

Creative Culture-Led Strategies for Sustainable Innovations: The Multidimensional Valorisation Project of the Pioppi Living Museum of the Sea, Italy

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Abstract. The role of eco-museums, and public aquariums, as cultural attractors and generators of socio-economic impact on the territories and communities in which they operate, shows how the analysis and comparison of the various European experiences highlight the modernity of Anton Dohrn's ideas and the creative strategies that have determined the virtuous reactions triggered in other contexts. The reinterpretation and application of the proposed innovation strategies were reinterpreted in the management of the Museo Vivo del Mare in Pioppi (Pollica, Salerno, Italy), set in the Italian context of public aquariums and eco-museums strongly linked to their territorial dimension. The decision-making process developed in this study allowed the identification of policies, approaches, and tools for the maximisation of the cultural impact of multidimensional valorisation processes. Implementing Multi-Criteria Analysis (MCA) techniques, it was possible to identify the preferable scenario and outline the corresponding development strategy.

Keywords: Eco-Museum · Cultural Heritage · Multi-Criteria Analysis (MCA)

1 Introduction

In Italy, the cultural and creative supply chain proves to be fundamental in developing national human and territorial capital, accounting for 5.6% of the added value of the entire Italian economy and 5.8% of employment [1]. These results translate, in a global dimension, into 3.1% of world GDP and 6.2% of the workforce, achieved despite the problematic two-year period of the Covid-19 pandemic, which led to a loss of general turnover, a contraction of employment and a crisis in the cultural and creative sector, to which the European Union responded with the Creative Europe Programme (2021–2017), allocating 2.44 billion euro to support the sector [1].

In addition, a key role from an economic perspective is played by the models of financial support through private funds for the valorisation of cultural heritage, widely

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adopted in the tax systems of several European countries: in France, donors can deduct up to 66 per cent of a donation from their income tax; in Germany, contributions for art and culture can be deducted up to 20 per cent of total income or, for private companies, up to 4 per thousand of annual turnover; in the United Kingdom, there is a general rule that establishes the principle of tax exemption for donations benefiting certain national museum institutions and, limited to natural persons, these acts of donation entail the advantage of the limit placed on the annual tax deduction on their income; in Spain, the deduction is around 35% [2].

In Italy, cultural patronage is also facilitated by the Bonus Art, which since 2014 has allowed private individuals to invest in the public heritage while receiving a 65% tax deduction from the State, thus greatly encouraging the synergy between the profit and non-profit worlds.

In the policies for the valorisation of cultural heritage, particular attention is paid to the role and contribution of museums for their potential to mobilise economic resources and to be drivers in urban and territorial regeneration processes, both when they belong to or are under the protection of a local administration, and when they are managed by a national authority or are private [3]. In recent years, valorisation strategies based on collaboration and dissemination of museum activities between cultural institutions, overcoming competition and conflicts, pursuing cooperation, and sharing tangible and intangible resources are gaining importance [4].

In this perspective, there is a need to develop a shared cultural enterprise strategy for museums, understood as innovative systems of cultural production capable of responding to the different demands of tourists and citizens and aimed at building a common language, able to dialogue with institutions and to enhance and safeguard the specificities of the environmental and cultural contexts in which they operate [5].

This need is particularly valid for ecomuseums, which require strategies and tools related both to their scientific and experimental research activity and as cultural enterprises. Public aquariums, which can be configured as a particular type of ecomuseums, historically based on their exhibits' attractiveness and scientific relevance, also fall into this con-context. However, the proposed study showed how these characteristics often proved insufficient for their survival, especially if not accompanied by adequate entrepreneurial creativity and the ability to build and maintain territorial links with the context in which they carry out their activities.

The contribution develops a reflection on the role of ecomuseums and, in particular, of aquariums, outlining a methodological approach aimed at identifying a valorisation strategy for the aquarium of Pioppi, in the National Park of Cilento, Vallo di Diano and Alburni, in the municipality of Pollica, in the province of Salerno (Italy). Starting from an analysis of the Italian context of public aquariums and a comparison of the various European experiences, particular attention was paid to the valorisation strategy promoted by Anton Dohrn for the Napoli aquarium in Italy, reinterpreted in the definition of the MuSea, the "Museo Vivo del Mare in Pioppi", which is one of the twenty-two aquariums currently active in Italy.

The contribution is therefore organised as follows: Sect. 2 is dedicated to Materials and Methods, in which the role of aquariums in Europe and the stages of the proposed

methodological process is made explicit; Sect. 3 faces the case study; Sect. 4 describes the results; Sect. 5 is reserved for the discussion of the results and conclusions.

2 Materials and Methods

2.1 Aquariums in Europe and the Creative Strategies of Anton Dohrn

The analysis of the development of public aquaria in Europe - from diffusion to decline, up to the current situation - makes it possible to explicate the causes and current conditions of decline, but also the need for innovative approaches essential for the operation of contemporary aquaria, with particular attention to the Italian situation.

The spread of aquariology and aquaristics to the public [6] is due to some relevant assumptions, such as: technological and scientific progress, insofar as for marine biologists and naturalists, aquariums were the perfect tool for observing aquatic fauna and flora, and technical skills enabled the reproduction of such habitats in captivity [7]; the periodic organisation of Universal Expositions - in close connection with technical-scientific development - with the aim of displaying their level of avant-garde and innovation; the accessibility of coastal areas, made reachable by a large part of the population through the new railway lines; collectivism, related to the fashion of collecting objects, which exploded in the field of private aquarium keeping [6].

From the beginning of the second half of the 19th century, in the main European centres, the first large city aquaria began to open to the public by civic but also private initiative. In the second half of the 19th century, 14 public aquaria were established: the first was the Fish House in London (1853–1855), followed by the Jardin Zoologique d'Acclimatation in Paris (1860–1877) [8], the Viennese Aquarium Salon in Vienna (1860–1864), the Marine Aquarium Temple in Hamburg (1864–1930) the Berlin Aquarium (1869–1910), the Crystal Palace in Sydenham in London (1871–1941) [9], the Brighton Aquarium (1872-in activity), the Stazione Zoologica in Naples (1874-in activity), the Manchester Aquarium (1874–1876), Dr. Cocker's Menagerie in Blackpool (1875–2010), the Royal Aquarium in Westminster (1876–1903), the Scarborough Aquarium (1877–1925) [10], the Tynemouth Aquarium and Winter Garden (1877–1898), the Artis Aquarium in Amsterdam (1884-in activity).

Each of the listed aquaria was analysed considering some significant criteria: location, period of activity, type of facility and reason for closure. Observing the collected data, it was possible to make some considerations on the development phases of the phenomenon and the characteristics that contributed to the longevity and vitality of these facilities. In fact, the datum common to most of the historical aquaria highlights among the reasons for the closure, followed in some cases by the demolition of the building that housed them, the low financial return.

The progressive loss of attractiveness for visitors, with the consequent condition of economic unsustainability, led, in turn, to the conversion of aquaria into more profitable activities (in 42.9% of cases) or to closure due to bankruptcy (in 28.6% of cases).

Furthermore, in the first decades of its development, aquarists also brought with them logistical and functional advantages useful for scientific research, such as the possibility of observing marine organisms at close quarters, with the development of new instruments - including underwater cameras and diving equipment - it was no longer

essential for naturalists and marine biologists to recreate aquatic ecosystems in tanks in order to conduct their studies in the laboratory [6].

The only three historical aquaria still active today - Brighton, Amsterdam and Naples - have probably survived ephemeral fashions and economic obstacles for a variety of reasons: for the Brighton aquarium, it was the citizens themselves who contributed to the enhancement of the public aquarium, consolidating its attractiveness as a historical tourist destination; the aquarium in Amsterdam [11] was integrated into the city's enhancement and management actions, also developed in relation to the zoological park and other cultural and natural facilities; the aquarium in Naples, known as Stazione Zoologica, was activated with the intention of enhancing scientific research, and developed thanks to the creative and entrepreneurial skills of its founder and director, the biologist Anton Dohrn [12].

In particular, the success factors - exogenous and endogenous - acknowledged to the valorisation strategy promoted by Dohrn can be summarised as follows [13]:

- the creative and entrepreneurial capacity of the founder;
- the ability to design a museum in innovative terms;
- the ability to bring together and stimulate various scientific talents;
- a strong motivation of the collaborators towards a common goal;
- the application of a paradigm of great scientific value: the Darwinian theory;
- the development of a lively cultural climate;
- the possibility of increasing international relations and exchanges;
- the aptitude for interdisciplinary study;
- the realisation of a building characterised by high aesthetic quality, stimulating scientific creativity.

The combination of these various factors meant that the Zoological Station adopted an organisational and management model characterised by a number of peculiarities, such as: the free and autonomous organisation of the research work; elasticity of the organisation; a position in the vanguard and openness to new technologies; the absence of compartmentalisation in the division of tasks; apoliticality, hospitality, secularism, tolerance, continuous exchange; personal and informal connections between scientists on an international level; interdisciplinarity and collaboration between the natural sciences and art.

There are currently twenty-two public aquaria in Italy, of varying vocation and size [14–18]. The regions with at least one public aquarium are mainly those with a Mediterranean character and a maritime vocation: the record is held by Tuscany, which has six public aquaria. In fact, the aquariums are mainly marine - in 72.7% of cases - but 13.6%, consistent with the reference territory, host fauna and flora typical of lake or river habitats, and the same percentage has both freshwater and saltwater tanks.

Within this variegated aquarium landscape, some distinctions can also be made in relation to the management and administrative structure: private ownership characterises 27.3% of aquaria, while 54.5% belong to a public body; 36.4% of living museums are managed by private companies, while non-profit organisations manage 31.8%, and only 13.6% are publicly managed.

2.2 A Decision Support System for the Pioppi Aquarium Enhancement

The multidimensional valorisation project MuSea Museo Vivo del Mare has been structured by elaborating a decision support system articulated in four main phases [19]:

1. Knowledge of the territorial context and identification of the stakeholders;
2. Identification of policies and tools for the maximisation of the cultural impact and elaboration of alternative scenarios;
3. Multicriteria evaluation and selection of alternative scenarios;
4. Explication of the valorisation strategy and programming of activities (Fig. 1).

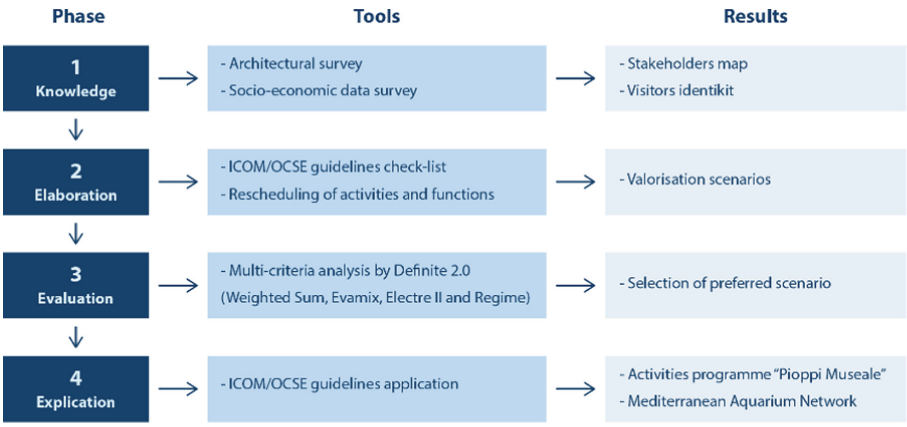

Fig. 1. A Decision Support System for the Pioppi aquarium enhancement strategy.

The first phase analysed the village of Pioppi and the MuSea, the aquarium housed in the historic building of Palazzo Vinciprova, considering both the historical and territorial, as well as the architectural and cultural aspects. In particular, the methodological process was carried out on the survey and representation of the building housing the aquarium, necessary to put forward a multidimensional valorisation proposal also aimed at developing a reorganisation of the exhibition spaces in relation to the new functions and activities envisaged in the valorisation proposal.

The knowledge of the context and of the cultural asset was articulated considering also the way in which the exhibition spaces are managed, analysing the type of visitors and the network of stakeholders that can be involved in the decision-making process, with the aim of preparing a valorisation strategy capable of maximising the cultural impacts of the aquarium.

The different types of information collected in the first phase of the research were complemented by identifying possible local administrative policies and instruments available to museums and verifying their implementation under the specific conditions of the case study analysed.

The data obtained and analysed were relevant for the planning of museum activities and for the elaboration of valorisation scenarios, which were developed on the basis of a

number of significant components: types of admission tickets, local events that could be activated with the involvement of the museum, stakeholders involved, activities carried out, professional resources employed, sponsors engaged and expected results.

Finally, in the evaluation phase, the constructed scenarios were subjected to a structured multi-criteria analysis with the support of Definite 2.0 software to establish an order of preference and select the alternative to elaborate the enhancement strategy.

3 The Case Study: "MuSea", an Ecomuseum for Pioppi, Italy

The ecomuseum under study, the MuSea, is in Pioppi - a village on the Cilento coast in the province of Salerno, in the highly touristic and naturalistic context of the Cilento, Vallo di Diano and Alburni National Park - and together with the Living Museum of the Mediterranean Diet, is housed in the historic Palazzo Vinciprova (Fig. 2).



Fig. 2. The case study: MuSea, Pioppi (Italy)

The MuSea is currently owned by the municipality of Pollica, and its management is entrusted to the Legambiente Onlus association, which in turn uses the Cooperativa Minnelea to organise its activities. The MuSea offers the possibility of purchasing a ticket online, including a visit to both mu- seas of Palazzo Vinciprova; an annual subscription can be purchased, and a guided tour service is available. MuSea's activities mainly consist of three didactic workshops dedicated to school groups, including preschool and secondary schools.

The data collected on the number of admissions show that the period of highest attendance coincides with the spring months. Looking at the attendance figures for the last few years of the museum's operation, the trend has been positive from 2016 onwards, when the latest restoration work was completed. However, the same data confirms the negative effects of the Co-vid-19 pandemic, reporting a drop in admissions in 2020 [20].

The case of the Pioppi ecomuseum is paradigmatic in terms of both criticality and potential: it is one of the Italian aquariums owned by a public body - accounting for the majority (54.5%) - and managed by a non-profit organisation (as in 31.8% of cases). Moreover, its insertion in the context of a small village - but at the same time strongly characteristic and sensitive to the processes of tourism - underlines its territorial vocation and its capacity to generate positive impacts on the local community. Moreover, the peculiarities of the context allow the elaboration of development scenarios able to

enhance the different roles that the MuSea could potentially assume in the process of active co-engagement of the different local resources.

4 Results

The application of the methodological process described in Sect. 2 led to the definition of a new programme of activities and the proposed establishment of a collaborative network between Italian public aquaria in an incremental multivariate perspective.

4.1 Knowledge of the Territorial Context and Identification of Stakeholders

The historical and territorial framework of the village of Pioppi was structured by analysing historical memoirs [21], monographs [22–24], drawings and documents relating to the recent restoration project of Palazzo Vinciprova [25], and socio-economic data and trends [26], as well as through the inspections and surveys carried out. In particular, an integrated survey campaign was carried out for the building housing the MuSea - with image-based and range-based techniques - which allowed the building's two-dimensional and vectorial graphic restitution and detailed architectural and material knowledge.

The survey of socio-economic data and the description of the administrative-managerial organisation of the museum were based on the consultation of recent balance sheets [20, 27] prepared by the managing body and the museum management. The different surveys allowed the construction of an overall picture of the museum's functioning, including information on visitor numbers and flows, services offered, exhibition content, staff employed and external companies and structures involved in the activities.

From the different analyses carried out, it was possible to structure a map-pa of the stakeholders involved and potentially involved in the museum activities. The identification of the stakeholders, i.e. the groups of individuals or individuals who can influence or be influenced by the achievement of the museum's objectives [28], allows, on the one hand, to understand the socio-economic environment in which the museum is contextualised, and on the other hand to identify the resources and possibilities for its development [29, 30] based on bottom-up and inclusive strategies to maximise the cultural impact [31–34].

The stakeholders of the MuSea that have been identified (Fig. 3) correspond primarily to the territorial authorities, represented not only by the municipality of Pollica - of which Pioppi is a hamlet - but also by the Province of Salerno and the Cilento, Vallo di Diano and Alburni National Park Authority, responsible for the adoption of administrative policies in collaboration with the museum institutions. Fundamental to the scientific interest and cultural matrix of the ecomuseums is also the relationship with universities and research centres, in which the two largest universities in Campania - the Federico II in Naples and the University of Salerno - as well as the Anton Dohrn Zoological Station, occupy a leading position.

To promote collaboration between cultural institutions and to elaborate a shared strategy, not only the other Italian public aquariums are privileged interlocutors, but

also the National Association of Scientific Museums, as well as the nearby and well-established Archaeological Park of Paestum and Velia. Naturally, the stakeholders that can be involved in MuSea's activities include local businesses - in their forms of accommodation, commercial and catering activities, and farms - and cultural associations operating in the area, as well as the local community itself. Finally, the visitors of the MuSea have also been included in the stakeholders' map. All the actors identified are thus interconnected by relationships of mutual influence and direct or indirect cooperation.

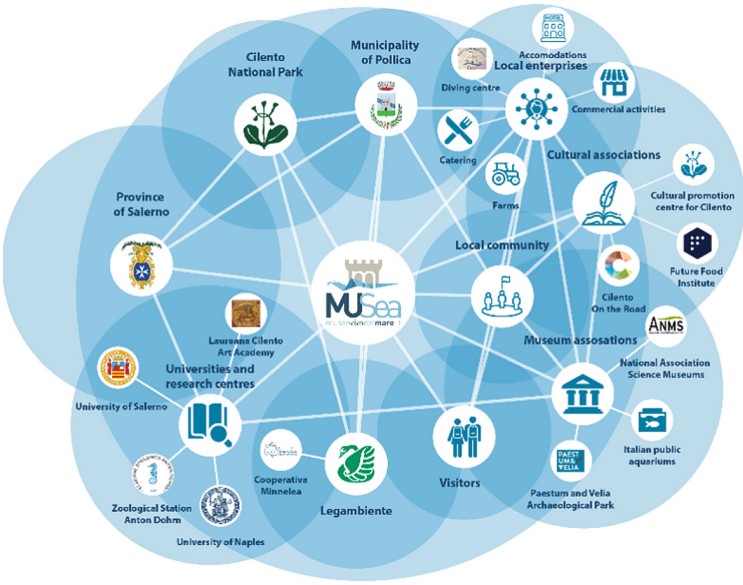

Fig. 3. Stakeholders map

Furthermore, within the stakeholder group represented by the visitors, a number of relevant categories are distinguished: schoolchildren, travellers, tourists and naturalists. The parameters used for the selection concerned the period in which the visit takes place - in a particular season or throughout the year - and the type of entrance - single or in a group; the demand for activities expressed by the visitors - such as educational activities, exhibition quality and scientific research tools - and the services that can be offered by the museum - guided tours, educational workshops, excursions, thematic exhibitions, events, seminars - and consequently the necessary museum spaces - exhibition halls, book-shops, library, laboratories and multi-purpose halls - and the external services supporting the activities - agritourisms, educational farms, refreshment facilities, commercial activities, natural parks, other museums and research centres.

4.2 Identifying Policies and Instruments for Maximising Cultural Impact and Developing Alternative Scenarios

Strategies to maximise cultural impact articulate and implement museum programmes of activity through policies and instruments available to both museum institutions and

public administrations, which have been defined according to the guidelines of the International Council of Museums (ICOM) and the Organisation for Economic Co-operation and Development (OECD) [2].

The guidelines identified five main themes:

1. Harnessing the power of museums for local development;
2. Enhancing the role of museums in urban regeneration and community development;
3. Stimulating culturally aware and creative societies;
4. Promoting museums as spaces of inclusion, health and well-being;
5. For each of the themes, actions and possible policies were identified and analysed through a check-list [2], resulting in a classification based on the relative level of criticality and potential, indicating which are to be introduced, which are to be increased and which are to be enhanced (Fig. 4).

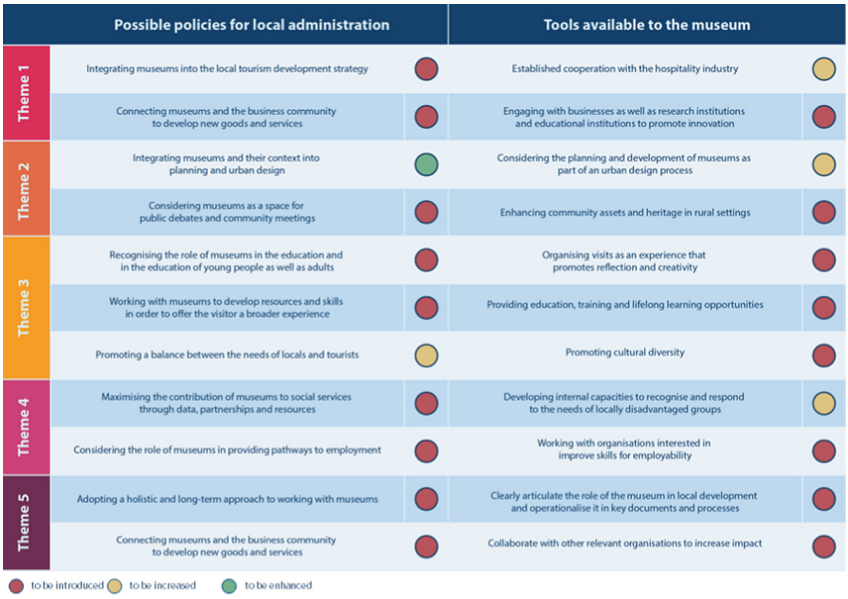

Fig. 4. ICOM/OECD guidelines check-list.

The result is a poor picture of the current condition in terms of administrative policies and strategies implemented by the museum institution, especially if one considers the museum's educational role and contribution to employment. Indeed, its role is in a passive position within the local tourism and economic scenario, indirectly suffering its positive impacts without generating further impulses in terms of new goods and services. The museum's integration into urban planning is less critical, thanks to recent initiatives undertaken by the municipal administration.

The knowledge of the processes being implemented and of the main stakeholders has made it possible to structure the planning of MuSea's activities that move according to the principles of innovation and digitisation of services, the elasticity of supply, synergy

between profit and non-profit, and museum outreach and collaboration with other cultural institutions. The activities are designed by identifying different modes of use (online or in-presence) dedicated to different categories of visitors in partnership with the mapped stakeholders. The programming of activities also aims at defining and enhancing the different vocations of which the MuSea is bearer: the tourist, the scientific and the territorial character.

The programme of activities, administrative policies, implementation tools and stakeholders involved have therefore taken on different modulations and articulations, according to three alternative strategic options (Fig. 5), each of which refers to a particular vocation that the ecomuseum potentially possesses. Three alternative strategic options were elaborated to identify the pre-feasible scenario, each based on a specific vocation attributed to the MuSea.

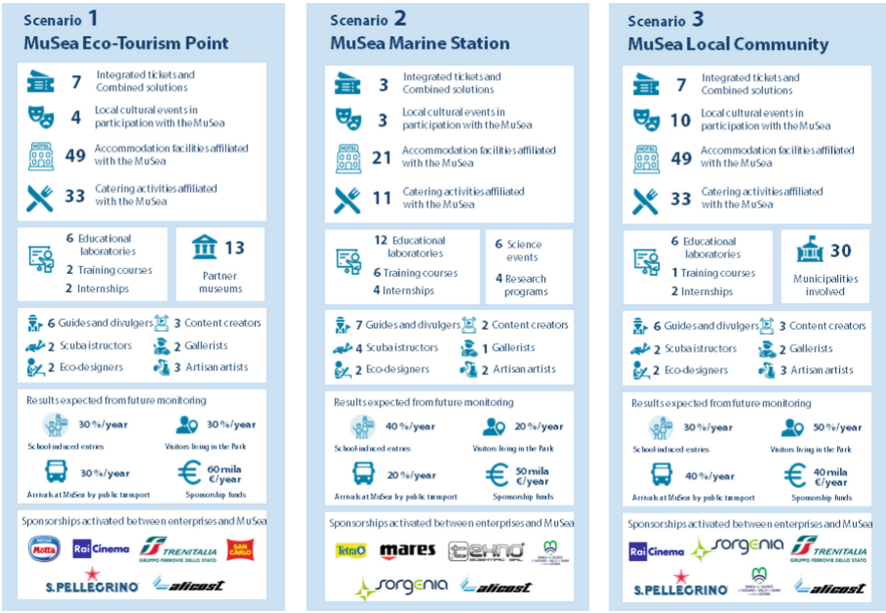

Fig. 5. Alternative scenarios.

In the first scenario (S1), the 'MuSea Eco-Tourism Point', emphasis was placed on the active participation of the Pioppi Aquarium in the development of sustainable tourism in the area, paying attention to the issues of the environment, climate risk, and the conditions of abandonment and depopulation of internal areas [35]. An entrance fee plan has been drawn up to provide a satisfactory number of combined solutions, encouraging collaboration with other museum institutions in Cilento National Park and neighbouring municipalities and involving hotels and restaurants; the educational and training offer has been expanded with respect to the status quo, but it is expected that economic resources will be used to a greater extent in the recruitment of professional profiles needed to carry out attractive activities mainly aimed at tourists and travellers;

the sponsorships that can be activated between private companies and the MuSea involve important national companies in the food, transport and cultural entertainment sectors, potentially interested in investing [36].

In the second scenario (S2), the 'MuSea Marine Station', the scientific nature of the particular type of museum institution that the Pioppi aquarium represents was emphasised, with an emphasis on its training and educational role in the protection of the marine ecosystem and biodiversity, as well as on the potential scientific research activities [37] that can be conducted at the new laboratories proposed to be located in the Palazzo Vinciprova building and in collaboration with the other aquariums in the network. Human and financial resources will therefore be concentrated on activities dedicated to educational laboratories, training courses and workshops, with a more targeted use than collaborations with tourist facilities; in this scenario, sponsorships will involve more companies specialised in the aquarium and technology sectors.

In the third scenario (S3), the 'Musea Local Community', the museum's ability to create territorial links and to become a promoter of local culture is encouraged, re-proposing some of the strategies envisaged for the eco-tourism scenario, but with a greater focus on the interests and needs of the local community [2]; the collaboration with companies and accommodation facilities located in the neighbouring municipalities becomes particularly important, and the distribution of resources in the activities carried out outside the MuSea premises grows accordingly; sponsorships could, in this case, involve both big national companies and solid local realities.

4.3 Multi-criteria Analysis, Selection of Alternative Scenarios and Valorisation Strategy

To identify the preferred strategic alternative, it was essential to proceed with a multi-criteria evaluation, defining the objectives to be maximised and the respective relevant criteria to be used to describe and analyse the options.

It proved useful to make use of the decision support provided by the Definite 2.0 software [38], which offers the possibility of comparing the results of the evaluation carried out with the Weighted Sum, Evamix, Electre II and Regime methods [39–42].

An evaluation matrix was then structured in which the criteria are made explicit by indicators, for each of which, in addition to defining its value as it stands, forecasts were made for each of the hypothesised strategic scenarios.

The second step, necessary to homogenise information of different natures, consisted in standardising all the components of the evaluation matrix in a range between 0 (zero) and 1 (one).

This was followed by the 'weighting', i.e. the assignment of weights to all criteria to reflect their relative importance in the evaluation process: in this case, the weighting was based on the classification returned by the checklist of ICOM's selected themes, thus delineating three groups of weights, consisting of the criteria linked to the valorisation objectives and placed in descending order of importance, attributed by applying the expected value approach.

To examine the alternative options ranking, applying the four multi-criteria analysis methods of the Definite 2.0 software made it possible to reason in an integrated manner and verify the robustness of the preferred scenario.

The following objectives were defined for the group of scenarios outlined:

1. integrating the museum's role in local development processes;
2. valorising the museum's activities in territorial regeneration programmes;
3. stimulating culturally aware and creative communities.

For each objective, relevant criteria were defined to analyse the options. Respectively, the first objective identifies: to develop cultural strategies for the valorisation of local tourism (C1); to activate collaborations and synergies with tourism and accommodation activities (C2); to collaborate with the local, national and international business community to develop new goods and services (C3).

The second objective considers: to integrate the museum into a broader process of territorial development (C4); enhance the assets and heritage of the local community (C5).

The third objective includes: to develop resources and skills to offer visitors an immersive experience in the museum (C6); to strengthen the active involvement of young people in the museum's didactic and educational activities (C7); to offer education, training, and lifelong learning opportunities at the museum (C8); and to foster a balance between the needs of the local community and those of tourists (C9).

In the evaluation matrix (Fig. 6), each criterion is expressed by one or more indicators, the value of which has been made explicit for each of the three scenarios considered.

After the standardisation phase, the 'weighting' of the criteria - based on the classification returned by the ICOM checklist - outlined three groups of weights, in descending order of importance: C1, C5, C6, C8; C2, C9; C3, C4, C7.

The weighted sum method allowed the alternative options to be analysed in order of preference, resulting in: S3 (0.72), S2 (0.69), S1 (0.66).

The robustness check, conducted by changing evaluation methods (Evamix, Electre II, Regime), confirms the result previously obtained as the preferred strategic scenario but also shows a not particularly significant difference between the values of the three options. In particular, the results identify the following rankings (Fig. 7):

– for Evamix method: S3 (0.38), S2 (-0.01), S1 (-0.37);
– for Electre II method: S3 (1), S2 (2), S3 (2);
– for Regime method: S3 (1), S1 (0.5), S2 (0).

The preferred strategic alternative was found to correspond to the MuSea Local Community scenario, thus favouring the territorial vocation of the Pioppi aquarium, and this result is also appreciable from the sensitivity analysis, carried out by changing the weight attributed to each criterion and comparing the obtained results through other multi-criteria methods.

Goals	Sub-Goals (criteria)	Indicators	Unite of measure	Value as it stand	Source	Year	Direc-tion	S1	S2	S3
Integrating the role of the museum in local development processes	(C1) Developing cultural strategies for the enhancement of local tourism	(I1) Annual number of local cultural events in which the museum is involved	No./year	1	Legambiente Report	2021	>	4	2	10
		(I2) Annual number of seasonally active activities and services	No./year	3	Legambiente educational proposal	2022	>	6	6	6
		(I3) Annual number of year-round activities and services	No./year	0	Legambiente educational proposal	2022	>	5	5	5
		(I4) Annual number of activities and services available on the museum's online platform	No./year	1	Museum web site	2022	>	5	5	5
		(I5) Number of offers of combined packages of museum admission and other cultural activities	No.	1	Museum web site	2022	>	7	3	7
	(C2) Activating collaborations and synergies with tourism and accommodation activities	(I6) Number of accommodation establishments cooperating permanently with the museum	No.	0	Museum web site	2022	>	49	21	49
		(I7) Number of catering businesses that collaborate permanently with the museum	No.	6	Museum web site	2022	>	33	11	33
	(C3) Working with the local, national and international business community to develop new goods and services	(I8) Annual funding obtained from sponsorships of companies or external bodies	€/year	nd	Museum administrative report	2023	>	60000	50000	40000
Enhancing museum activities in territorial regeneration programmes	(C4) Integrating the museum into a wider process of land development	(I9) Number of municipalities in the provincial territory involved in the museum activities	No.	1	Legambiente Report	2021	>	30	23	30
		(I10) Number of scientific, cultural and social institutions from other municipalities or provinces, which collaborate with the museum	No.	1	Legambiente Report	2021	>	20	13	20
		(I11) Number of public aquariums in the Mediterranean area collaborating with the museum	No.	1	Legambiente Report	2021	>	6	6	6
		(I12) Annual percentage of visitors reaching the museum by soft mobility or public transport	%/year	nd	Visitors questionnaire	2023	>	30	20	40
	(C5) Valuing local community assets and heritage	(I13) Number of volunteers involved in the management and maintenance of the museum and its premises	No.	0	Legambiente Report	2021	>	2	6	8
		(I14) Number of external venues hosting services or activities organised by the museum	No.	0	Legambiente Report	2021	>	3	3	3
Stimulating culturally aware and creative communities	(C6) Developing resources and skills to offer the visitor an immersive museum experience	(I15) Number of museum employees in charge of digitising content and managing the online platform	No.	0	Museum administrative report	2022	>	3	2	2
		(I16) Number of museum employees engaged in activities at external locations	No.	0	Museum administrative report	2022	>	6	5	8
	(C7) Strengthening the active involvement of young people in the museum's didactic and educational activities	(I17) Annual number of educational workshops for schools offered	No./year	3	Legambiente educational proposal	2022	>	6	12	6
		(I18) No. of museum employees involved in outreach and education	No.	2	Museum administrative report	2022	>	3	5	3
		(I19) Annual percentage of school induced entries	%/year	nd	Museum administrative report	2023	>	30	40	30
	(C8) Providing education, training and lifelong learning opportunities at the museum	(I20) Annual number of undergraduate and postgraduate internships activated by and/or at the museum	No./year	0	Legambiente Report	2021	>	2	4	2
		(I21) Annual number of training courses and scientific seminars organised by and/or at the museum	No./year	1	Legambiente Report	2021	>	2	4	2
	(C9) Favouring a balance between the needs of the local community and those of tourists	(I22) Number of museum employees engaged in activities in the territory	No.	0	Museum administrative report	2022	>	5	6	6
		(I23) Annual percentage of visitors living in the Park	%/year	nd	Visitors questionnaire	2023	>	30	40	30

Fig. 6. Table of objectives, criteria and indicators of the current state and alternative scenarios.

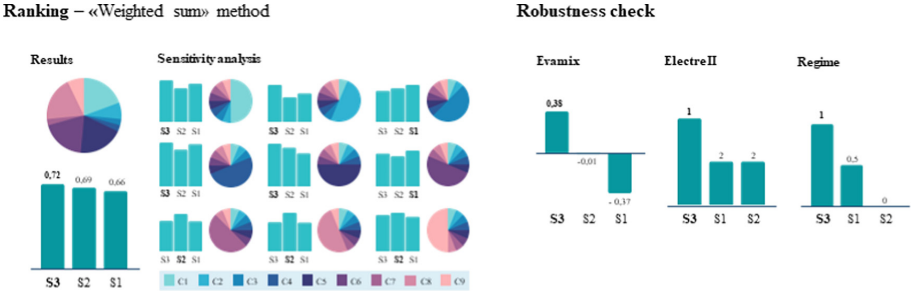

Fig. 7. Results with weighted sum method and robustness check with Evamix, Electre II and Regime methods

5 Discussions e Conclusions

The evaluation phase of the constructed strategic development scenarios made it possible to identify the preferred alternative able to maximise the cultural and economic impacts, consistent with the application of the ICOM/OECD guidelines.

The programme of activities "Pioppi MuSEAle" and the Network of Mediterranean Aquariums are developed based on stakeholders' identification and considering four categories of visitors. Indeed, it was possible to draw up a programme of activities of the MuSea, tailor-made on selected target groups and resources that can be activated.

Innovation and digitisation of museum content are considered a priority, which can be translated, for example, by a more significant presence of the museums on social channels or by the proposal of visit experiences conducible through web platforms; these new ways of enjoyment are combined with the principle of elasticity of the services on offer, also in terms of tariffs, thus preparing subscriptions and integrated solutions. Therefore, the Pioppi MuSEAle programme was developed with these inputs and articulated in eight different activities according to a creative strategy [43].

The programme was calendared annually to distribute the activities, concentrating them from time to time in the months in which there is the most significant demand from the main target groups, but without creating time gaps that would support an ineffective seasonality of the museum offer.

Furthermore, to carry out the new activities, it was necessary to identify six new professional profiles to act as a bridge between the sea, the territory and the museum: Thus, the figure of the local guide is indicated for the organisation of activities focusing on historical-cultural themes; the underwater guide, for the supervision and support for visits and excursions organised at sea; the gallery manager, for the care of the art gallery and the promotion of cultural events; the artisan artist and the eco-designer, for participation in the gallery exhibitions, creative workshops, and activities focusing on historical-artistic themes.

The new programme changes the territorial and spatial organisation of the MuSea and its activities, expanding it both on a municipal and provincial scale and in its articulation within Palazzo Vinciprova. Furthermore, the activities carried out outside the MuSea premises - thematic tours and underwater excursions - will help spread the area's cultural value and create social and economic links with other municipalities in a virtuous involvement of the respective communities.

Following the principles of collaboration and museum dissemination, the establishment of a Network of Mediterranean Aquariums is proposed, identifying them among the mapped contemporary Italian aquariums according to selection criteria that consider both their specific vocations - educational, scientific or even attractive - and quantitative parameters, which are comparable and compatible with those of the MuSea. Specifically, they looked at the active commitment to scientific research and the protection of the marine ecosystem of the Mediterranean Sea; at the dimensional and quantitative characteristics of the contents of the living museums and host structures; at the administrative and management structure of the various sectors involved in museum activities; and at the solidity of the economic system and stability of the financial resources, ensured by funds, sponsors or receipts. Tools and strategies at the disposal of the Network were then defined: provision of a website dedicated to the Mediterranean Aquarium Network for the offer of multimedia content, online services and information; visitor loyalty plans, such as subscriptions and membership cards, and discounted rates for admissions to the various aquariums of the Network; travelling festivals and exhibitions and tours, stage trips and "sustainable cruises" reaching the locations included in the Network events and initiatives to raise the awareness of communities and visitors on the protection of the biodiversity of the territory and the marine ecosystem; workshops, intensive courses and seminars dedicated to the training and refresher courses for aquarium operators and

staff; the drafting of a periodical magazine with a scientific and popular character, to be published in digital form and collections of physical copies at the aquarium bookshops.

The multidimensional valorisation project Pioppi MuSEAle aims to give the local aquarium, as a place of culture and research, an essential role in territorial and sectorial development based on the structuring of a decision-making process aimed at developing strategies to maximise the cultural impact using approaches and techniques from multi-criteria analysis, to outline a programme of activities for the valorisation of the cultural asset.

This contribution highlighted the role of the multiple components determining the correct and stable functioning of ecomuseums and museum institutions: entrepreneurial creativity, institutional cooperation, synergy with public administration, public-private partnership, and territorial interconnections.

Through the application of the ICOM/OECD guidelines, the aim was to trigger a process of maximising the cultural and economic impact produced by a public aquarium for the local community in terms of growth and mobilisation of resources and territorial development.

The research also highlighted the multi-scalarity and multi-dimensionality involved in impact maximisation and resource enhancement, both in the decision-making and implementation phases.

The structured decision-making process could be replicated using methods that support stakeholders' participation and active involvement, including assigning weights to criteria by different groups of actors to consider the other points of view and identify possible conflicts in different policy scenarios.

The tried and tested methodological process, together with the advanced reflections and results of the multi-criteria evaluation, represents a starting point for the further design developments of the strategic scenarios, recognising as a prerequisite the preferability of the option that emphasises the territorial character from which to trigger direct participation and active involvement of stakeholders.

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