

Applying an Interpretive Model to assess Cultural Landscape Dynamics in a Highway of Portugal

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Abstract: The relationships between the development of the A22 *Via do Infante de Sagres* highway in the Portuguese region of the Algarve, and the development of a contemporary landscape by using the Cultural Landscape Dynamics Interpretative Model are studied. The model evaluates the kind of development followed by contemporary landscapes based on transportation infrastructures in relation to contemporary cultural landscapes, which according to the theoretical approach of the work are based on the sustainable development principles. The presented model provides guidelines for future transportation infrastructure projects towards the development of contemporary cultural landscapes. In the Portuguese case study, the model is used to analyze the strengths and weaknesses of the contemporary landscape formed after the construction of the A22 highway.

Key words: Linear infrastructure, Contemporary Cultural Landscapes, Dynamics, Interpretative Model, Portugal

1 Introduction

A shared vision estimates the improvement of transportation infrastructures decisive for economic growth and in general for territories development. At the same time such projects produce simplification actions on landscape complexity, which is based on the evolving interrelation of natural, social, economic, historical dynamics. Transportation infrastructures can be considered an exemplificative, limit case of the relationships between local and global dynamics. They are global networks which derive from choices and rationalities of an upper level, nevertheless they physically cross local territories. In these contexts, the challenge with contemporary sustainable landscapes (or contemporary cultural landscapes) takes place.

The method applied to this work was carried out in a PhD research which outcome was the Cultural Landscape Dynamics Interpretative Model (University of Trento, Italy) [1]. The model has a double aim. The first, evaluate the kind of

development followed by contemporary landscapes in relation to contemporary cultural landscapes, which according to the theoretical approach of the work are based on the sustainable development principles. The second, provide a number of guidelines to plan future infrastructure projects towards the development of contemporary cultural landscapes.

In the Portuguese case study, the application of the model aims at enhancing the strengths and weaknesses as well as the quality of the contemporary landscape developed with the construction of a transportation infrastructure.

In particular, part of the above method will be applied to the A22 *Via do Infante de Sagres* highway in the region of the Algarve. As this is a quite new infrastructure (ended in 2003), the application of the model will permit to outline a preliminary evaluation of the relation between contemporary landscapes development and transportation infrastructures development in south Portugal, by analysing the planning process and the strategies undertaken.

The information and data required for the application of the grid of criteria to the case study, were collected in September 2009 during the European program COST, STSM.

2 The Cultural Landscape Dynamics Interpretative Model

Each cultural landscape, as intended in this work, is characterized by four processes which have been identified after an analysis of the structure of historic cultural landscapes and contemporary landscapes (for further investigation see E. Bertè, [1]).

The four processes are: identity, integration, multi-scalarity and innovation; the management of such four processes is at the basis of a sustainable development of contemporary landscapes. The effectiveness of each process depends on the correspondence between the planning actions carried out to develop a project and the criteria which underpin each process. A brief explanation of the four processes follows.

IDENTITY PROCESS: contemporary cultural landscapes are strictly related to identity, as they are based on the cultural expression of local societies. They are related to symbolic, recognizable, shared elements and to the evolution of peculiar characteristics of local societies. Local know-how, differences of places, preservation of cultural and natural specificities, awareness of past evidence in a physical and/ or a symbolic sense, the collective memory of a population, are basic sources for cultural landscapes. On the contrary, loss of social interest determines landscape de-structuration.

INTEGRATION PROCESS: cultural landscapes in general are characterized by large heterogeneity, which is determined by the presence of a variety of uses: the outcome is an integrated landscape as the natural and social processes are compatible. Contemporary cultural landscapes originate from integrated goals: territorial projects are successful when physic, ecosystem, social elements are planned together. They are based on local know-how integrated to experts knowledge (both at ecosystem, economic and social level) and specific tools (i.e. disciplinary approaches such as landscape ecology, or

integrated guidelines such as the European Landscape Convention).

MULTI-SCALE PROCESS: Cultural landscapes evolve continuously by “internal” and “external” factors. Internal factors are those which may be controlled at local level (by the direct action of the inhabitants, for example). External factors are mostly indirect and influence the local landscape conditions through upper local strategies, policies and dynamics. Interdependencies /exchanges between the different scales is a basic aspect for the development of cultural landscapes both concerning the social and the natural system

Social system: in traditional cultural landscapes local societies were the main actors. Nevertheless, upper interests (external dynamics) which weigh on local dynamics for example through large-scale projects development, have led to the development of new tools/ instruments to manage some of such dynamics at local level (i.e. European Landscape Convention, Environmental Impact Assessment, Strategic Environmental Assessment).

Natural system: local ecosystem dynamics are related to upper ecosystem dynamics through linkages for example based on flows and migrations.

INNOVATION PROCESS: cultural landscapes are evolving systems and reflect natural and cultural processes which guarantee renewable dynamics. Their durability is related to the capability to answer to the problems of contemporary society-nature interactions, therefore contemporary cultural landscapes are durable if they provide such answers. Starting from landscape structures inherited from the past, it is essential to activate an innovative process of cooptation of landscape structures towards new functional contexts, where historic values (both natural and social) are considered a stimulus for new coherent solutions.

2.1 The structure of the model: the grid of criteria and the table of indicators

Each one of the four processes can be analyzed with a number of criteria listed within the grid of criteria, and more schematically with a table of indicators. The grid of criteria and the indicators' table are the two parts which outline the Cultural Landscapes Dynamics Interpretative Model [1].

In this case, the grid of criteria will be applied to the case study identified. The grid is structured as follows: each process is divided into a number of criteria in order to collect information about a specific aspect. Four or more criteria have been identified for each process. To provide an example, the identity process (*a*) has four criteria, from *a.1* to *a.4*. In some cases, a criterion is furthermore divided into a number of specific measures which may be helpful to find a more detailed information.

2.2 A Portuguese contemporary landscape in the region of the Algarve

In a preliminary phase two highway projects at the national level have been overviewed:

- the A2 highway, a 4-lane infrastructure which goes from Faro to Lisbon. The highway (named *Auto-estrada do Sul*) is 240 km long; it was opened in 2002 and its planning process started in the second half of the XX Century.
- the A22 highway "*Via do Infante de Sagres*", a 4-lane infrastructure which goes from Seville (Spain) to Bensafrim (Algarve), it is around 270 Km long (130 within the Portugal boundaries); it was developed immediately after the entrance of the Nation within the European Union in 1987.

The A22 highway (fig. 1) has been finally chosen for its capability to affect multi-level changes under an economic and territorial perspective within the Algarve region.

Located in the western extreme of the Iberian Peninsula, in the south of Portugal, the Algarve region is easily distinguished from the rest of the country. Not only because of its peripheral location, but also for its morphological and geological features.

The Algarve region covers 6% of Portugal's total area and it is 5.000 km² wide. On the north side it is limited by the Alentejo region, on the east side the Guadiana River separates the region from Spain, on the west and south sides it is bathed by the Atlantic.

Algarve can be divided into three main geographic areas: the Mountains (Serra), the Barrocal (an area of ruts, crags and caves) and the Littoral. The A22 highway runs horizontally mainly through the Barrocal and the Serra.

A good overview of the interior areas as well as of the history of the region can be experienced going along the *Via do Infante*.

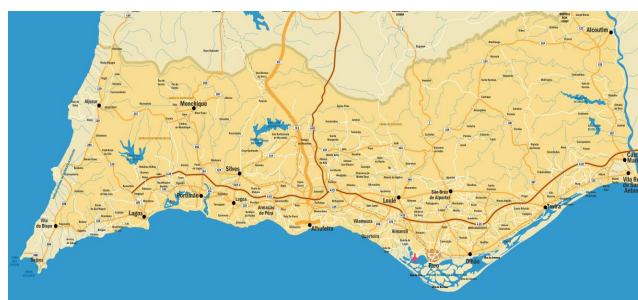


Figure 1- The Algarve region in the south of Portugal. In dark brown the major road network. The *Via do Infante* runs parallelly to the coast from the Spain borders to Bensafrim, nearby the city of Lagos [2].

The territory is characterized for the majority by abandoned land with under shrubs scattered over. Agriculture, together with fishery and forestry, underpinned the economy of the region. Such traditional economic structure started to be replaced in the second half of the XX century with the development of tourism. The remnants of an agricultural structure based on little private fields that defined the Algarve landscape for decades, are still visible (fig. 2). They are characterized by a terracing of the hills and the remains of some types of cultivation typical of the region such as carob trees, grapes, citrus (fig. 3). Few wine fields and citrus trees are still active. A small number of greenhouses, which ones were largely widespread in the countryside, are still visible.

For what concern some active economic elements which delineate the nowadays landscape of the inside, some working sand quarries are present together with a number of tourist areas along the highway.

The lay-out of the road does not intersect industrial districts, nor urban and periurban areas, as the majority of the small cities of the region have been developed along the coast (the coastal city of Faro, the capital of Algarve, has 52.000 inhabitants).



Figure 2- The landscape characterized by under shrubs and remnants of terracing of the hills. (E. Bertè photo)



Figure 3- Few wine yards are still present in the interior of the region. (E. Bertè photo)

3 Application of the grid of criteria to the Via do Infante highway

In the next pages the identity process, the integration process, the multi-scale process and the innovation process will be briefly overviewed in relation to the *Via do Infante* highway by applying the grid of criteria. The aim of the application is that of acquiring some main information, collected through a bibliographic research and interviews to experts, which will be worked out in chapter 4.

Some technical data

Name: “Via do Infante de Sagres”, A22 Highway (fig. 4).

Project proposal: national level

Planning process: end of 1980s (using projects already outlined in the previous decades)

Works started: end of 1980s

Opened to the public: the last part (from Alcantarilha, few km after the junction with the *Auto-estrada do Sul* A2, to Bensafrim) opened in 2003

Length: about 270 km from Seville (Spain) to Bensafrim (Algarve). It crosses almost the total length of the region of the Algarve (approximately 130 km). The highway is eventually to continue north to Aljezur on the Atlantic coast, up to Lisbon.



Figure 4- The monument dedicated to the Via do Infante. The road is dedicated to the Prince D. Henrique, who was one of the first to develop a road system in the region. (E. Bertè photo)

Application of the grid: identity process

The first process is divided into 4 criteria (from a.1 to a.4).

a1. Knowledge of dynamics of cultural heritage/ local landscapes

Knowledge/ awareness of the cultural heritage at local level: specialist knowledge (scientific-formal studies) and common awareness (associations, groups), already present, underline if involved in the project definition

As the region in the 1970s-1980s was interested in moving fast from a more traditional agricultural and fishery economy to a tourist economy, local environment and landscape became a prerogative to speed-up tourism industry rather than an occasion to develop adequate structures with the aim at protecting and renovating such an heritage.

An example towards a more widespread interest in cultural and environmental protection in the region can be recognized with the establishment in 1988 of the local NGO ALMARGEM, which interests are based on the defense and promotion of projects

concerning the cultural and environmental heritage [4].

a2 Knowledge of local environment and biodiversity/ evolutions of local environment and biodiversity

Knowledge/ awareness of physiognomic-structural elements of landscape: specialist knowledge (scientific-formal studies) and common awareness (associations, groups) already present and involved in the project definition.

As visible in fig. 5, the majority of the areas under protection are far from the highway which cuts horizontally a number of ecological corridors.



Figure 5- An overlap of the road network map with the protected areas (sketch).

In the early Eighties the nation established a number of Natural Parks. Together with the Natural Reserves, they are governed by an autonomous official institute called *Instituto Conservação da Natureza* (ICN, Institute for the Preservation of Nature) [5].

In the Algarve region there are three protected areas: the *Parque Natural do SW Alentejano e costa Vicentina*, the *Parque Natural da Ria Formosa* and the *Reserva Natural do Sapal de Castro Marim V.R.S.A.*. Two of the three areas are not involved in the project, the *Reserva Natural do Sapal de Castro Marim V.R.S.A.* is partially crossed (fig. 6).

In 1987, the Portuguese Environmental Act was approved (law 11/87), with specific recommendations on noise mitigation measures [6]. In 1990 the Decree 186/90 acknowledged the EU Directive n° 85/337/EEC. It introduced the Environmental Impact Assessment (EIA) within the Portuguese legal framework and made the proponent responsible for presenting the EIA study to the competent authority [5].

The law 93/90 defined the National Ecological Reserve (REN), considering it as “the basic and diversified biophysical structure that guarantees environmental protection, through the creation of restricted areas” [5]. This tool is intended to protect that areas which have specific ecological characteristics. It includes coastal zones, areas along rivers, interior waters, areas of maximum infiltrations and areas of steep slopes. [6].

The study on the Nature 2000 sites and their integrated management has been carried out at national level by the *Liga para a Protecção da Natureza* (LPN, League for the protection of Nature). This project has started in 2005, after the construction of the main part of the road.

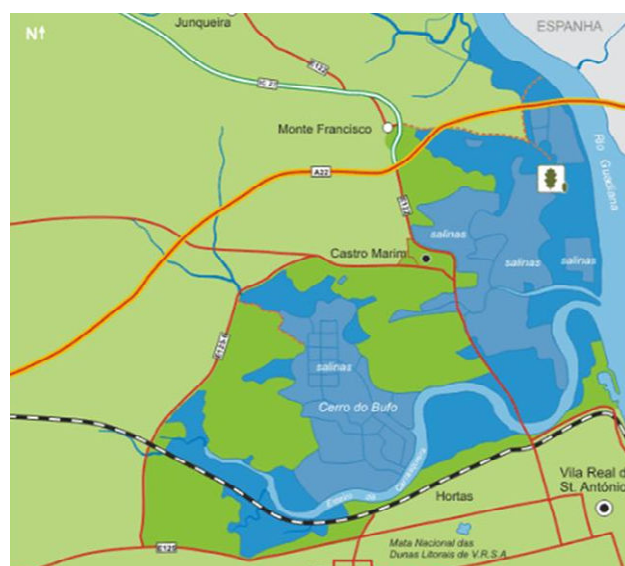


Figure 6- The A22 intersects part of the *Reserva Natural do Sapal de Castro Marim V.R.S.A.* [7].

a3 Which local know-how?

Know-how and skills of the inhabitants of the areas crossed by the infrastructure

Historically the Algarve region was based on agriculture. The production and export of wine, fruit, vegetables, along with forestry and fishing, represented the livelihood of the Algarve families for decades. This has been progressively abandoned, whilst tourism has started to grow: things begun to change in the last two decades of the XIX Century with the arrival of the railway, later with the development of the national road network, the construction of the Faro airport in 1965 [6], and the construction of the *Via do Infante* in the 1990s.

Nowadays about a half of the Portuguese tourism is located in the Algarve. To provide an example, Faro has approximately 50.000 inhabitants which grow to 250.000 in the tourist season [10].

a4 Added value to territorial culture/ knowledge

Acknowledgment and use of local plans/ projects already present within the areas involved; use of local skills

Nor plans neither projects already present at local level were acknowledged and involved in the infrastructure project definition.

Re-activation of traditional territorial structures/approaches (reclaim peculiar traditional landscape structures already present)

Nowadays, although some efforts for an agricultural re-development of the region have started to be put into practice (in particular for what concern the wine sector, citrus fruit cultivation and processing carob seeds), tourism is still the major economic income [3]. The region has still to find an equilibrium between the development of tourism and the attention to environmental and landscape dynamics, although the *Plano Regional de Ordenamento do Território* approved in 2007 (Regional Plan for Territorial Management) puts the sustainable development at the basis of the development of new activities and advanced services [3].

In general the land along the highway is abandoned by the local owners who moved to the coast. With its development, some abandoned rural buildings along the *Via do Infante* have started to be renewed and sold or re-used (fig. 7).



Figure 7- A rural house which has been renewed along the road. (E. Bertè photo)

Analyze which different cultures/societies come into contact (local with “global”, local with local...): The development of this road together with other tourism infrastructures have encouraged new flows of people from the inside of the Nation and from the outside, in particular from Spain and France.

Strength of the local debate related to the project topic. Evaluate the cohesion/rupture percentage of the local debate: Locals were mainly in favor of the highway construction as they considered the project a way to speed up the economic growth and solve the traffic problems of the region.

Evaluate the general utility of the project at local level: At the end of the 20th Century, as a consequence of a lack of planning regulation tools, the previous regional road network was unable to manage the traffic flows [6]. The National Road EN125 that runs along the coast and connects horizontally the region, was one of the most dangerous, noisy and busy before the construction of the A22 highway.

Application of the grid: integration process

The second process is divided into 4 criteria (from b.1 to b.4).

b.1 Territorial project (focus of a planned complex territorial project which includes open spaces such as protected areas and agricultural areas, inhabited areas, productive areas).

- Identify and guarantee, with adequate actions, the presence of flows, the role of ecotones, interaction and connectivity; use the ability of nature to purify and restore through the acknowledgment that the survival of species is based on ecological wellbeing and ecological linkages.

A saturation of the beaches along the coasts and an increasing demand for natural non-artificial areas, is now leading to higher pressures on the natural system in general, in particular concerning the ones along the coasts [11].

A first part of the highway (from the Spain borders to few km after the junction with the A2 “Faro-Lisbon highway”) was planned and built immediately after the entrance of Portugal in Europe in 1987. This first section of the project did not follow any preventive study and analysis both

concerning environmental issues, land-use issues and social aspects. The land required for the construction, for the majority of cases unused by the owners, was expropriated. A fixed quote was refunded and established a priori by the government.

From the 1990s, a renewed attention for environment led to new regulation tools at national level, in particular with the EIA approval (law 186/90) and the institution of the National Ecological Reserves (law 93/90). The second section of the road (from the A2 connection to Bensafrim) was therefore planned with a partially different approach. Studies concerning a better integration within landscape (landscaping of the slopes and along the borders) and local environment were carried out (EIA); sound protection systems were used (fig. 8) and more attention to ecological reserves was guaranteed by collecting and treating the polluted water of the highway in ponds along its borders (fig. 9).

The connection roads which link the highway with the local road system, have started to be enriched with landscaping projects characterized by green solutions in the roundabouts or along the sides of the road (using oleanders or other shrubs).



Figure 8- Sound protection systems along the new part of the highway from the A2 connection to Bensafrim (E. Bertè photo)

- Coherence/ integration with the existing infrastructure network

The Via do Infante has introduced coherence and functionality into the Algarve's road network. This is reflected in the new hierarchical structure of the national roads, the regional roads and the municipal roads [10].

The construction of the highway has furthermore helped the region to improve its centrality in the national context as in terms of distance from the main markets Algarve is the most peripheral region of the nation. However, if considered the transportation infrastructure system, its level is above the European average (1,9 km/km² versus 1,4 km/km²) [12].



Figure 9- A pond for the collection of polluted water (E. Bertè photo)

- Design new land configurations (relations between infrastructure and protected areas, agricultural areas, productive areas, settlements which include villages and cities)

Some unused agricultural areas along the infrastructure have been sold to private companies which have started to develop resorts and golf fields. Around 30 golf fields have been built at the moment and other 20 are under development.

A big sand quarry between the area of Faro and Loulè was implicated in the road lay-out and suffered a reduction of its potential working area. This led to a number of consequences still under discussion between the infrastructure administrators and the quarry owners.

- Occasion for landscape re-structuring (opportunity for environmental problems solution/ urban renewal)

According to an emerging demand for environmentally friendly tourist areas, some of the new structures and facilities along the highway (golf fields and resorts) have started to pay more attention to environment by following more sustainable rules in the construction and management (fig. 10).



Figure 10- A number of golf fields have started to be built along the *Via do Infante*. (E. Bertè photo)

b.2 Guarantee/improve multi-functionality

- Guarantee processes through the individuation of case-specific land uses (guarantee/improve multi-functionality, variety of uses). Avoid mono-functionality and exclusion

No considerations for this aspect. No measures have been taken.

b.3 Openness of the decisional process (integration of actors)

- Capability of the planning actors to incentive socio/cultural inclusion

The infrastructure project aimed at overcoming the socio-economic isolation of Algarve and create a more functional relation between the eastern and western part of the region.

- Interdisciplinarity of the planning actors

The responsibility to plan the road system was given to a number of institutions linked with the central State (*Junta Autonoma das Estradas, Instituto das Estradas de Portugal*). For the majority of cases nevertheless, their decisions did not take into consideration any planning strategies nor interdisciplinary approaches, either at the regional-municipal-local level, and antique plans which in some cases went back to the 1940s were used [13].

- Involvement of the communities of the place and the interest

No involvement of local groups and associations. The local society was in favor of the project.

b.4 Project flexibility

- Evaluation of different alternatives, solutions
No alternatives seem to be evaluated.

- Amplification/ construction of the objectives during the resources/ needs analysis

The starting point which led to plan a new transportation infrastructure was related to the precarious situation of the regional road network at the end of the 1980s, that was not efficient enough to pursue the goals of the region: incentive tourism and guarantee a better connection between the eastern and western part of the region, allow the economic growth, overcome social isolation, support individual transportation which was growing of importance and required new attention.

Application of the grid: multi-scale process

The third process is divided into 5 criteria (from c.1 to c.5).

c.1 Local analysis

- Will to connect expressed by local territories and reasons (provincial-local dimension)

The necessity to solve the inefficiencies of the regional road network was a priority for the population of the region, who required a more efficient connection both for economic and for mobility reasons.

- Analysis of ecological/cultural structure of landscape and dynamics at local level (already present or to be improved)

No analysis at local level was carried out, except for the second part of the infrastructure which was planned with some attention for environment and landscape. In this case the issues were mainly focused to add sound barriers along the borders and manage and treat the polluted water collected from the road and canalized within ponds along the infrastructure. No integrated studies and analysis were carried out.

c.2 Exogenous analysis

- International, national, regional responsibilities/interests in the planning area

In general after the entrance of the nation within the EU, and in particular in the 1990s, Portugal carried on a structural change of the infrastructure network with the opening of new motorways and highways, whilst many other EU States experienced this development in the post-war years (e.g. Italy). From 1990 to 1995 over 1150 km of main roads and complementary roads were built. This infrastructure

expansion was supported by the EU on the basis of a road transportation dependence for the economical development, the reduction of regional disparities and the integration in the Trans-European road network [6].

The money to plan and build the *Via do Infante* came for the 90% from the EU, the remaining 10% was given by the nation. The abundance of the EU funding used to carry on a structural change of the national infrastructure network, in some cases speeded up many decisions which were not enough evaluated [13].

- Multi-scale analysis (without the project effects, ex ante): analysis of the interrelations between local ecological dynamics and dynamics at a large scale level (already present or to be improved). Individuation of hierarchic linkages with local analysis and provision of guidelines in order to guarantee the system needs (ecological networks, socio/cultural networks).

At the time of the development of the *Via do Infante*, only 3 natural protected areas were identified within the region (the *Parque Natural do SW Alentejano e costa Vicentina*, the *Parque Natural da Ria Formosa* and the *Reserva Natural do Sapal de Castro Marim V.R.S.A.*). More ample environmental analyses started in the end of the 1990s and in 2005, with the study upon the Nature 2000 sites and their connection.

c.3 Growth limits estimation, guarantee the durability of the structure:

- Growth limits estimation, carrying capacity. Individuation of actions of transformation compatible with the possible equilibriums (identified from the analysis of interrelations between local ecological dynamics and dynamics at large scale level, see criterion c.2)

No considerations neither studies were carried out concerning the carrying capacity of landscape and the environmental system.

- Evaluation of critic scenarios
No critic scenarios were evaluated.

c.4 Multi-scale system, systemic project

- Multi scale plan: a project is the outcome of the interrelation of different scales: large,

intermediate, focused (both for technical choices, socio-economic choices, ecosystem choices).

The main planning tool of the national infrastructure system is the *Plano Rodoviario Nacional* (PRN, National Road Plan). The first PRN goes back to the 1945. A revision was carried out in the 1980s, when the new PRN was approved. In 1998 a second revision was approved (Law 222/98) with the National Road Plan 2000. The aim of this planning tool is based on balancing regional development, reducing operational costs, guaranteeing safety, facing international traffic volumes.

At the local level, the planning instrument which manages urban development is the *Plano Director Municipal* (PDM, Municipal Director Plan) [14]. The first local PDMs were approved in the early 1980s. In the 1990s (D.L. 69/90) such tools were re-elaborated and a number of measures to reinforce population involvement and ensure linkages with upper-level territorial instruments were taken. Nevertheless, it is after 1999 that the Portuguese territorial management clarified the coordination of planning instruments at three levels: national, regional and local, years after the construction of some important road systems (such as the *Via do Infante*) [6].

The *Via do Infante*, together with the A2 Faro-Lisbon highway, is the structural axis of the region as stated in the PRN, and is part of the main infrastructure system of Portugal. To connect the majority of the tourist centers and towns along the coast, many connection roads start from the *Via do Infante* to reach those areas. Such a multi-scale connection guarantees socio-economic flows at the different levels.

c.5 Compensations, transformations: towards a systemic project?

- Compensations: level of integration between the infrastructure planning and the local compensations (nature - culture compensations)
No compensation projects were carried out.
- Transformations: level of integration between the infrastructure planning and the consequent planning of local transformations (infrastructure - soil transformation, apply rules to manage the changes). Land-use control, conservation designation in order to prevent land exploitation

No measures to prevent land exploitation were taken, due also to the scarce use of the interior land by the owners.

Application of the grid: innovation process

The forth process is divided into 6 criteria (from d.1 to d.6).

d.1 Use of extra-ordinary tools (ad-hoc)

- Innovative disciplinary outcomes (innovative extra-ordinary studies elaborated by external experts, institutions or informal bodies)

Transportation infrastructures have been the first projects developed after the entrance of Portugal in Europe in 1987. From the beginning of the 1990s, a number of EU directives have started to be acknowledged by Portugal and led to a number of changes in planning procedures in general and in planning infrastructures in particular (e.g. EIA directive).

- Pilot projects activation

No pilot projects have been activated for the construction of the infrastructure.

d.2 National/ international models acknowledged

- Models acknowledged and used as outstanding examples for case-specific aspects

Although the acknowledgment of a model as a guideline (at least for some parts of the project) should have been important and relatively easy to find considering the many best practices present in Europe, in this case no examples have been considered and followed.

d.3 Learning from the project

- Innovative institutional relations (governance improvement)

Considering that the project was one of the first developed after the entrance in the EU, this established an early work experience based on international agreements (fig. 11).

At the local scale, a Public Attendance Office has the purpose to link the local population with the management and development of the highway. The activity of the body consists mainly in solving local problems. In particular, noise mitigation measures along the road sides in new developing areas are carried out.

- Model exportable to other contexts because recognized a compatibility with environment and socio-identity values

No considerations on this aspect.

d.4 Correspondences between cultural debate at national/ international level and project criteria

- Up-to-date project choices

The Guadiana river, that follows the border between Portugal and Spain, is crossed by an award-winning bridge of Portuguese engineering, the International Guadiana Bridge. It is constituted by an arched platform suspended on two huge pillars. It was completed in 1991 and opened to vehicles only (fig. 12).

It has become a model for the detailed seismic analysis carried out to develop its structure as it was built in the worst seismic zone of Portugal [15].

d.5 Project use and management

- Local users integrated to 'global' users, overcome the dualism node (important) segment (simply necessary to connect nodes)

The infrastructure is used both by external and local users and is properly linked to the local road network.

- Local management integrated to upper management

The JAE (*Junta Autonoma de Estradas*) is the national body in charge of the management and construction of the transportation infrastructure network. It has a number of regional delegations (for the Algarve is the delegation of Faro). It was founded in 1927. In 1999, another institute was funded with the same aim: the IEP (*Instituto das Estradas de Portugal*).

d.6 New local identities

- Creativities at local level which came out with the project. Aptitude to enhance/ renew the local identity

For the population of the region, and in general for the Portuguese population, the construction of a more efficient infrastructure network has a strong symbolic meaning, as it represents development, growth, modernization and innovation towards the EU model.



Figure 11- These three road levels along the Via do Infante are considered a symbol of modernization (E. Bertè photo)



Figure 12- The International award winning Gadiana Bridge signs the boundaries between Spain and Portugal [3].

4 Results from the case study: the four processes and the “Via do Infante” highway: towards the development of a contemporary cultural landscape?

This part focuses on a preliminary overview of the contemporary landscapes which have been developed with the construction of the highway, intended as the outcome of an intertwined both visible and invisible presence of natural and social dynamics.

In the case of the *Via do Infante*, the processes which determine the development of a contemporary cultural landscape are still weak and not structured together, if compared to other European case studies analyzed with the same methodology [1]. Nevertheless, in the last years some emerging planning strategies (social, environmental) are developing and may have a determinant role in future linear infrastructure projects.

The following considerations elaborate on these aspects. They have been carried out by analyzing the data and the information collected in the grid of criteria, focusing the attention on the four processes: identity, integration, multi-scalarity and innovation.

Identity process:

In the 1990s, also as a consequence of the entrance of Portugal in the EU, different social and environmental dynamics have started to change and in some cases to develop new local approaches. This has led to a number of consequences in the local economic, cultural, environmental contexts. Some of these consequences are overviewed below.

The construction of the first part of the *Via do Infante* happened in the period immediately after the 1987, before EU regulations could be acknowledged and applied in the national planning process. In the following year, local society started to acquire awareness of environmental changes and fragility and established the local NGO Almargem. In 1990, the acknowledgment of the European directive EIA has improved the environmental approach of infrastructure planning in general (EIA entered in force in 1990 with the Law 186/90). In the same year a number of environmental solutions were undertaken with the National Ecological Reserves, REN (law 93/90). In 2005 the study of the Nature 2000 sites and their integrated management at national level have started. The planning and construction of the second part of the road could eventually benefit of some of these new environmental regulations and approaches.

About the traditional use of land, the local know-how was historically based on agriculture, although in the last decades this has been progressively abandoned in favour of tourism. Abandoned fields and rural houses are visible along the road and testify the past agricultural structure of the region. The *Via do Infante* has speeded up such processes leading the Algarve to become the most touristic region of Portugal. Linkages with foreign tourists, such as Spanish and French, have been strengthened. Traditional territorial structures and approaches have not been supported with the construction of the road and the abandoned fields along the infrastructure in some cases have started to be transformed into recreational areas. Nevertheless, a partial re-activation of traditional structures can be observed with the restoration of some abandoned

rural buildings along the road and a limited support to agriculture (concerning the wine sector and citrus cultivation).

The region has still to find an equilibrium between the development of tourism and the attention to environmental and landscape dynamics. This diatribe tries to find an answer with the *Plano Regional de Ordenamento do Território* approved in 2007 (Regional Plan for Territorial Management) that puts the sustainable development at the basis of the development of new activities and advanced services. The *Via do Infante*, found support from the majority of the inhabitants of the region, who saw in the project a way to develop tourism further, to obtain incomes from the unused land along the road, as well as to overcome the inadequate regional road network that was unable to manage the traffic flows of local and upper-local users.

Integration process:

For what concern the relation between the linear infrastructure and the open spaces such as protected areas, the opening of the highway, together with other tourist policies followed by the nation and the region, have produced an higher critical pressure on the natural system in general, especially along the coast. For what concern the relation with the project and the abandoned agricultural areas, the road has facilitated the development of new tourist areas in the inside and has therefore partially changed some landscape dynamics. Some abandoned lands have been sold and transformed into golf fields and resorts, as a consequence of their strategic position, the good connection and the visibility from the road.

In general the project did not take into consideration the development of the surrounding areas, as it was not planned under an integrated-systemic approach. The aim of the infrastructure was based on the need to overcome the socio-economic isolation of the region. About the relation with the existing road network, the introduction of the highway permitted to reach a defined hierarchy of the national, regional and municipal roads. The planning approaches (and actions) of the years immediately after the entrance in the EU, did not follow any strategy: the outcomes are verifiable in the way the infrastructure project has been developed: the responsibility of many of the decisions concerning

the choice of the layouts were given to a number of institutions linked with the central State (*Junta Autónoma das Estradas, Instituto das Estradas de Portugal*), that did not take into consideration any strategy. In some cases antique plans which went back even to the 1940s were used.

Multi-scale process:

Local territories suffered a lack of an efficient mobility system due to the incapability of the road network to support not only local but also upper-local needs. The national road E 125 was the only east-west axis that served the cities and towns along the coast, it was busy, noisy, with high levels of pollution for the majority of the year. In general, the new highway has succeeded in solving local and upper-local mobility problems also thanks to its location. It runs in the rural area inside the region, where cities and inhabited areas are rare. An efficient linkage between the *Via do Infante* and the cities and villages along the coast is guaranteed through a number of roads which permit a multi-scale connection.

For what concern the external dynamics which have had effects on the improvement of the transportation infrastructure network, the EU influence was determinant mainly concerning funding (in this specific case, the 90% of the total cost of the *Via do Infante* was financed by the EU). After the entrance of the nation in the EU the infrastructure road system has undertaken a large expansion and modernization. The EU aimed at integrating the Algarve in the Trans-European road network in order to overcome regional disparities and link the region to the international economies. Nevertheless, few instruments at the different scales (national, regional, municipal) could provide adequate environmental, social, economic analysis of the contexts which were about to change with the construction of the new road network. The main planning tool of the national infrastructure system is the *Plano Rodoviário Nacional* (PRN, National Road Plan, the last approved with the D.L. 222/98) that at the time did not have any strong linkages with the lower planning tools. Only after 1999 the Portuguese territorial management clarified the coordination of the planning instruments at the three levels: national, regional, municipal (local).

Innovation process:

a renovated approach is under development for what concern linear infrastructure planning. Transportation infrastructures were among the first projects developed after 1987, and many directives had still to be acknowledged from the EU, as well as many strategies needed to be ameliorated. Things have started to change during the 1990s. The national planning system in general has started to point the attention more on participation, ecosystem management and multi-level coordination [16].

These changing strategies and perspectives are visible in the different approaches which have driven the planning and construction of the two parts of the road. The second part is characterized by a more attention for environment through the application of EIA, the use of sound barriers, the planning of landscaping solutions in the areas nearby the road borders. Nevertheless, the changes are still at the beginning and many aspects need to be solved and the approaches need to be settled.

In general, the road project did not follow any international good practices nor provided innovative solutions, except for the International Guadiana Bridge along the Spain borders, that has become a model for the detailed seismic analysis carried out to develop its structure.

For the population of the region the construction of a more efficient infrastructure network, and in this case of the *Via do Infante*, has definitely a strong symbolic meaning. If considering that the region just few decades ago was suffering poverty, the new highway with its strong visual presence within the landscapes crossed, has brought new tangible and intangible dynamics such as growth, modernization and innovation towards the EU model.

5 Conclusions

Europe, as emerged by the considerations done in the previous paragraphs, has been determinant for the modernization of Algarve and in general of Portugal. The funding available for the development permitted to improve the road network from 1990 to 1995 with over 1150 km of main roads and complementary roads. A lack of adequate instruments have characterized this first stage of development, which

has been distinguished by many contradictions and rushed decisions based on the need to speed up a modern infrastructure system, with consequences on the relations between the transportation infrastructure and the landscapes crossed. Nevertheless, the will to overcome these contradictions has led to a renewed approach, also on the basis of the EU stricter observances which have started to be acknowledged by the Nation (EIA).

Planners and designers are interested in projects that express spatial ideas and have meaning for the general population [17]. The design of linear transport infrastructures like highways is one type of place where designers have opportunities to express ideas and connect with the public.

The challenge for the immediate future is to take advantage of the many European best practices available in terms of integrated projects based on infrastructure development and landscape management (see projects in France, Swiss, Italy), as well as to put into practice international strategic tools such as the European Landscape Convention acknowledged by Portugal in 2005 [18], the Strategic Environmental Assessment, and experiment innovative policies (e.g. start-up pilot projects with original energetic-environmental-cultural strategies). These aspects acquire further importance if considering that many linear infrastructures have been preliminary planned in the PRN 2000 and should be developed by 2015.

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