerant playgrounds to slowly restart the social processes, in complete safety and following the procedures of Covid-19 containment, even in countries with little economic resources (Harrouk, 2021). In the most neglected areas of countries such as Vietnam, Bangladesh and India, the itinerant pop-up playgrounds have systematically appeared. They are made with recycled elements and natural materials requiring little maintenance. Parking lots, abandoned areas in highly populated parts of the city and peripheral areas near the informal urban voids have transformed into small temporary devices, easily accessible for children to play in total safety. In these interventions, very simple elements are used and combined with each other in original ways. They refer to an essential compositional code and to a non-predefined hierarchical scheme (Anderson, 2013). Some of these are: coloured flags attached to road bollards to divide the playground areas; recycled tyres, used for jumping games; nets and ropes attached to temporary wooden scaffoldings for acrobatic climbing; recycled pallets to create tables and temporary seats. During the pandemic emergency, these types of playgrounds, distinguished by simple actions and instant forms of participation, have proven socially vital for entire communities all over the world.

In our country, among the most popular strategies adopted to guarantee a re-functionalisation of public spaces, for outdoor activities done in total safety, we can spot two light and punctual actions on a small scale of intervention. In stations and shops, as well as museums, markets, post offices and supermarkets, a series of temporary devices for social distancing have been used, such as polycarbonate panels, pavement marking, mainly created with tape, stickers and polychrome paints. In businesses like bars, cafés and restaurants with permission to occupy the public space in front of their premises – usually destined to parking cars – temporary structures for reception purposes were installed. This outdoors, mostly made with platforms, tables, seats, transparent walls, shade umbrellas, movable shade canopies and flowerpots, might not have a suitable design for the urban context, but they considered light and temporary installations: they are often built by the business owners and are realised with a small budget.

The two light actions of set-up and re-design, with their immediate, contained and reversible features, highlighted how to deeply transform the usability and spatiality of places of social interest. Making Space has therefore produced some remarkable advantages: new forms of negotiations between privates and public authorities for terri-

Figg. 6, 7 | DettoFatto, 'Lady flower', 2015 (credits: L. Caruana; courtesy of DettoFatto).

torial management; original and synergic cooperative systems between individuals; flexible project solutions, easily repeatable in various contexts and levels of temporariness; experimental building solutions, economically and environmentally sustainable, mostly made with standardised elements which are easy to assemble and facilitate the DIY processes; new ways of testing critical aspects of the project and the effectiveness of the intervention, in order to orient future design choices in short times.

In the report dated 30th of March 2021, titled Cities and Pandemics – Towards a More Just, Green and Healthy Future, UN-Habitat, the United Nations Agency for human settlements and sustainable development, listed an important meeting in the 2030 Agenda, concerning the necessity of researching innovative approaches in the field of urban planning, which is interesting for governments, public administration, civil society and the private sector to make inclusive, multifunctional, safe, resilient and sustainable cities. The report clarifies that the way cities will recover after the pandemic will have an important impact on the global efforts to reach a more sustainable future for everyone. When the current restrictions on social distancing – due to the healthcare emergency – allow it, it will be necessary to adopt new and appropriate modes of 'tactical' intervention inspired by the light strategic actions which have been in place since before the Covid-19 and after.

These modalities will conciliate between social distancing and the need for sociality, conviviality and use, so as to give new life to neglect residual areas. Communal spaces will become spaces of planning experimentation, where the 'set-up' replaces the 'build-

Figg. 8, 9 | DettoFatto, 'Lapollo', Apekitchen 2015 (credits: L. Caruana; courtesy of DettoFatto).

ing'. These places will have to be 'open' to sharing and 'flexible' to social interaction.

On the basis of some virtuous planning experimentations, realised in the latest years by designer collectives engaged in active change Europe-wide, and based on some recent experiments made by groups working within the Italian borders, this contribution describes the distinctive features of possible strategic actions regarding the public space set-up. In times of uncertainty and environmental, social, economic and healthcare crisis design acts as a catalyst, able to trigger new regenerative interventions which come alive from the constraints and the conditions of that particular context. These 'light' interventions are distinguished in the international scenario, for their social inclusiveness, implementational simplicity, temporariness, 'micro' dimension, 'playful' character, informal image, low-profile constructive nature and multi-disciplinary approach (Iacovoni, 2009). The places are transformed through unplanned spontaneous 'strategic' actions, definable as 'bottom-up', regarding urban planning, architecture, design, art, culture and sociality.

The general objective is to identify those modes of action typical of some case studies. By adopting 'tactical' set-up strategies they can be an example and be implemented in regeneration projects of the post-Covid-19 public spaces, according to an innovative culture of living that offers a 'new life' to residual and peripheral places. This contribution wants to outline some distinctive features of the strategic actions which can be useful to those who deal with the enhancement, upgrade and management of places of common interest.

Fig. 10 | DettoFatto, 'Labiocco', 2015 (credit: L. Caruana; courtesy of DettoFatto).

Figg. 11, 12 | DettoFatto, 'Apekitchen', 2015 (credits: L. Caruana; courtesy of DettoFatto).

Collective strategic actions for public space regeneration | In light regeneration practices of public spaces there are some recurrent aspects characterising bottom-up processes: social engagement and inclusive policies for spaces of collective interest; the ability to interpret the legal code regulating the activities on the public space; temporariness; the micro-scale of the interventions; the playground; the multidisciplinary skills of collectives and the transmission of know-how. In these processes, projects are usually 'top down', they are characterised by an informal image and by the use of light technologies, modular systems, cheap materials and recycled products. The activity of social engagement and inclusion of public spaces – usually corresponding to residual or unproductive marginal areas located in peripheral urban contexts – represents one of the typical main aspects of these ways of claiming habitable plots of land.

'Neglected' places can be 'recovered' (Piano, 2014), redesigned, enhanced and reintroduced in the social fabric through tactical actions aiming to transform common goods into heterogeneous spaces for collectivity, sharing and conviviality. Inclusion policies make the most of possible interventions on public ground thanks to 'light' work sites involving the locals through participatory processes and citizen empowerment. These worksites often materialise as planning ateliers, didactic labs and DIY workshops. These inclusive processes generate a 'diffused planning activity' among groups of citizens, where everyone feels involved in a small creative project, adding up to those of other participants. This unity is obtained by overlapping layers and ideas able to modify the use, the set-up, the image and the identity of a place.

Music festivals, cultural events, political rallies, religious celebrations and fairs are some examples of the recurring inputs that activate socially engaging situations in a community and that started new regenerative processes and activities in public spaces. In most projects there is a wide variety of inclusive functions, such as playgrounds, relax areas or refreshment stands. In these kinds of situations, the digital social networks become an important additional channel, a viral tool of communication, essential for a successful participation and involvement of the community, grouped by age and interests.

Project Prossima Apertura was launched just a few days ago by the Roman collective Orizzontale. This project adopted an experimental process where the community actively takes part in the regeneration of a square in the peripheral Toscanini district. Winner of a competition back in 2016, the project originates an experimental work site and involves a psychologist association and a group of public art curators with the common goal of implementing new forms of social inclusion. The intervention includes a series of integrated activities during the whole process. These correspond to actions complementary to those of a traditional worksite: surveys to find out the opinions of the locals; focus groups for a direct debate with the community; DIY workshops; experimental workshops on urban art; photo shootings; communication and video-documentary projects to spread the voice about the initiative on social media. Prossima Apertura represents an inclusive project where the activities are a fundamental and core part of the whole process. The project is open and flexible to changes and

Figg. 13, 14 | Campomarzio, Coperativa 19, Teatro Cristallo in Bolzano, Infopoint Bolzanism Museum, Bolzano 2021 (credits: V. Casalini; courtesy of Bolzanism Museum).

adjustments during the progress and the different steps, trying to find a compromise between what citizens want, what the initial goals and intentions were and what possible future purposes there can be (Figg. 1-5).

The democratic and inclusive act of reappropriation of collective places needs a particular knowledge of the laws that regulate activities on public grounds. The action is carried out in full awareness of the relevant regulations and can interpret the law, taking advantage of the 'opportunities' offered by the legal loopholes in the administration (Cano, 2020). The legal trend in some projects is based on workarounds, thanks to the lack of regulation or exact definition within the legal frame, concerning a particular type of intervention. Therefore, we can talk about 'a-legal' strategies where, differently from legal or illegal occupations, it is possible to use expedients existing within a grey area of confusing or inexistent regulation (Delgado, 2007).

Because of their temporary nature, various projects follow the same simplified procedure to ask permission for the occupation of public ground with a worksite for provisional construction. Santiago Cirugeda turned this practice into an operational procedure. For example, he transformed a work site container, used to collect debris, into a children's playground, into a functional structure for a skateboarding ramp or into a

Figg. 15, 16 | Caret Studio, StoDistante, Vicchio, Florence 2020 (credits: F. Noferini; courtesy of Caret Studio).

green micro-area. The Spanish architect rediscovers his civic commitment and offers his mediation skills to the community to help them to take back the urban space and exert their rights on it. Moreover, he uses his skills as a qualified technician to provide a handbook of urban expedients which take advantage of the grey areas of the regulations in the construction industry and urban planning for future needs. These action modalities are opportunities, which were never taken into account before, to intervene in poorly equipped areas that need to be redeveloped, where waiting for political parties to solve the problem is no longer an option.

The issue of temporariness represents a particularly effective tool, as it allows the realisation of the project in a short or medium term, and at the same time, it allows to respect all the initial ideas. Traditional planning is characterised by very long-term programs, slow and complicated application processes. They are usually bound to be delayed or obstructed, and the initial solutions could become obsolete or useless when compared with the quickly changing needs of citizens and estimated budget. The temporariness of actions that are occasionally taken and adapted to the circumstances represents another test tool for the solutions that were implemented and, once ended, allow to fix or correct the possible incongruities between the solutions that were

Figg. 17-19 | Collective etc., Meccalupino, Bastia, 2021 (credits: Collective Etc; courtesy of Collective Etc).

planned and the acceptance of the final results by the community, in future interventions. In areas that are particularly vulnerable in terms of social issues and neglected on an urban level, these temporary solutions can represent great examples of upgrade and functional shift – especially if they are not conceived only as an art installation and if they involve the community – and they can contaminate the surrounding areas with the same ideas.

DettoFatto collective produces a series of actions that have temporary effects as their main trait. They are occasional interventions where the 'time factor' is materialised in the speed of the project, in its realisation, in a short-term construction process and in the duration of the work itself. This group of young designers realised a series of small temporary and travelling structures, such as Lady Flower (a greenhouse garden), Lapollo (a small building to shelter animals in the garden), Labiocco (a series of poly-functional modular furniture for the outdoor) and Apekitchen (a small itinerant kitchen to make mojitos and barbecues). The temporary structures were conceived to be located in unexpected places, they can be scattered in irregular and complex areas, like old town centres or recent expansions, rural areas, parks or natural environments, roads or residual marginal areas of the diffused city. These temporary devices, suitably

and strategically inserted in places that need regeneration, are turned into a particularly effective occasion to trigger social effects (Figg. 6-12).

The dimension of the upgrading intervention in communal places has radically changed. It has gone from small architectural projects, developed on a contained portion of public land, to micro-interventions of creative design acting on a punctual scale, made of a small number of pieces and functional parts. Tables and linear seats, flowerpots, shades, platforms, cantilever roofs, spectacular scaffoldings and itinerant kiosks represent micro-devices with a travelling and temporary feature, interacting with each other and with the surrounding space while activating an exchange and a synergic debate between the community and the urban context. They are punctual 'infrastructures' with an experimental disposition, flexible, combinable and ready to be disassembled and rearranged, able to reorganise the 'liquid' marginal space where they are temporarily set up.

These design artefacts become catalysts that intervene on the local scale, becoming new landmarks, new sharing and defence spaces of the urban micro-scale. The 'micro' dimension represents a concrete occasion to test, research and experiment quick actions of punctual urban regeneration so that places can get their identity back and citizens can find that sense of belonging linked to a certain public space. Campomarzio collective together with Cooperativa 19, Bolzano's Teatro Cristallo and a group of university students realised a small information module, recently launched to promote Bolzanism Museum, a tour that reinterprets daily life places and the working-class districts of Bolzano in an 'improved' version. The small info-point/box office, born in a DIY workshop, was built with a light modular structure made of blue- painted timber. It represents a micro-setup of strategic design, particularly effective for social interaction and community building (Figg. 13, 14).

The public space evolves into a field of possibilities, where it is possible to experiment with numerous light temporary actions, unexpected 'play' activating unusual and effective freedom of movement. Conceiving the upgrade of a marginal area as a playground is an elementary, although effective, strategy that represents today a mode of intervention able to restore functionality to a neglected public space through collective playful activities. Aldo Van Eyck's playgrounds represented one of the first action strategies on public space, a modality of intervention to reclaim the urban voids created in the city of Amsterdam by the bombings during World War II. Following an abstract geometric grid, drawn with tapes, chalks and coloured paints, the ground turns into a playground hosting processes of continuous transformation. The bodies moving on the playground outline a public space where the 'markings on the ground' design an informal, friendly and reassuring space, where citizens feel part of a collective performance. In this sense, we can define the action of 'play' as a strategy to remark upon the idea of territoriality, able to represent that instinctive factor that makes the individuals feel in a safe and comfortable space. The street becomes a stage, enlivened by itinerant performances activating a process of social regeneration and claim the urban space.

Figg. 20, 21 | 'La Rivoluzione delle Seppie', Belmonte 2018 (credits: N. Barbuto; S. Gin; courtesy of La Rivoluzione delle Seppie, 2020).

A particularly interesting example referring to the topic of the playground is that of a temporary installation, recently made in the old town of Vicchio, near Florence. The project, called StoDistante, conceived by Caret Studio, reinterprets new forms of social distancing imposed by Covid-19 with a regular grid, a square of 180 x 180 centimetres – the distance imposed by the local regulations to contain the spread of Coronavirus. The abstract drawing is made of a regular pictogram of a sequence of squared pixels of various dimensions, created with white paint directly on the cobbles, and shows unexpected urban perspectives and a new way of claiming the public space. The temporary installation generates an 'open' platform, flexible enough to host a series of collective initiatives for social events even during a time of social distancing (Figg. 15, 16).

In the majority of the interventions, we find multi-disciplinary groups of action, made of professionals with very different and complementary skills, whose goal is to pass on the know-how to improve the quality of those communal places which are going through a common decay. The multi-disciplinary character of collectives has the aim of providing empowering tools, allowing the community to act autonomously and with determination, to activate regeneration and transformation processes of the public space. The groups of activists are formed by single individuals united in both public or private associations which have also council members, cultural institutions, private foundations, sociologists, philosophers, anthropologists, artists, directors, performers, photographers, architects, designers, students and groups of volunteers. The action modality is decided with 'open' debates between the participants with different interests and skills. Through dialogue, opinion exchange, and knowledge transfer they attempt to reach a form of shared and constructive agreement, giving the citizens the opportunity to gain more awareness of the common good and ensuring knowledge on

topics that concern the public space. The know-how transfer of these collectives is also finalised to face the Nimby syndrome (‘not in my back yard’), that s to find forms of social participation in social communities, to facilitate cohesion and stop mobilisation as a form of opposition to progressive interventions, which are not seen as suitable in a certain context by the community, even though it is considered useful.

Collectif etc is a French collective, among the first in Europe, created by a group of professionals with diverse skills. For more than ten years it has been engaged in activating and experimenting with new creative modalities of communication and intervention for the regeneration of marginal urban contexts. Through the fulfilment of small art and design interventions, this collective works with the participation and the engagement of the locals to offer a democratic vision, an alternative to the usual procedures of public space regeneration. In the recently completed Meccalupinu project, for the upgrade of a decaying walking path in Bastia (Corsica), the multi-disciplinary group compiled an informational brochure which was delivered to the whole community during the participative phases, in order to give the locals the necessary knowledge to intervene during the realisation. The leaflet was presented in the form of a comic strip to simplify the comprehension of the construction processes during the intervention, and it was a particularly effective and useful instrument for the locals who were interested in the upgrade. The guide simulates a simplified assembly kit describing all the construction phases for the temporary structures distributed along the walking path, made with metal pipes and slats (Figg. 17-19).

These strategic actions of regeneration of the public space often stand out for their top-down approach to the project, where most of the time the designer uses the combining principle of DIY, light technologies and cheap materials. The ‘informal’ nature of this project is the identity code of design temporary actions, characterised by a ‘generic’ image lacking in figurative or calligraphic self-referentiality, adaptable to each case. The linguistic expressiveness of the design artefacts is associated with a soft communicative image, mainly trying to search for new forms of relations with marginal domains. They are informal devices whose aspect is characterised by an absolutely original figurative variety, mutating thanks to the idea of connection and addition.

The composing modality of the bricoleur can best express the figure of ‘activist’ and ‘militant’ designer, standing out for their natural creative approach, a peculiar communicative and engaging skill, a predisposition to the art of making and a profound spirit of adaptation. The bricoleur becomes, as defined by Lévi-Strauss, someone who can easily adapt, conceive and realise modular objects which are simple and cheap to implement, who is keen on «[…] adopting different tools from those used by professionals in the same field» (Lévi-Strauss, 1964). The bricoleur’s objective is to obtain the maximum result on the project while using and optimising the scarce resources available. The expressive identity, resulting from the ‘minimum effort, maximum performance’ logic, has to deal with the actual resources of what can be realistically built to upgrade a decaying context in a short time, more than with what the im-

age itself can represent. In these urban action forms, the designer can both imagine the project and create it by themselves. Enzo Mari (2002) talked about 'autoprogettazione', a process of design and realisation which helps people understand the meaning and value of the objects of daily use. The models that Mari proposed in the 70s, in the allegory Proposal for an Example of Autoprogettazione, still are a suitable tool of socialised knowledge and practical awareness, to realise objects with an informal design, able to activate processes of urban regeneration.

The project of development and upgrade of the small village of Belmonte Calabro (in the province of Cosenza) was carried out by the Cultural Association La Rivoluzione delle Seppie, together with Orizzontale collective, the London Metropolitan University and various experts in communication, marketing, art, music and theatre. Since 2016, they have been implementing a series of actions that planned the realisation of endorsed strategic interventions, with an informal design and 'self-designed'. The DIY projects are realised with the production tools which Enzo Mari would have defined 'collective heritage' and which use the 'carpenter technique'. Through simple combination of unrefined wooden planks and nails, it is possible to create spectacular scaffoldings for outdoor or summer performance, benches, tables and seats for young people's gatherings, cantilever roofs to shelter working spaces or cultural happenings, in addition to all the indoor works of renovation of a series of buildings in the village. One of these buildings, casa BelMondo, became the Association's headquarters thanks to an agreement with the city Council. This aims to avoid the depopulation process, promote social integration among locals and the intercultural interaction with the communities of migrants in the area, learn and share of common skills and passions such as sewing, cooking and carpentry (Figg. 20, 21).

The use of light technologies, modular systems, cheap materials and recycled products represent a strategic tool that helps to transform everyday dynamics in a social space. Design artefacts are created by using simple creative solutions and dry assembled with different materials and low-cost techniques, which rationalize the constructive process and do not require skilled labour. Steel pipes, used for scaffoldings, allow to create a certified and resistant system; construction wood and recycled wood boards which are connected through simple structural joints, joint with nails or staples; recycled pallets for transporting and storing goods; modular plastic jerseys which can be matched, stacked, filled with water or sand, generally used as traffic barriers; paints, coloured tapes and reflective elements used for road signs are just a few tools that can be included in this creative regenerative activities.

Hybrid constructive solutions are researched and studied in order to offer new space configurations, extremely flexible and easy to be personalised in each context. The constructive quality of design artefacts does not lie in the attractive ability of the materials or in the 'preciousness' of the detail, but their success is given by the intrinsic sustainable combination of environmental, social and economic factors. The TAM TAM project (Temporary Architecture Module), in the peripheral district of Sorgane (Florence) was

Figg. 22-25 | ND Studio, TAM TAM (Temporary Architecture Module), Sorgate, Florence 2020 (credits: S. Giraudeau; courtesy of Studio, 2020).

inaugurated just before the beginning of the pandemic emergency and lockdown by the Tuscan collective ND Studio, who designed some of the temporary architectural devices, realised with standardised modular systems. The upgrade intervention, with the active participation from the local community, was realised with small 3D modules and Layer, the popular German system – patented for scaffoldings – and yellow wooden planks to cast concrete. The temporary modules, especially cheap and easy to assemble, host built-in seats with green tubs, swings, rocking chairs, trees and board games. The modules can be easily transported, allowing a change of set-up during the installation by moving the modules according to the locals' feedback. They could set up the square differently, following the suggestions of the activist part of the community (Figg. 22-28).

After lockdown: possible future scenarios | The current pandemic has undoubtedly highlighted the conditions of our times that influence collective living spaces in public areas, like the political instability, the massive migrations and the growing socio-economic inequalities. According to Richard Florida, with the end of the pandemic the cities won't stop being places of innovation and creativity enlivened by an aggregational process that brings people closer and will continue in the future (Molinari, 2020). Once the Covid-19 effects are over, the cities will go back to being a lab of active experimentation where the new 'connective fabric', represented by the locals, will work for the implementation of new practices to fill the 'voids' with new contents, activities and services for the city, as a result of 'sharing' (Stefanelli, 2021).

The next regional policies will have to examine once again the transformation, enhancement and redefinition of the abandoned areas; they will have to find new purposes of the uncultivated green areas through collective and punctual actions, sudden and light, able to upgrade the marginal spaces for social activities (Agnoletto, 2020). Both public and private actors, dealing with the enhancement, upgrade and management of communal public spaces, will have the chance to implement all those intervention strategies which are reactive, hybrid, adaptive, flexible and cheap and that can 'learn on the streets' (Rykwert, 2015).

Hashim Sarkis, curator of the 17th International Architecture Exhibition of Venice in 2021, titled How will we live together? (Rodenigo, 2021), in his inaugural speech stated: «We cannot wait any longer for politicians to propose a path towards a better future. While politics keeps dividing and isolating, architecture can offer alternative ways of living together». According to Sarkis, in the present times, it is necessary, as well as suitable, to carefully look at the emerging and radical activism in young groups of designers, who face new challenges in daily actions. The living space is consumed in favour of new realities, we will need young activist facilitators with marked creativity, self-sufficiency, professional skill, knowledge of the regulations, relational aptitude, team spirit, constructive awareness and the ability to adapt to different marginal contexts. The synergic exchange of knowledge and aptitudes of each individual will return new spatialities and different ways of living, through experimental processes of original design practices which are diffused and shared, in order to get new uses of inclusive spaces, far from the traditional urban planning.

In the current condition, creative collectives formed by young designers, graphics, photographers, artists, directors, botanists and communication experts will have the chance, in the near future, to implement the transversal knowledge and skills of going back to live in the public spaces through precise regenerative and addition interventions, even small-sized ones. The change taking place won't consist of a mutation for its own sake, but in the rediscovery of social values underlying the meaning of public space, places made for sharing and conviviality, equally redistributed. This is a real expressive reconfiguration regarding the present condition of ambiguity, characterising the uncertain state of materiality, irreversibly linked to the current historic moment

Figg. 26-28 | ND Studio, TAM TAM (Temporary Architecture Module), Sorgate, Florence 2020 (credits: D. Spadola; courtesy of ND Studio, 2020).

and highlighting possible scenarios which could take place as a result of the current transformation on a cultural, social, environmental and economic level.

In this scenario, it is possible to imagine a series of actions and activities which act under the name of 'temporary set-up'. Within the regulations, this can be described as a 'temporary artistic installation' instead of a 'permanent architectural intervention'. During project approval procedures, it will be possible to adopt all those expedients which help speed up the bureaucratic steps and political timing and shorten the distance between regulations and implementation. It will be possible to obtain new forms of the urban upgrade, through bottom-up processes and top-down projects, which will facilitate social inclusion, allow new forms of 'play' on the micro-scale of intervention and will be implemented thanks to informal-looking artefacts, with a constructive low-profile identity, obtained during the transmission of multidisciplinary skills of the professionals involved.

These virtuous experiences of the set-up and redesign of public space do not aim at becoming striking projects, but they are going to be a form of redemption on the daily practices. The city will be 'set-up' instead of 'built', and not only will it develop post-pandemic emergency solutions, but it will become a new way of upgrading parking lots, areas for temporary events, local green areas and spontaneously equipped residual places. This way, it will be possible to re-think the places of conviviality with 'tactical' set-up interventions, shared and endorsed by the community, aimed at the functional change of pavements, pedestrian paths, gardens, street edges and unused areas, so that a new alternative public space can be created. The path of sharing and participation will allow the local informal groups to acquire that sense of belonging and a desire to take care of the common assets (Tato et alii, 2020).

These light regenerative actions of set-up and re-design of the public space, despite being particularly effective and beneficial for many aspects – such as returning a sense of sociality to the communal public spaces – might appear limited especially on a figurative level. As a matter of fact, the interventions are often made with artisanal techniques, DIY processes, limited budgets and marginal conditions of the peripheral context, and they won't always be included in the domain of an 'aesthetic revolution' in terms of urban decor. The informal nature of these actions of regeneration is not always particularly aesthetically refined, but this should be seen as a 'will to re-start' and a desire to trigger a social reaction to reclaim public space.

In a small volume titled Quel che Stavamo Cercando – 33 Frammenti, Alessandro Baricco has recently written that when the frontal attack fails, infection wins; the pandemic is a small handbook about strategy, among other things (Baricco, 2021). The 'virus' among other things – according to Baricco – redesigns our cities with original tactical elements of urban override, which don't mean to represent an aesthetic revolution, but a functional action able to activate new forms of sociality and upgrade the public space. In this health crisis, the 'extreme' conditions all around it, the constraints determined by social distancing, the necessity to 'make space', the rediscovery of new domains of relations, the need to adopt collective synergic actions, to research new forms of public-private regulation and organisation of the territory combined with the necessity of regeneration of public space are connected to man's relentless spirit of resilience and become the starting point which will give an identity to the project. For our near future, we can imagine a public space inhabited by an archipelago of independent micro-islands, integrated in the urban fabric, described as outdoor multi-functional 'rooms', with a transitional nature and each one will be set up with punctual and flexible solutions with a functional and essential design.

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FUTURE SCENARIOS
The new life of the fashion industry in the post-pandemic scenario

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ABSTRACT
Worrying about the future means worrying about changes, both present and future environmental changes. But how will dramatic changes and consumer behaviour in a post-coronavirus world affect the future of fashion? What assets can design provide to rewire a system that has faltered so much? This essay aims to give meaning to the Covid-19 crisis by placing it precisely in the clothing industry context. It investigates the complex fashion system and the dynamics that are currently shaping this sector, catalysing it towards a sustainable new life. The paper also analyses future scenarios existing in the fashion industry to define some guidelines for preferable post-pandemic future.

KEYWORDS
fashion, covid-19, sustainability, future studies, design

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For decades, the fashion industry has been a powerful driver for economic growth, contributing not only to the creation of millions of jobs, boosting capitalism globally, but also and undoubtedly an absolute protagonist in shaping cultures, societies, and our daily lives and consumer behaviours. The unforeseen circumstances that hit the planet during the Covid-19 health emergency were disruptive, and overwhelming. As never before, the fashion industry had to reorganise, readapt and redefine sustainability and unsustainability, short term and long term. This is because the pandemic, unaffected by borders, has challenged global structures by causing a profound economic shock, pushing companies and societies towards financial instability and human beings towards an unprecedented humanitarian and existential crisis.

These phenomena have destabilised the fashion industry, and the long-term consequences risk to confine sustainability issues to a secondary level again, following the usual strategy of quick profits. This happened when the foundations and the nature of sustainability were starting to be understood and metabolised, by both consumers and entrepreneurs, as an organisational principle to build a future scenario. From clothes capable of guaranteeing social distancing to the urgent and unexpected reconversion of entire production chains, from experimentation with new fabrics (possibly antibacterial) to the boom in online purchases, this essay aims to identify economic resilience actions and practices pursued by the fashion sector. These are very contemporary strategies that have unexpectedly pushed and accelerated the transformation towards a sustainable future vision. Finally, the analysis is supported by using the three horizons model first theorised in The Alchemy of Growth and adapted by Andrew Curry and Anthony Hodgson (2008) to link future-thinking to change processes.

Pandemic as a disturbance factor | The global coronavirus pandemic has led to a real push towards sustainability. This immediate threat to health has demonstrated human beings' fragility, making them feel overly dependent on a 'healthful' environment to safeguard their physical and emotional status. If a sick planet can make humankind sick, then the fashion industry (only peculiar of this species) cannot afford to worsen its health. The reference framework and the reflections that will emerge in this contribution are based on the awareness that you can never master a living system; you can only disturb it (Maturana and Varela, 1992, p. 256). The pandemic for the fashion industry has certainly been a disruptive factor, but at the same time, it has been able to direct the change towards sustainability. The fashion industry, which was already experiencing significant changes in consumption habits, has seen an acceleration in the need to look to the future with sustainability at its core – certainly environmental, but also social and economic. The 71% of consumers say that they will prefer to invest in higher-quality clothing in the wake of the health emergency, and that they are more inclined to favour circular business models, such as rental and upcycling practices.

The pandemic has added new concerns and accusations that have always been levelled at this industry. The inadequacy of business models and infrastructures to re-

Fig. 1 | Vogue Business, Chanel Fashion Show 2020 (credit: C. Lavenia).

spond to global challenges and even more so to sustainability challenges was now evident: «[…] Even if we pull all the levers, we will be very far from having a sustainable industry by 2030» (Global Fashion Agenda, 2020). This distance was in some ways exacerbated by the upstream and downstream repercussions of the effects of Covid-19. While on the upstream part of the chain, that of manufacturing, never stopped, either because of the derogation or because production was converted to overcome the lack of masks and gowns (to avoid stopping machines and people altogether); downstream, revenues and consumption of fashion and goods in general decreased. In Europe, compared to the same period in 2019, textile production fell by 16.8% in January-April 2020, and when global coronavirus cases peaked, retail sales of textiles saw the sharpest decline, with a 31% drop in sales per unit (Shahbandeh, 2020).

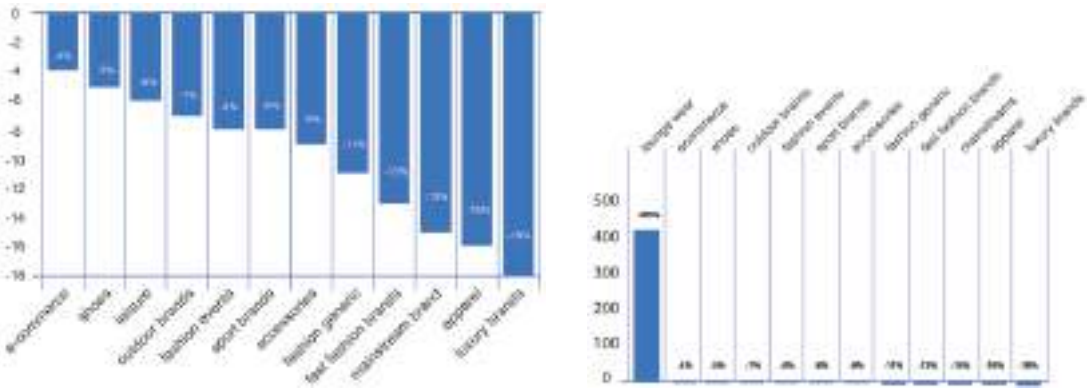
Spring-summer collections struggled not only to be launched at fashion shows, sometimes using masks and screens (Fig. 1) but also for on-shelf availability. Consumers postponed their purchases and preferred clothes to wear at home. To attract consumers' attention, many brands and social media invested on specific categories of home or casual outfits; some launched a series of hashtags related to loungewear, such as #StayInPyjamasContest (Figg. 2, 3). In a recent interview, Net-à-Porter, a well-known e-commerce company, stated that it had a 40 per cent increase in online sales, with consumers looking for comfortable outfits and buying mainly sweatpants (Fractals LAB, 2020). Smart suits, heels and jeans have given way to more comfortable clothing lines, and there has been no shortage of memes online of virtual meetings being held for 'components', where people put on clothes that were only visible on camera, wearing their pyjamas or being barefoot under it. The data also show how the

coronavirus pandemic's impact and the isolation measures imposed in many European countries have generated a widespread growth trends in online retail orders in many sectors. As shown in the chart (Fig. 4), after declining in January, online revenues in fashion and accessories categories in Italy increased steadily in the following weeks, with a 150% increase in the third week of April, compared to the same period last year (Shahbandeh, 2020).

The pandemic, with its lockdown and blocking of mobility and all activities, has pushed many fashion brands to 'take refuge' in e-commerce as a safe haven to cope with the closure of 'real' shops. A trend confirmed by a survey by The Business of Fashion and McKinsey & Company (2020) carried out in Italy, France, Germany, the United Kingdom and the United States, which showed that 24% of people bought a product online for the first time during the quarantine, and 76% of them were satisfied, suggesting that the increase in online purchases will be a permanent trend in the future even when the crisis is over. This evidence, as well as the possible cyclical nature of this pandemic, could lead many businesses to adapt to stressful conditions, exacerbated by an intermittent opening and closing, with a digital conversion of many aspects of the business as has already happened in other sectors, for example, the education sector.

The drop in sales, which was strongly analysed in the first part of this essay, is, however, a figure linked exclusively to the opening and closing of shops but is also closely linked to a change in consumers' interest which, given the 'size' of some wardrobes, no longer perceive clothing as a basic necessity. In particular, what society and the fashion system faced with Covid-19 is not just a health or economic crisis but a real cultural and consumer crisis. The large amount of money usually spent in luxury and clothing whims are now being re-allocated on daily necessities and preventive savings for a second or third wave of the virus. While the end of over-consumption has been threatening developing countries for many years, at the same time, faced with the unexpected halt in production, the most vulnerable and lowest-paid people in the fashion supply chain are suffering the worst effects. IndustriALL (2020), the global union working to give voice to workers worldwide, says millions of garment makers have already lost their jobs to the virus and have no access to social or financial safety nets to help them weather this storm. Reports of retailers cancelling orders and late payments to suppliers have spotlighted how brands manage their relationships with supply chain partners.

To tackle and overcome the financial disruption and commercial difficulties caused by the pandemic, many brands and retailers have invoked force majeure to withdraw orders from suppliers. According to the labour rights monitoring organisation Worker Rights Consortium (2020), the number of cancelled orders in countries such as Bangladesh, Cambodia and Vietnam is estimated to be more than $20 billion. In the event of a similar scenario, transparency will become a key asset for consumers to verify whether companies have honoured their commitments during the crisis, both on environmental and social issues. For all the above-mentioned reasons, this article in-



Figg. 2, 3 | Data retrieved from Quentin, TD Reply's Search Data tool, across 5 markets (DE, ES, IT, FR and UK). Growth rate calculated as month-over-month comparing March-April 2020 against March-April 2019 (credits: Reply).

tends to pursue a more ethnographic and humanistic reflection than technical, using future-thinking as a tool to direct future project practices.

Futures in/of fashion: tools for design | «[…] The future, of course, is still being made: it is what people can shape and design through their own actions. To act intelligently, people need to know the consequences of these actions, of others' actions and reactions, and of forces beyond their control. These consequences can only occur in the future. Thus, people try to know not only what is happening now, but also what might happen, what could happen or what will happen in the future given certain conditions. Using such conjectural knowledge, people orientate themselves in the present and navigate through time, physical space and social space» (Bell, 1996, p. 28).

The studies on possible futures have always existed as peripheral and interdisciplinary areas of investigation in many fields of study but emerged as a discipline only after the Second World War with the aim to generate a more positive future (Slaughter, 1996). Nevertheless, several international organisations for the future had already developed by the end of the 1970s, including the Club of Rome and its publication The Limits to Growth (Meadows et alii, 1972) for directing change towards sustainable futures. Future Studies, deliberately in plural form to underline the possibility to imagine more than one future, intend to investigate models and signs of change in the present and their various forms. They have been applied to different areas of study, including marketing and fashion in general. In fact, when discussing Futures Studies applied to the fashion industry, one comes across concepts such as fashion forecasting or trend-forecasting (Tham, 2008). However, although the latter are widely used based on purchasing data, inventory and social media monitoring, they lose their meaning in a context such as pandemics, where nobody knows what will happen tomorrow.

In this crisis scenario, some data clusters are missing. There is a lack of customer research, selection and purchasing, reduced ability to interpret order movements and the resulting difficulty in clearing them out, and a loss of certainty about what will happen in the future. The fashion industry, certainly not impervious to the threats posed by an uncertain future of the world, including climate change, resource scarcity, vulnerable economic conditions, changing consumer behaviour within the pandemic context, has seen the need to face and understand these threats. Warnings are essential to take appropriate action to safeguard the future, protect the environment, and improve consumers and citizens' lives. With this in mind, future studies should be more widely applied to the fashion industry. On the other hand, studies of the past also show how specific global interest events have profoundly changed this sector. The influenza epidemic in 1918, by transforming personal hygiene and cleaning habits, had increased the frequency of washing clothes and the use of washing machines. The Second World War changed women's domestic employment, that started to participate in the workforce after the war. Moreover, the more recent SARS outbreak in 2003 brought about lasting changes that facilitated e-commerce platform development (Tham, 2016). Consequently, investigating the effects and implications of Covid-19 means considering all those signs of change and transferring them into design skills to design tools, processes, and products to cope with epidemics.

Nobel Prize winner Herbert Simon (1982) defined design in the broadest sense of human action as the ability to devise courses of action to transform existing situations into preferred situations involving a wide range of processes that humans use to plan for the future. Nevertheless, a decade earlier, Charles Eames (1972), in his video Design Q&A, asserted that design depends mainly on the designers' ability to recognise as many constraints as possible and their willingness and enthusiasm to work within those constraints. Constraints of price, size, strength, balance, surface area, time and more (Candy and Potter, 2019). However, the current scenario is full of more considerable, systemic, dynamic, and pervasive constraints.

Within this essay, the authors wanted to highlight the importance of these otherwise invisible or hidden constraints that could play a significant role in the potential of design in the clothing industry. If design orients our strategic choices, objectives, and planning of our actions made to achieve them, Future Thinking and Speculative Design represent the future-oriented approach to identifying problems within an increasingly complex scenario. Similarly, Systemic Design as a tool and method to develop a critical sense of the complex contemporary fashion system highlights a preferred and preferable future that follows some well-defined guidelines that pursue sustainability goals. These guidelines, ranging from a collective vision to the efficient use of project inputs and outputs, intended to guide the designer in the configuration and management of the design activity in its entirety with the aim of zero-emissions (Bistagnino, 2009).

The case study analysis that follows will be interpreted following precisely the Systemic Design guidelines concerning the signs of the current health crisis (Fig. 5).

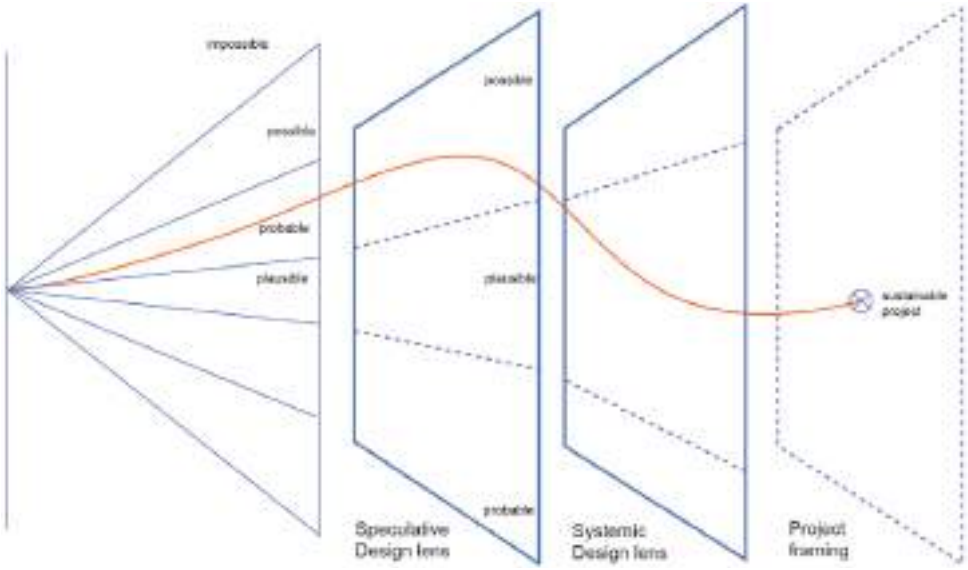


Fig. 4 | Weekly trend of online revenues in the fashion and accessories retail sector in Italy 2020 (credit: Euratex, 2020).

Fig. 5 | Research methodology (credit: Authors).

In other words, all the explorations of probable, plausible, possible, and preferable futures made possible by speculative design will be brought under the microscope of a systemic design. In this case, Systemic Design will move the reflections away from a vision of a linear future to a circular one while maintaining the viewpoint on the whole system. The selected case studies are part of an initiative by Forum for the Future, a leading global sustainability organisation that theorised eight future scenarios ten years apart. The first was Fashion Futures 2025, set in 2025 and explored in 2009 (Fo-

rum for the Future and Levi Strauss, 2010), and the most recent Fashion Futures 2030, theorised in 2019 and set in 2030. Both projects aimed to understand and highlight possible threats and signs of the future in the clothing industry.

Case Studies | Using future thinking techniques and Levi Strauss & Co support, four scenarios were created that explore how climate change, resource scarcity, population growth, and other factors will shape the world of 2025 and its fashion industry's future. From the production of raw materials to manufacturing and sales, to use and end of life, every aspect of the industry is explored. Each scenario is designed as a tool to challenge companies' strategies, inspire them with new opportunities, help them plan future projects, and support students to understand the challenges of the future and come up with ideas for sustainable products and services (Tab. 1).

Since 2009, it was clear that a resource crisis and a change in consumption had already been predicted. The health crisis, however, has a significant impact on these scenarios. According to the systemic approach guidelines, the only viable futures are the first and the third. In particular, the first refers to a slowdown trend that the coronavirus brought back to light during the crisis. Giorgio Armani, in his open letter to Women's Wear Daily, and Alessandro Michele (Zargani, 2020), Creative Director of Gucci, emphatically stated that fashion must slow down. In the aftermath of the lockdown, these two statements hijacked the whole post-pandemic vision of fashion as being close to consumers and the environment. The third scenario, acting locally and allocating technological resources instead of human resources in manufacturing, would avoid all possible disruptions in the production chain that have jeopardised the industry's ethical sustainability. However, this does not mean that, in a future scenario, machines will entirely replace humans, but that part of the processes that generate social inequalities in a utopian future could be solved.

During the Fashion Futures 2030 project, four toolkits have been developed for fashion professionals and educators that make accessible four possible future scenarios. The toolkits were co-created by experts from the C&A Foundation, Centre for Sustainable Fashion and Forum for the Future (2020). Through the critical consideration of fashion and nature, they aim to encourage the development of visions and goals to guide design, business and communication from a strategic perspective. At the heart of the kits the scenarios explore, once again, climate change, resource scarcity, population growth, and other factors that will shape the world of 2030 and the fashion industry's future. The descriptions, this time more detailed, explore every aspect of the industry, from the production of raw materials, through manufacturing and retailing, to use and end-of-life (Tab. 2). In this second case study, it is possible to see how the pandemic has anticipated some future signs. If, since the dawn of the 20th century, fashion brands have shared their creative innovations and reinforced their brand image through highly ritualised interactions such as fashion shows, in the contemporary scenario, fashion brands have abandoned seasonal clothes along with the

Futures Scenario	Description
Slow is beautiful	A world of political collaboration and global trade where slowness and sustainability are in fashion
Community Couture	High-tech systems are the ideal solution for the speed-obsessed global buyer
Techno-chic	The resource crisis limits consumption in a world centred on local communities
Planet patchwork	A world of fast consumption in global cultural blocs

Tab. 1 | Fashion Futures 2025.

Futures Scenario	Description
Living with less	Thanks to new investment strategies, governments and companies have made a global turnaround in the fight against climate change. Fashion continues to play an essential role in societies; clothing is treasured and preserved for a long time and handed down within groups of friends and family. Sharing networks, enabled by the social credit system, are proliferating. Brands have also tapped into this 'heritage is queen' mentality and now offer 'product + service' models as their primary offering.
Hyper hype	The application of Artificial Intelligence (AI) to various industries has grown exponentially during the 2020s and has eliminated the need for most manual labour, leaving many unemployed. Fashion is fast, frivolous, cheap and fun. Seasonal clothing and the catwalk have been abandoned as new styles are launched every day through digital fashion shows and advertisements by large multi-brand conglomerates. There is a shift towards genderless clothing attributed to the rise of casual and streetwear, which continued to dominate fashion trends after 2020, and became increasingly popular once 'going out' became less common. One segment of the fashion industry creates exclusively for digital interaction. However, spurred by curiosity and an obsession with 'pre-digital' life, there is a growing subculture among some of the young, who collect vintage clothes and fabrics and patterns and use them to create their clothes.
Safety race	Tensions are high in an unstable global equilibrium. The world operates in silos of varying size and power, and inequality levels between countries are high. Many countries feel left behind. Terrorism, piracy and the collapse of democracy are becoming increasingly common. Fashion is driven by politics identity and strongly influenced by ethnic and national traditions. People deliberately seek patriotic clothing and clothes are a visual language for distinction. Fashion is often peppered with historical references, marking social and tribal divisions. Counterculture communities rebel against this, deliberately mixing and matching different cultural references to create political fashion statements that promote collectivism and globalism in a vibrant and arresting way.
Chaos embrace	Global agreements such as the SDGs and the Paris Agreement are long gone and forgotten. The world has retreated from globalisation as things fall apart and power is redistributed to local governments and communities that focus on building self-sufficiency and resilience, primarily due to a prolonged economic recession. Everyday fashion focuses on utilitarian, well-made clothing that is stored and worn for long periods. With a shortage of essential raw materials, most fashion is bought locally or used and remade. Personal style has become firmly linked to local identity and is often personalised with themes, images or symbols representing community, cultural or political affiliation. Fashion activism has played a critical role in the last decade's protests, including people wearing clothes expressing their disagreement with dominant regimes, and sculptural clothes worn by performance artists to bring attention to social and environmental issues.

Tab. 2 | Fashion Futures 2030.

catwalk. New styles are launched every day through digital fashion shows and advertisements of large multi-brand conglomerates'. In this sense, Covid-19 has brought an abrupt end to these environmentally costly forms of interaction, once again turning the future gaze towards sustainability.

In the 'living with less' scenario, the perspective is closer to the strategies that the fashion brands were already undertaking in the short term: the clothes are treasured and stored for a long time, as well as handed down within groups of friends and family. Sharing networks, enabled by the social credit system, are proliferating. Brands have also adopted this 'heritage is queen' mentality and now offer 'product + service' models as their primary offer. Covid-19 has already highlighted the need for a change in profitability mindset. If some products and collections have not necessarily generated better financial results, companies are being pushed to find ways to increase services to reduce stocks and use business models based, not only on the demand but also on the circularity of material resources. At the same time, increasing responsiveness in the season for both new products and restocks. In this case, currently, there is no shortage of business models interpreting sustainability with reusing and recycling models. Platforms such as Depop, Vinted, or Yoox act as resellers of used or unsold clothes. We still have to wait for other issues such as gender equality through clothing, the localism of specific productions, and the design strategy having a new life in mind and the prolonged use of clothing. Following this analysis, which focuses on the foreseeable aspects of the future in developing these case studies, all those signals in the present, which the health crisis has channelled towards preferable future scenarios because they are sustainable, will be expressed.

Future sustainable horizons in the post-Covid-19 paradigm | Using the three horizon models first theorised in The Alchemy of Growth and adapted by Andrew Curry and Anthony Hodgson (2008), signals from the present that triggered change processes are linked to future scenarios. The aim is to define an analysis model, based on the future, that can enable sustainability strategies in the whole system: both for the individual product and future business models.

Horizon 1 – Seeds of the future in the present. According to Curry and Hodson's (2008) model, on the first horizon should be placed all those signals that give value to a specific business strategy in the present scenario. In this case, we can only focus on the fact that the fashion industry moved to the forefront to reconvert production chains during the pandemic crisis and triggered major brands' reflections to re-evaluate their business models. Digitalisation is already underway, leading the entire system to reduce waste, such as that of fashion shows, and optimise rapid prototyping processes in design. These strategies to re-functionalise the system suggest that resource efficiency, improving the ability to re-use or reconvert (at any scale) are business models that are as viable as they are necessary to produce a precise shift of the economy towards a sustainable one. The covid crisis, which has accelerated some ideas, showed that such

transitions are feasible even in the short term to convert the impact of the supply chain.

Horizon 2 – The new transition paradigm. The second horizon, can include new opportunities for the sector, not tested but undoubtedly feasible in an approximately near-future scenario. In such a scenario, all those practices that move fashion away from the paradigm of visibility emerge. With the emergence, fashion was perceived as a peripheral need, clothing as a validation of one's identity and status no longer required high funding. In this social distance scenario, remote working and more digital than face-to-face engagement, the characteristic of fashion as a visible indicator of social status, wealth and style is increasingly losing ground. So, if fashion shows are cancelled and shops closed, the growing accumulation of unsold stock could lead to a radical paradigm shift for some brands. In this case, designers would have to shift their attention to new agile waste disposal strategies to avoid (forever) dead stock, perhaps speeding up the transition to an approach no longer oriented towards trends and seasonality, with collections guided by the vision of the consumer.

Horizon 3 – A preferable, sustainable, but still very distant future. Finally, in the third horizon, it is possible to include all those signs of the future that could happen in a very distant timeframe, unpredictable and falling within all the possible preferable futures. Therefore, we can highlight which features we hope to see in the post-Covid fashion system. Technology will give an essential contribution to this horizon. Online fashion, supported by data to encourage transparency and on-demand production, will prevent the system from falling back into over-production with terrible environmental and social impacts. A production that follows project guidelines, centred on people and their real needs, that can exchange information transparently, that does not need to leverage production across borders but can feed local, territorial systems. Covid has accelerated the digitisation process, this will undoubtedly support fashion companies in making each link in the value chain sustainable.

In conclusion, the threats of the current economic growth paradigm, digitisation, and a total overturning of relational logic, make difficult to imagine what future lies ahead for the fashion industry after the pandemic. However, the signs lead us to think of a resilient and regenerative future – a sustainable future, a blank sheet to design.

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SECOND LIFE IN SUSTAINABLE FASHION DESIGN
The contribution of Made in Italy

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ABSTRACT
The article aims to highlight the process, product and cultural innovations implemented by the Italian fashion design manufacturing sector as a part of an overall environment-centred strategy. The analysis of these innovations makes it possible to identify a sustainable approach to design in the Made in Italy sector. This approach is typical and linked to its territory, therefore it can be defined as an actual 'Italian way'. The aim is to demonstrate, through case studies, the need and desire of the Italian Fashion System to show a way to respond to environmental problems. In the same way, we intend to underline how eco-innovation in this sector provides solutions aimed at improving the efficiency of our resources, becoming a driving factor for environmentally friendly economic growth.

KEYWORDS
made in Italy, fashion design, genius loci, environment-centred design, circular economy

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The design industry is now faced with major environmental challenges such as climate change, depletion of natural resources and loss of biodiversity, with no room for procrastination. The current situation no longer allows for isolated or locally effective solutions, as the implementation of sustainability requires context-specific temporal and spatial indicators. Sustainability is, indeed, a property of the system and not a property of individual elements, and achieving global sustainability requires a systemic, multiscalar approach, guided by vision rather than a traditional optimisation approach (Bagheri and Hjorth, 2007; Holling, 2001; Walker et alii, 2004), which takes into account human beings and the environment and the interconnections they create in the system. This also requires major changes in the way we use and produce goods and services. All too often, they come at a market price that does not reflect their real environmental and social costs. Therefore, to protect and preserve the planet, consumers and producers must begin to play their part in an economy that focuses on low CO_2 emissions, energy and resource-efficient processes.

Through targeted policy actions it is necessary to identify and promote sustainable economic and social models, and to stimulate and disseminate innovative technology solutions that deliver clear and substantial environmental benefits to achieve environmentally friendly economic growth. Europe has developed a range of economic tools on environmental innovation and entrepreneurship with the purpose of encouraging investment in environmental processes and technologies. The challenge is to invest in eco-innovation in order to improve the overall environmental performance of products throughout their life cycle, increase the demand for sustainable products and production technologies, and help consumers make informed choices. In this sense, this contribution aims to highlight the key role that the Italian Fashion System can play in orienting the national market towards sustainable production and consumption. Therefore, best practices in the different phases of the fashion supply chain have been analysed to highlight the innovations implemented by Italian companies to improve the environmental impact of their products. Specifically, they were characterised by a deep knowledge of the territory and its specificities, the rediscovery of the genius loci and the enhancement of circularity actions.

Evolution of sustainable thinking | The Covid-19 pandemic tragically devastated global economies, highlighting how worrying it was to manage current needs according to old paradigms. The coronavirus entered a global framework already disrupted by deep inequalities (Piketty, 2018), where the ways of capitalism had long since begun to show signs of structural fragility, with serious consequences for liberal democracies (Jacobs and Mazzuccato, 2016). The health emergency has dramatically highlighted the flaws in the system, forcing governance models and industrial systems to face a radical and urgent transformation. The complexity of our economic, social and cultural systems has led to the exploitation of resources and alteration of natural cycles. The scientific com-

munity compared the damage done by human intervention in nature to the great geophysical forces that have transformed our planet over the millennia.

In fact, in the 1980s the scientist Stoermer defined the geological era we are living in with the term Anthropocene (from Greek, anthropos: man) and, subsequently, the term was also taken up by the Nobel Prize winner Paul Crutzen. He proposed the second half of the 18th century as the beginning of this new era, emphasising that since then – as it had never happened in human history – the global effects of human activities become evident and accelerated (Crutzen and Stoemer, 2000). Therefore, humanity is today facing a life driven by a capitalist consumption model that does not take into account the limits of the ecosystem, which is in a state of progressive deterioration. The dynamics linked to the quantitative growth of the dominant economic model of consumption have led humanity to dramatic consequences not only from an environmental, but also from a social, economic and cultural point of view (Meadows et alii, 1972; Meadows, Meadows and Randers 2004).

Various economic theories have been developed as an alternative to consumerism growth, criticising the current capitalist system, such as the application of the degrowth and post-development concept (Latouche, 2006; 2015) of qualitative growth (Capra and Henderson, 2013) or the happiness economy (Kahneman, 2007), the Circular Economy (Ellen MacArthur Foundation, 2010) and the Blue Economy (Pauli, 2009). Or bottom-up movements implemented by the Collaborative Commons (Rifkin, 2014) Sharing Economy (Botsman and Rogers, 2010) and creative communities (Florida, 2006). These are development alternatives that propose to measure the well-being besides the monetary and material aspects, more oriented towards qualitative indicators and not only focusing on the individual, but on the community. For its part, Design for Sustainability has put in place effective methods and tools such as the Life Cycle Design (LCD) or the Life Cycle Assessment (LCA) that favour an analytical approach. The design orientation has shifted its focus from damage remediation to strategic design for sustainability (Vezzoli, Kohtala and Snrinivasan, 2014) thus leading to more complex approaches such as Cradle to Cradle (McDonough and Braungart, 2003), Biomimicry (Benyus, 1997) or Social Innovation (Manzini, 2015).

Throughout history, the evolution of the concept of sustainability can be summarised in three phases. The first begins between the 1960s and 1970s, a period in which designers began to manifest an ecological consciousness linked to the direct implications of design for society and the environment. An important role was played by Rachel Carson's book Silent Spring (1962) and the birth of the Green Movement. Over these years some new approaches emerged, such as ecodesign and ethical consumption. The pioneer of social and sustainable design was Victor Papanek, with his critique of consumerism also based on political awareness. In 1972, the report The Limits of Growth commissioned by the Club of Rome has unequivocally shown the problems originating from population growth and the inconsiderate use of resources and environmental pollution, showing how that growth model was unsustainable for

the planet. The same year saw the first major United Nations Conference on the Human Environment in Stockholm, at which UNEP (United Nations Environment Programme) was established.

The second phase took place in the 1980s and 1990s, based on the economic and energy crises, and coincided with the green consumer revolution. The first half of the 1980s was characterised by design experimentation with materials, and the advent of artificial and intelligent materials that were also of great interest from an environmental point of view (Pietroni, 2001). In 1987, the World Commission on Environment and Development, established in 1983, published the well-known report Our Common Future in which the concept of 'sustainable development' was defined for the first time: «[...] Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs» (WCED, 1987, p. 15). The subsequent Rio de Janeiro Conference in 1992 took up the definition of sustainable development coined in the Brundtland Report and placed it at the centre of the new socio-economic policy analysis. It also drew up the Agenda 21 document, which required member states to put environmental objectives at the core of their national policies. It also began to monitor the pollution load resulting from human activities, especially greenhouse gas emissions into Earth's atmosphere. The industry of design is changing, overcoming the throw-away culture. Among the international agreements made during this period, there was also the Kyoto Protocol, signed in 1997, which came into force in 2005 and ended in 2012, aimed at reducing CO_2 emissions.

Finally, with the beginning of the new millennium we are witnessing a global awareness on the damage of incorrect product and process design from an environmental, social and economic point of view (Bhamra and Lofthouse, 2007). In 2000, the OECD developed Guidelines, a set of recommendations to encourage governments and multinational companies to make a positive economic, social and environmental contribution to society and sustainable development. In 2012, the United Nations Conference on Sustainable Development Rio+20 was held, which set new goals for member states, making up for some of the shortcomings that had emerged from previous actions by creating new Sustainable Development Goals (SDGs) and drafting the concluding document The Future We Want (United Nations, 2012), that established the definition of the Sustainable Development Goals. This led to the 2030 Agenda for Sustainable Development, a programme of action for people, planet and prosperity, signed in September 2015 by the governments of the 193 UN member countries, a key document aiming to show how the transition to sustainability goes through values that can still place man at the centre of the process.

Fashion Design System | The transition to a post-Covid-19 era seems to offer a rare opportunity for change for the entire fashion system, pushing towards a competitive advantage in an environment that has always been labelled as volatile, uncertain, com-

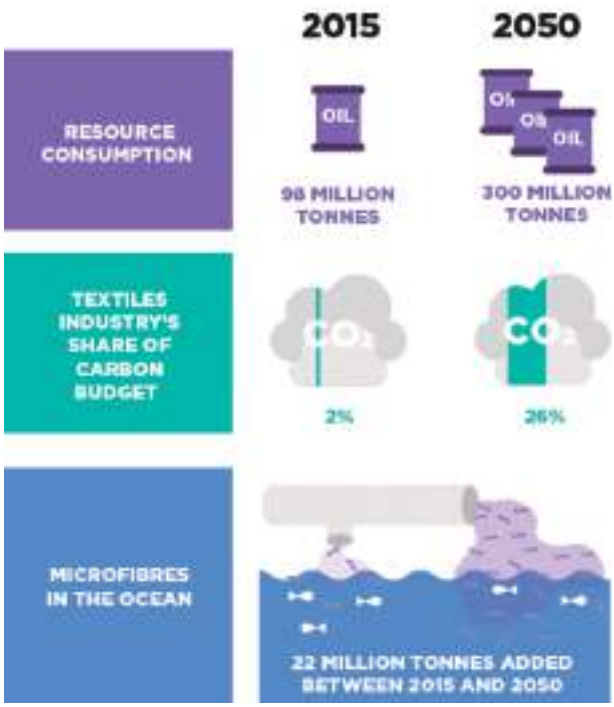


Fig. 1 | Negative environmental impact of the textile industry: forecast to 2050 (source: Ellen MacArthur Foundation and Circular Fibres Initiative, 2017).

plex and ambiguous. This urgency is now reflected in the methods of production, distribution and consumption of its products: developing as a resource-intensive industry and a powerful global growth engine, the fashion system, especially in its latest 'fast' mutation, has massively participated in human and environmental exploitation (Niinimäki et alii, 2020; Rinaldi, 2019).

Currently, the global fashion industry is responsible for 10% of global pollution and 8% of global greenhouse gas emissions are attributable to the clothing and footwear industry, while the textile sector emits 1.2 billion tonnes of CO_2 annually (Ellen Mac Arthur Foundation, 2020; Fig. 1). However, the environmental impact of this industry continues in most cases in the linear 'throw-away' approach of its consumers. The State of Fashion 2020 report (Amed et alii, 2020) states that today 60% more clothes are bought than 15 years ago and they are stored for less time, and that 85% of the clothes produced end up in landfills while only 1% are recycled. But the report also shows that, on the one hand, many companies are making efforts to increase the supply of sustainable products, and, on the other hand, consumer choices are becoming more aware of and sensitive to 'sustainable fashion'. According to some data from Lyst Club (2020), the increased interest in sustainable fashion is expanding worldwide and Italy is in 12th place, with a 78% increase in purchases of sustainable garments from October 2018 to March 2019. For its part, the Camera Nazionale della

Fig. 2 | Summary of the analysis of the Made in Italy Fashion Best Practices examined (by Authors, 2021).

Moda Italiana in collaboration with Eco-Age and with the support of the Ministry of Foreign Affairs, has set up the Green Carpet Fashion Awards with the aim of rewarding the commitment of fashion houses to sustainability, as well as to highlight the national commitment of institutions on it.

In fact, several scholars have pushed for more sustainable fashion since before Covid-19 (Birtwistle and Moore, 2007). Despite its limited scope, the trend for fairer fashion has gradually been supported by many forms of activism, ranging from the 'fashion revolution' (Ditty, 2015) to the 'anti-fashion manifesto' (Edelkoort, 2015), aimed at raising awareness about the necessary reformulation of its industrial models. In this sense, the pandemic has shortened the timeframe for action, becoming an unexpected discontinuity moment. The Copenhagen Fashion Summit of 2020, held in virtual mode, entitled Redesigning Value, raised a complex question about the values that fashion will and must express in the near future. The answer stems from a tragic underlying emergency, based on a humanitarian crisis and aggravated by a rampant environmental crisis, characterised by hypertrophic global supply chains with a high ecological footprint (Gazzola, Pavione and Dell'Ava, 2019). Today, the pandemic has disrupted society and markets, forcing fashion to confront radically different, more critical consumers with high expectations of greater transparency and social, environmental and economic responsibility (Amed et alii, 2020). Therefore, the need for a transi-

Fig. 3 | ECONYL®, patented in 2011, is made from post-consumer waste including fishing nets that are sourced by divers (photography courtesy of Aquafil).

tion from previous industrial paradigms seems to be emerging. In this sense, the paper intends to analyse the strategies implemented by the fashion industry specifically in Italy to respond to the complexity of contemporary life. The Italian fashion system, intended as the whole of the upstream and downstream sectors of the supply chain, took shape in the 1970s. It is a pillar of Italian manufacturing and has a solid tradition and a consolidated competitive advantage at the international level.

Fashion Design Made in Italy | Considering that the fashion industry is one of the most polluting in the world and that, at the same time, it is the jewel in the Made in Italy crown, many examples of national excellence in sustainable innovation now show how Italian fashion expresses the desire and the need to show a viable way to respond to environmental issues. Leaving aside the legal aspect of the definition, the expression Made in Italy began to be used in the 1980s and concerned those manufacturing sectors that express the district characteristics and the strong roots in the territorial specialisations of the Italian production system, such as: the fashion system, typical Mediterranean food products and the furniture sector (Fortis, 1998; Quadrio Curzio and Fortis, 2000; Rullani, 2000). These products are therefore linked by a particular mix of elements that determine their unquestionable recognisability at an international level, and through which the tangible and intangible values of our territory are highlighted and made known throughout the world. Values deriving from the specific know-how and the creative and design capacity of its creators (Plechero and Rullani, 2007; Bettiol, 2015; Capalbo, 2020).

The different cultures and civilisations that have followed one another and lived in our peninsula over the millennia, the geographical variety of the territory, the socio-political history that, starting from the 11th century in the medieval era, went through the phase of the Communes, have favoured the flourishing of a multifaceted identity on the national territory, which today claims its reason to exist, to express itself and to be known (Terenzi and Furin, 2020). The territory, intended as an integrated place of

skills, knowledge, culture, environmental assets, tangible and intangible excellence, is now widely considered as the subject of interest for models and innovative strategies of accreditation, enhancement and socio-economic development (Bassi, 2017; Giumelli, 2019). Truly believing that knowledge and critical awareness of an articulated identity, including its mutations, is the key to continuing to express it with meaningfulness, keeping alive and peculiar the link between design, knowledge of materials and workmanship, executive quality and the complex of everyday life, assigning to the genius loci a highly conceptual and communicative value, regardless of the national location of the entire supply chain. Therefore, the work intends to outline the Italian Way in the approach to Design for Sustainability which, starting from the rediscovery of the genius loci, and using solutions of up-cycling, reuse, valorisation of secondary raw materials and eco-innovation (Puglia and Terenzi, 2020) giving rise to product, process and cultural innovations, to create a sustainability future.

By analysing how the fashion industry has mastered short-term horizons, this article aims to promote new strategic tools for the fashion system. The relationship between production, territory and environment can, in fact, be rebalanced through a strategic design, which goes from the simple concept of a product to a system of products and services. Strategic design favours new models of harmonious local development, enhancing and transforming the local material and immaterial resources present in a territory (Catania, 2011). The cases presented will outline the possibilities offered by the circular transition linked to territorial design, centred on local roots, as an identifying and winning tool in the identification of eco-sustainable innovations. It will be demonstrated that design can and must help us to visualise environmental urgency in all its forms, in favour of unique and unrepeatable creativity that gives new form and function to production processes, allowing a paradigm shift capable of determining multiple and different environmental, economic, social and cultural implications.

With this aim, the analysis carried out on the best practices currently implemented in the different phases of the fashion supply chain is presented, in order to decline the multiple possibilities that the sector can express and demonstrating how it is possible to intervene in a green-friendly way. Companies that would like to open up to the world of sustainability are often catapulted into an infinity of disconnected data that is difficult to use. To systematise this information, the study divided the fashion supply chain into a) raw materials; b) manufacturing processes; c) finished products; d) end-of-life products. Subsequently, it was defined where and how to intervene for the single phases, through the analysis of best practices of Italian companies that have already undertaken sustainable actions.

The previous four macro-categories have in turn been divided into sub-categories: raw materials will be addressed for the textile and leather sectors; production processes have been distinguished by actions to reduce emissions of CO_2, hazardous chemicals, and the use of renewable energy; finished products are broken down by innovation in design, by physical and emotional durability criteria, by choice of packaging,

and finally by an offer for repair and warranty services; finally, the end-of-life of products will be addressed under the entries of reuse, which includes rental, vintage and take-back programmes, and recycling (Fig. 2). In the next section we will analyse best practices in the exploitation of the most commonly used raw materials for the sector: from textiles, which are divided according to their origin into synthetic, natural or artificial, to leather.

Textiles | Synthetic fabrics are neither recyclable nor biodegradable and are mostly derived from oil waste. The main synthetic fabrics used in fashion are nylon, which is responsible for nitrogen oxide emissions, and polyester, which contaminates water systems. The Aquafil company, founded in the 1960s in Arco, has succeeded in transforming an apparently non-renewable material such as nylon into a regenerated material for other uses. The chemical process developed starts with a funnel of waste (in particular used carpets and fishing nets). The polymers separate and become monomers that form caprolactam, a distilled liquid identical to that derived from benzene. The liquid, once cooled, is transformed into plastic granules, 'pure nylon 6'. Finally, the granules are spun and arranged on reels to be sold to the customer, under the name Econyl (Fig. 3). The quality and processing characteristics of this regenerated material are the same used for petroleum-derived nylon, with 50-60% lower energy consumption. The first fashion brand to use the new yarn was Speedo, which produced part of its swimwear collection, then Adidas with a line of swimwear and socks. They were followed by fashion brands such as Gucci (Fig. 4), Stella McCartney and Prada (Fig. 5), which has declared its intention to make all its nylon bags entirely from Econyl by 2022. Finally, Napapijri, with its new Infinity jacket project, which is 100% recyclable, and Safilo which, for the first time, has used Econyl for the frames of an eyewear line.

Natural textiles are made from plant fibres, animal fibres, or are extracted from a mineral. They are recyclable and biodegradable, but involve considerable use of soil, water and energy. For example, the application of chemicals in cotton cultivation impacts 33%, cotton ginning 25%, irrigation 19% and the use of fossil fuels 17%, highlighting various socio-economic and environmental impacts (Hossain, 2015). The Bergamo-based company CFT Masserini S.p.A working in textile trade since the early post-war period and was the first to introduce natural and recycled organic cotton yarns. The company's organic cotton comes only from certified organic farming and an ethical production chain.

With the COREVA® patent, the Candiani company, founded in 1938 near Milan, processes organic cotton by wrapping it around a layer of natural rubber, creating a fabric free of plastic and microplastics. By replacing normal, synthetic, petroleum-derived elastomers, Candiani has created an innovative biodegradable stretch denim fabric (Fig. 6). In the dyeing and finishing phase, the company uses Kitotex® as a substitute for chemicals, starches, fixatives and polyvinyl alcohol (PVA) and the Indigo Juice technique that maintains indigo on the fabric surface. Both technologies reduce

Figg. 4, 5 | Off The Grid Gucci Shopping bag, made of Econyl, 2020 collection (source: gucci.com); Screenshot from the video Prade Re-Nylon – What We Carry, documentary created by Prada in collaboration with National Geographic, 2019 (source: youtube.com).

Fig. 6 | Jason Denham's 2019 Denim line using technology developed by Candiani to make the first biodegradable stretch jeans (source: it.fashionnetwork.com).

Fig. 7 | Image from Detox My Fashion, a campaign launched by Greenpeace in 2011 that ended in 2020 with the Detox Fashion Show, a real ranking that highlighted the progress of the fashion brands that had joined the Detox My Fashion campaign (source: green.it/moda-detox/).

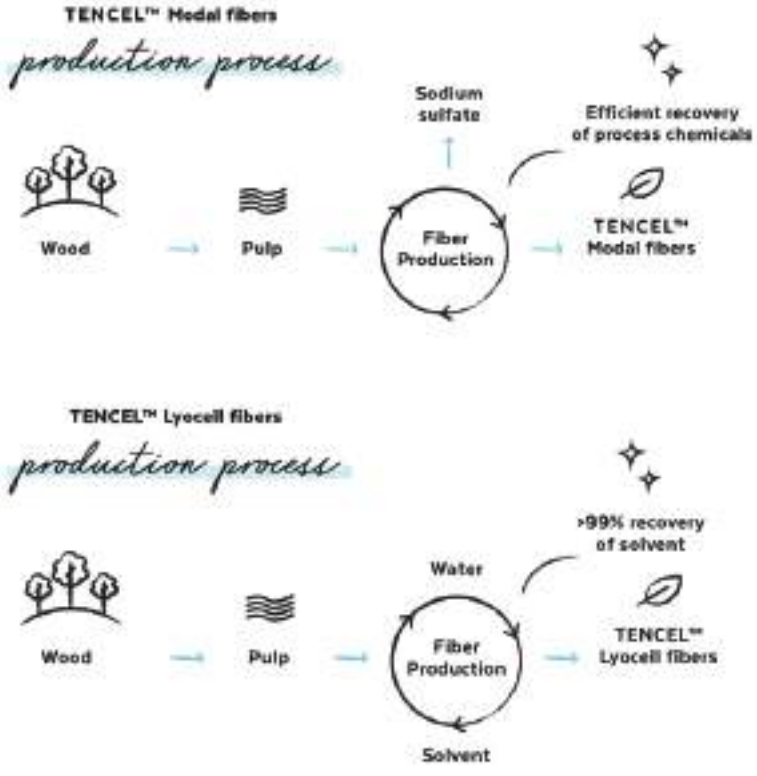


Fig. 8 | CasaGin and TENCEL™ modal fibers mainly manufactured from wood, renewable raw material, sourced from sustainably managed forests. The production process of these fibers is also environmentally sound, with the use of renewable energy and recovery of raw material components for the production of co-products (source: hotlifestyletale.com).

the consumption of water, energy and chemicals used in dyeing and laundry processes. Canepa Spa, founded in Como in 1966, has developed Kitotex® in collaboration with CNR-Ismac in Biella, a polymer obtained by recycling the exoskeleton of crustaceans, a waste product of the food industry. The fabrics obtained using this technology also provide health benefits to consumers thanks to the antibacterial, anti-static and anti-mite properties of chitosan.

Man-made textiles are biodegradable, although not all of them are recyclable. They are made from natural raw materials that are transformed into fibres by chemical processes. Today there are processes for their production with a low environmental impact. The company Orange Fibre, founded in 2014 in Sicily, has developed and patented an innovative fabric derived from citrus by-products from local crops. The process starts with citrus pulp, the wet residue, waste from the process, which remains after the industrial juice production. From the pulp, citrus cellulose is extracted and transformed into yarn using an innovative process. The result is a very high-quality yarn that can be printed and dyed, allowing for sustainable, innovative and high-quality collections. The company presented its first fashion collection in 2017 in collaboration with the fashion house Salvatore Ferragamo from Florence. In 2019, citrus fabrics were chosen for the Conscious Exclusive Collection of Swedish brand H&M and a capsule collection of ties signed by the historic tailoring brand Marinella from Naples.

Fili Pari is a start-up company that combines design, innovation and circular economy, producing clothing with a completely innovative material, which comes from marble processing waste. Veromarmo fabric is a waterproof, breathable, windproof, flame-retardant and abrasion-resistant microfilm that combines technical performance with aesthetic qualities. It is made from marble powder, selected from Italian stone districts, which is mixed together with a special composite. The marble contained in the fabric not only increases the material's resistance to abrasion, but also gives it colour and special graphic effects, enhancing the original product. For example, grey is obtained from black ebony marble and a bright salmon from red Verona marble.

Leathers | Leathers used in the fashion industry have to be traced and certified, in compliance with the most relevant regulations and certifications, for transparency on farming and conservation of certain protected species. Animal welfare policies of some brands and several legal guidelines, such as bans on the sale of fur in some countries, are leading to a steady increase in demand for artificial fur and fur-free alternatives. However, even alternative products have sustainability complications, as most of them are made from synthetic fibres, including acrylic, modacrylic and polyester, all of which are petroleum-based.

Gucci, the fashion house from Florence active in the haute couture and luxury goods sectors and part of the Kering Group, has shown a marked sensitivity towards issues of environmental, ethical and social sustainability. With this in mind, in 2019 the Kering Group developed and published a series of Animal Welfare Standards, de-

Fig. 9 | In 2020, the start-up Rifò proposes Repack, the reusable packaging service, advertising the initiative on Twitter (source: twitter.com).

Fig. 10 | Gianfranco Lotti luxury brand offers customers a lifetime guarantee on purchased products (photography courtesy of Gianfranco Lotti, 2020).

signed to be applied in the supply chain in the steps concerning live animals (especially on farms and in processing plants). Concerning leather of bovine and ovine origin, although it is considered a by-product or co-product of the meat industry, the Group is committed to ensuring the most responsible and sustainable sourcing possible, helping to reduce the negative impacts of livestock farming. For Kering, the only way to reduce the risks associated with social and environmental impacts is to have complete traceability of the leather throughout the supply chain. About fine leathers, the Group is committed to ensuring that these leathers are sourced according to the highest standards of animal welfare, environmental and working conditions.

Manufacturing processes | In order to meet the needs of an exhausted planet, it is important for sustainability to focus heavily on manufacturing processes, before addressing only the end-of-life of the product. It is necessary to develop effective solutions, using renewable energy, to reduce harmful emissions from the industrial production system and avoid the use of chemicals that are extremely dangerous to the environment and humans.

Reducing harmful emissions. The Sharing Economy promotes more conscious forms of consumption based on reuse rather than purchase and access rather than ownership. Thanks to the support of technology and social networks, collaborative consumption is expanding into other areas of daily life, reflecting the values of openness, sustainability and collaboration, derived from digital culture. The beneficial outcome is to reduce environmental pollution by reducing transport. The sharing model has also spread to the field of fashion, where more and more online platforms provide collective wardrobes. In Italy, the My Secret Dressing Room platform has taken off, connecting those who lend an item of clothing or an accessory with those who borrow it, even if only for a day.

Water pollution. In the textile district of Prato, about three hundred and fifty indus-

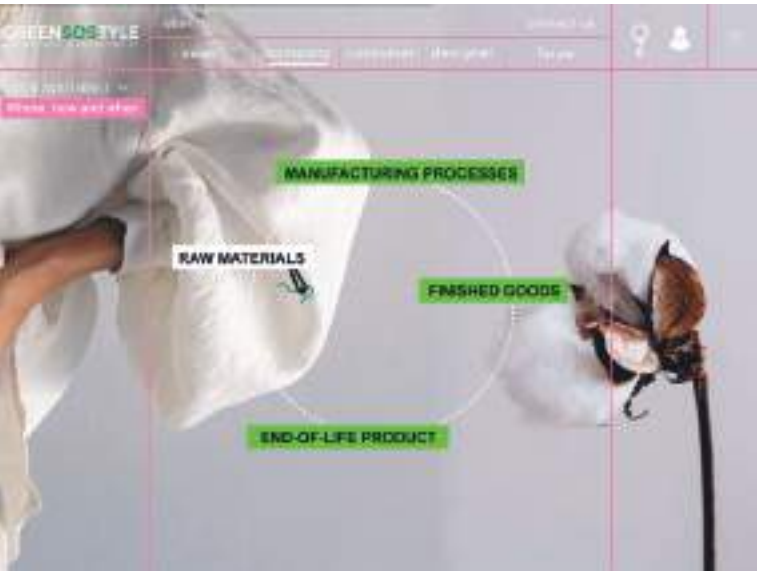
tries are connected to the GIDA (Gestione Impianti Depurazione Acque S.p.A.) wastewater treatment plant. The water, once purified, is used in the cycle of the textile production chain. The purification process involves an initial phase of water treatment up to its last stage when it takes on a transparent colour and is treated with ozone which totally reduces its yellow colour. This process is essential for the washing, finishing and fabric treatment stages. GIDA is the only industrial system in the world to reuse water from civil and industrial waste and return it to the production cycle. The result is a textile supply chain that always uses the same water, purified for each use, without the need to exploit other water resources.

Dangerous chemicals. Greenpeace was among the first to believe in sustainable fashion, launching the Detox Campaign in 2011. After a careful analysis of the entire fashion supply chain, numerous trips to South-East Asia to take samples of polluted water and air and to better understand the gaps in the entire supply chain, and appropriate laboratory tests in collaboration with the Buzzi Lab in Prato, Greenpeace drew up the Manufacturing Restricted Substances List (MRSL), a list of 435 hazardous chemicals (Fig. 7). The Detox philosophy does not analyse subcategories but considers the group of hazardous chemicals and fully eliminates them. The programme challenges companies to eliminate the substances on the MRSL list. Italian companies that have signed up include Uniqlo, Valentino and Mirò, who have committed to completely eliminating harmful chemicals from their supply chains and publishing the updated list of products eliminated to date on their website.

Finished Goods | For this phase of the fashion supply chain, the role played by correct design choices is decisive, as they can bring about a real change in the relentless consumerism and consequent waste production.

Product design. It is possible to intervene with a wise choice of quality and durable materials, but it is also necessary to extend the durability of the finished products, not only physical but also emotional durability. By linking the product to the sensorial and emotional sphere of the end-user, in fact, it is possible to give the user an experience of purchase and use of the goods that goes beyond simply wearing a garment and then forgetting about it after a few uses. The philosophy of luxury brands is closer to this approach, as very often the possession of these garments is considered as a way of being, a lifestyle, a sign of belonging to a group and the brand identity.

CasaGin is a young company from Veneto founded in Padua in 2017, awarded as an innovative start-up in the field of fashion, at an international level, by the MIT of Boston together with the Business School of Bologna. It produces underwear, home and beachwear and sportswear, sold on its e-commerce website, in specific marketplaces for sustainable products and, in Italy, also in pharmacies and herbalist shops (Fig. 8). The company's mission is to create a 100% Made in Italy brand, linked to comfort and environmental protection. The first fabric is used for its products was Tencel, made from a fibre obtained from beech and eucalyptus wood. Then other ma-



Figg. 11, 12 | Website GreenSOStyle by Francesca Piccinini, 2019. This graduation project starts from the awareness of current environmental issues such as climate change and the dependant responsibility of fashion. this work's uniqueness is the creation of an online platform called greensostyle.com dedicated to sustainable fashion. The platform connects three main groups involved in sustainable fashion (companies, consumers and designers) and offers each group some useful tools that fill the gap of information and cooperation between actors (source: francescapiccinini.design).

terials were used such as Econyl, derived from the recovery of fishing nets and plastics thrown into the sea and, from this year, biodegradable nylon has also been introduced. For packaging, CasaGin uses small laboratories located between Veneto and Piedmont, thus combining sustainability and innovation with the great Italian craft tradition.

Packaging. The idea of durability should not be limited to the final product, but also to its surroundings and context. This is why it is important to plan a second life also for the accessory parts of the product, such as the packaging, which has a great communicative function and has a significant impact both on the price of the final product and on the environmental cost. It is estimated, in fact, that from 100 to 500 grams of CO_2 are emitted for the realisation of a cardboard box and from 100 to 200 grams for a plastic bag. Rifò, a company from Prato founded in 2017 with the mission of creating quality clothing and accessory lines with 100% regenerated and regenerable fibres, has understood the importance of intervening in product packaging as well. Rifò products are packaged and shipped through cardboard packaging and plastic-free materials, 100% recyclable and made in Italy. Rifò has also introduced the use of Repack packaging, i.e., special packaging that can be reused up to 20 times, thus considerably reducing the impact of traditional packaging production (Fig. 9).

Repairability and warranty. One cannot think of a circular economy without keeping in mind the need to minimise the reintroduction of post-use products into the remanufacturing process as waste. This is why some companies have taken action with specific reparability services for the products they sell. Durability and sustainability go easily together. Important steps towards an ethical approach to fashion products, abandoning the linear and ephemeral disposable approach. It was demonstrated by the advertising campaign of the company Patagonia, which urged the customer to repair their old jacket through waterproofing or maintenance treatments, to increase the life of the product by at least three years. Similarly, Farfetch, the e-commerce giant for luxury fashion, has launched Farfetch Fix, a new initiative to encourage the circular economy, in collaboration with The Restory, a company specialised in the restoration and care of fashion accessories. This will allow customers to restore damaged garments, extending the life cycle of the products. As far as Made in Italy is concerned, Valentino, for example, has introduced a 5-year guarantee on its products. While the company Gianfranco Lotti from Florence, which produces luxury leather accessories, has a lifetime guarantee on the purchased product, for which the customer can request maintenance or repair within an unlimited time after purchase (Fig. 10).

End-of-life of products | The obsolescence of fashion products, induced by aesthetic evolution and linked to changing social preferences, highlights the psychosocial nature of the factors that condition their service life. A vision linked to the assumption of a development model that is also capable of overcoming the crisis of the current production model, undoubtedly goes in the direction of extending the potential linked to

the recycling and reuse of products, and the search for technical solutions and materials that prolong their life and convert their uses at the right time, transforming products perceived as waste or having reached their end-of-life into new raw materials or new products. The aim is to see a second life or second raw material in the end-of-life of a product, through reuse and recycling strategies.

Reuse. Svuotaly is an Italian platform that allows you to buy and sell used goods online. Specific and very detailed profiling has been devised to make supply and demand easy to match. 90% of the users are women aged between 25 and 40, demonstrating the trend of interest in this market segment (Figg. 11, 12). In the company Quid, from Verona, clothes are sewn and made from waste material, fabrics donated by textile companies in the major Italian districts and by clothing companies, which would otherwise end up in landfills with a considerable environmental cost. To create the products, it uses a production process that goes backwards compared to the traditional one. It starts by analysing the waste to understand what can be created and with what techniques. Quid now employs 120 people, 70% are vulnerable, disabled people, ex-convicts, asylum seekers, of 17 different nationalities and 80% are women.

Recycling. The Bisbag company was founded in Scandicci, in the centre of the Tuscan leather goods production sector. In this case too, the idea stemmed from the desire to recover production waste from local companies – which otherwise would be disposed of – to transform it into new and unique accessories. The company's mission is based on the desire to enhance the value of leather and make this historic and world-famous production sector more sustainable.

Conclusions | Sustainability is now an immanent value in the whole design process: from conception to realisation. The growing attention to issues related to social responsibility and sustainability, both on the part of end consumers and companies, has led the luxury and fashion industry to attribute increasing importance to the inspiring principles of the sustainable approach, introducing them into their basic strategies and core business. Revisiting products, services and management processes in the direction of sustainable development and developing new socially responsible business models are becoming key in creating value for both companies and society. In light of these considerations, the research aims to understand how sustainability and social responsibility are influencing luxury and fashion companies to support strategic decisions.

This paper, through the presentation of significant case studies, aimed to outline the 'Italian way' in the approach to Design for Sustainability. The analysis carried out made it possible to categorise the types of interventions in the Made in Italy fashion manufacturing sector, describing innovative, proactive and responsible approaches to value creation. Best practices undertaken at a national level were then summarised, taking into account the seven priorities highlighted during the Copenhagen Fashion Summit in 2018 by Eva Kruse, regarding the challenges of sustainability in the contemporary fashion system. The contribution is aimed at highlighting the importance of

research and the establishment of 'virtuous connections' at various levels (Universities, companies, public and private bodies) in the definition of innovation drivers. These drivers will allow fashion manufacturing companies to become and remain competitive on the market by supporting the diffusion of a culture of sustainability, considered as the development of new products and processes, the mitigation of the environmental impact of processing and the development of eco-materials able to create new product categories. Clearly, the issues mentioned are intertwined, in broad terms, with political ideologies and choices, touching on issues such as rethinking production systems, quality of life and work: these are issues that in the short term could represent an obstacle to the spread of these practices, if they are not supported by targeted governance actions and tax breaks for businesses.

The Italian Fashion System must, however, seek to network in order to assert its economic strength and aim to become a beacon for the entire Made in Italy sector. By taking note of the possibility of converging towards solutions that reduce the impact of our production methods on the environment, strengthen the resilience of nature to environmental pressures and encourage more efficient and responsible use of natural resources. As a powerful cultural lever, fashion will be able to influence the behaviour of important critical masses, so the eco-innovations and positive practices introduced in the sector will attract a new generation of high-tech manufacturing and services, increasing Italy's competitiveness and creating new highly skilled jobs. This will ensure lasting prosperity for the sector, while respecting ecological and social limits.

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THE SECOND LIFE OF RUBBLE
Time and Matter in Anselm Kiefer's towers

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ABSTRACT
The Seven Heavenly Palaces (Milan, 2004) is one of the most impressive installations bearing the signature of the German artist Anselm Kiefer. The work consists of seven towers – erected in the former industrial space of the Pirelli Hangar in Milan – and uses the archetype of vertical construction, as a number of other Kiefer's works do. The artist reinterprets and reiterates the theme of the tower on several occasions, charging it with complex symbolic meanings. His installations – alienating scenarios in which visitors can deep in his creative universe – rely on an act that is not necessarily artistic: the act of building. This is the starting point of this paper, which aims to analyse the Milanese installation from a semantic perspective, especially highlighting its spatial value. Kiefer's work leads to considerations on the meaning that building and destroying have in contemporary society and prefigures a new life for those fragments whose disposal is the only aspect we are interested in: rubble.

KEYWORDS
rubble, ruins, memories, matter, tower

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Charged with symbolic meanings, Anselm Kiefer's towers stand out in museums, on the stages of European theatres, and in French rural landscapes. They are among the most striking works of contemporary art, and they decline (and disrupt) one of the archetypes of the art of building: the tower. As artefacts conceptually between two disciplines – architecture and sculpture – they emblematize Kiefer's artistic action and ideology; he draws from very diverse disciplines and considers the thorny ambiguity of borders as the source of the most vigorous expressive power. The art of Anselm Kiefer – German by birth (Donaueschingen, March 8, 1945) and French by adoption – is based on the search for an historical identity everyone has to deal with, even when it is tied to social tragedies before which you may be left with no other choice than being silent.

According to Celant (2017, p. 13) for Kiefer, the possibility of being in the world does not lie in refusing cultural, social and ethnic birth, but in using it as a premise, albeit linked to the anxiety and anguish of a forbidden and fearful past. His creative process considers any intervention on matter as absolute protagonist, regeneration in transformation. Like a contemporary alchemist, he shapes and burns, oxidizes and overlaps, bi-dimensionally and tri-dimensionally, as if in the search of the light of gold in the 'nigredo' of lead. Memory is undoubtedly the other great constant of his work: both the disturbing memory of the recent past and the memory of a mythical past whose symbols and archetypes become powerful tools for metabolizing dramas which are not so distant in time. His towers materialize all this on a tremendous scale. As in his tragic childhood in the ruins of post-war Germany, Kiefer reassembles rubble that he redeems by endowing them with a new existence and new meanings. Infused by the artist with prodigious emotional values, rubble of a traumatic past is projected into the present and translated into a mystical journey exploring archaic roots.

By necessity, the state of the art of literature on Anselm Kiefer's work has a broader horizon. First, Anselm Kiefer is not a silent artist. His critical awareness and the expressive need of his complex inner universe emerge clearly in the collection of lessons 'Art will survive its ruins' and in his countless interviews he provides clues to venture along the paths traced by his work. Many and exhaustive essays were written by renowned authors such as Germano Celant or Paul Ardenne, just to name a few. Their writings try to unfold the artist's creative nature, explaining the many nuances that it has and thus representing an essential tool for approaching his work full of symbolic and metaphorical references. Such essays are often included in the catalogues of individual exhibitions, with the purpose of clarifying the assumptions of the most recent works in relation to past production, enriching their interpretation from time to time. This paper, instead, aims at examining the work of one of the most influential contemporary artists from a different perspective, i.e. analysing his architectural production rather than his original artistic field. The ultimate goal in reviewing the different manifestations of the towers is to outline a selective narrative of the artist's work and to evaluate the relationships that it interweaves with the spaces around it.

Drawing from different disciplines and joining emotional instances and practical

Fig. 1 | Anselm Kiefer, The Seven Heavenly Palaces, Pirelli Hangar Bicocca, Milan 2004 (credit: mam-e.it, 2020).

solutions involve the risks embedded in any multidisciplinary approach, but also the opportunity to go beyond the boundaries of the individual disciplines. This approach is based on the belief that Kiefer's attitude is an important conceptual reference at interdisciplinary level, due to the strength with which the technical (and constructive) solutions adopted become an essential tool in conveying the artistic message. Nevertheless, a broader investigation on the documents concerning the setting-up of installations is needed for further study.

The study starts with The Seven Heavenly Palaces (Milan, 2004), the first and most famous public installation with Kiefer's towers, which can be classified as site-specific even if with some ambiguity. To clarify its expressive values, it is impossible not to look at the prototypes in Barjac and at the artist's demiurgic action on the landscape. Through the tower archetype the study then analyses the case of Opera Bastille, where the towers repeat differently[1] thus highlighting how those alienating scenarios ultimately lead to a reflection on the meaning of the ruins of the 20th century and of the contemporary world. In fact, if rubble – no longer ruins – are the product of the second half of the 20th century (Augè, 2004), Kiefer believes rubble has a great expressive power

and its shaping is a chance for redemption that art unquestionably needs after a century in which it served politics and propaganda with unpredictable consequences.

Architectural Sculptures | «[…] I worked without an engineer, without an architect, I constructed tall buildings. Just like when I was a child when I played with the bricks of some bombed ruins near our house» (Bouhours, 2015). During the interview with Jean Michel Bouhours, curator of the artist's retrospective exhibition at the Centre Pompidou in Paris (December 2015 – April 2016), Kiefer reveals how the practical act of building, intended as manipulating the matter, is an integral part of his creative process. As a result of growing up amidst the ruins of post-war Germany, fragments of destroyed buildings exert a compelling fascination over Kiefer. He considers transforming them into essentials of his art an immediate gesture of redemption. Seven Heavenly Palaces (Fig. 1) is an artistic installation with a strong architectural dimension. Even the simple observation of the photos documenting the set-up phase suggests the activity of a building site: foundations, iron, formwork, reinforced concrete panels can be easily recognized (Figg. 2, 3). The dissonance revealing that it is not a standard building site is represented by the prefabricated elements in reinforced concrete. The panels are not new products resulting from an industrial process: the reinforcing rods sprout bristly from the concrete, the horizontal elements are chipped and shattered as if they had been hit by an explosion.

Figg. 2, 3 | Setting up phases of The Seven Heavenly Palaces, Pirelli Hangar Bicocca, Milan 2004 (credits: Galleria Lia Rumma).

Fig. 4 | Concrete L shaped panel (credit: A. Kiefer, Jericho, 2000).

Fig. 5 | Anselm Kiefer works settled in the arches of Chapelle de la Salpêtrière, Paris 2000 (credit: A. Kiefer, 2017).

Fig. 6 | Anselm Kiefer, Shebirat Ha-Kelim (Breaking of the Vessels), Chapelle de la Salpêtrière, Paris 2000 (credit: A. Kiefer, 2017).

Fig. 7 | Anselm Kiefer, towers prototypes in Barjac, 2000 (source: wikiart.org, 2019).

The towers are precast concrete modules. The artist used metal containers for freight transport as formwork. Every floor has L-shaped elements (Fig. 4) which are put near each other to reproduce the volume of the containers (2.5 x 2.5 x 2.5 m). The concrete elements maintain the surface of the containers, i.e. corrugated steel and spots of blue and red paint released by the rough coloured finish of their matrix (Tramontano, 2006). The concrete casting is not subject to vibrations and the result is an irregular material characterized by clumps and discontinuities. The latter together with the reinforcing iron emerging from the slabs and edges of the panels has a vigorous expressive effect which is functional to the re-use of rubble (Rossellini, 2016). The Seven Heavenly Palaces is the result of constructive experiments that the artist conducted in Barjac, in the South of France, near Avignon. In 1992, a 35-hectare estate, where once stood a silk factory, became a laboratory and theatre of large-scale creative interventions. The artist did not just move his home and atelier there, but actively carried out a profound transformation of what surrounded him, both the buildings and the land. La Ribaute constitutes the real possibility of interfering with places, something the artist started experimenting while working on an installation for the Parisian church Salpêtrière, as he himself tells in an interview with Karen Wright (2011).

In 2000 he was commissioned a work for the Saint Louis chapel in Paris, as part of the Festival d'Automne. On that occasion, Kiefer brought one of his personal declinations of a Judaist theme in a Catholic place of worship. The title of the work is Chevirat Ha-Kelim, one of the episodes of the world's creation described by the kabbalist Isaac Luria at the end of the 16th century. The title – which can be translated as the Breaking of the Vessels – is also the name of one of the six paintings in the arches of the chapel. Like enormous sacral altarpieces (9.4 x 5.1 m), the paintings alter the architectural perception of space (Figg. 5, 6). Kiefer does not illustrate, but rather materialises the phases of the creation of the world according to Lurianic mysticism: his work on canvases relies on the use of layers that generate thickness, of objects and fragments, of the traces they leave on surfaces. In this way he manages to express concepts such as Tsimtsoum, the retraction of the light from above (God), which creates void, i.e. an essential condition for the generation of a matter other than the divine; or the Chevirat Ha-Kelim, the destruction of the receptacles, the ten emanations of the divine light they result from and which they are meant to contain if it was not so powerful. The impossibility of limiting generating infinity within generated finite is reflected in the fracture of the vessels, the origin of chaos in the world in which fragments are dispersed and which hopefully will be recomposed in a process of reconstruction (Tikkoun). Tsimtsoum, Chevirat ha kelim and Tikkoun together with Atsilouth (emanation), Sefiroth and The Order of the Angels are the titles of the six altarpieces in the arches of the chapel, which enhance their circularity, defining a meditative space.

Kiefer's work is made for Chapelle de Saint Luis; its specificity creates an alteration, and its artistic reflections give life to a rare phenomenon: a coexistence of cults, one in the architectural system and the other in the decorative system, which results

Figg. 8-11 | Anselm Kiefer, The Seven Heavenly Palaces, Pirelli Hangar Bicocca, Milano 2004: lead books and wedges at the base of the towers; chaining system; Sefiroth and Melancholia (in the backround); Tower of the Falling Pictures (credits: Pirelli Hangar Bicocca, 2015).

from the encounter of Catholicism and Judaism. This longing for an intimate and permanent dialogue between the work of art and the space destined to accommodate it affects both the artist's workplaces in Barjac and his other ateliers. «[...] showing my work in a gallery or a museum seems quite an unnatural thing for me to do [...] my works are very fragile, and not only in literal sense. If you put them in the wrong circumstances, they can lose their power completely. So, what I do in Barjac is give them a space» (Wright, 2011, p. 446). An unsuitable site annihilates the work and neutralizes the artist's effort. Although the Provençal estate is not the only place where Kiefer lived and worked for a long time, it configurates as a materialization of his creative universe, made up of space-time connections between different eras and cultures which combine contemporaneity and archetypes.

La Ribaute is not only the place where Kiefer's works are conceived, but also the best place to experience them. Entering the property means venturing into one of the gardens of the artistic imagination, such as that of Niki de Saint Phalle in Gravicchio near Grosseto or the 16th century garden of Virginio Orsini in Bomarzo: it is a real art park, a landscape dotted with sculptures and architectures (Rossellini, 2016). Walking through the residence you come across the famous stacks of lead books; a light-filled greenhouse with a fallen military plane overrun with sunflower stalks; huge portals that act as a curtain to equally huge canvases; and above all what looks like a village of towers (Fig. 7). Indeed, an entire sector of the estate is used as a permanent construction site and through countless tests Kiefer fine-tuned the method of making the L-shaped modules and of giving the towers that apparently precarious balance that makes them magnetic and disturbing at the same time.

In a land populated exclusively by his works, the precarious balance could not even be apparent. Breaking down and rebuilding are actions that alternate in a creative modus operandi admitting the coexistence of destruction and construction, but especially considering the work as a result of the clash of these two operations. Without the intervention of architects or engineers, assisted only by a team of collaborators and a crane to lift the pieces, the German artist creates countless constructions, most of which turn out to be real prototypes of his most famous works. Alongside prefabricated panels made from containers, Barjac has evidence of two other versions of the towers, subsequently abandoned (Rossellini, 2016). One has a configuration in which the volumes of each floor are still readable, made up of grids of concrete blocks and element casted on site. The second version of the tower is reduced to its skeleton, realized with H-section steel beams, braced to form an irregular trellis. Both experiments show those characteristics that make Kiefer's towers a metaphor for the dramatic impossibility of ascent/descent to the Heavenly Palaces: smashed attics and impassable stairways. «[…] It is as if, interacting with each other, the images of Barjac house-atelier and the images of the works could paradoxically clarify each other. In my opinion, Barjac's house-atelier does not look like the remote place of the creation of works, from which they would later be detached, but as a sort of origin, which is infinitely

Fig. 12 | Anselm Kiefer, Sternenfall (Stelle cadenti), Monumenta's first edition, Grand Palais, Paris, 2007 (credit: Pirelli Hangar Bicocca, 2015).

present in them. What is in Barjac is in the works and what is in the works is in Barjac» writes the gallery owner Lia Rumma (2004), curator of the Milanese installation, who has been exhibiting and promoting Kiefer's work for years. Barjac is therefore the fruitful soil of France that nourished the constructive vein of the German artist. It is the starting point, the original site of the towers, but also a private place of the artist, which nevertheless reveals much of the subsequent specificities.

The tower between archetype and mystical journey | In order to understand Kiefer's sculptures-architectures in Milan two fundamental aspects need to be taken into account: their appearance leads to a reflection on a constructive paradigm, while the title – Seven Heavenly Palaces – gives a possible interpretation of the installation, in which the seven objects symbolize the stages of an upward journey linked to Jewish mysticism. The title that Paul Ardenne gives to his essay, published in the catalogue of the permanent installation within the Hangar Bicocca, is polarized on the relationship between the Celestial Palaces and the archetype they relate to. With A Tower is Sometimes a Tower, the French curator and critic reveals that pervasive and disturbing ambiguity that Kiefer's art transmits to the observer (Ardenne, 2004).

If on one hand the proportions of the artefacts suggest the turreted landscapes of medieval cities, in which the buildings served social purposes, on the other hand the Seven Palaces gives the impression of mangled residues of a harsh post-atomic conflict, raised with primordial techniques. Evoking the archetype of the tower means above all dealing with an almost obsessive representation of the human desire for self-elevation, often accompanied (and driven) by pride and hubris towards pares and super-pares, i.e. men and gods. From the ambition to conquer a privileged observation place to that of obtaining on the third dimension a space which is not available on the ground, from Babel to the skyscrapers of Manhattan, the most advanced theoretical knowledge and the most daring techniques have been employed to achieve the ever-increasing height reached by a building.

To the imaginary of the ascent – supported by technology – and to the idea of stability (consolidated by literature) Kiefer responds with an archaic construction method which

consists in the obsessive overlapping of pieces. The reinforced concrete slabs and walls activate a constructive accumulation process, which does not include any structural skeleton. The constructive method that confers the sense of visual instability is the same that ensures static firmness. At the base of each tower and in the upper floors there are books and lead wedges. The towers arouse in the viewer a profound sense of unbalance especially because of the movement of the laying surfaces between the different floors. Nevertheless, the static firmness is linked to the compression of the interposed metal elements under the weight of the structures (Fig. 8). The technical solution has an evident expressive value, and it preserved the pieces' cohesion until a chaining system was set up (Fig. 9) during the renovation works in the Hangar in 2007 (Tramontano, 2008).

In the experimental lab of Barjac the towers become an integral part of the landscape and they are deprived of explicit symbolic references, whereas in the former industrial buildings of the Pirelli Hangar Bicocca – where the towers were officially presented – Kiefer uses the title to give an interpretative clue to the installation. The semantic association pertains to theories of Jewish mysticism described by Isaac Luria in the 16th century. Inside the Hangar (61.0 x 180.9 x 29.76 m) the seven towers embody the Seven Heavenly Palaces described in the Sefer Hekhalot (The Book of Palaces): they are mandatory stops on a journey leading to divine presence. The towers resemble each other, but they are not equivalent. They differ in height, between 13 and 16 metres, and they are unique pieces (there is no methodical control on the traces of paint that the concrete removes from the container or on open gaps on slabs and vertical panels). Nevertheless, it is the use of real props that generates the distinction. Sefiroth, Melancholia, Ararat, Magnetic Field Lines, JH&WH, Tower of the Falling Pictures: they are identified by elements that are not intrinsic to the construction, but arranged on the ground or on the top of the towers and constitute the starting point for decryption.

In the kabbalistic tradition the term Sefiroth indicates the ten emanations revealing the divine and giving shape to the world; the Hebrew names of Sefiroth hang from the reinforcing rods along the side of the tower as neon signs (Fig. 10); furthermore, seven lead books placed on the top of the tower evocate a commitment to mystic knowledge and the risk incurred when the latter is threatened. A glass polyhedron – a clear reference to the Melancholia engraving by Albrecht Dürer (1471-1528) – flanked by glass fragments engraved with NASA's star classification codes suggests reflections on the ambiguity of the role of the alchemist between art and science and necromancy, between aspiration to the sublime and measurement of the immeasurable (Biro, 2018).

Ararat is the name of the mount where Noah's Ark landed. A lead sculpture depicting a German military ship is placed on top of the tower to show the ambiguity of an object that evokes both salvation and destruction. Reels and lead films descend from Magnetic Field Lines – the highest tower – thus exploring the close relationship between art and politics, between visual culture and propaganda. The fifth and sixth towers – JH and WH – form a diptych and their names (written in neon signs) are complementary in writing the Hebrew name of God. The link with Judaism is made explicit

by the presence of lead meteorites, which symbolize the shattered vessels of the Chevirat Ha-Kelim. Finally, the Tower of the Falling Pictures (Fig. 11) focuses the value that images and icons have taken in history and contemporaneity by means of lead frames and shattered glass plates.

Few words need to be spent on the planimetric distribution of the towers: Kiefer decided their position according to perceptive criteria evaluated on site during the installation phase. The artist configured a flat path, conducing the visitor inside the hangar where he can freely wander and even access some of the towers. The towers do not seem to identify stages of a journey in a predetermined sequence. Due to maintenance works in the Hangar, over the years the route was reversed, replacing the entrance with the exit (Tramontano, 2008). But then, if such a radical inversion is legitimate, how is the journey that Kiefer invites us to make inside the Hangar articulated? How is it linked to Jewish mysticism? Which form of Divine does he invite to reach? The literature of the Hekhalot is ancient and mysterious, Giulio Busi warns in his book City of Light – Jewish Mysticism of the Celestial Palaces. Those texts are remote in space and time. How can the description of mystical journeys that even precede the Kabbalah – the wisdom collection of Judaism dating back to 13th-16th century – resonate in the man of the 21st century? Kiefer's work boldly grapples with these questions in his usual experimental way.

The journeys of the mystics are inner journeys, aimed at crossing the boundaries between the human and the divine to reach the wisdom which can be brought back to human beings. Hekhalot's journeys lead to a place, a divine elsewhere, with its own topography and organization. Eternity, Busi points out, translated in an accessible way means 'temporal synchrony', the coexistence of past-present-future, since 'in the divine abode time is pure space' (Busi, 2019). In many Hebrew texts, indeed, the possibility of visually inspecting what belongs to different times is expressed by the concept of deposit. In my opinion, this reflection is fundamental to understand Kiefer's work. The title of the installation and the numbering of the towers suggest that those are stages of a journey on the ground floor of the hangar. But the bursting verticality, the objects that distinguish and characterize each tower, the references to the historical and philosophical themes dear to the artist, aren't they movements within a temporal synchrony?

Ultimately: Kiefer spatializes time, he creates timeless places, in which the visitor's present is alongside the past to think about the future. It creates seven independent journeys, the direction of which is clear, indisputably vertical, but the same cannot be said for the experiential sense. In an interview on the installation, the artist even enjoys quoting Goethe's Faust, who going down to the mothers says 'going up, going up, you go down', alluding to the ambivalence inherent in otherworldly journeys and in the mysticism of the Merkaba (Zanchi, 2016). If the personal declination of the Kiefer's archetype consists in materializing the fatigue of the ascent, the visitor does not even think that there is this possibility, rather feeling the vertigo of the fall. The towers attract the visitors and project them into the universe of the artist, populated

Fig. 13 | Anselm Kiefer, scenography for Am Anfang (At the beginning), Opéra Bastille, Paris, 2009 (source: theguardian.it, 2015).

Fig. 14 | Anselm Kiefer, The Shape of Ancient Thought, 2012; electrolysis on photographic paper on lead cm 307 x 440 x 4. The Work was shown during the exhibition La Mezzaluna Fertile in Galleria Lia Rumma, 12/09 - 15/10, 2012 (credit: Galleria Lia Rumma, 2012).

with those universal but historicized themes he had to deal with as a German born in a country pervaded by material and cultural rubble.

Conclusions | Kiefer turns and returns to the motif of towers as he always does with themes deeply affecting his creative sensitivity. He photographs the prototypes in La Ribaute and shapes their scenarios, imagining them as episodes of a two-dimensional

narrative, on whose supports he still intervenes materially (burning/oxidating metal sheets). He inserts a tower among other fragments of ruins in the installation Sternenfall (Falling stars) at the first edition of Monumenta in Paris in 2007 (Fig. 12) and in the same year twelve of his towers are used as scenography for the performance Am Anfang (In the Beginning) at the Opéra Bastille in Paris (Fig. 13). In the latter case, Kiefer brings his architectural sculptures to the theatre, invading all the backstage and the stage for the first time in the history of the French theatre. The scenography causes an intense sense of alienation: an unusual scenic depth, accentuated by real constructions and not by two-dimensional perspective representations. His experimentation on the aesthetic of rubble lands on the stage floor and on the costumes with dust and debris. The curtain seems not to open on a scenography, but on a dramatic real fragment of a world in ruins. Only the title contrasts the unequivocal sensation of the end: In the beginning it borrowed from sacred literature, the oldest of sacred books, the Bible (Searle, 2012).

Again, in a work in which the matter of art invades spaces more than ever, Kiefer leads us to reflect on time. Not the 'pure time' which we experience by facing ruins according to the anthropologist Marc Augè. In Time in ruin, in fact, he defines ruins as 'what remains' of a past whose historical value we are unable to identify. Art itself is a form of ruin or premise of it, since it cannot completely show its original instances or our different sensitivity cannot help us to understand them, especially if distant in time. The pleasure we derive from art comes from the perception of a gap between the generating sensitivity and the contemplating one (Augè, 2004).

It is not the time lag, the perception of which makes us deeply human, that Kiefer is interested in, but rather the temporal syncretism which, precisely as humans, we are unable to experience except on very rare occasions. In his writings he often tells how much he was struck by some passages of Proust's Time Rediscovered where a present sensory perception (the taste of a madeleine immersed in tea or the noise of the spoon hitting the cup) vividly evokes sensations of the past to the protagonist (Kiefer, 2004). His towers become objects of temporal convergence like Proust's Madeleines. That idea recurs in the series of works The Shape of Ancient Thought (set up at the Galleria Lia Rumma in Milan on the occasion of the exhibition La Mezzaluna Fertile 2012; Fig. 14), in which the artist superimposes images of Greek temples in ruins and Hindu places of worship to generate an impossible landscape in which those invisible connections between diversity of time and culture are made evident.[2]

He alludes to the rubble of his childhood rather than the lyric-soaked idea of individual duration induced by ruins. To those fragments that burden the bombed or wounded cities, or simply in search of renewal. The only possible product of today's society where the only admissible time is the present. Anselm Kiefer gives temporal depth to contemporary cities: as futuristic prefiguration of places in a state of abandonment, as fragments of past myths and archetypes, the rubble towers project art into a disruptive constructive dimension that gives it the aspired (auto) regenerative power and the coveted possibility of a new beginning, especially in dramatic historical moments.

Notes

1) The expression comes from the philosophical thought of Gill Deleuze elaborated in the book Difference and Repetition (1968).

2) The Shape of Ancient Thought is an explicit reference to the essay written by Thomas McEvilley (2002) where the authors traces parallelism between Oriental and Occidental philosophies.

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The subjects of climate change, excessive use of soil, renewable resources, ever-increasing production of waste, the current pandemic emergency and the global socio-economic crisis that it is causing, have in fact entered our daily life. Even if these are terrible issues, they can be, somehow, seized as an opportunity to rethink the way we live and our world. In this 'revolutionary' (Floridi, 2020) and 'polycrisis' (Losasso, 2020) context, specifically referring to the building industry, the Academy, the Research and Industry worlds are called to give answers – based on sustainability and the principles of the Green Deal – that can stimulate reconsiderations and re-orientations of processes, products and services, new projects on places, buildings, objects and materials, able to positively affect the governance of the global change that our planet and humanity need, able to give a 'new life' to the built environment, at any scale.

In the light of these considerations, the volume entitled A New Life for Landscape, Architecture and Design encloses 14 essays, research and original experiments, projects and interventions. While they address only some of the issues listed in the introduction, they are food for thought and contain good practices capable of give a contribution to the international debate on the subject. The contributions show that now more than ever a paradigm shift is needed. Though a multidisciplinary, systemic and interscalary vision, it should be able to deal with problems as if they were complex processes, activate projective simulations with the use of big data and implement structured strategies and actions that, on the one hand, can determine new balances adaptable to the unpredictable, continuous and constant change, and on the other, are respectful of our planet and of its non-renewable resources, but are also inclusive not to leave anyone behind.

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