Urban Regeneration in the Age of Transitions

Celestina Fazia[1](✉), Dora Bellamacina[2], Giulia Fernanda Grazia Catania[1], and Federica Sortino[1]

[1] Faculty of Engineering and Architecture, University of Enna Kore, Cittadella Universitaria, 94100 Enna, Italy
celestina.fazia@unikore.it, {giuliafernandagrazia.catania, federica.sortino}@unikorestudent.it
[2] Mediterranea University, 89 100 Reggio Calabria, Italy
dora.bellamacina@unirc.it

Abstract. Joint Programming Initiatives (JPI) - designed to fund research projects on Europe 2020 and sustainable development - target the challenge of cities to lead the urban transition towards a sustainable future. Ecological and environmental, social and demographic, technological and digital transformations are understood as prerogatives of the third millennium.

Although European guidelines are clear, in line with the challenge of climate change, the question arises as to whether cities are sufficiently prepared (in terms of urban planning tools and in terms of administration, organization and social awareness) to manage the changes taking place.

Through an analysis of current regeneration programs and projects, it will be possible to determine how urban transformations are being managed. Are the various ongoing urban regeneration initiatives succeeding in achieving the goals set by European recommendations? Comparison with good practice in operational terms is necessary. It is indeed imperative to monitor the implementation of urban regeneration interventions.

The aim of this dissertation is to conduct a survey, through current initiatives, of successful experiments in terms of urban regeneration in order to constitute a virtuous index.

Keywords: Ecological Transition · Resilience · Social Justice

1 Introduction

Resilience is far from a new concept, but it enjoys marked versatility today, especially in urban settings. New, however, is the role that the current need is giving it, confirming the broadening range of areas of use of the term. Today, however, it is no longer enough to speak of a resilient city; our cities need to be fast, safe, high-performing and respond perfectly to the model of the new Smart city.

The interplay between these two needs, however, is not always obvious [1].

Many of our cities have been conformed to an urban planning model that evolved in an era when fossil fuel energy was the undisputed base, the expansion of cities and the

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gradual abundance of the historic center created numerous chasms in the urban grid and drove land consumption rates to unprecedented levels.

For today's times, these cities appear rigid, having at best "structural resilience" and not ecological.

A "smart" and "resilient" approach is therefore expected from the design of new cities and their infrastructure.

2 Regenerate: The New City Between Smart and Green

Cities are getting bigger and bigger and more complex, and within them there are more and more "machines," generators and energy sinks.

As much as talking about "green city" and "smart city" may seem an oxymoron in reality, technology has shown us that it can fulfill in an egregious way to improve the offerings of cities, adjusting them to higher and higher parameters of resilience and performance, making itself an active and indispensable component in aiming for the regeneration of neighborhoods and cities [2].

Technological evolution is leading us to the achievement of new frontiers that are coming to fruition, especially in the field of transportation. Created for military needs, self-driving vehicles are becoming more established and widespread, but while self-driving cars represent an increasingly near future, less information is available on self-driving ships that actually already count some concrete examples.

Although they are still in the embryonic stage of development, the United States, on April 7, 2016, already christened the Sea Hunter, one of the first autonomous surface vehicles, a military vessel with the function of scanning the Pacific seabed for enemy submarines.

The outlook is also rosy for civilian uses, especially in the business sector, which sees the future of self-driving ships engaged as cargo transport.

Indeed, Norway has christened the Yara Birkeland, the world's first fully electric, autonomous, zero-emission container ship. Yara promises to reduce diesel truck transport by 40,000 trips per year.

In the regenerative perspective, we cannot rely only on the vanguards in terms of transportation. These, in fact, represent only one of the building blocks capable of mitigating the ecological traumas we are facing. Urban resilience must have the capacity to deal with the cataclysms and difficulties that dominate our age.

The land-sea relationship has always been complex, even more so today with the growing concerns regarding climate change and the consequent rise in sea level.

Scientific studies show that the average sea level has risen by more than 20 cm since 1880, and is predicted to worsen unstoppably, rising a further 30 cm by 2050.

This is just one of the catastrophic consequences of our reckless behavior.

The only implementation that can be considered lies in "Nature based solutions" to a reinvestment and rethinking of the city as an organic structure closely tied to nature and respect for the environment, eliminating the uses and abuses perpetuated to date (Fig. 1).

Many countries, intimidated by the predictions are running for cover.

According to forecasts by the New York City Panel on Climate Change by 2050, tidal growth will inundate the financial district and the Lower Manhattan Seaport monthly, reaching a daily cadence by 2080.



Fig. 1. Yara Birkeland is the world's first fully electric and autonomous container vessel with zero emissions. Source: https://www.yara.com/news-and-media/media-library/press-kits/yara-birkeland-press-kit/.

The new project includes a nearly one-mile multi-level waterfront that includes the construction of floodwalls well camouflaged in the landscape.

Resilient green infrastructure and stormwater storage and pumping stations that not only act as a lightning rod for calamitous eventualities but also provide new green public spaces for socializing.

A new Jagged Coastline that will allow for the emergence of new inlets is the restoration of natural habitat and biodiversity.

This example certainly provides us with food for thought on how human actions today must increasingly draw on and blend in with nature. The gradual removal and brutalization from the landscape and natural environment brings problems of no small magnitude, and only experiments that as close as possible to it can be the solution [3] (Fig. 2).

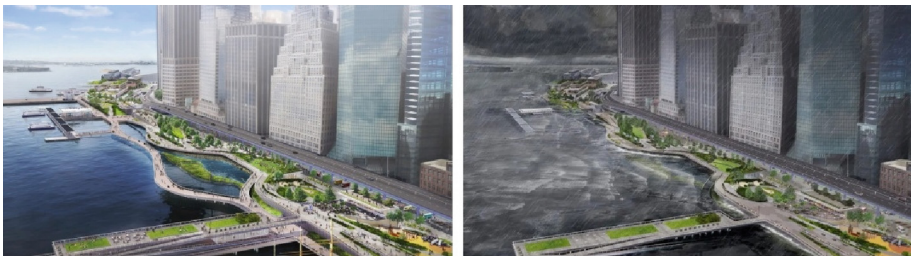


Fig. 2. Masterplan Financial District e SeaPort New York. Credit: NYCEDC. Source: https://www.rinnovabili.it/greenbuilding/smart-city/gli-effetti-mortali-del-cambiamento-climatico-new-york-si-prepara-a-difendersi/.

Another American gimmick that combines well technological sophistication and the demand for urban greenery is the Pop Up parking lot, which proposes a functional

solution to two different problems: the lack of parking spaces and the need for green areas.

According to recent studies, 30% of roadblocks are caused by motorists looking for parking. The increase in population has led to an obvious increase in means of locomotion making the present services insufficient.

This has led to the need to find new spaces to be used for parking spaces or garages, often at the expense of green areas.

An innovative proposal comes from Denmark, the architectural firm THIRD NATURE has developed a contrivance called POP-UP, which by exploiting Archimedes' principle manages to solve 3 problems with a single "smart" solution: lack of parking spaces, protection from flooding events, and provision of new green areas.

Thus, was born the Pop Up floating parking lot: a tank that serves as a water reservoir and floating space where cars can be parked with green covering to crown the structure.

If the day is sunny, the parking lot is underground and the green space will result ground height; if, on the other hand, the day is rainy, the reservoir will be opened to allow rainwater collection and consequently the garage structure will rise above ground (Fig. 3).

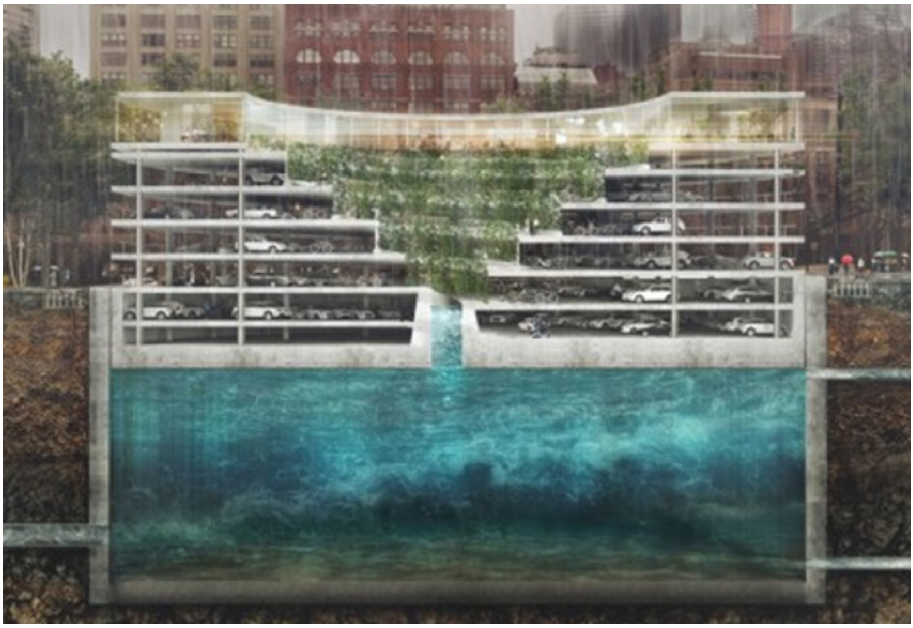


Fig. 3. Reander of the POP-UP parking project. Source: https://www.abitare.it/it/gallery/habitat/urban-design/inondazioni-new-york-parcheggio-gallery/?ref=319993#gallery.

Another example demonstrating that by investing in the pursuit of sustainable urbanism, the problems due to climate change can be addressed and mitigated.

The new city will have to be informed and informing, have the capacity to accommodate and interact well with the technologies that are being experimented and commercialized in so many countries, but at the same time treasure past.

3 What is the Status of Project Implementation and Results Achieved?

Much of the future of cities lies in the hands of administrations, whose task would be to halt the use of "new" land for the benefit of primordial environmental identity through the regeneration of existing heritage. This change of perspective, where the planner no longer intervenes only on a building, but on a portion of land, is the key to achieving more environmentally functional projects while preserving what has not yet been used. From this perspective, urban regeneration is opposed to land transformation in that the aim is to protect and restore the soil and its ecosystem functions while ensuring the quality of the urban fabric and social security.

In order to attract a diverse population that contributes to the realization of a new identity related to regenerated areas, the key is to prepare a range of services assessed on the dimensional character of the plan. So what is the status of project implementation? While attention must be paid to the personal and social dimensions of the citizen's daily life on the other hand, it is necessary to refer to all those ecosystemic and sustainable aspects that conform to new lifestyles. In Italy, for example, regeneration acquires a certain urgency and a large part of the resources must be focused on the rehabilitation of existing structures while limiting land consumption to a minimum. To date, there are significant examples of implementation of the projects, which are having a positive feedback in the enhancement of the city's real estate heritage, among them we find Milan and Rome Capital as well as many small municipalities. For example, in Lombardy the results obtained in reference to this issue are relevant, although the area redeveloped is significantly down compared to 2014, 70% of this is covered by urban regeneration areas (221 km^2), while 30% pertains to land transformation interventions (90.5 km^2). (Source Real Estate Scenarios).

And what are the results achieved? As Fabiana Megliola, Tecnocasa Group Research Office Manager, confirms, "In Milan in the last ten years prices have increased by 19.3%, but from 2017 to 2022 houses have increased their value by 43.2%. These interventions, - such as the extension of the subway or the rehabilitation of brownfield sites - are enhancing the value of real estate. Such urban regeneration is a strategic choice in order to restore capacity and grandeur to the already urbanized areas of cities such as are degraded, unused, unplanned, and with random functional mixes - former rail infrastructure, former industrial settlements - that are no longer being used and left to their own decline of collapse and abrupt decline [4] (Figs. 4, 5, 6 and 7).

Another example is the social and cultural redevelopment of the Casali neighborhood area in the historic center of Cosenza through interventions of various kinds, from the care of greenery and street furniture to new forms of animation in the area, from the safety of the area to cultural integration, from the usability of sports facilities and cultural services to assistance intended for the vulnerable or marginalized. The project has been focused on three areas of intervention, innovation, culture and sociality, where each



Fig. 4. Regeneration Business District of Santa Giulia building Spark One. Source: https://www.infobuildenergia.it/approfondimenti/rigenerazione-urbana-citta/#Nord_%E2%80%93_Milano.



Fig. 5. Regeneration of Porta Naviglio Grande (MI). Source: https://www.infobuildenergia.it/approfondimenti/rigenerazione-urbana-citta/#Nord_%E2%80%93_Milano.

area provides a physical place in what are the basic structures of the neighborhood: the Sports Hall, the Vallone di Rovito under the archway of an ancient aqueduct, and the Museums of the area on the history and archeology of the territory. They become spaces of socialization, through which the urban and social regeneration of the entire neighborhood passes, nerve centers of the redevelopment action, from which the renewal spreads to the whole city (Fig. 8).



Fig. 6. MoLeCoLa (Mobility's Bovisa neighborhood fabric mending masterplan (Mobility Learning Community Lab) (MI). Source: https://www.infobuildenergia.it/approfondimenti/rigenerazione-urbanacitta/#Nord_%E2%80%93_Milano.

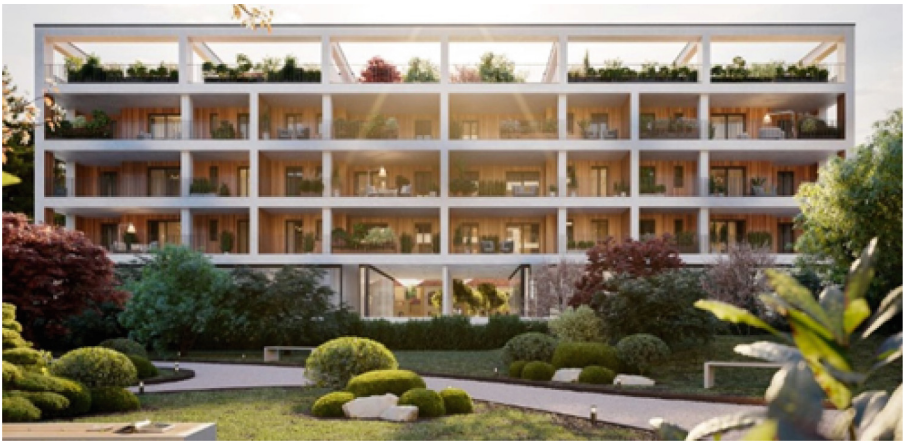


Fig. 7. Redevelopment of San Cristoforo district, Boscanavigli (MI). Source: https://www.infobuildenergia.it/approfondimenti/rigenerazione-urbanacitta/#Nord_%E2%80%93_Milano.

In Padua, a prison facility in the city center, in Piazza Castello, was decommissioned in favor of a cultural center. In reality it was born as a Castle-Reggia, completely frescoed inside and out, only to become the prison of Padua, thus shedding its identity as a Castle, just as it had lost it in the memory of the citizens. This regeneration, which aims to transform it into a major cultural center, brings a rebirth for the city of Padua and to revive the forgotten place. Three distinct excerpts are planned, giving rise to exhibition spaces for design and contemporary art: one relating to the south side, another to the east side, and finally, a third, to the north side. With the transformation of the Castle into a



Fig. 8. The Museum of Brettii and Enotri in the heart of Cosenza. Source: https://cosenza.italiani.it/scopricitta/il-museo-dei-brettii-e-degli-enotri/.

large cultural space, Padua will not only recover significant pieces of its lost identity but will come to have one of the most significant spaces, in the Northeast, for the languages of contemporary Art and design (Fig. 9).



Fig. 9. From Padua prison to a great design hub. Source: https://mattinopadova.gelocal.it/padova/cronaca/2021/02/27/news/da-carcere-a-grande-polo-del-design-al-castello-carrarese-nasce-il-pad-1.39961093.

San Paolo 2030 is the physical and intangible urban regeneration plan developed by the Bari municipal administration for the San Paolo neighborhood. This neighborhood was born in the late 1950s as an isolated neighborhood being outside the SS 16 belt enclosing the consolidated city. This isolation, together with the lack of services and connections and the low assortment of the social mix, made this place unsafe, socially vulnerable and with high crime. Therefore, a process of social and material redemption has begun with the aim of improving the quality of life for the inhabitants that has recently used culture and cultural processes as an element of transformation [5] (Fig. 10).



Fig. 10. Bari, the 10 murals of San Paolo. Source: https://www.borderline24.com/2021/09/01/bari-i-10-murales-del-san-paolo-saranno-scelti-dai-condomini-artisti-anche-da-australia-e-cile/.

The presence of the subway, the neighborhood's infrastructural endowment, and cultural services have connected the neighborhood to the city center within minutes, thus regenerating the neighborhood. The driving intervention that has been at the heart of the neighborhood's regeneration through urban art.

4 Strategies to Combat Climate Change and Urban Regeneration Plans and Programmes: A Winning Link

The issue of combating climate change is closely connected to that of urban regeneration for many and many reasons. This, in particular, plays a fundamental role in terms of reuse of existing buildings, energy conversion and risk mitigation [6].

In fact, urban regeneration was born in contrast to the expansive urban planning model of second generation plans in Italy, which have indeed contributed to producing a significant disciplinary evolution, but which have been regulated by an excessive culture of expansion. The advent of the transformation plans, then, has come to demonstrate the reflections and the disciplinary debate on the climate crisis and urban planning, as a matter that manages and organizes territorial and social functions [7, 8] (Fig. 11).



Fig. 11. Boston Common, Boston, MA. Source: Photographic processing by Dora Bellamacina.

European strategies on urban regeneration are based on the concept known as DUT - Driving Urban Transition - in guiding cities in the transformation towards a sustainable future. This transformation is applied according to three fundamental macro themes:

- the transition path of circular urban economies - Circular Urban Economies, CUE - aimed at promoting urban regeneration projects by making neighborhoods and urban communities sustainable, inclusive and green. It is also intended to specify that the term "urban sustainability" means a process that is both from a natural and from an economic point of view; in the latter case, in fact, a community is said to be sustainable if it manages to trigger circular processes that feed on the flows of its own resources;
- the transition path of positive energy districts - Positive Energy Districts, PED - which aims to optimize the local energy system through energy efficiency, flexibility and local generation of energy from renewable sources in actions towards the (urban) energy transition and climate neutrality and the integration of these actions into urban planning processes;
- the 15 min city -, particularly developed after the Covid19 pandemic, which is based on a concept by the academic Carlos Moreno and then taken up by the former mayor of Paris Anne Hidalgo, is based on the concept of rethinking the system of existing mobility and of the urban morphology to encourage soft and sustainable mobility

choices, such as the use of bicycles or zero-emission urban public transport, redistributing the urban space to organize its sharing by the social community, not only as a place of passage but as a public space that joins the personal private one, in the general reorganization of urban daily activities aimed at making cities more neutral from a climate point of view, liveable and inclusive. It refers to the concept of proximity of urban plans, on a practical model that is widely discussed starting from 2020 [9].

The theme of the reuse of the existing, in the macro challenge to climate change, is part of the objectives of the Community orientation which provides for the zeroing of land consumption by 2050 (also in line with the regional urban planning laws on zero land consumption or tending to In particular, ISPRA has defined soil consumption as a phenomenon associated with the loss of a fundamental environmental resource, such as the territory, the landscape, due to the overbuilding of green surfaces, linked to settlement dynamics. at the expense of the natural one.

The natural soil is in fact home to biological organisms useful for the correct procedure of the climatic and temporal phases. Woods, beaches, agricultural fields, but also places capable of hosting wild fauna and flora are protagonists of the natural life process of planet earth. In the past, dense urbanization risked and still risks conditioning the correct performance of vital natural functions. Just think of the overbuilding of hectares of green land, the deforestation for the necessary replacement of the existing natural territory with artificial one and the anthropic densification (Fig. 12).

The urban plans dealt with regulating the expansion - although providing for an organization into zones, which was never fully implemented and thus causing discontent in terms of proximity services - however they envisaged growth patterns which then turned out to be “excessive”. A correct review of what has been done is only possible through the transformation of the areas, in view of the European directives.

Education, training in non-wasteful attitudes must be taken away from people from an early age, so that these strategies do not take the form of an obligation imposed by far-sighted programming, but as a shared modus operandi [10].

Also, that of energy conversion, with the ambivalent environmental and economic function, given the relationship between the quality of the environment and of life. The urban development indices of the last decade place countries such as Norway, Iceland, Australia at the top of the rankings for quality of life, whose score is above 95% for the satisfaction of the established indicators. At the same time, with the exception of Australia, the other two European countries do not appear in the top 50 for carbon dioxide emissions. One wonders if the two themes are connected. If environmental policies go hand in hand with the increase in people’s quality of life.

From the study of all data, the binomial energy-economy is closely connected. Regenerating cities from an energy point of view translates into enrichment from an economic point of view, in terms of avoiding the dispersion of resources, attracting investments and intercepting community contributions.

Last but not least – it is in fact the most widely debated topic in common opinion, almost to the detriment of other urban regeneration policies – that of risk mitigation in the context of climate change (Fig. 13).

Although such mitigation policies are primarily connected to a non-waste lifestyle and the resilient capacity of communities, they are also developed in the context of



Fig. 12. Promenade_-Miami-beach_-Miami_-FL. Source: Photographic processing by Dora Bellamacina.

the transformation of cities, in support of the environmental cause. In fact, it is in this perspective that strategies for the redevelopment of public space are placed, as bearers of well-being as an example for communities [11].

In particular, the Italian territory is characterized by a complex morphological structure, as well as a central geographical location with respect to the Mediterranean context and the presence of an exceptional multitude of historical and cultural references, thanks above all to the numerous UNESCO sites present in the area. In risk mitigation, in fact, it is necessary to consider the urban structure of Italian cities, which in addition to some large centers is peculiar to the small communities that inhabit historic centers scattered throughout the territory.

Intervening in the urban regeneration of the aforementioned fabric is therefore an almost more difficult operation than what could happen by reasoning on the concept of tabula rasa. In fact, from a legislative point of view, the mixing of more and more entities for the protection of the territory is foreseen, in addition to local administrations and the ability of the designer but also of those who launch tenders for transformation projects.



Fig. 13. Promenade, Miami beach, Miami, FL. Source: Photographic processing by Dora Bellamacina.

The concept of urban regeneration referring to climate change therefore appears as the mixture of several themes. The main ones are connected to each other and the approach must be logical and mathematical, capable of combining the needs of the communities, the adequate reading of the territory and of the legislations on the guidelines of the European strategies.

The urban planner thus presents himself as a forward-looking figure, not a mere enforcer of the laws drawn on paper, but a far-sighted environmental philosopher who in the twenty-first century dusts off the aesthetic garments of thought to transform them into a vision that accords with the 'environment.

5 Conclusions

The diverse and multi-sectoral case studies presented offer food for thought on of ways and means to contain environmental pollution, for urban circular metabolism, for climate change and resilience, for urban regeneration and social. The Yara Birkeland (Norway)

the world's first fully electric, autonomous and zero-emission container ship. The POP-UP (Third Nature, Padua) designed by exploiting the Archimedes principle manages to solve the city's problems with a single 'intelligent' solution. Also in Padua, a prison structure in the city centre, in Piazza Castello, has been decommissioned in favour of a cultural centre; the San Paolo 2030 project is the physical and immaterial urban regeneration plan developed by the municipal administration of Bari for the transition of circular urban economies; the Circular Urban Economies, CUE to promote urban regeneration projects by making neighbourhoods and urban communities sustainable, inclusive and green; the 15-min city based on an idea by Carlos Moreno and applied in Paris, is current and can be proposed at different scales. Other interventions, both recent and in progress, are urged by the new programming, the measures provided by the PNRR and the interventions for the reorganization of services, for inclusion and territorial cohesion from the Next Generation Eu funds [1]. The challenge is an opportunity to give impetus to the creation of models and strategies with a start-up effect also with respect to the themes and sectors indirectly involved. The opportunities offered are endless. At the Italian level, the country's relaunch is based on three strategic axes: digitalization and innovation, ecological transition and social inclusion [12]. They are instrumental in radically improving the competitiveness of the economy, the quality of work, and people's lives, and in making Italy, through its cities and activities, a protagonist in the global technological challenge [13]. The ecological transition will be the basis of the new economic and social model of development on a global scale, in line with the UN's 2030 Agenda for Sustainable Development. The missions include investments and reforms for the circular economy and to improve waste management, energy efficiency by strengthening existing infrastructures, modernizing existing ones or developing new facilities in all sectors involved, to reach ambitious targets [14]. One of the intangible infrastructures for the recovery of cities in transition is undoubtedly 'the city', which becomes an incubator for experimentation and at the same time a vehicle and recipient of specific and varied measures of intervention intercepting the sectors of services, urban endowments, urban welfare, mobility and infrastructure, energy and cultural heritage. An open laboratory of experimentation and contamination [15].

Contribution. Attributions: although the research is the result of the work carried out jointly by all the authors, the drafting of the essay is to be attributed differently to each of them, although many references and the setting of the project are attributed to Celestina Fazia:

The Abstract and introduction by Celestina Fazia; § 2 by Federica Sortino; § 3 by Giulia Fernanda Grazia Catania; § 4 by Dora Bellamacina; § 5 Conclusions by Celestina Fazia.

Dora Bellamacina took care of the graphics of the images and took the photos of Boston and Miami.

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