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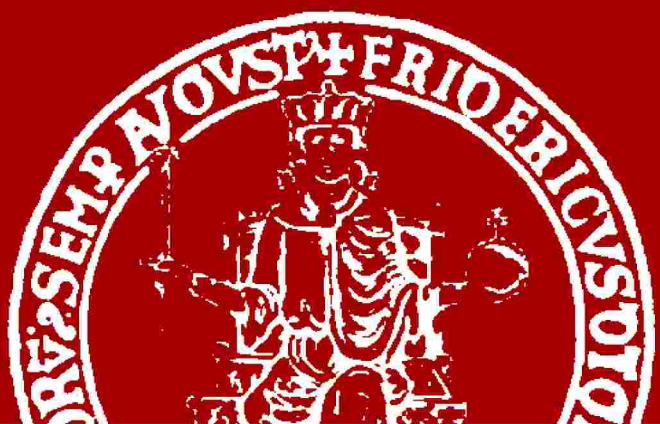

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New Green Deal: Towards Ecological and Human-centred Urban Development Strategies

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ADAPTIVE REUSE STRATEGIES FOR A REGENERATIVE DESIGN: A MULTI-METHODOLOGICAL DECISION-MAKING PROCESS FOR MONTALBANO JONICO

Maria Cerreta, Antonella Falotico, Giuliano Poli, Giorgia Grazioli, Francesca Laviola

Abstract

The work presents the results of a multidisciplinary study aimed at responding to the requests of the Administration of Montalbano Jonico, a Municipality of the Metapontino Plain, in Basilicata Region, Southern Italy. The study aims to verify the potential directions of the transformation of the territory, considering the specificities of local resources and their adaptive capability to change and to build tangible and intangible network relationships, including users as an active part in guiding transformations and generating new values. The activation of an adaptive reuse strategy starts from the redevelopment and re-functionalisation of a historic building, the Casino Federici as a component of the complex matrix of the Montalbano Jonico territory and the Metapontino Plain, identifying an operational model that uses regenerative design as an opportunity to co-create possible futures.

Keywords: adaptive process, regenerative design, spatial multi-criteria analysis

STRATEGIE DI RIUSO ADATTIVO PER UN DESIGN RIGENERATIVO: UN PROCESSO DECISIONALE MULTIMETODOLOGICO PER MONTALBANO JONICO

Sommario

Il lavoro presenta i risultati di uno studio multidisciplinare volto a rispondere alle richieste dell'Amministrazione di Montalbano Jonico, un comune della Piana del Metapontino, in Basilicata, nel sud Italia. Lo studio mira a verificare le potenziali direzioni di trasformazione del territorio, considerando le specificità delle risorse locali e la loro capacità adattiva ai cambiamenti e a costruire network di relazioni, tangibili e intangibili, che includono gli utenti, come parte attiva nel guidare le trasformazioni e nel generare nuovi valori. L'attivazione di una strategia di riuso adattivo parte dalla riqualificazione e ri-funzionalizzazione di un edificio storico, il Casino Federici, componente della complessa matrice della Piana del Metapontino, identificando un modello operativo che utilizza il design rigenerativo come un'opportunità per co-creare possibili futuri.

Parole chiave: processo adattivo, regenerative design, spatial multi-criteria analysis

1. Introduction

The work presents the research results that a multidisciplinary group of the Department of Architecture of the University of Studies of Naples Federico II has developed in Montalbano Jonico, a municipality in the province of Matera (Fig.1). The work, through the objective of functional recovery of Casino Federici, in Basilicata, identified as a pilot project, has experienced a regenerative process model that has become opportunity to co-create the development conditions of the entire Metapontino Plain. The structured proposal for the Metapontino was based on strategies of "network" connections and on *Open Innovation* or *User-Led Design* approaches, in which networks of public and private organizations operate together to develop processes in which the production of "value" is the result of an effective combination of internal and external local and territorial resources.

The research has addressed in a particular way the theme of abandonment, identified as significant in encouraging the processes of *regenerative design*, for which the building becomes a catalyst of change in its "rebirth". At the same time, the protection of a cultural heritage assumes the meaning of a local life model that would otherwise be lost and is the reason for the necessary socio-technical updating to create a dialogue between tradition and innovation.

The old-new dialectic has now become particularly complex, because its course is no longer linear: if once the places have lived of solid relationships, linked to the biological rhythms of individuals and the earth, today the development is played on the difficult ground of a planning process that renounces to rigid programs in favour of flexible strategies, according to adaptive, agile and variable paths, crossing the different project scales and the different modes of involvement of the actors (public, private, social) that it is possible and necessary to include in the transformation actions, in accordance with the most innovative strategies of *good governance* of the territory and the environment.

Re-generating and designing in the fourth industrial, cultural and digital revolution, means facing challenges that affect in a decisive way the design thinking in the direction of a generative process that, by overturning customs, trace the directions of the future leaving room for a new "poetic" of building. Today we are immersed in «[…] a universe of instability and fluctuations, which are at the origin of the incredible variety and richness of forms and structures that we see in the world around us. We, therefore, need new concepts and new tools to describe a nature in which evolution and pluralism have become the fundamental words» (Nicolis e Prigogine, 1991). In the time of transition that we are going through, the challenge of digital culture is bringing about an epochal change in design modes and thinking as in human behaviour and value categories. Material culture passes from objects, uses and standards to systems in which information and reticular relationships prevail. Change takes place in our lives in a molecular, pervasive, immaterial, fluid, seemingly unobtrusive but substantially significant way. «Unlike other paradigmatic periods, the change that today affects architecture does not concern the mere spatial re-definition of the system of values about social, economic and productive contexts, as to a real internal revolution, whose digital matrix calls into question the modus operandi of the design itself» (Nebuloni and Rossi, 2017). It seems legitimate, therefore, to rethink in which terms to reread the relationship between material culture and technical innovation and how to recover ancient values in the perspective of the "new". Today the phase of "disposal" of modernity requires a new design idea of physical space within a challenge that connects the existing with conceptual devices that work on the change of the value and new life cycles of habitable spaces. A challenge is considering the context as a project and the landscape as infrastructure, where cities are conceived as a collective process. The experimentation by the working group moves in this

direction, imagining a matrix at several levels in which multidisciplinary skills and project themes are intertwined and to which is added the clear territorial matrix that characterizes the Lucan territory since the agrarian reform of the 1950s. These matrices become a multi-level work tool for the organisation of data and knowledge and a model that assumes the virtual and immaterial components as vectors of forces capable of transforming matter. «The form is constantly changing and only at the end emerges, replacing the idea of a closed, defined, stable, isolatable whole, that of a dynamic process in progress in which the final form represents only one possible actualisation» (Gregory, 2010).
A programmatic practice in which «to connect and disconnect means to design the bones, the organs, the nerves and the cells of the territory and to know where each of these must in some way terminate…, working on archipelagos of thresholds, domains and relationships; therefore, intervening on the materiality and understanding that this is a product of contingencies but also of norms, of order codes» (Ruberto, 2017). Standards, constraints and codes, in the reading of a territory or the elaboration of a project, are two complementary and inseparable aspects that allow to describe, codify and measure the options (Reas, 2010).
In this context, the theme of abandonment and isolation of the internal areas and their development are the background to the whole proposal for the Basilicata territory: in the settlement design characteristic of the areas of the agrarian reform, and in accordance with the experimental lines proposed by the research, it is recognized and selected a patrimony of abandoned historical residences and *masserie*, buildings-node/attractors of relationships that once contributed to the identification of that structural network between artifacts and environment that still resists to the change and survives to the memory. Among these buildings, the Casino Federici is assumed as the "prototype building" from which the strategy starts. The design of the building becomes the model capable of modifying not only itself through the use of digital fabrication techniques, but also, in a synergistic relationship, to direct the changes that design and shape the context with which it relates. Between the building and the context, a dynamic, open and generative bond is established where stability and mutations alternate according to trajectories that are a function of time, social systems, economic organisations, environmental rhythms. The system territory/buildings is considered as an "algorithmic system", a continuously re-programmable code according to the values of the variables in play, a network system, continuously adaptable, flexible and temporary. In the concept of provisionality lies that mutation components, typical of the vital cycles, inputs variations correspond to a variation of the physical and not physical outputs. According to this principle, space is occupied by physical elements but is built through the changing interaction between matter, persons, energies and non-linear processes in which strong bonds and weak bonds intersect (Granovetter, 1998). The latter, in particular, feeds on the reactive capacity that comes from the need for "to be reborn" in new forms of life, a capacity that is linked to the human concept of survival and that connects, in architecture, to the paradigm of adaptivity as a system's ability to modify itself in order to find new balances and uses in a dynamic relationship between what destabilises and what changes.
The aim of the research work was to develop a complex system of knowledge, methods and tools aimed at enhancing the municipal territory of Montalbano Jonico and the Metapontino Plain through an integrated development strategy that has privileged "network" relations. The latest have been the methodological tool that has characterized both the mode of vision of the territory as a complex system, and the relationship between disciplines in the field. In particular, the synergy between the evaluation disciplines and the technical-experimental

approaches of the technological disciplines has made it possible to identify micro-pluralistic decisions starting from the recognition of existing values (Cerreta, 2015). "Thinking by values" implies the inclusion of a multidimensional perspective, which takes into account tangible and intangible values, hard and soft, objective and subjective, use values and intrinsic ones (Fusco Girard, 2010), and their synergistic and complementary relationships, considering fluid spaces and blurred contours, including pluralistic views, in order to formulate a strategy located (Liew and Sundaram, 2009). The reticular approach of the work imagined for the areas of investigation has also favoured the necessary digital transition that has revolutionized ways of thinking about the processes of territorial development by orienting the future of transformations. In this context, the digital world does not constitute a separate element from the physical world, but it becomes the key *interface* for material exploration and vice versa, determining a close and unprecedented interrelation between the micro-scale of the material and the macro-scale of the artifact (Arrighi, 2017). Buildings, small housing systems, hamlets, are assumed, in the idea of research, as 'pilot projects' and 'material devices' for the construction of a regenerative process that is opportunity to co-create cultural development, social and economic, and to think about ways of development related to the network. The artifacts are thought as informal Hubs, which assume the role of generators of a transformation process that, in connecting *attractor buildings*, draws, by successive increments, multidirectional and adaptive development paths. In this framework the building-node territorial matrix is built and modified itself over time in accordance with the connections it is able to generate. The generative action will describe a geometry of reticular levels, new, neuralgic, sometimes unexpected, able to feed the dynamic directions of development at the different scales. The concept of scale is fundamental in experimentation: it ranges from the scale of detail, able to provide knowledge of the subject, the scale of the building, the village, to include wider systems projected in the wider national and international network. In this perspective the case-study is an opportunity for the experimentation and prototype of adaptive system, transformable over time by modular design based on digital fabrication techniques but also a dynamic object capable of generating relationships, activating networks, modifying scenarios and redesigning development paths that allow the necessary dialogue between material culture and innovation: the first, dictates invariant techniques, aims to the maximization of permanences, to the recognition of ancient materials, to the respect for the techniques of tradition. The second one identifies the variables, the mutations generating new future that work on multilevel and multiscale hypotheses.

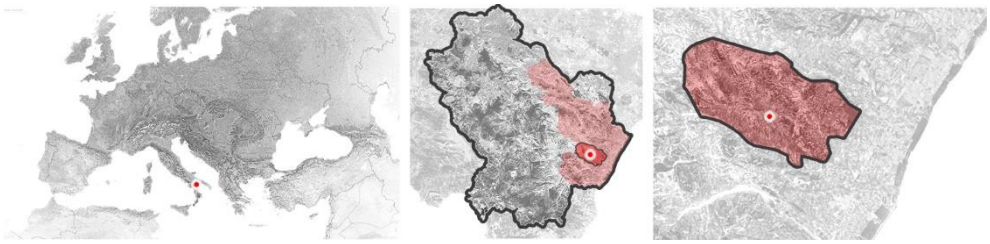
The contribution in section 2 illustrates the territorial context and dynamics that characterize it, identifying the characteristics of network strategy; section 3 presents the spatial and multicriterial decision support system, which accompanied the development of the regeneration strategy; section 4 illustrates the choices identified for Casino Federici; in section 5 the conclusions are described.

2. The territorial framework: Montalbano Jonico and Metapontino's network

Montalbano Jonico is localised near the Ionian Coast, in Basilicata, in the South of Italy (Fig.1). The territory, mostly hilly, is of considerable scenic and naturalistic value especially for the presence of gullies, deep furrows in the clay soil that degrade up to the cultivated fields of the Metapontino Plain. The Ionian area has experienced great transformations in the last century, from marshy and malarial land to rich and flourishing land, marked by large

partitions of land lined by North-West to South-East, signs still readable today of the reclamations made in the 1930s and the Agricultural Reform in the 1950s, which tell the agricultural organisation of the territory and constitute its identity matrix evident in the conformation of its urban agglomerations and of a high quality agri-food sector.

Fig. 1 – Casino Federici and Municipality of Montalbano Jonico



Source: elaboration of the authors

The characteristics of the physical space of the Metapontino, organised by lattices, and its fundamentally agricultural vocation, are the elements that, already starting from initial analysis, are identified as the basis for the project strategy. The first information is processed through site visits, photographs, surveys and maps describing a reality made beforehand of signs not yet explicitly related, but that already seem to address the operational boundaries and give space to the vision of the future. The vision is conceived as the ability to build from a new way of understanding and defining spaces, and as an inventive ability to build a possible future (Campioli, 2016). A future that is defined starting from the possibility to put together material and immaterial components, flows and techniques, landscapes and people, with the systemic vision of the territory and through elaborations that refer to the idea of a network: a territory which not only looks beyond its borders but which finds in its natural internal network the reasons for the development. Therefore, Montalbano Jonico and the Metapontino Plain, of which the Municipality is part, constitute a complex matrix system that finds the greatest generating force in the different declinations of the constituent components: the territorial characteristics become, in the project idea of the working group, a set of elements (attractors, parameters and constraints), at the same time variable and stable, capable of directing new and new paths of development through the initiation of reticular relations (Fig. 2). Starting from these reflections, a network of municipalities has been identified, consisting of those belonging to the GAL START 2020 (Territorial Strategy Accessible Tourist Responsible), which also includes the Municipality of Montalbano Jonico. Over the last few years, the influence and role of Local Action Groups (GAL) have grown considerably in Basilicata to become major territorial development agencies, especially through the networking of resources and the concrete and participatory implementation of regional planning at the local level. The same logic of coordination can be found in the organisation of agri-food districts, based on shared social and environmental responsibility, as well as in the promotion and enhancement of agricultural production. The District of Agro-food Quality of the Metapontino counts approximately 74.000 hectares of

agricultural area and covers 80% of the local fruit and vegetable production. GAL and Districts are, in this sense, significant realities of the economic organisation and of the natural vocation of the territory, able to give back an integrated and cooperative system that also connotes the social and occupational dynamics. In particular, the GAL START 2020 was born in 2016 from the union of 17 Municipalities and 49 private partners belonging to GAL Cosvel (Metapontina area) and GAL Bradanica (middle Bradano area) to connect the city of Matera and the surrounding territories. The latter, partly internal and depressed, support only local resources and feed on a slow vitality, which follows patterns of contracted relationships, often hostile to any contamination hypothesis that modifies the architecture and natural biological rhythms. The change assumed by the GAL through the START 2020 action plan aims at reactivating cultural heritage abandonment and enhancing the agri-food chain, linked to an idea of development of sustainable tourism and its socio-occupational dynamics. The driving force promised by Matera, through its Dossier of candidacy for European Capital of Culture, and the commitment of the municipalities themselves in the search for a "dialogue", has not always determined the desired effects. Many problems remain open, mainly related to a lack of strategic planning of the territory, a systemic vision of the places, processes of governance of the complexity that characterises that part of Basilicata between the hill, the gullies and the sea, in a natural dynamic that brings together small towns, rural agglomerations, noble farms, castles, towers, furnaces, distributed on mainly cultivated routes, but also production sites and working districts, a testimony of an important part of the national industrial history, and confinement colonies.

The attention to the multiple territorial resources has oriented the identification of the material generative elements (the attractors) and immaterial ones (the history in its evolutionary dynamics) that have informed the elaboration of the strategy. The study area has allowed evaluating the potentialities and the criticalities in the relationship with Matera and the adjacent municipalities, identifying the opportunities for the transformation and outlining the potential lines of development: hybrid, random, descriptive directional lines of new dynamics and networks, which, according to Althusser (2006), we could define as trends: «a trend does not possess the form or figure of a linear law, but it can fork under the impact produced by the encounter with another trend, and so ad infinitum. At each intersection, the trend can take an unpredictable path because its substance is random».

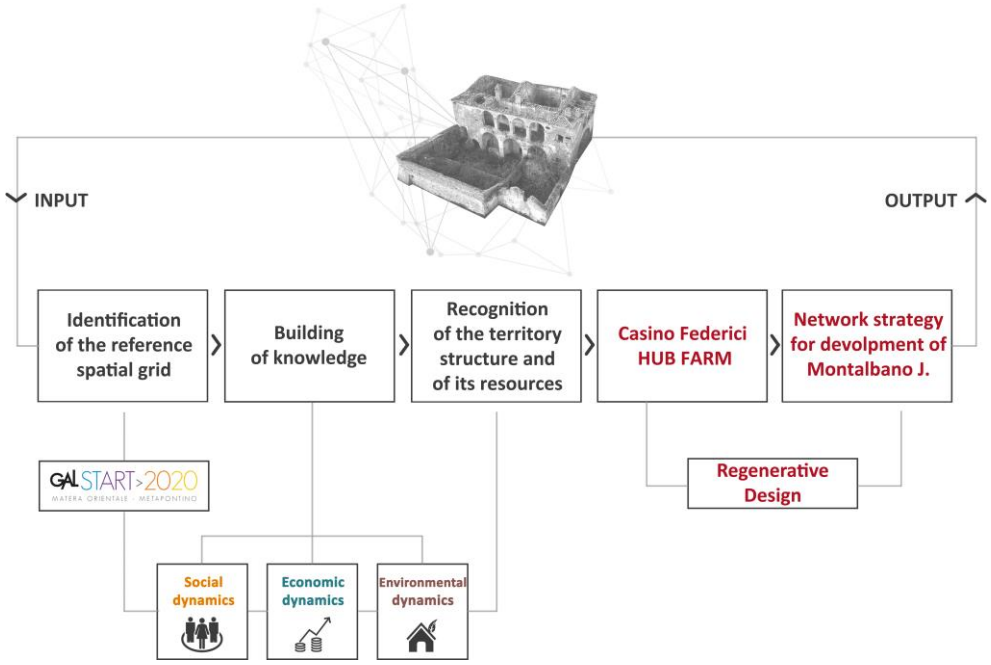
3. The decision-making process for an adaptive territorial strategy

The elaboration of the territorial strategy develops intentionally on several levels, enabling the interaction between several disciplines that contaminate and relate to each other in a process that is built up through continuous feedback, discontinuity and circularity, in a decision context in which each progress continually re-conditions the path. An open, modifiable, incremental, re-programmable decision-making process has been structured to reconstruct the various components in an organic unit, using differentiated tools and techniques that favour interaction and collaboration.

Moreover, the construction of transformation processes cannot ignore the social dimension and the search for a consensus that allows conflicts to be managed, but also the awareness of the consequences deriving from the unconscious use of resources, from the waste of energy deriving from the obsolescence and degradation of the built heritage, from risks due to climatic changes, from environmental disaster, but also social and economic problems. Issues

that focus on a new idea of well-being that is linked to the actions of regeneration and the desires of the communities (Cerreta et al., 2016; Falotico, 2014).

Fig. 2 – Construction of territorial development strategy for Casino Federici reactivation



Source: elaboration of the authors

The decision-making process was structured starting from the identification of the characteristics of the macro-model, the territory, then downscaling and progressively motivating the outcomes and the programmatic choices, up to the project of re-functioning of the model-type, the Casino Federici, assumed as a generative node of the entire development strategy and a process of spatial mutation (Van Hinte, 2003), capable of generating fields of possibilities rather than stable certainties.
The analysis of the territory was carried out by identifying the different components (environmental, social, economic, cultural) concerning the Casino Federici, and the new function that it should have assumed, in a synergistic relationship where local and global, large and small scale, environment and matter, people and numbers, summarise and describe scenarios that "incorporate" already in themselves, in the given, generative lines of transformation. The decision-making process was structured through a Spatial Decision Support System (SDSS) (Munier, 2011; Cerreta and De Toro, 2012; Cerreta and Poli, 2017) which made it possible to organise the phase of knowledge of material and immaterial resources, to identify the relationships, to explain their potential and the elements of crisis

and, finally, to guide the decisions. In particular, the SDSS has been divided into the following phases:

Phase 1: knowledge and processing

- identification of emerging issues in the territory;
- data collection through direct surveys, web sources and institutional data analysis;
- classification of information and identification of three thematic dimensions (Society, Economy, Environment);
- data processing and construction of qualitative and quantitative indicators;
- spatial representation of indicators through a Geographic Information Systems (GIS) platform.

Phase 2: synthesis and evaluation

- synthesis of the potentials and critical issues emerged from the indicators;
- spatial multi-criteria evaluation of territorial opportunities with the geoTOPSIS method.

Phase 3: scenarios

- elaboration of scenario maps that identify territorial opportunity networks.

In Phase 1 (*knowledge and processing*) the GIS platform was the first tool aimed at activating the decision-making process, intended as an action-space in which to manage the variety and complexity of the data and in which it was possible to interact with qualitative and quantitative components to produce new knowledge. In this phase, identification and selection of the multiplicity data, the collection of hard and objective data, was accompanied by the detection of soft and subjective data. The elaboration of the various data has allowed us to delineate the future trajectories and to define the operational boundaries of the strategy, taking into account three thematic dimensions (Society, Economy, Environment) declined considering the physical, economic, cultural and social capital of the selected territories. For each thematic dimension, a core set of indicators has been developed that takes into account the data collected by geostatistical and network surveys and field acquisitions carried out thorough inspections, surveys, photographs, and thematic maps (Fig. 3).

The Society dimension is aimed at identifying the communities that are most sensitive to territorial or potentially most active promotional actions. The characteristics of the population were elaborated through three parameters: age, occupation and education.

The Economy dimension aims to identify those areas in which the predominant economic-productive activities are concentrated and to define the leading sectors of activity. In particular, the selected local resources are linked to quality agricultural production and tourist accommodation.

The Environment dimension describes the potentialities and environmental criticalities of the territory. The areas and sites of naturalistic and cultural interest have been identified, those in which phenomena of abandonment are recorded, and the state of the housing heritage has been described. For each thematic category, 16, 22 and 9 maps have been structured respectively representing spatially the indicators developed and identifying the territorial specificities, constituting an essential prerequisite in the strategy elaboration process.

In Phase 2 (*synthesis and evaluation*), the indicators were evaluated using the geoTOPSIS multi-criteria method, which allowed us to return a summary map for each dimension able to explain the territorial opportunities. The geoTOPSIS is integrated into the VectorMCDA plugin of the QGIS software (Rocchi *et al*., 2015; Massei, 2018) and it is an implementation of the Ideal Point algorithm according to the TOPSIS model (Technique for Order Preference by Similarity to Ideal Solution) (Hwang and Yoon, 1981).

Therefore, spatial analysis has been elaborated considering the descriptive attributes of the indicators as evaluation criteria, attributing a weight and identifying a preference index (gain-cost) to each of them. Through the application of the geoTOPSIS method, three synthesis maps have been developed for each thematic category, capable of representing local resources using a semantic scale at three levels of intensity (low, medium, high potential), in order to visualise the areas characterised by greater or lesser possibilities of development taking into account the interactions between the three dimensions (Society, Economy, Environment). An analysis of the synthesis map of the potentials relative to the Society dimension showed a general population decrease, in contrast with the dynamics of young people between the ages of 15 and 29 still strongly rooted in the territory. As regards education and training, two phenomena are predominantly observed. While on the one hand 16.5% of young people between the ages of 15 and 24 leave school early and are employed in their lands in professions with a low level of competence or in crafts, on the other hand, around 80% of those who are in possession of higher education (graduates or graduates), leave the Basilicata region. From the comparison among Montalbano Jonico and the neighbouring Municipalities examined, Montalbano Jonico emerges in a more critical condition than Bernalda, Montescaglioso, Policoro and Scanzano Jonico. Therefore, it is highlighted to activate a strategy that can transform some significant criticalities into potential forms of development.

The synthesis map of the Economy dimension shows how agriculture is the main source of income. Since the agrarian reform of the 1950s, the agricultural sector has been showing a vitality that today takes shape in applications of smart farming and precision agriculture linked to digital technologies, and systems for monitoring and mitigating the risks deriving from climate change.

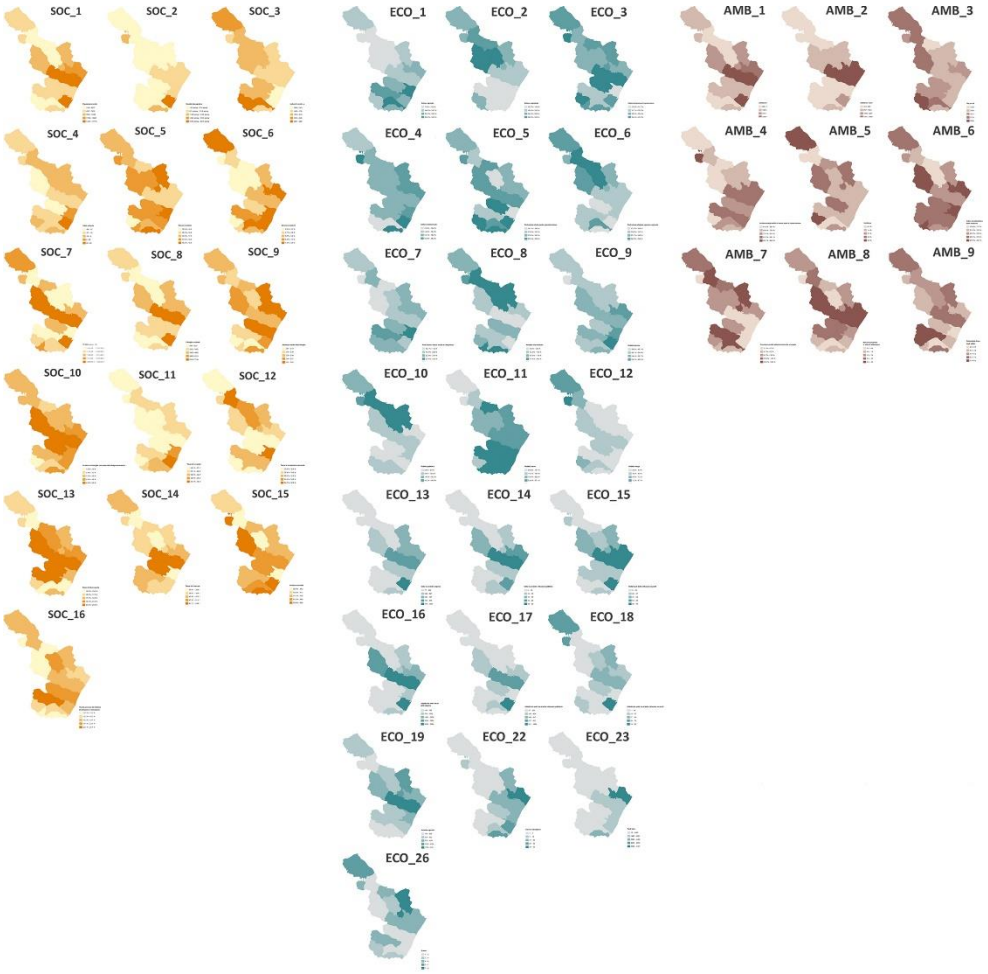
The employment rate in the agricultural sector is higher than the national average (19% against 5% according to the data of the last census) and returns quality food products, firmly rooted in specific local systems but which have found favour with international markets.

Among these excellent products, the Candonga strawberry produced in the territories of Bernalda and Pisticci, the Signora pear originally from Valsinni, the Staccia orange typical of Montalbano Jonico and Tursi and the olive of Ferrandina emerge. In recent years the cases in which a territorial economic system has been built around the offer of typical products, itineraries and paths to discover places considered marginal are not isolated; in these realities the products of the earth have constituted the multiplier of connected services (agritourism, rural tourism, reception), which have also had positive effects on growth and social improvement.

Although tourism is not the main source of income in Basilicata, the touristic activity is particularly interesting, mostly in the municipalities located on the Ionian coast, due to the presence of the sea, but less in the inland areas, where most activities are focused on culinary traditions or events related to the patron saints and to religion. The economically leading municipalities are Bernalda, Pisticci and Policoro. The main criticality lies in the concentration of activities in the high summer season only, since it requires a reflection on the possibility of expanding the offer by evaluating the opportunity to bring out from the different territorial identities, alternative to the beach, or food and wine. We refer to cultural tourism, to the "green" one, to cine-tourism, to sports tourism, to congressional tourism, as to all those forms of tourism linked to health and well-being, which are connected on the one hand to the strengthening of local specificities and on the other hand to the idea of

contamination advocated by an incremental network model, which identifies in the individual occasions, caught in their local specificity, the potential for triggering new links between places, elements, fragments of the territory that are set up to become strategic components of the valorisation process.

Fig. 3 – Synthesis of Society, Economy, Environment maps elaborated with geoTOPSIS method

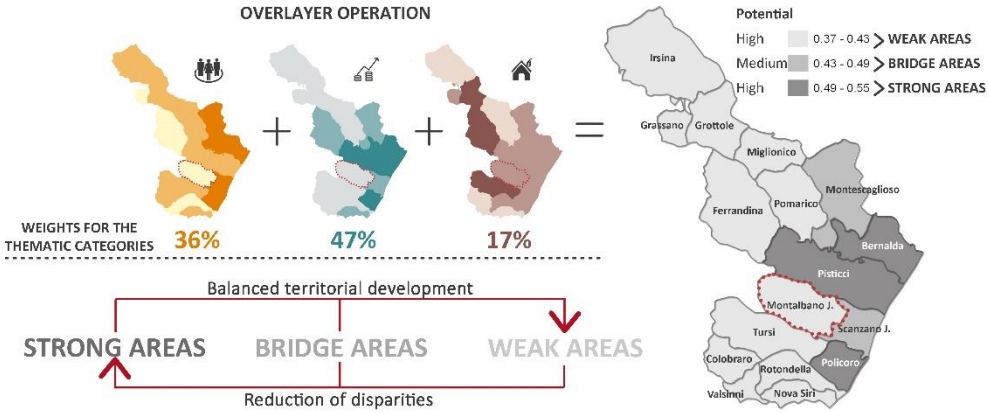


Source: elaboration of the authors in GIS on URBISTAT 2016, ISTAT 2016, 8000CENSUS 2011 data

The synthesis map of the Environment dimension returns the framework of the building stock and the general conditions of land use. In particular, there is a high number of underutilised (with an average of about 24% between the municipalities of GAL) or abandoned buildings, some of which of particular architectural value (such as the Casino Federici).

The territorial reading also returns a positive datum in the relation between the occupied surface and the free surface. The density of the "small" residential areas that characterise the countries of Basilicata is distributed according to a territorial design marked by large agricultural areas of great environmental value, in a landscape at times still uncontaminated, rarefied, a specific condition that few other territories in Italy possess. The areas of particular environmental value are those of Montalbano Jonico and Pisticci, characterised by the presence of the Calanchi Regional Park.
The elaboration of the proposal has made it possible to identify, for each thematic category (Society, Economy, Environment), some guide-actions appropriately selected to support the strategy of valorisation and territorial transformation. These actions will support the research team in identifying the new function to which the prototype building will be destined and in the construction of the generative process intended to guide the directions of change.
Phase 3 of the decision-making process is characterised by the construction of possible development scenarios (Fig. 4).

Fig. 4 – Scenario maps and identification of significant areas

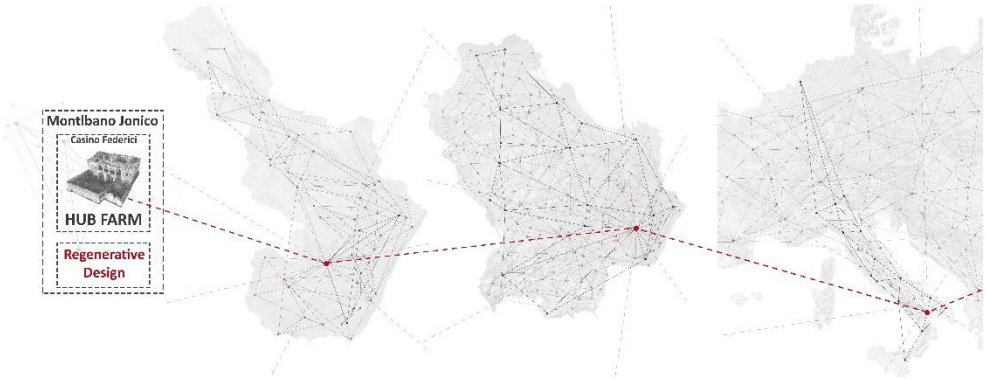


Source: elaboration of the authors in GIS on URBISTAT 2016, ISTAT 2016, 8000CENSUS 2011 data

The complexity of their definition depends on the system variables (actors/parameters/data) on which one operates. However, their construction makes it possible to support and argue the choices by comparing alternatives to verify compatibility, synergies, factors of criticality and potentials. The scenarios thus become the simulation and, at the same time, the control tool of possible futures and their elaboration requires analytical rigour, field surveys, relationships with multiple interlocutors, identification of variables and measurable and invariant parameters to be taken into account, to describe all that is resistance to transformation and what facilitates it instead, identifying favourable decisional contexts. In this sense, the scenario is an "open project": alternatives, critical reviews, audit, participation and multidisciplinarity, becoming both an opportunity for investigation and an integral part of the decision-making process. The scenario is defined, therefore starting from the context, the place, and the building, and it is articulated around them, assessed and structured in the

relationship with its specific variables, and compared with the social and economic dynamics, the production systems and local construction. At the same time, the scenarios elaboration, activating the comparison, becomes a useful tool for breaking pre-established models, changing established habits and encouraging change.
A "map-overlay" operation was therefore carried out, for which the synthesis maps of the previously elaborated thematic categories were superimposed, and the weights were assigned again to each selected indicator, consistently with the weights assigned in the second phase of the decision-making process. In the final map, thus obtained, the areas with high, medium and low potential concerning social, economic and environmental dynamics were identified. The same areas were then renamed "weak areas", "bridge areas" and "strong areas" (Fig. 4).

Fig. 5 – Incremental network strategy: international network for the activation of new synergies



Source: elaboration of the authors

In this first analytical framework, the area of the Metapontino was stronger than the one of the middle Bradano, while the common development drivers were those of Bernalda, Pisticci and Policoro. Montalbano Jonico has instead revealed a condition of weakness, typical of the internal areas, which becomes an unexpected "strength" for the new valorisation process. The synthesis map made it possible to deduce the strategic opportunities connected with higher education, the development of agri-food supply chains, and the revitalisation of abandoned architectural assets. These opportunities will become concrete in the system of network relationships, whose nodes are constituted by attracting buildings, abandoned goods like Casino Federici, which will be able to accommodate training, experimentation and research centres. In strategy, the Casino Federici takes on the role of a generator of a multidirectional transformation process which, by connecting the attractors initially identified, draws, in successive increments, new development paths capable of intercepting and influencing the various components (Fig. 5). For example, the training component will make it possible to put schools in network, research centres and university institutes, and will involve an increase in not only local students, triggering new economic and social dynamics in the various territories. Taking into account the guidelines emerged from the multi-criteria analysis

results, the training network will be linked to the experimental poles already present in the territory, such as the ITAS in Pisticci, the Alsia-Agrobios in Bernalda and the ENEA in Rotondella. These centres are involved in research and development in the field of green biotechnology, already investing in social capital by training young people in the field of molecular biology and genetics, and also by raising awareness on issues related to innovative technologies applied to agriculture (Agriculture 4.0 or Smart Farming). Connected to each other, these poles prepare themselves for the activation of new synergies, projecting the Basilicata research context into the broader national and international network.

4. Casino Federici Hub Farm: from the local material culture to the hypotheses of transformation

The analytical-critical elaboration of parameters and constraints identified allowed to determine the new function of Casino Federici, conceived as a Hub farm, building/generative prototype that is configured as a High Training Pole for the development of the agro-food chain. The Casino becomes the center and node of a complex grid that is built and modified over time, according to the connections that it can generate. The generating action will describe a new, neuralgic, sometimes unexpected geometry of reticular levels, able to feed the dynamic directions of development to the different scales. The concept of scale is fundamental in the developed experimentation: it ranges from the scale of detail, able to provide knowledge of the matter, to the scale of the building, of the village, up to understand the system of municipalities, of the Region and, in a programmatic vision, of a wider territory. The Casino Federici belonged to the Baroni Federici, a noble family arrived in 1712 in Montalbano Jonico from Corleto Perticara, before handing it over to a branch of the Troyli family who, for a long time, elected their home in Montalbano Jonico. It is located in Borgo Nuovo, a district of the last expansion of Montalbano Jonico, which marks the entrance to the town and is characterized by a type of construction that can be associated with fortified masserie-village intended for both cereal farming and breeding, generally organised on two levels: the lowest for storage and shelter and the upper floor for housing. The scarcity of documentary sources and the need to determine technical characteristics and transformation of Casino Federici has imposed a rigorous field study in order to identify invariants and technical and typological variables and compare them to our building. A complex and long campaign of reliefs on buildings in the historical centre of the country has been organised allowing to identify and catalogue techniques of the local constructive tradition, decorative elements and expressive forms, as well as to understand the methods of production of the clay components that make up most of the local rural and noble buildings. The investigations carried out on the historical buildings of Montalbano Jonico (Palazzo Federici, Palazzo Troyli and Palazzo De Ruggeri) have allowed to identify some recurrent elements, characteristic of the building and architectural tradition of the place (Fig. 6). Among these we can distinguish the loggia, marked by round arches made with “bricks disposed to the knife”; the crowning in bricks and tiles of brick arranged in alternate strips; the vaulted rooms, generally placed at the entrance of the noble buildings, and finally the typical external staircase, which connects the two overlapping spaces of the low house and high house. All these type-construction features are present in Casino Federici. The similarity between the construction elements shows that the formation of the shared “constructive type” descends from the more classic process of iteration/optimisation of the technical act (Nardi, 1994), from the widespread presence of “individuals”, very similar but not completely equal, that reveal the continuous

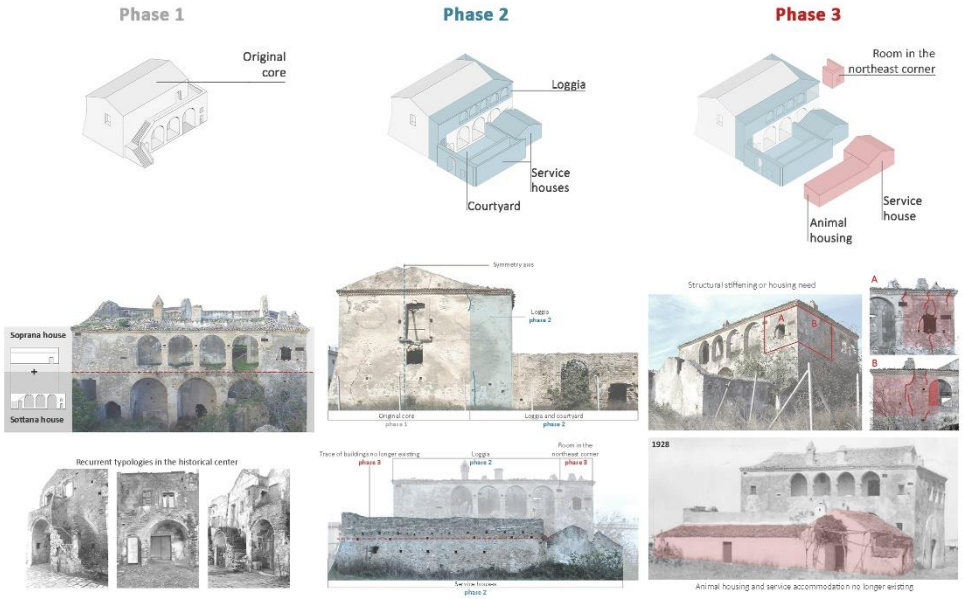
work of "repetition with differences". However, the differences are not as significant as the similarities. The similarities are the constructed, therefore indisputable, demonstration of the collective sharing of a way of building that means, for wide traits, collective sharing of a way of living. The ruined state of Casino Federici has allowed to recognize materials and construction techniques and to hypothesize its possible transformations over time, especially through the interpretation of structural components. Most information has been deduced in fact from the wall systems in which two different types of masonry are recognized: a compact bearing masonry, part of the main nucleus made of clay-based bricks, river stones and mortar, and a sack masonry with bricks, river stones, gravel, processing scraps and mortar characteristic of the courtyard and service dwellings. Each type of masonry also corresponds to a dimension of the used bricks: 30x14. 5x4 cm is the specific measure of the elements of the compact masonry, while the sack masonry consists of elements measuring 26x13x4 cm. These data allowed hypothesizing the temporal succession of the construction of the two systems: the small court and the service houses were added, for successive enlargements, to the construction of the main building

The limited accessibility and the obvious risk condition due to the presence of weeds and collapses of part of the vaults, the roof and the access ladder to the upper floor, determined the need to proceed in different ways. In the easily accessible parts, the classic measuring instruments (laser meter and meter) were used, while for the non-practicable parts, high precision instruments, such as the PLR laser Disto S910 Pack, were used, which allowed rapid and accurate measurements between two points from a single position with a maximum range of 300 meters and an error margin of only 1 mm, and the drone DJI Phantom 3 SE with GPS system incorporated, which made it possible to detect and analyze the rooms of the upper floor and, in general, the interior. The data collected allowed us to process the plans, prospectuses, sections and details of the building with a right precision margin and to facilitate the knowledge of structural system (masonry and vaults). From this last operation, it was possible to reconstruct the different phases of building construction (Fig. 6).

The first typical houses of the Municipality of Montalbano Jonico were born as a single volume at a single level, in which different functions were carried out: from the residential one to the storage or shelter one for the animals. Over time, due to the need to have a larger living area, the upper levels have been built, giving rise to a new typology consisting of overlapping environments, processing feature also recognizable in the Casino Federici. In this case, the "s*ottana*" house becomes warehouse exclusively for tools, store for agricultural products or shelter for animals, while the "soprano" house assumes exclusively the dwelling function. The connecting staircase between the different floors was placed strategically on the outside and leaned against the wall structure, another element that makes it credible the hypothesis that the service houses, outside our building, have been built over time to meet new housing needs. In a later phase to the construction of the original building, characterized by a compact shape and closure to the outside, the loggia with arches, the courtyard and the service residences were added; this hypothesis derived largely from the analysis of the cracking map. In particular, the traces and the visible lesions in correspondence of the gallery, are evident signs of a more recent construction than that of the original nucleus. This hypothesis is further supported by the asymmetry of the double-pitched roof evident in the southern façade and, as already mentioned, the different construction characteristics of the wall system of the outer courtyard and the service buildings (sack masonry) compared to the original core (compact brick masonry). In the only photographic document found, dating

back to 1928, it is also visible the presence of two other small volumes close to the east side of Casino, witnesses of a further increase in the time of the entire system of which today there is only a trace imprinted on the external masonry. A last element of the building, a tiny room in the northeast corner of the loggia, would seem to provide a trace of further information useful for the reconstruction of the object of study. Probably born for the housing needs or with the function of structural stiffening, it constitutes the natural and subsequent extension of the wall sect covering half of the first arch of the loggia on the north side, and for this reason, it is walled.

Fig. 6 – Hypotheses of growth of Casino Federici during the time



Source: elaboration and photographs of the authors

The prototype is designed as a Hub, centre and powertrain of network links. In the Casino Federici, material culture and innovation coexist and complement each other: the first said the technical invariants, aims to maximise permanence, the recognizability of ancient materials, respect for traditional techniques, and consolidation measures. The second identifies the variables, the future-generating mutations that work on multi-level and multiscale hypotheses. At the scale of the building, the parametric conception of the architecture mediates the transformative possibility of the elements that can generate "parameters" with the condition of doing that still requires a good dose of "craftsmanship" as part of the culture of building. In the design of the Casino Federici, practices of *digital fabrication* were used for all those collapsed elements, and therefore no longer "witnesses of its history", such as coverage, and for the design of external service spaces, less significant

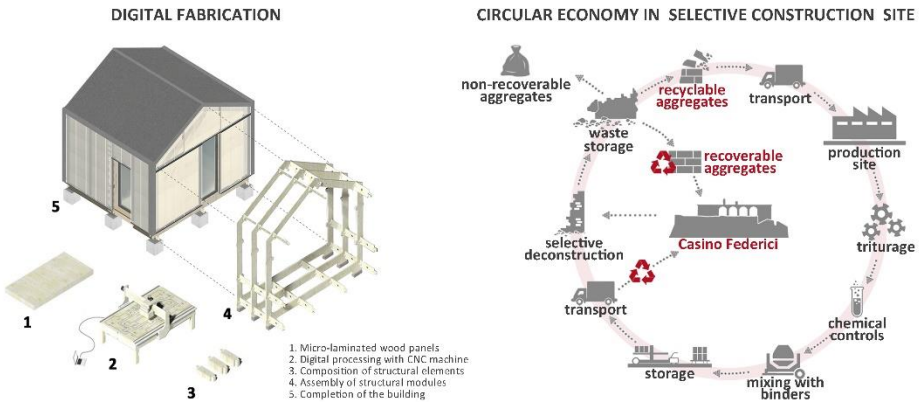
small buildings to which was conferred "new life" (Falotico, 2017a; 2017b). The idea-project is linked to the concept of the variability of some elements in opposition to the stability of those related to historical memory. In this connection lies still the desire to combine innovation and tradition and, therefore, to implement that necessary reference to memory and, at the same time, to contemporaneity in the constructive and imaginative actions of the project. The new technical elements are all made of wood. The different components are also charged with technological and performance values to minimize the implementation difficulties and allow the realization by a low skilled workforce up to get, in the future idea, to the possible involvement of future users and their communities in the transformations. They are designed as a sequence of numbered parts, organized in an abacus and assembled, produced *on-site*, as in the past was organized the production of the bricks, cooked in the furnaces at the foot of the building site. The old furnace is replaced by a large-format 3D printer, which converts the building into a large open-air laboratory in which man and information, matter and constructive logic are related: the latter aim at reducing costs and times of installation of the elements, all dry assembled and interlocked, to optimize movements and storage of materials.

«To evoke the work of the craftsman, the German uses the word Handwerk, and the French use the adjective artisanal. The English language is less restrictive and uses craft (art, trade) in more extensive combinations, such as in statecraft, the art of governing, the political ability. Čechov applied the term "*mastersvo*" both to his art as a doctor and writer» (Sennet, 2008). Richard Sennet, specifying the different terms, treats all these concrete practices as equals, as if they were laboratories in which to subject to analysis feelings and shared ideas. There are no differences in being a craftsman. The difference lies in the tool and ingenuity. Today the makers, the new artisans, still have a peculiarity compared to the "old makers": they are a connected community, collaborating through open-source practices. «The web has taught us the power of the "network effect": when you connect people and ideas, they grow. It is a virtuous circle, more people together create more value which in turn attracts more people and so on» (Anderson, 2013). However, the culture maker is also ecological. It is deeply rooted in an idea of responsibility as well as solidarity and sharing. In its DNA there is not only the push towards the use of advanced digital tools but an impulse to put the correct use of resources at the centre of the creative process and a cyclical idea of resources. This economy is based on the premise that everything is precious and should have a life in addition to the first use and every product we imagine, object or building, must be able to be repaired and reused before being considered waste. «Repairing to reuse is the best way to protect the environment by saving: this is the approach of the community *iFixit* that makes "*Fix it* first" a slogan that refers to a more concrete idea of struggle for the protection of the environment. This community proposes a thorough reading of e-waste, that particular type of special waste from electronic goods, containing many types of harmful chemicals, from lead to mercury, which cannot only be disposed of in landfills because it contaminates soils and aquifers» (Colabella *et al*., 2014). Makers do of this attitude a poetic of life extended not only to the conception of the instruments they use but to all that they can imagine, to design, to produce. The digital fabrication and the choice of wood as a building material for the newly built parts of Casino Federici, are founded in the visionary strategy of makers.

5. Conclusions

Deconstruction is a practice that reverses the natural cycle of construction. However, it finds its meaning in the principle of temporary inauguration with the "civilization of machines" which has replaced the principle of the limited duration of buildings to the ancient principle of indefinite permanence, following a cyclicality which is proper to nature and which cannot exclude matter. If, however, new-generation buildings, for the most part dry-assembled, can be considered with good reason as the result of a project such as the "disassembly factory" and thus predisposed to the substitutability of parts, the reversibility of systems and their dismantling aimed at the possible reuse of components and materials is not so for buildings characterized by wet connections, such as Casino Federici. These buildings are based on principles of irreversibility that do not allow any possibility of reversal. The awareness of the limited resources and the need for optimisation of building practices have for a long time determined a new concept in construction practices which are oriented, in the case of interventions on the existing building, towards selective demolition. Selective disassembly is a strategic practice aimed at the rational and programmed disassembly of materials and components with the possible discard of unusable ones and the regeneration of those usable own of reversible processes. In this practice lies the idea of a circular and regenerative culture that does not allow waste. The construction site of Casino Federici organises itself on two different levels: one linked to the practices of the digital culture and one that concerns the selective construction site (Fig. 7).

Fig. 7 – Practices of digital fabrication and circular economy in Casino Federici



Source: elaboration of the authors

The two logics, different but shared by the objective of optimisation and rationalisation, are part of a process that is only instrumentally understood as a conclusive part. In reality, it is a fundamental part of design thought and characterises its progressive formulations. A process in which there is no separation between hand and head, technique and science, art and craft. A process that, at the same time, does not divide the man from the designer, the nature from the artifice, the part from the whole that coexists in a positive tension towards the "new" and

establishes a new relationship between project and practice or between theoretical and practical work, in a synthesis that does not see disconnected the moment of formulation of ideas from that in which they materialise but which, on the contrary, it determines a real concert between those who 'draw' the project and those who guide the tool to build it. In this scenario, operational practices, driven by cooperation concepts as interoperability and adaptivity, become fundamental, according to an image of reality in which nature and artifice can find a balanced relationship with resources.

The experimentation of the research group has developed a model of intervention aimed at providing possible answers on the modalities of re-functionalisation of the abandoned patrimonies concerning the development of the habitats and to processes that refer to a systemic, connective, relational, anticipative vision. We know that project innovation is linked to a cultural and thought revolution; also, that building experiences a new, educated, equipped, and responsible craft. In this perspective, the main objectives that can be linked to the experience of the working group are to reduce waste and save resources, to be included in the project and its generating idea. Casino Federici is a derelict building, subjected to the environmental actions that for years have caused its degradation, to the point of making inefficient its more resistant parts, reducing it to ruins: Casino Federici today is a “refusal”, so redeveloping it means, above all, helping to find answers to the challenge to safeguard the environment with urgent and shared solutions. Reducing waste is part of the renewal of life cycles that is achieved by designing and planning the reversibility of uses by building on what happens in nature where there are not «Unemployed and not waste, all carry out a task, and the waste of some becomes raw materials for others, in a cascade system in which nothing is wasted» (Segrè, 2012). Scientists and researchers have been studying ways of transferring the principles of the circular economy to the design and construction of buildings. At the centre of the reflections, the following fundamental question: Is it possible to design and build a building in which all the components and materials used are completely recyclable? We are far from being able to give an affirmative answer, and it will probably not be possible in the near future, but the road is now mapped out. The evolution of the principle of sustainability is generating a series of normative transformations, and new practices; sustainability in the design field is producing effects on the production reality, markets and inhabited space. The idea of the environment has also changed, revolutionized by the advent of digital technologies and the consequent opening of new operational and thought horizons that have changed the notion of living, redefining material and physical support.

The advent of digital practices is constantly increasing and widening the boundaries of living space (*augmented reality, social network, internet of things*), at the same time, it is bringing about a profound transformation of the project's instrumentation. The city of tomorrow, as Carlo Ratti says, is a city in-formed by networks, psychic, responsive. The proposal has its roots in this context. First of all, in the idea of triggering a network connection capable of directing the future of places adaptively, secondly in an attempt to respond to the objectives of safeguarding resources and the environment, in which two questions become fundamental: the makers and the selective construction site.

The particular condition of Montalbano is therefore a favorable context for testing environmental regeneration practices, able to combine different components (culture, traditions, goods, resources and communities), in a synergistic dynamic that puts together tradition and innovation, technical and digital culture, present and transformation actions to generate new values.

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