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Scholars has been invited to submit researches on theoretical and methodological aspects related to Smart Design, Planning and Technologies, and show real applications and experiences carried out on this themes. Based on blind peer review, abstracts has been accepted, conditionally accepted, or rejected. Authors of accepted and conditionally accepted papers has been invited to submit full papers. These has been again peer-reviewed and selected for the oral session and publication, or only for the publication in the conference proceedings.

Conference report

300 abstracts and 550 authors from 40 countries:

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From a disused industrial area to an innovative sustainable campus in Milan

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Abstract

In a scenario that reveals an ever-increasing competitiveness between territory, cities, geographic areas and territorial systems, the real estate operators are engaged in important relaunch and requalification activities. They are aware that in the competition between urban areas there are awards more dynamic "systems" able to combine the safeguarding of one's own territory with the hypotheses of redevelopment.

The redevelopment foresees at the base of the design a regeneration process of the existing buildings in response to the new market needs and in line with the sustainability and circular economy vision.

The paper, through a multiscale approach, from a macro-territorial and metropolitan level up to the level of the neighborhood, will represent a scenario of the economic dynamics and the territorial structure in which the cities in the last twenty years and will illustrate the case study of an important recovery project of disused industrial area.

The regeneration process to create a multipurpose center designed for the service industry and for leading consumer and B2B companies will be described.

The integrated campus, a former industrial complex of more than 29,000 sqm fully regenerated, is 100% Carbon Free and 3 buildings has the LEED Gold certification.

Keywords: Keywords Environment, redevelopment, valorization, urban regeneration, resilience

1. Introduction

The cities play a primary role in developing urban interventions with the goal of improving social cohesion, and economic and environmental sustainability, toward the creation of more resilient urban environments.

There represent the innovation drivers and the preferred centers for the production of knowledge and all the necessary resources in order to face the international competition and overcome possible structural crises on a territorial basis.

This processes, however, requires to overcome criticalities and bonds that metropolitan cities face on different scales and dimensions – mainly economic, environmental and social – including aspects relating to the variation of the settlement/functional trends and the complexities of urban transformation/regeneration and building restoration activities. [1]

The transformation phenomena of the cities and the economic crisis [2] produced dismissed areas and Buildings and it becomes necessary to identify new development models: the reclaiming of unused spaces through a new architecture become the possible strategies to find answers to the new social needs of the cities.

An architectural project translates as responsibility towards the society and the real world, knowing how to understand and reveal the social and cultural essence and physics of a place, building with materials suitable for every circumstance today even more so in an era in which he called himself to make the building less energy-intensive. [3]

According to the Triple Bottom Line (TBL) theory, to guarantee sustainable development of the built environment it is necessary to consider three elements: economy, environment, and society.

Renewal or new construction operations must therefore include interventions that aim to achieve maximum environmental sustainability while ensuring the highest economic value and greater well-being of individuals. [4]

Environmental certification protocols have been developed to overcome information asymmetries to provide reliable and internationally valid label concerning buildings sustainability. Simple and affordable information is then provided to investors and tenants with all its sustainability characteristics. [5] [6]

There are various environmental certifications of buildings around the world, some of the most widespread type are: "Leadership in Energy and Environmental Design (LEED)", was developed by the american non-profit U.S. Green Building Council (USGBC) [7] and "Building Research Establishment Environmental Assessment Method (BREEAM)" first published by the Building Research Establishment (BRE) [8]. that have become the main used certification protocol worldwide.

In Italy, in addition to LEED and BREEAM certifications, other protocols are employed for residential buildings. CasaClima [9] is widely used for residential developments while for social housing projects and the ITACA Protocol (Protocollo per la Trasparenza l'Aggiornamento e la Certificazione degli Appalti) [10] is the most common standard.

Based on the premises, this paper will analyzes the Milanese experience as an example of urban resilience, to demonstrate "the capacity to recover quickly from difficulties", hence to tow territories toward resilience [11], by exploring the real estate strategies that supported the recovery from the crisis.

2. The Milanese experience

In 2008, the economic crisis involved all of Europe. In Italy, the stagnation of the market continued for several years, impacting severely the real estate sector. A considerable volume of real estate vacancy and unsold was accumulated, especially in the office sector [12] [13]. In this context, the metropolitan city of Milan has emerged among the first European cities that rapidly recovered and successfully overcame the economic crisis without losing their leadership role [14].

In this scope, we studied the investments of the major real estate players who have directed their attention to Milan and focused on the real estate dynamics that characterized the city of Milan in the past decade by analyzing a large database, provided to Politecnico by "Il Quotidiano Immobiliare-QI" [15], the first Italian online magazine and search engine about real estate issues. This database collects all the real estate investments in Italy from 2012 to 2017.

Our scrutiny shows that most of the recent urban renewal programs involve the commercial sector, and and devote great attention to environmental sustainability.

We can see that Milan (with over 11 billion euros in the period 2012-2017) is the metropolitan city preferred by investors. The metropolitan city of Rome attracts only one third of the volume produced by Milan. Milan sees more than 150 transactions above 5 million each. Rome reaches barely one third of the Milan's number and value of transactions. All other Italian metropolitan cities run far behind these records. Other provinces with relatively high performance are: Sassari (thanks to the 600 million Euros spent by a Holding of Qatar in the hotel sector), Bologna (with around 500 million invested in the commercial/retail and logistics sectors), and Turin with almost 500 million Euros distributed mainly in the tertiary and commercial/retail sectors.

Milan is confirmed as the most active city in the Italian real estate market, based on both the number of real estate transactions and their value between 2012 and 2017.

According to the Green Building Council, Milan also enjoys a well-deserved reputation as Italy's green capital with more than 320 buildings certified or under certification by Green Building Rating Systems including LEED and BREEAM, certification, while in the Eternal City there are 90 sustainable building projects [16].

The Green city map show the evolution of the city and its urban layout allowing them a new perspective on the innovation of new buildings and the renovation of historic landmarks.

Research literature [17] [18] [19] highlights that major national and international corporations have chosen to locate or relocate their headquarters in urban areas that have been involved in massive renewal programs over the past years. New areas are emerging as alternative "centers" of the city, besides the traditional "Duomo". Above all, Porta Nuova and City Life District are emerging as the most vital urban and business hubs of the city.

Some additional clusters appear as outliers as they are placed in the outskirts of Milan, namely in the West side of the City and on the South-end. Rho-Però, is going to be enhanced soon thanks to the redevelopment of the Expo site. This area host the new campus of the Milan State University and the science and technology park. Thus, this is candidate to become a cluster by itself in the years to come. Lastly, the cluster located in the southern part of Milan, comes together around Rogoredo-San Donato. In addition, the areas of the former railway yards that have long been abandoned (Farini, San Cristoforo, Porta Romana, Greco-Breda, Lambrate, Rogoredo and Porta Genova) will be transformed and

enhanced, giving life to new projects covering an area of about one million square meters with the 65% destined to green areas.

3. The Forgiatura Case Study

In this part will illustrate the case study of an important recovery project of “The Forgiatura” disused industrial area.

Located, in the North-Western part of Milan (Via Varesina), between Zona Certosa and Scalo Farini, The old Forgiatura factory, in the last hundred years or so it was a workshop that forged (by means of water power) steel components belonging to either submarines or electricity power stations. Then came the crisis in the iron and steel industry and it was abandoned.

The dismissed industrial building in the area of 19.000 sqm of land were fully regenerated and trasformed in a unique integrated campus, of more than 29,000 sqm of Gross Leasable Area GLA composed by 15,000 sqm of industrial requalification and 14,000 sqm of new buildings for a total of 7 buildings for office and showroom space.

The objective was to create a multipurpose center for the service industry and for leading consumer and B2B companies that arises from the culture and history of the original place marrying technology and natural environment, with a strong integration between architecture and landscape.

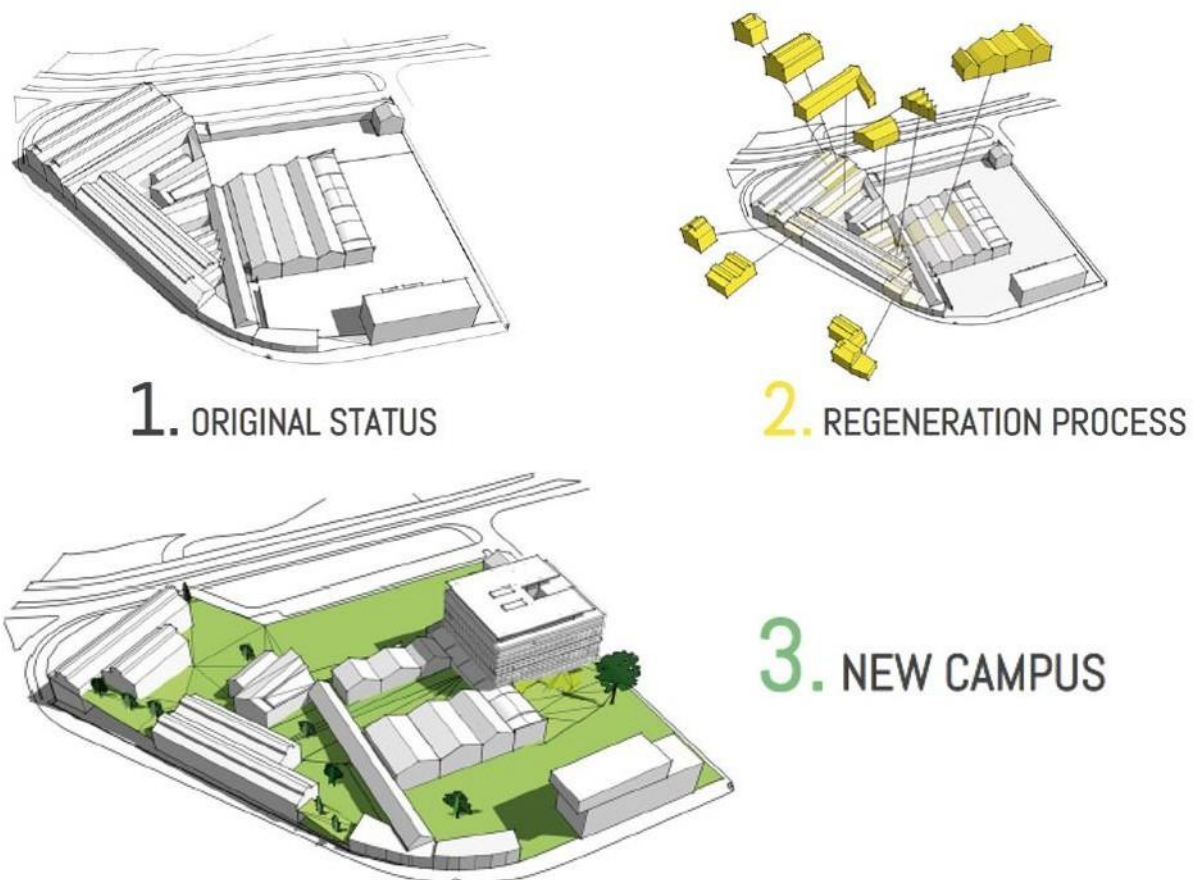


Fig. 1: Regeneration process of the industrial area “La Forgiatura”.

Now, the current tenants base of La Forgiatura is characterized by:

- Mainly Italian headquarters of leading multinational companies;
- Highly diversified industry mix;
- Strong financial structure and income generation;
- Secured leases with high residual life.

The regeneration project had opted for a combination of past history and present requirements in a project looking for a dialogue with the surrounding urban fabric. It represents an example of harmonic integration between a modern concept of spaces economy and last century industrial architecture.

The architect (Giuseppe Tortato) [20] [21] has, in fact, exploited the structural features of the old building with a careful eye for its industrial past, holding on to the original reticular structures while at the same time, where it is possible, focusing on the prefabricated construction; he has created a man-made hill (that is an integral part of the redevelopment of the La Forgiatura area) openly avows its being artificial and a metal structure).

He has worked on hollowing out empty spaces, ideally leaning the brand-new building on the little mountain while, in actual fact, it is supported by giant beams, which make it look as if it is suspended; he uses air, water, sunshine and soil drawing out their ancient potential and making them highly technological (for example, he has envisaged small photovoltaic cells, not just to send out a trendy ecological signal, but also to water the greenery).

The landscaped section of the hill conceals the technical features and air-conditioning systems in the underground garages. The transparent part is made of a glass skin covers an intricate prismatic-shaped steel structure of "spot-supported glazing system". [22]



Fig. 2: The innovative campus "La Forgiatura".

Today The Campus is 100% Carbon Free and 3 buildings has the LEED Gold certification. The sustainability and the energy efficiency are guaranteed thanks to advanced technologies and materials (i.e. high energy class) and through the use of renewable energy: (i.e. geothermal heat recovery and

heat recovery from airconditioning systems; photovoltaic systems). The building management system (B.M.S.) combining all the management and computation functions of the individual buildings in one single interface.

The technical lighting design have been carefully conformed to the regulations set by the Lombardy Regional Council in terms of lighting pollution.

A real urban oasis, characterized by a three-dimensional development of the green landscape that incorporates old industrial structures joined smoothly to the new buildings. Thanks to the movement of the ground, in some cases real artificial hills eight meters high, you can access the buildings from various levels, including the roofs, enjoying a unique sensory relationship, given by the alternation of emotions: thanks to green patios, great heights, natural light, a unique relationship between interior and exterior greenery, old and new structures. [23]

The project has not just taken care over the construction design but also focused on materials; cars have been relegated underground and there are some gently winding pathways of varying widths serving emergency vehicles only.

The green and communal paths are 8,500 sqm and the underground parkings are 434 slots.



Fig. 3: The innovative campus “La Forgiatura”.

To underline the link with the past, the buildings that compose the new settlement, derived from the ancient production structure, are named after the processes and the activities hosted in the previous century: Meccanica, Uffici, Ingresso, Tempa and Tecnica.

The main building (Raimondi building) is 1,400 square meters floors without columns ensuring maximum flexibility for customisation:

- Continuous facade, comprising a sunlight control system obtained by means of aluminium lamellar strips;
- External maintenance of the crystal facade features an inspection walkway on each floor, hidden by the aluminium lamellar strips;
- Hill is designed to be self-supporting, made of metal beams hinged to each other, forming a single large triangular network dome;
- The building comprises 8 storeys above ground (two of which within the artificial hill).

The original steel structures of the Meccanica and Tempa and Meccanica buildings have been preserved and enhanced by interior patios and intermediate levels, while a particularly flexible beams-and-stanchions system provides variable lighting across the façade. [22]

The developer of the project is RealStep [24] (a SICAF, multi-sector real estate authorized by the Bank of Italy) which has as its objective the realization of specific real estate investment projects, with particular attention to the redevelopment of industrial areas, through the raising capital from institutional and private investors.



Fig. 4: The Raimondi Building



Fig. 5: The Astronave Building



Fig. 6: The Tempura building. The original metallic structure were preserved in this building

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