

Planning the wetlands in a conflictual Era. The Santa Gilla & Molentargius compendia cases– study (Sardinia, Italy).

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Abstract

The stratification of natural and anthropic phenomena on territory moulds environmental components. Spatial interactions of different systems (social, cultural, productive) modify landscape due to uses that are increasingly inducing some fast environmental transformations, especially in urban areas with a highly dynamic development. Quality environmental recovery and safeguard are considered as new emerging need's categories, expressed by a clearer socio-cultural consciousness, within life quality requirements of expanding society. Despite this and the widespread dissemination of the landscape approach since 2000, it is not yet clear whether this change of mindset has corresponded to a real update of city planning instruments and tools. Our research tries to clear up this aspect considering the Cagliari metropolitan area with the Molentargius Pond Park and the Santa Gilla Lagoon wetlands (Sardinia). Through a comparative analysis of planning and programming experiences, the research aims to focus on the effects produced by the new paradigms of urbanism on landscape and local administrative capacity, pointing out some useful considerations about the role played by the Italian cities during this so called transition phase.

Keywords: city-planning paradigms, Strategic planning, environmental planning, coastal wetlands, Sardinia, regional development

1. Introduction

The stratification of natural and anthropic phenomena on territory moulds environmental components. Spatial interactions of different systems (social, cultural, productive) modify landscape due to uses that are increasingly inducing some fast environmental transformations, especially in the areas with a highly dynamic development.

Therefore, the sensibility to environmental problems seems to be strictly tied to the socio-cultural conditions of settlements and to its capacity in defining its own territorial interests aiming at life quality improvement. Hence, anthropic space requirements change according to socio-cultural needs expressed in a precise territorial context and in a peculiar historical moment, such as functions of a settlement's development model. The fast obsolescence of exogenous models for

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economic planning is increasingly making evident an incapacity for the implementation of a territorial use control, especially for highly crowded areas. Therefore, territory cannot be reductively considered an interaction field of complex social and economic system, where space represents a dependent variable of a social behaviour. On the contrary, it has to be thought as a part of a larger environmental system where the developed actions change the balance of the relationship and the roles of the different eco-systems. It is evident that quality environmental recovery and safeguard must be considered as new emerging need's categories, expressed by a clearer socio-cultural consciousness, within life quality requirements of expanding society. Their improvement is one of the main objectives of territorial and urban planning. The question is particularly urgent in metropolitan systems that have developed their economy around high natural value areas, such as for example, the coastal wetlands.

These areas are historically occupied by salt pans and fisheries and they have gradually lost their productive identity becoming an "empty" space from the physical point of view (it cannot be built) and perceptive (it cannot be easily accessed). This "vacuum" has meant, for a century, a lack of planning capacity and a spontaneous swarming of industrial and residential activities along the ponds banks. After the ecologist Seventies turn there has been a change of mind about the role of natural urban environment which have gradually become a protection subject and enhancement in a sustainable local development perspective. Despite this and the widespread dissemination of the landscape approach since 2000, it is not yet clear whether this change of mindset has corresponded to a real update of city planning instruments and tools. Our research tries to clear up this aspect considering the Cagliari metropolitan area with the Molentargius Pond Park and the Santa Gilla Lagoon wetlands (Sardinia, Italy).

1.1 Method

Through a comparative analysis of planning and programming experiences, the research aims to focus on the effects produced by the new paradigms of urbanism on landscape and local administrative capacity, pointing out some useful considerations about the role played by the Italian cities during this so called transition phase.

2. Planning in the western city from the Eighties to today: the emergence of new disciplinary paradigms and the role of the Italian cities in the renewal process

During the Eighties of last century, many European cities began to undergo major changes to their economic bases and to their physical and functional arrangement. The serious global economic crisis of the Seventies had produced profound effects on urban economies and, as a consequence, had served as the principal motivation for the growing economic, social, and physical deterioration of many cities. That crisis, which in many cases was also reflected by a slowing down or even an arrest in population growth, while it may had its greatest effect on those cities that were specialized in areas directly related to manufacturing (such as industrial and port cities), nevertheless had more general effects as well. In reality, the worldwide crisis suffered by Western economies constituted the end of an economy based on the production of material goods and the beginning of a new phase based on the production of intangible goods. This was a significant turning point, involving the conversion of Western economies in the direction of an information technology society and a transfer of material goods production to developing countries. This shift has also been referred to as the advent of the post-Ford society [1,2,3]. This process of transformation of the big cities has also taken place in a cultural context characterized by other important changes. On a cultural level — and this may be the most important aspect from the point of view of the way in which the research project is setup — radical changes are made to several aspects of the scientific approach on which such fields of study traditionally based their methods. Review of the concept of "complexity" that got under way towards the end

of the sixties modifies the paradigm of the positivistic cognitive process and leads to an approach that is more and more inductive and experimental, since the complexity can never be totally unveiled — much less controlled. We are talking about moving from a "society of certainties" to a "society of uncertainties", where the uncertainty itself serves as stimulus for innovation [4, 5, 6, 7, 8]. At the same time, the characteristics of the information technology age modify the space-time relationship, reaching — with the widespread use of the term "real time" — first the definition of the "real time society" and then that of "real virtuality" [1, 2]. The effects of these profound changes on city planning and on the methods used for planning the city and its surrounding area are of considerable importance [9, 10]. A discipline that, starting with the assumption of a predominance of the rational cognitive process, has built its social role on its capacity to forecast the social and physical development of the city over the middle and long term and on its capacity to govern with its own tools the processes of transformation of the city and its territory has necessarily needed to reflect on its scientific bases and tools. This review started at the beginning of the Eighties, involving the conceptual structure on which the planning tradition is based and leading to significant works on a theoretical and experimental level, all aimed at searching for new perspectives [10, 11, 12, 13, 14, 15, 16]. Moreover, the new phase of the world economy is characterized by a new leap, more than two centuries after the first one, in the forms of relations between manufacturers and in the way their decisions are made — a process called "globalization" of the economy [17, 18, 19, 20]. Two responses would seem to correspond to this process: on the one hand, there is a process of homogenization of social behaviour; on the other hand, an emergence of new forms of reaction, tending to keep or returning to new levels of identity. This has led to an obvious conflict between a search for new super-national arrangements that are necessary in order to find a dialogue between the new models of decision-making in the world economy, a redefinition of the rules of national states, and certainly a new role for regions and cities.

One of the major transformations in city policies starting in the Eighties has been the preparation of real "international policies" by many of the most dynamic cities — international policies made possible to initiate direct dialogue with national and super-national bodies and with international financial bodies, and also to create "networks" between cities so as to influence or have a bearing on the decisions and choices made by these bodies [21, 22]. In this context, many European and American cities have seized on the opportunity to attract the headquarters of the new businesses typical of the post-Ford society. This introduced a phase of competition between cities to improve their position in the new hierarchy undergoing redefinition. Along with the world-class cities [23, 24], during the eighties there was a renaissance of many cities, such as Bilbao, Barcelona, Lisbon, Rotterdam, Frankfurt, Birmingham, Lyon, Vienna, Detroit, Seattle, and Los Angeles, to name only the best known. In light of these experiences, it can be said that there really was no crisis of the big city, but rather that there was an evolutionary phase. If the big city does not grow any more, what has grown is the size of the surrounding cities and towns. In other words, along with a change in the economic base there has also been a "new dimension" and a "new form" of the Western world-class city.

Theoretical reflection on the "contemporary city" is at very early stages and involves many fields of study: from economics to geography, from sociology to anthropology, from psychology to urban planning. We need only list some of the attempts at defining the contemporary city, which are significant to understand different perspectives: metropolitan city, sprawling city, archipelago city, hyper city, metapolis [12, 13, 16, 25, 26, 27]. Beyond theoretical research, the transformation of many American and European cities has created an opportunity to experiment new tools, new approaches, and new ways to design and administrate the city. Criticism of the culture of rationalism — which dominated in city planning in the period between the two world wars and imagined a model for a modern city that was completely alternative to that of the pre-existing city, and which after World War II was applied on a wide scale both in the reconstruction of the war-torn cities and in the models for enlarging the cities that were growing

rapidly on account of the urbanization processes – manifest itself in a search for and experimentation with new forms of plan based on flexibility, operability, and processual way. At the same time, new tools were being defined, in part as an alternative to existing tools and in part complementing the new plan forms. These latter included the strategic plans borrowed from the experience with corporate management and assume the central nature of the city as an asset to be set at the centre of a system of competitiveness between cities. Another way to draw or redraw the city shape must be reconsidered and the urban project becomes the procedure within which not only to redeem the quality of urban space through a new relationship between the city planning and the architectural dimensions, but also to reconnect the design of the city to the pre-rationalistic models, overcoming a fracture in the history of urban form in a modern perspective [28]. In this long, complex, and variegated process of city planning re-identification, it is possible to see a number of questions that seem to become more and more central. These include the relationship between planning and management; between city planning dimension and the quality of urban spaces; the horizontal and vertical relationships between the various bodies and organizations having responsibility for the territory; the question of the credibility of the use of planning tools that, as such, still seem to be based on a minimum of rationality, albeit revised, with respect to the apparently disjointed and irrational forms of the contemporary city; resizing the role of city planning as a discipline, accepting the loss of its demiurgic and comprehensive role in favour of greater credibility and operability, causing it to become one of the disciplines that can give a specific contribution by participating in the drawing up of the design and the project for the city; and the conflict between the different cultures charged with the design and the management of the territory and its specific aspects (the culture of transformation, the environmentalist culture, the culture of cultural assets).

In this process, although Italian culture has made significant contributions [29, 30, 31, 32, 33], the big cities in Italy have been, for the most part, absent. There could be a number of reasons for this. Firstly, there is the term of office of local administrations. From the Eighties and up to the implementation of the reform of the electoral system for local bodies (end 1993), the government remained in office for an average of two years. Even worse, the fragility of the mandate was high. There was little chance to guarantee the policies implementation, at least over the middle term, and the proper attention to contexts extending beyond immediate interests. Secondly, in the post war years there was a lack of policy for the cities. Political and scholarly attention was concentrated mostly on specific themes, such as the battle against land rent, the city planning reform, safeguarding of historic centres, and public housing policy. They were all legitimate concerns, but they often lost sight of the question of the city as a complex and unitary object; and all too often they led, albeit involuntarily, to policies that were profoundly anti-urban – that is, the sectarian policies that have made no contribution to the planned construction of the city but have rather contributed to its disorderly growth (housing policy). Even during the Eighties this lack persisted, just when major cities of the Western world were at the centre of the attention of national and international policies. It was a culture of city governance – both on a local and on a national level – that paid more attention to sectarian and short-term questions than to the role of the city as a whole.

3. The impact of contemporary city-planning paradigms on Italian cities: the case of Cagliari (Sardinia)

3.1 The impact on the urban area's environmental structure.

In the area of Cagliari environmental transformations caused by land use changes connected with various anthropic activities have led to the progressive decay of environmental quality through the

continued depletion of resources. This urban area is subject to extremely dynamic phenomena comparable to those typical of greater metropolitan areas, such as the unrelenting and widespread pressure of new settlements, the accumulation of centrality and the area's high degree of internal mobility.

The tendency towards a progressive population concentration is the result of the economic strategies followed by the public administration in the 1960s. In fact, the relationship between development model and localizing effects led to the creation of situations characterized by high settlement density that unbalanced the relationship among the components of a sufficiently interdependent settlement system. The population dynamics of the area's urban centres presented a moderate growth starting from 1950s, and it went hand in hand with the conservation of traditional economic and productive structures. Later, with ever-increasing momentum, consequent to the overall development of the area's economic factors, an unplanned population increase. With consequent spreading of residential settlements of similar proportions, it disrupted the fragile local economic system that was mainly connected with the territory's agricultural structure.

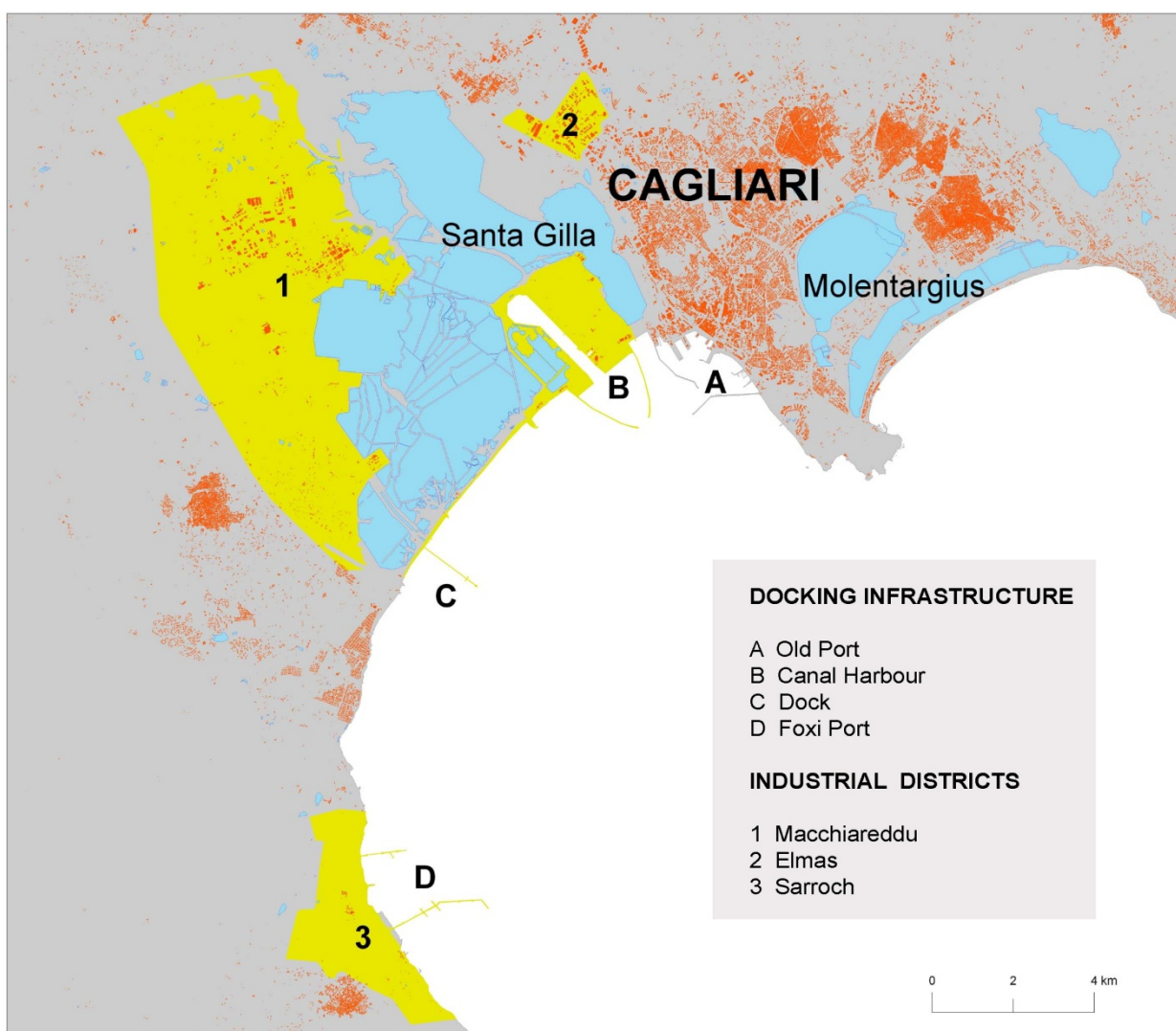


Figure 1. The vast area of Cagliari: natural *compendia*, docking infrastructure and industrial districts
 Source: processed by the authors

The rapid population growth noticed in the last few years has therefore led to the disruption of the environmental and historical-typological characteristics of the smaller settlements, with the spreading of anonymous and ever more alienated and alienating peripheral areas. Hierarchical

relations and functional roles have thus been reductively determined by the availability of instruments for territory control. The single municipalities have to face the challenge to create new settlements depending directly on internal migratory movements.

The lack of benchmarks, represented by an overall development policy projected into the area is underlined, even from the structural standpoint, by the different quality to be found between the development of the town and that of its hinterland, as remodelled by the new spontaneous geographies in the distribution of population and services. From this viewpoint, the recovery and safeguarding of environmental quality are coming to the forefront as new emerging necessities in plans for readjustments of the territory. The environment in all the complexity of its natural and historic-cultural values must therefore represent the binding elements in the reassembling of the settlement's structure.

The system of parks, ponds and wetlands covering over 25% of the territory of the province of Cagliari will constitute not only an essential resource to protect and use to better advantage but also, through coordinate initiatives of the single municipalities, will become the connecting tissue of the new system of relations (see Figure 1).

3.2 The impact on the urban area's historical structure

The city reflects the image of spatial transformations that over the time have embodied political and administrative designs. The urban effects depend mostly on the capacity to create recognizable signs for the connotations of space. In the loss of the "sense of place" [34, 35] we thus find the main reason for the alienation and extraneousness we perceive in the suburbs, a world in which "man loses his existential foundations". The image of historical city still appears as the results of the stratification of cultural traditions and the political and social events. These elements have modelled city's places, shaping in this way a complex and vital tissue to which slow and different evolutionary processes have given meaning through spaces for human relations. Conversely, the recent production of additive settlements has not succeeded in creating new cities; suburbs are unstructured, generated by contingencies, without history and able to carrying out the sole function of residential containers. Despite this, the richness represented by building stock in the suburbs is a resource that can be protected through a progressive attribution of values. Urban renewal projects (historic centres, suburbs) must therefore aim at recovering the quality of the built environment and at reducing inequalities to re-establish an internal balance between the different parts of the city. The project of centralizing the suburbs must especially tend toward re-establishing functional links and spreading non residential activities able to supporting operations for the recovery of housing stock. In the immediate future it will be necessary to draw up organic plans for the rebirth of the city aiming at making useful and effective projects for the recovery of buildings as support for contemporary improvement in urban quality [36].

The structural changes that have taken place in the post-war period in the urban area of Cagliari highlight the effects of the additive development of a settlement. The city has grown without any special attention to the environment despite the presence of conspicuous resources in it. It has been unable to formulate a planning policy to support decisions on the government and management not only of its own territory, but also of the conurbation that was being developed. High residential concentration has also enhanced "social tension" in the area which has in turn set off uncontrolled processes of spontaneous adaptation (in fringe areas) which have given rise to serious environmental pathologies. Sensitive zones devoted to low cost and subsidized social housing were developed with little or no heed to their future effects on processes of transformation. Pathological suburbs were built, whose recovery today is more complex than ever.

The municipal planning instrument has not been transformed into a tool for steering and promoting

the demographic and economic dynamics of the area. Variations made in the plan have been ineffective not only in controlling the urban form and the quality of space produced during the settlement growth, but above all they have indicated any alternative strategies for the locating of service structures at the territorial scale able to tackle residential concentration, nor they have supplied policy elements useful in developing the metropolitan area.

The quantity and quality of urban development appear to be simplistically restricted by the rigid bond between zoning and settlement typologies within a statutory framework that in the long run has favoured factors leading to the formation of suburban ghettos, which in turn have frustrated the demand for better environmental quality. The scanty attention paid by the principal town to hinterland growth phenomena and the incapacity to assume the leading role in governing the metropolitan territory have produced important effects, especially on the urban quality of the weaker villages and neighbourhoods in the suburbs, where the signs of a profound crisis of identity are most evident. A historical analysis has led to the sufficiently accurate description of mechanism explaining urban development in a succession of stages that can be summarized as follows:

- Balance between walled city and countryside;
- Beginning of the dualism between centre and suburb;
- Affirmation of the model of the nuclear diffusion over the territory;
- Transfer of central functions: policy of re-balancing services on the territorial scale;
- Recovery of environmental values (re-use of building stock).

The articulation of the historic centre into four quarters characterized by different functional roles and recognition of local autonomies, which started in the first years of the 19th century, confirm the subordinate and marginal role (despite spatial proximity) of the suburbs as regards the citadel. Only in the second half of the 19th century, with the eclipse of the strategic importance of the military apparatus, the municipality did succeed in legitimizing initiatives in the urban field by adopting the town building plan designed by Gaetano Cima. He perceived the importance of moving directional functions/ high order services and proposed the "opening up" of the walled town.

The operation, if it was viable for the quarters on the slopes of the Castello hill, not the same was for the Castello quarter. It began its inexorable functional obsolescence, accompanied by signs of its physical decadence. In reality, the lack of territorial spreading of urban functions (relations with local governments in the first belts, indifference to economic susceptibilities connected with the harbour) also characterized later urban initiatives: private building developed without guidelines, progressively consuming soil and led to a decrease in settlement density, thus confirming the diffusive nature of urban growth. The new residential settlement, in a very broad range of cases, broke up into pieces unrelated to pre-existent urban functions. The suburban tissue was characterized by mono-functional residential areas and the high level functions as well as the most representative places for social communication continued to be located in the central areas. The forms taken by territorial consumption also concerned, through more and more rapid processes, the fragile, conterminous urban structures. The development of the largest centre conditioned the growth of semirural settlements, giving them the evident connotations of destructured suburbs. Basically, the structure of the 1960's Municipal Plan designed for Cagliari a suburban tissue according to the tendencies created by spontaneous post-war reconstruction processes. Emphasis on the size of new building areas and on the location of office districts along the eastern and western approach directions to the town, where commercial interchange and services accumulated, surely led to the affirmation of the dichotomy between the centre and the areas of expansion.

Cagliari's suburbs have developed in a compact spatial layout interrupted by the main morphological and environmental features (hill, wetlands) in a spatial involvement with little heed to the opportunity and compatibility of certain location choices. With this concept of settlement expansion, public buildings have represented bridgeheads (with no environmental attention paid to the town's territory) in the saturation of the urban space. Furthermore, difficulties in formulating an overall plan for the balanced development of priority-oriented housing and service functions,

together with the failure to redistribute central functions over a consolidating urban area, have contributed to stress the conditions to an authentic subordination of the territory to the central area. These processes established new conditions for the development of a greater metropolitan periphery. While the limited size of the settlement represented an advantage for the main centre, the recovery of the urban periphery appeared to be a more difficult task.

The town centre is no longer able to satisfying demand for accessibility, either in terms of public transportation or in terms of parking lot offer. The accumulation of higher level functions has stressed the marginal status of the wider territory and has created a growing demand for mobility. The distinction of the urban tissue into the following four main types is becoming more and more evident:

- the historical suburbs;
- the public suburbs;
- the private suburbs;
- the spontaneous suburbs;

The carried out analysis have confirmed that the different types are not determined by geometric, spatial elements, such as the distance from the centre, or by functional elements, such as accessibility to central places, but by manifest social, economic and environmental considerations. The contradiction in the different suburban areas can be associated with obstacles of a prevalently socio-economic nature which confirm their marginal condition and reflect on the quality of the overall environment. The different levels of integration are represented mainly by the dissemination of the territory (especially the historical and private peripheries) and by the presence of soft tissue (abandoned areas, urban vacuums) which are available as strategic elements for the success of a regeneration and riqualfication plan open to different subjects, both public and private.

Concerning the other two types of suburb, it will be necessary to create procedures going towards a multifunctionality of destinations through mostly public operators. In any case, for each type it will be necessary to find the right intervention to bring about a reduction in its marginal condition within the framework of plans for socio-environmental recovery.

The priority will be given, case by case, to the reconversion and substitution of urban functions, the recovery and reuse of building stock and the strategic use of available areas, with the aim of reducing functional unbalances and giving qualities (morphological, technological, social) to the built environment. In suburban recovery, criteria for intervention may vary, but in all cases they must interpret the inhabitants expectations. In some cases the urban effect may be identified with the development of internal relations; in other cases priority may be given to the creation of places for socializing and collective use, as well as to enhancing pre-existing figurative elements. In other cases, emphasis may be given to improving accessibility to central places able to start relations of functional reciprocity. In any case, interventions must have the goal of re-qualifying the environment and spreading non-residential functions.

For the recovery of housing stock, the various levels of interventions have to be verified, with the proposal of realistic financial plans and differentiated technologies depending on different stages of decay. Usually social housing is owned by public authorities and they have to steer private interventions as well. Interventions for urban renewal must thus be addressed to bridge the qualitative gap opened up between the centre and the suburbs through operations aiming at an overall improvement of the life quality. The spreading of the urban effect (improvement in mobility, accessibility to services, connotation of spaces for human relations and social communication, dissemination of service and productive activities) must be understood as much as a redistribution of values. But if on one hand the opportunity to spread qualifying services and to set up spaces for participation is instrumental, on the other hand the process of restoring the social tissue, not only through an economic investment plan, will be succeeded only if the rule framework

for urban tissue recovery and regeneration will be included within a broader vision of overall urban renewal.

3.3 The impact of planning on Cagliari's wetlands

Cagliari is built on hills bounded on the east and west by coastal wetlands which have determined the shape of the conurbation, orienting it in specific directions and having a strong influence on the area's economy, history and microclimate. A very close relationship has thus developed between the urbanized area and its wetland (to the west the Santa Gilla lagoon, to the east the Molentargius and Quartu ponds) which in the long run have come to represent the most characteristic element in the man created landscape. Ponds and lagoons are ecosystems with an extremely fragile balance: their vegetal and landscape characteristics, with the presence of birdlife and fishes species, are constantly in danger of being irreversibly modified, above all due to different factors of pollutions coming from the man created environment.

In the case of Cagliari, progressive environmental damage, caused by urban and industrial impacts (Santa Gilla) and the lack of regulation of waterways and urban sewage represent a constant danger to the survival of the wetlands. In the case of Santa Gilla, the construction of the transshipment canal-harbour and the urbanisation of the industrial park, situated to the west of town and close to the wetland, have produced a substantial disruption of the habitat and natural environment [37].

On the other side of town, the Molentargius and Quartu wetlands, which form a single complex covering about 1400 hectares, once mostly devoted to salt production, constitute a strategic area in the context of the planned territory. The Molentargius complex includes the homonymous wetland, the Quartu wetland, Bellarosa Minore wetland and the dune belts of Is Arenas and Poetto.

It represents the special case of a wetland exemplifying the dynamic stage of a biotic community and of hydromorphological conditions in a strongly anthropic environment. The ecosystem of Quartu and Bellarosa wetlands are natural environment created by the man. In fact the original exploitation of a productive resource (salt) has been interrupted due to progressive pool eutrophication.

These wetlands, bordered on the south and west by the hills of Cagliari and on the north by the Campidano plain, are today undergoing strong anthropic pressure, mainly due to building initiatives in Cagliari conurbation. The towns and suburbs belonging to the first belt of the Cagliari conurbation have now merged around these ponds, thus bringing the components of this environmental system under the threat of dangerous urbanisation processes that continue to erode the territories on its borders.

Up to a few years ago the active presence of the saltworks represented the element bringing order to the system. The settlement's development, caused by a considerable population growth especially in the period from the 1960's throughout the 1980's, generated an uninterrupted and uncontrolled flow of urban sewage into the wetlands natural tributaries without any prior treatment.

This mistake has set off a dynamic process leading to new stages the ecological equilibrium of the environmental system. The initial effects of transformation, which have produced the present day configuration of the Bellarosa Minore biotope, have been followed by an explosive polluting effect on the whole water system which now compromises the productive use of the lagoon.

The effects of strong anthropic pressure appear evident in the surfaced parts of the territory (unauthorized dumps, sand quarries, unauthorized buildings, land transformations) where the state

of decay clearly shows the ineffectiveness of international constraints.

Since 1977, the whole area has been included in the Convention of Ramsar for the protection of wetlands, and it is classified as a biotope of international interest.

In 1983, an environmental recovery plan was presented. The local administrations, instead of seeing these plans as instruments to aid them in protecting and developing their territories, considered them as nuisances. Already in 1979 a first variant declassified a part of the hill of Monte Urpinu and Poetto Beach, while the 1983 plan was not implemented at all. It was demonstrated in reality that even useful and positive constraints remain dead letter when public administrations are unfit or unwilling to enforce them. Inertia in the solution of the problems of Molentargius is therefore the result not only of a high level antagonism between different political and administrative spheres of influence in territorial management, but above all it shows the difficulty to be still overcome in converting the methods of urban and infrastructural planning into the more complex approach represented by environmental planning. The systematic use of interdisciplinary comparisons, which are essential for identifying land-use compatibilities and territorial transformation, as well as the definition of legal and administrative instruments aimed at producing more effective resource management, represent strategic elements in the planning of the Molentargius environmental system. It represents the core of a system of urban parks capable of producing connective tissue between the different centres of the conurbation, up to the point of constituting, wherever possible, an element of continuity with the rural green areas.

The planning of green areas will thus have to be agreed upon by taking into account not only the concept of environmental protection, but also the necessity of creating models for development and the control and governing of the territory compatible with the desires of the settled communities.

3.4 Planning and programming for the wetlands of Molentargius' Pond Park and Santa Gilla Lagoon: a comparative analysis

In the Seventies the affirmation of the ecological concept of "environment" has changed the way of conceiving the natural habitats found in urban contexts: from fringe elements they have become a key component of the urban ecosystem. Therefore they were first subjected to actions for the protection and enhancement and, then, placed at the centre of the sustainable local development policies. This long, complex, and variegated process has led to a re-identification of city planning in terms of internationalization, metropolitan dimension, sustainability (indicators, strategies and actions), vertical and horizontal coordination, local identity, new techniques of dimensioning and standards, mechanisms of compensation and equalization, management and "building consensus".

In order to outline the position taken by the Italian cities in this transition phase and to assess the effects produced by the latest generation planning on landscape and local administrative capacity, especially in terms of plans and policies updating, it is taken into account the metropolitan area of Cagliari with its system of wetlands, consisting of the Molentargius Park and the Santa Gilla Lagoon. This because the area – with its geo-morphological, historical and cultural vicissitudes – represents an emblematic case of the dynamics that characterize the Mediterranean coastal urban systems developed around areas of high natural value.

The methodology focuses on the planning and programming experiences acquired over the past twenty years concerning the two environmental systems. They are analyzed from a qualitative point of view through a conceptual matrix of comparison in which each plan instrument is analyzed on the basis of the contemporary urban planning's key items (introduction of new tools and approaches) and pointing out their strengths and weaknesses in accordance with the logic of the SWOT analysis [38].

The relevant elements emerged by the comparison are then reviewed in a historical perspective through a chronological reconstruction of the plans drawn for the two natural compendia so as delineate the role played by historical and environmental heritage in the wetlands design and on the innovations introduced by the latest planning tools.

Subsequently, the environmental planning for the wetlands of Molentargius and Santa Gilla is compared with the most recent plans for the Metropolitan Area of Cagliari in an attempt to highlight the position taken by the City of Cagliari with respect to the revision of the paradigms of city planning and then define on a general scale the behaviour assumed by the Italian cities before this transition process (see Figures 2 and 3).

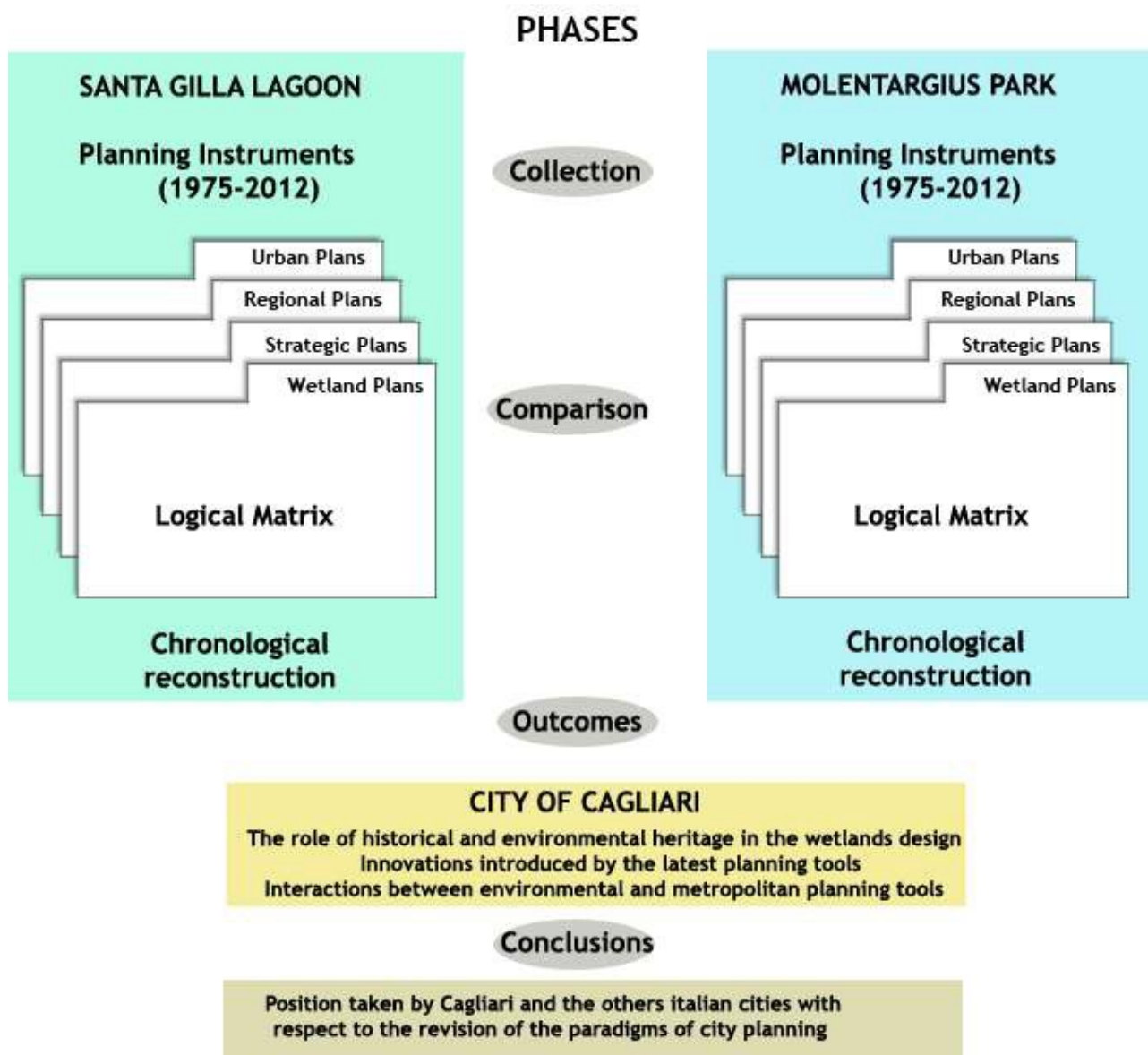


Figure 2. Methodology adopted in the study
 Source: processed by the authors

Contemporary City Planning: Central items/questions	Innovative approaches	Internationalization: development of “co-planning” experiences through Integrated Programs, International and European Policies for the city, Public - private partnerships (PPP)
		Metropolitan dimension the management of relations between the cities and their hinterland to solve common problems with a multitasking approach
		Sustainable development: indicators, strategies and actions
		New forms of vertical and horizontal coordination
		The role of identities
	Innovative tools	Techniques of dimensioning and standards
		Mechanisms of compensation, and equalization
		Management: methods and time of project realization
		“Building consensus”: participation, communication and information

Figure 3. The conceptual matrix at the base of the comparison
 Source: processed by the authors

3.4.1 Planning and programming for the Santa Gilla Lagoon

The competence with regard to the protection and management of the lagoon of Santa Gilla falls back on different agencies, each with its planning instrument. From the regulatory point of view these tools act following the hierarchical or "cascade" diagram of the National Urban Planning Law (see Figure 4) establishing restrictions and standards of conduct that support those arising from environmental planning and European directives on nature reserves. So in our analysis we have decided to limit the comparison to plans drawn up since 1975 which have had the greatest impact on the physical transformations of the lagoon system assessing their approach to the natural and environmental heritage and its evolution over time (see Figures 5 and 6).



Figure 4. Santa Gilla Lagoon planning according to Italian Urban Planning Law (L.1150/42)
 Source: processed by the authors

1976	Special protection RAMSAR AREA " STAGNO DI CAGLIARI (AKA SANTA GILLA)" (CODE 3IT018)
1988	Special Protection Area ITB044003 "Stagno di Cagliari" within the meaning of Directive 79/409/EEC "Birds"
1989	Regional Nature Reserve (first draft)
1996	Site of Community Interest (SCI) "Stagno di Cagliari, Saline di Macchiareddu, Laguna di Santa Gilla" within the meaning of Directive 92/43/EEC "Habitat"(CODE ITB040023)
	Life Nature : "GILIA Acquis" Project
1998	Integrated Program PIA "6 SUD Santa Gilla"
	Permanent oasis of wildlife protection and catch "Stagno di Santa Gilla e Capoterra", established under the Regional Law n.23/1998
2006	Management Plan of the SCI ITB040023 "Stagno di Cagliari, Saline di Macchiareddu, Laguna di S. Gilla"

Figure 5. Santa Gilla Lagoon Environmental framework since 1975

Source: processed by the authors on [37, 39-60]

1993	Landscape Territorial Plan n.11 Marganai Region
1994	Building Plan of the Municipality of Assemini (1982 - version 1994)
1996	Cognitive framework and proposals developed under Life Nature: "GILIA Acquis" Project
2001	Regulatory Plan of the Cagliari's Industrial Area (1967 - 6 th version)
2002	Urban Plan of the Province of Cagliari
2004	Urban Plan of the Municipality of Cagliari
2005	Sub-plan for the hydrogeological risk of the unique basin of the Sardinia Region
2006	Plan of Water Protection
	Regional Landscape Plan
	Building Plan of the Municipality of Capoterra (1967- version 2006)
2007	Strategic Plan of the Municipality of Assemini
	Strategic Plan of the Municipality of Capoterra
	Strategic Plan of the Municipality of Elmas
2009	Strategic Plan of the Municipality of Cagliari
2011	Urban Plan of the Municipality of Assemini
	Urban Plan of the Municipality of Elmas (2006 - version 2011)
2012	Inter-municipal Strategic Plan
2012	Urban Plan of the Municipality of Capoterra

Figure 6. City planning framework related to Santa Gilla Lagoon since 1975

Source: processed by the authors on [37, 39-60]

The first finding to note is the absence of a Park Authority to the lagoon and its SCI and SPA areas. Currently this task is carried out by "Inter-municipal Office for the management of the lagoon of Santa Gilla" at the Municipality of Cagliari - Department for the Environment. In 2006, the Office has prepared a Management Plan that, today, appears to be the only integrated planning instrument with effectiveness on the entire lagoon surface.

This coordination lack has led to an overproduction of municipal plans and programs to which it has been given unity only recently with the approval of the Inter-municipal Strategic Plan (2012). The Plan tries to solve the metropolitan-scale issues through innovative forms of cooperation vertical and horizontal, for example, the Forum of Mayors or thematic tables of discussion, one of which is dedicated to the lagoon.

From a historical perspective it is possible to identify five distinct seasons for urban and environmental planning regarding the Santa Gilla's compendium.

The first covers the period 1975-2001 and is characterized by the spread of zoning: the creation of specific zones for the protection and recovery of the agricultural areas and brownfield is the prime solution for the protection of historical and environmental heritage and the enhancement of the lagoon. Some examples are provided by the Building Plan of the Municipality of Assemini (1982 - variant of 1994) and Regulatory Plan of the Cagliari's Industrial Area (1967 - variant of 2001), which still continues to influence the decisions of the municipalities in so far as plan of inter-municipal level. The Project Life Nature "GILIA Acquas" (1996) is rather an exception because, having to take account of the European Directives "Habitat" and "Birds", deals with aspects of planning hitherto unexplored in the lagoon as the methods and tools for implementation of interventions (information systems, database archives) and activities for "Building Consensus".

The second season covers the period 2001-2006 and is characterized by a gradual abandonment of the zoning in favour of a strategic approach. Plans at regional, provincial and supra-territorial level with value of Territorial Coordination Plan, assume a strategic dimension foreseeing at their inside innovative tools in land management, forms of administrative integration, new forms of sizing and compensation/ equalization between public and private (see e.g. Provincial Urban Plan of Cagliari - 2002). Despite this, regional, provincial and inter-municipal plans with sector nature, such as the Sub-plan for the hydrogeological risk of the unique basin of the Sardinia Region (2005) and the planning instruments at municipal level (Urban Plans or Building Plans), remain very similar to those of the previous phase. Both go into detail of interventions focusing mainly on the sizing techniques. The search for strategies, actions and indicators to sustainable development is translated then with the formulation of homogeneous zones dedicated to areas of particular historical and environmental value. The issue of participation is not considered in none of these instruments.

The third season covers period 2006-2007 and represents a real turning point with the landscape planning affirmation at regional level, and the strategic planning diffusion at the municipal level, while at the inter-municipal level participation and internationalization are becoming increasingly more important in the planning tools. The most significant tools in this sense are the Santa Gilla's Management Plan (2006) and the municipal Strategic Plans of Assemini, Capoterra and Elmas drawn up in 2007 under the European Programme JESSICA.

The last season covers the period 2008-2012 and is characterized by a systematization of the main innovations introduced in environmental and urban planning by the previous one: on the one hand there is the adoption of the Inter-municipal Strategic Plan (2012), the first instrument to tackle the metropolitan problems (mobility, demographic dynamics, definition of the brownfield to be regenerated, etc.) while, on the other hand, there is an adjustment of municipal instruments to the

Regional Landscape Plan with the recognition of new categories of historical, cultural and environmental goods to be protected, the identitarian cultural goods, as shown by the municipal Urban Plans of Assemini, Elmas and Capoterra approved in 2011.

However, the adjustment process is to be considered unfinished as evidenced by the fact that Santa Gilla lagoon, unlike the case of Molentargius, has not yet a single management agency and it is still planned / managed by separate offices, despite the willingness shown by local authorities on several occasions to go in the opposite direction. Considering, for example, the zoning in Santa Gilla Management Plan for industrial areas: it still takes place as homogeneous areas on the basis of the Regulatory Plan of the Cagliari's Industrial Area dated back to 1967. This shows how the sector planning is still closely linked to zoning, while the strategic and environment planning have evolved becoming multitasking.

3.4.2 Planning and programming for the wetlands of Molentargius Park

Considering the involvement of different local authorities in the protection and management of Molentargius pond, it has been necessary to analyze many instruments of urban and environmental planning. The followings are the most significant to assess the levels of protection and management of natural and environmental heritage, within a national and European framework which is becoming extremely dynamic, in particular referring to the ELC's landscape definition (see Figures 7 and 8).

1977	Special protection RAMSAR AREA "Stagno di Molentargius" (CODE 3IT017)
1988	Special Protection Area "Stagno di Molentargius" within the meaning of Directive 79/409/EEC "Birds" (CODE ITB044002)
1992	Landscape Territorial Plan "Molentargius-Monte Urpinu" (approved in 1979)
1995	Site of Community Interest (SCI) "Stagno di Molentargius e Territori Limitrofi" within the meaning of Directive 92/43/EEC "Habitat"(CODE ITB040022)
1999	Establishment of the Regional Natural Park (PNR) "Molentargius-Saline" with Regional Law N. 5/99

Figure 7. Environmental planning framework related to the Park of Molentargius since 1975
Source: processed by the authors on [39-46, 61-67]

1992	Landscape Territorial Plan Molentargius-Monte Urpinu (approved in 1979)
2000	Urban Plan of the Municipality of Quartu S.Elena
2002	Urban Plan of the Municipality of Cagliari
2004	Urban Plan of the Province of Cagliari
2006	Regional Landscape Plan
2009	Strategic Plan of the Municipality of Cagliari Strategic Plan of the Municipality of Quartu S.Elena
2011	Plan of the Regional Natural Park "Molentargius-Saline" (guidelines)
2012	Strategic Intermunicipal Plan Plan of Littoral Use

Figure 8. City planning framework related to Molentargius since 1975
Source: processed by the authors on [39-46, 61-67]

The Landscape Territorial Plan Molentargius-Monte Urpinu, approved by a regional decree in 1979, uses a conventional zoning to give different levels of protection and degree of transformation to the concerned areas. The plan, approved before the entry into force of Law No. 431/1985 on environmental planning, aims to protect landscape only through the imposition of constraints on the building and land transformation. In the rules of the plan cannot be found any sort of coordination with the municipal planning tools. Despite the legislative framework in the field of landscape and environment has evolved considerably and the same planning has produced new tools, the constraints imposed by the Landscape Territorial Plan of Molentargius - Monte Urpinu are still in force today, as evidenced by the decision of the Regional Administrative Court of Sardinia Section II, n. 868 of 10/10/2012.

With the Regional Law No. 5 of 1999, it is established the "Regional Natural Park Molentargius - Saline" which marks the birth of a territorial entity controlled by municipalities, province and region, but with an independent management structure.

With the Resolution of the Board of Directors no. 12 of 29 September 2006 has started the preparation of the Plan of Molentargius-Saline, which is the operational tool for the management of the park. Today they have been developed exclusively the guidelines for the park, whose analysis allows us to identify some innovative features compared to the current planning tools.

There are clear references to European policies for biodiversity conservation, such as the inclusion in the Natura 2000 network, even if the European regulations on the management of these sites do not seem to involve the process of drawing up the plan. For the implementation of restoration and redevelopment interventions, the guidelines provide for the activation of public-private partnerships by proposing the integrated program as an alternative instrument to the recovery plan.

The plan strategy is based on a new metropolitan vision in which the park would help to foster the quality of life in the urban centres nearby due to its barycentric position. It also proposes the enhancement of environmental continuity with the surrounding natural resources (Poetto coast, Monte Urpinu, St. Elia Cape, etc.), enabling an integrated fruition.

To ensure the sustainability of its provisions, the plan will be submitted to the indispensable Strategic Environmental Assessment and it will be drawn an indicator of pressures on the pond, called the "level of stress", and a set of indicators and descriptors for a real-time monitoring of the ecosystem. The economic sustainability is considered an important element in the park management which is therefore designed to ensure a mix of functions and activities that can produce profits to guarantee the coverage of operating expenses.

With regard to relations with the other planning instruments it can be stated that, as soon as finally approved, the plan of the park will replace all the planning tools of municipal, provincial and regional level with the exception of the Regional Landscape Plan which is super-ordinate respect to the ordinary planning according to the Code of Cultural Heritage and Landscape (Legislative Decree 42/2004).

The historical memory and identity of the park, linked to saltworks activity, are preserved in the management plan with the proposal of recovery interventions, enhancement of industrial archaeology along with the works of hydraulic engineering of the early twentieth century.

The Park Plan is aimed at overcoming the traditional zoning techniques with a method of coastal areas integrated management, defined ICZM (Integrated Coastal Zone Management) and promoted by the European Union. To solve the problem of illegal building, for example, it proposes to use alternative solutions such as compensatory mechanisms and volumetric rewards abandoning building amnesties and forced demolitions. In cases of severe environmental incompatibility it is

possible to implement the equalization remotely through demolition and reconstruction in areas outside of the park perimeter.

The guidelines for the preparation of the management plan also show a great interest in involving social and economic fabric in the park's building in order to overcome the physical and cultural gap between the park and the city.

The Municipal Urban Plans of Quartu S. Elena and Cagliari, respectively of 2000 and 2002, refer to the Landscape Territorial Plan for the definition of eligible interventions in the protected areas of the Compendium of Molentargius (being the Landscape Territorial Plan superordinate to these latter).

The season of strategic plans has contributed in recent years to create favourable conditions for an innovative approach to the planning of environmental resources.

The Municipal Strategic Plan of Quartu S. Elena, approved in 2009, suggests establishing institutional partnerships with the Ministry of Environment, the Autonomous Region of Sardinia, the Molentargius Park Consortium, local environmental associations, private partners and all the stakeholders. Among the plan objectives there is the identification of urban functions to insert on urbanized margins of the Molentargius Park, functions coherent with the evolutionary processes of Cagliari's metropolitan urban system and, at the same time, strategic in the defence against an improper and indiscriminate use of the Park. The Strategic Plan of Quartu S. Elena is the framework for some projects already underway of which it specifies available funds but not their implementation modes and times.

The Municipal Strategic Plan of Cagliari (2009) identifies innovative tools for the implementation of supra-municipal governance in order to ensure that the strategy becomes action. Territorial equalization and transfer of development rights, as well as tools of fiscal nature, are considered indispensable by the Strategic Plan for the implementation of inter-municipal and sectoral planning assumptions.

The competence of the Strategic Plan, limited to the municipality, does not prevent to think in terms of wide area, considering the natural landscape as symbol of the metropolitan identity: the Molentargius-Saline-Litorali compendium is therefore protected within this instrument as an identitarian good and a touristic resource for the entire city of Cagliari.

In October 2012, it has been signed up an Agreement for a Framework Programme, titled "Project for the Development and Protection of the Compendium Molentargius-Saline, Litorali", between the towns of Cagliari, Quartu S. Elena, Quartucciu, Selargius and the Province of Cagliari, forming part of the Consortium for the management of the Regional Natural Park "Molentargius Saline". Among the project objectives there are: the promotion and preservation of environment and landscape; the enhancement of the Compendium Molentargius-Saline-Litorali for educational and tourist purposes; the enhancement of salt pan through their productive recovery and the restoration of historic buildings, currently in disuse, for: spas, widespread accommodation, sports and cultural activities; the arrangement of green spaces; the improvement of accessibility and connections between the cities of Cagliari and Quartu S. Elena.

4. Results and Discussion

The analysis of the tools that, starting since the Seventies, had as its object the planning of environmental resources of the vast area of Cagliari, shows a historical framework in line with the evolution of environmental planning at national level, although it registers a slight delay compared

to the European context (see Figure 9).

Municipal and regional planning has dealt mainly of the conservative aspect and the enhancement of natural, environmental and cultural elements that characterize the territory of protected areas. Little attention has been shown toward programs for an economic and social development of local communities consistent with environmental values to be protected. Only recently, with the entry into force of the Regional Landscape Plan, it has been attempted to weave the measures to protect the integrity of historical and environmental values with guidelines for the redevelopment and enhancement of the landscape.

The use of European funds for the enhancement of areas has produced results released by the local planning tools which should have provided a framework for the sustainable development of the territories.

In recent years, strategic planning, introduced with the European program JESSICA, has tried to coordinate local policies for the management of natural resources and landscapes, often compromised by the superposition of several administrative competences on the same areas. In this sense the Strategic Inter-municipal Plan of Cagliari is emblematic as it has allowed building new forms of cooperation between different public actors and the creation of common networks around common objectives and projects.

		Planning Instrument Analyzed		
		Strengths	Weaknesses	
Contemporary City Planning: Central items/questions	Innovative approaches	Internationalization: development of “co-planning” experiences through Integrated Programs, International and European Policies for the city, Public - private partnerships (PPP)	YES	YES
		Metropolitan dimension: the management of relations between the cities and their hinterland to solve common problems with a multitasking approach	NO	NO
		Sustainable development: indicators, strategies and actions	YES	YES
		New forms of vertical and horizontal coordination	NO	YES
		The role of identities	YES	YES
	Innovative tools	Techniques of dimensioning and standards	YES	YES
		Mechanisms of compensation, and equalization	NO	NO
		Management: methods and time of project realization	YES	YES
		“Building consensus”: participation, communication and information	YES	YES

Figure 9. Strengths and Weaknesses of Cagliari’s environmental resources planning according to the logical matrix adopted in the study

Source: processed by the authors

5. Conclusion

According to the case study of Cagliari, it can be said that – just as the large Italian cities did not go through the phase of modernization (if not in an incomplete and contradictory manner) at the turn of the century (19th-20th), thus accumulating an historical delay compared with European metropolises in particular in the organization of infrastructure systems (the urban planning basis of the city) – the Italian cities accumulated a further delay with respect to the recent phase of deep-seated transformation, in the sense that they have not faced up to the problem and thus have, basically, submitted to spontaneous trends. From this point of view, the direct election of the mayors at the end of 1993 inaugurated a totally new phase for Italian cities. Firstly, this was true because it was characterized by the stability of the new administrations for up to two terms (first eight years, then lengthened to ten).

This is not only an allowed but also a required consideration of the issues concerning the future of the cities. Secondly, it was true because the new administrations were all led by mayors who, fully aware of the change in perspective, looked to the experience of European metropolises and aimed at the revitalization of the cities they governed. This change of perspective is shown by the objectives set forth in the election campaigns and in the policy statements made at the time of taking up office as mayor. It would seem to be a good idea, with the start of the third series of city councils led by elected mayors, to reflect on the experience gained in order to evaluate the paths taken, the contradictions that have emerged, the nature of the difficulties encountered, the results achieved thus far, and the level of maturity and of acceptance of the question of governance of the contemporary city in the information technology era and in the building of Europe.

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