FUTURE PATHWAYS FOR SUSTAINABLE TOURISM IN PUGLIA

DATA-DRIVEN INSIGHTS, FORESIGHT AND MANAGERIAL PROFILES

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Contents

Construction of Future Scenarios to Support Tourism Development Policies

1. Introduction to Futures Studies Methods

Futures Studies constitute an intrinsically interdisciplinary field of research oriented toward the systemic analysis of change and the structured exploration of future possibilities. Their purpose is not to predict what will happen, but rather to understand what could happen, through the integration of qualitative and quantitative methods, the elicitation of expert visions, and the observation of emerging dynamics. In this sense, they offer a valuable set of tools for addressing uncertainty, interpreting complexity, and guiding strategic decision-making in domains characterized by rapid and interdependent transformations. Although the discipline formally emerged in the twentieth century, its conceptual roots lie in much older philosophical and scientific traditions. Thinkers such as Condorcet, Vico, and Comte had already reflected on progress, historical trajectories, and the possibility of understanding the evolution of human societies. The actual formalization of Futures Studies, however, took place between the 1940s and 1950s in the United States, primarily within a military context, where future-oriented analysis became an essential instrument for strategic planning during the Cold War. A key theoretical contribution is H.G. Wells's essay The Discovery of the Future (1902), widely regarded as the foundational manifesto of futurology. In this work, Wells proposed a systematic, analytical, and scientific approach to studying the future, anticipating the idea that it could be explored through rigorous methods rather than merely imagined.

During the 1960s and 1970s, the discipline underwent a phase of consolidation thanks to the work of institutions such as the RAND Corporation (Santa Monica, California), the Club of Rome – with its influential report The Limits to Growth (Meadows et al., 1972) – and the Institute for the Future (Palo Alto, California). In this period, many of the methodologies still central today were developed, including the Delphi method, scenario planning, and trend analysis – tools that enable the elaboration of alternative visions and support decision-making processes in crucial sectors such as urban planning, education, technology, and the environment.

Between the 1980s and 1990s, Futures Studies spread progressively across Europe, Asia, and Latin America, adapting to diverse cultural, institutional, and political contexts. The European Union encouraged their adoption through strategic foresight programs and initiatives dedicated to innovation governance – for example, by integrating anticipation into research and innovation programs (Horizon 2020, Horizon Europe), through the Joint Research Centre (JRC) and the Competence Centre on Foresight, with annual strategic foresight exercises, by funding networks and anticipatory projects, and by embedding scenarios and trends into innovation governance. In Italy, the discipline remained marginal

until the 2000s, when research centres, professional networks, and academic programs began to emerge.

Today, Futures Studies are applied in an increasing number of fields: territorial planning, technological innovation, education, public health, ecological transition, and crisis management. Tourism is increasingly included among these sectors, as it is particularly sensitive to global change, socio-economic dynamics, and rapid technological transformations. Anticipation is used to explore the evolution of visitor behaviour, the impact of digital technologies, new mobility models, destination sustainability, and transformations in territories with a strong tourism vocation. In this way, Futures Studies help orient more resilient and innovative tourism development strategies capable of responding to emerging challenges. The integration of advanced digital tools and artificial intelligence has significantly expanded analytical capabilities, enabling the construction of complex, dynamic, and multi-level scenarios. Positioned at the intersection of methodological rigor and creative design, Futures Studies do not seek to predict the future, but to prepare individuals, organizations, and communities for change, fostering critical thinking, strategic imagination, and anticipatory capacity. In this perspective, they represent a fundamental resource for addressing contemporary challenges and building shared, resilient, and sustainable visions.

In the context of sustainable tourism development – an area marked by complex dynamics, increasing environmental pressures, and rapid transformations in visitor behaviour – Futures Studies provide strategic support of great value. They offer tools to explore possible futures and guide present decisions in ways consistent with long-term objectives such as the protection of natural resources, the quality of the tourist experience, and the well-being of local communities. The construction of future scenarios makes it possible to imagine and simulate alternative development trajectories for destinations, linking current choices to emerging trends such as climate change, mobility evolution, service digitalization, shifting traveller preferences, and new forms of experiential tourism. Through this approach, it becomes possible to anticipate the consequences of policies, investments, and territorial marketing strategies, identifying risks, opportunities, and potential unintended effects.

The use of scenarios is particularly useful in a sector like tourism, where the speed of change can quickly render traditional strategies obsolete. Phenomena such as overtourism, extreme seasonality, climate vulnerability of coastal and mountain destinations, and the growing demand for sustainability require tools capable of anticipating profound transformations and guiding resilient choices. In this sense, future scenarios help prevent tourism policies from becoming ineffective at the moment of implementation, instead supporting planning that can adapt to evolving contexts.

Ultimately, applying Futures Studies to sustainable tourism development means adopting an anticipatory perspective that enables the design of more resilient, inclusive, and responsible destinations. It also means promoting dialogue among institutions, operators, local communities, and visitors, so that the construction of the tourism future becomes not merely a reaction to present pressures but a conscious co-creation process oriented toward quality of life and territorial stewardship.

To develop future scenarios capable of guiding tourism policies in Apulia, this work employs a recently developed methodology known as Delphi-based future scenarios (Di Zio et al., 2021; Marozzi et al., 2022). This integrated approach combines two well-established tools within Futures Studies: the Delphi method and scenario planning. Before examining the functioning of this composite methodology, it is useful to analyse separately the characteristics, logic, and evolution of each method, thereby clarifying the theoretical and operational foundations on which the adopted approach is based.

1.1 The Delphi method

The Delphi method is an investigative procedure designed to address decision-making or forecasting issues by collecting and analysing the assessments of a group of experts engaged through a structured questionnaire. The entire process unfolds over several successive cycles, during which a facilitator provides participants with a statistical summary of the responses and arguments that emerged in previous rounds. Opinions are collected anonymously and without direct interaction among panel members, thereby limiting reciprocal influence and the biases typical of group dynamics. The primary aim is to foster a progressive convergence of judgments, understood as the guided construction of an informed and reasoned consensus (Pacinelli, 2008). For these characteristics, the Delphi method is considered the reference technique among those oriented toward synthesizing and converging the opinions of privileged informants.

The method took shape in 1952 in the United States within a strictly military context: a group of seven experts, appointed by the government, was tasked with assessing the likelihood of a nuclear attack by the USSR. It was only in the 1960s, however, through work conducted at the RAND Corporation, that the technique was systematized and officially registered under the name "Delphi." RAND, founded in 1946 with the support of the U.S. Department of defence and now operating in both the United States and Europe, used the method for the first time in a study aimed at simulating the selection of American industrial targets by a Soviet strategist and estimating the number of warheads required to neutralize the United States' conventional arsenal. The term "Delphi" was proposed by Kaplan, a philosopher active at RAND, as a reference to the ancient oracle[1] of the same name, whose predictions could not be directly verified.

At that time, the main methodological alternatives consisted of sophisticated, costly, and inflexible mathematical models. Unexpectedly, the evaluations obtained through the Delphi method regarding Soviet military strategies proved more effective than the available quantitative simulations, thereby contributing to the method's affirmation and diffusion.

[1] The Oracle of Delphi, located in the sanctuary of Apollo on Mount Parnassus, was one of the principal prophetic centres of ancient Greece. The responses of the Pythia, often ambiguous and open to interpretation, influenced political, military, and civic decisions within the poleis. It was precisely this non-falsifiable nature of its predictions that inspired Kaplan to name the method developed at RAND "Delphi."

Today, Delphi is widely recognized and used especially in contexts characterized by limited data availability and particularly rapid dynamics of change.

The diffusion of the method beyond the military sphere occurred in 1964 thanks to the work of T. J. Gordon and Olaf Helmer, Report on a Long-Range Forecasting Study (Gordon and Helmer, 1964), published by RAND. In that report, the authors analysed long-term trends (10-50 years) concerning science, technology, and their potential effects on society. The topics addressed included issues that we now recognize as global: scientific advancements, population growth control, automation, space exploration, conflict prevention, and weapons system development. This study, together with the contribution of Norman Dalkey and Olaf Helmer (Dalkey and Helmer, 1963), which formalized the philosophical and methodological foundations of the approach, represents the theoretical core of the Delphi method.

Over the following decade, the Delphi method progressively consolidated within the scientific literature, attracting particular attention in the aerospace and electronics sectors. In these fields, characterized by high investments in research and development, the ability to formulate reliable forecasts was crucial for guiding planning and allocating resources effectively. It became increasingly evident that extrapolations based solely on historical series were inadequate, as they failed to capture discontinuities, sudden innovations, and structural transformations that characterize complex systems – from technology to the economy, and from social to territorial phenomena. Awareness of the limits of linear projections contributed to establishing Delphi as a reference method for addressing high-uncertainty contexts, supporting its continued use to this day (Linstone and Turoff, 1975; 2002).

At the same time, awareness grew regarding the importance of integrating the subjective knowledge of privileged informants (institutional, professional, academic, community-based, experiential, and strategic) into traditional management, particularly in the field of risk analysis. The method thus began to be applied in new sectors, including the environment, health, transport, urban planning, and tourism – contexts in which the construction of shared scenarios and the evaluation of complex strategies require structured and methodologically sound expert contributions.

In pioneering studies such as Kaynak and Macaulay (1984), the Delphi method was applied to forecasting international tourism trends, demonstrating how the iterative and anonymous approach yields more robust estimates than simple statistical extrapolations, especially in markets subject to rapid and non-linear change. The results confirmed the method's usefulness in supporting strategic decisions for operators and policymakers. In a subsequent contribution, Green, Hunter, and Moore (1990) showed how Delphi can support the definition of sustainable tourism development strategies by integrating the assessments of experts from different sectors – territorial planning, tourism economics, environmental management – and identifying shared priorities for destination management. Their work highlights the method's ability to elicit long-term visions and guide tourism policies in contexts marked by environmental pressures and strong seasonality. More recently, Gössling, Scott, and Hall (2020) used Delphi to assess the impacts of climate change on

tourism, showing how structured expert involvement can facilitate the construction of climatic and operational scenarios for the most vulnerable destinations. The approach proves particularly effective in managing uncertainty and supporting the definition of adaptation strategies. A recent application of the Delphi method in tourism involved a panel of sector experts and human resource managers to identify the managerial competencies considered most relevant for graduates in tourism and hospitality; through two Delphi rounds, the study achieved convergence on a set of priority competencies, providing operational guidance for updating educational curricula (Othman et al., 2021).

These few examples, among many, illustrate how Delphi is widely used in tourism to address complex issues such as sustainability, destination management, trend forecasting, climate adaptation, and the definition of professional competencies. Its anonymous and iterative structure is particularly suited to contexts characterized by multiple interests and high uncertainty, fostering the construction of shared scenarios and supporting strategic decision-making.

In light of this evolution and the variety of applications in the tourism sector, it is useful to examine the fundamental characteristics of the Delphi method, in order to outline its basic structure before considering the numerous variants developed over time.

The Delphi method is based on a series of iterative consultations involving a group of privileged informants through successive questionnaires designed to collect individual assessments and foster structured comparison on the topic under study. The size of the panel may range from a few participants to around fifty, although in practice most applications involve one or two dozen participants; reliable results can already be obtained with groups of 10-15 members (Dalkey and Helmer, 1963).

Panel composition is a crucial step: the objective is not statistical representativeness but rather the solidity and relevance of the expertise involved. The robustness of the method depends more on the quality of the selected expertise than on the number of participants (Koch and Prügl, 2011), and requires selection criteria consistent with the research objectives and context.

The process begins with an exploratory phase involving the preparation of an open-ended questionnaire designed to freely collect expert opinions. The responses are subsequently analysed, grouped, and reorganized by the researchers to construct the instruments for the following rounds, clarifying key concepts and outlining the general framework of the problem. It should be noted that, since this preliminary phase is often laborious and time-consuming, it has recently been supported by artificial intelligence tools (Al-Qutaish, 2025).

The information emerging from the first questionnaire enables the development of the second, which initiates the first true Delphi round. In this phase, redundancies are removed and the content is logically synthesized, producing a structured set of relevant factors. When the objective is the construction of future scenarios, these factors correspond to events or conditions to be assessed in terms of plausibility, impact, probability, or future desirability.

After the first round, researchers produce a statistical summary of the collected respons-

es (Glenn, 2009), calculating in particular the first and third quartiles, from which they derive the interquartile range representing the central 50% of the evaluations. This interval is then returned to participants in the "second round," accompanied by the same questionnaire, thereby initiating the feedback mechanism. In this phase, participants are asked to reconsider their responses in light of the aggregated group data. Divergent positions may be maintained, provided they are justified through written and anonymous comments. These justifications feed the so-called "Delphi conference," an indirect exchange that stimulates reflection and potential revision of opinions (Pacinelli, 2008).

Anonymity and independent decision-making are essential elements of the method, as they allow privileged informants to express themselves freely and revise their judgments without external pressure. This mediated exchange process – feedback – constitutes the operational core of Delphi. After two or three rounds, or once a satisfactory level of consensus or stability has been reached, researchers discontinue the questionnaires and proceed with the final analysis. Although the interval between rounds may be short, it is often advisable to allow more time so that participants are not forced to reconsider their evaluations too quickly.

The Delphi method offers numerous advantages over other group-based techniques – such as conferences, brainstorming, or focus groups – in which direct communication among participants can generate systematic distortions. The strength of Delphi lies precisely in its ability to neutralize a series of cognitive biases that are difficult to avoid in face-to-face interactions. Among the main biases the method mitigates are:

- **Leadership bias**: in traditional meetings, the opinion expressed by the highest-ranking figure tends to orient the group, leading other participants to conform in order to avoid conflict with authority. This can limit freedom of expression and impoverish the quality of discussion.
- **Spiral of silence bias**: some individuals hesitate to express opinions perceived as minority positions for fear of isolation or disapproval. The silence of dissenters reinforces the impression that the dominant position is universally shared, creating a vicious cycle that further discourages divergent viewpoints.
- **Groupthink bias**: when a group seeks unanimity too quickly, members may sacrifice critical evaluation of alternatives in order to avoid internal conflict or conclude the work rapidly. In such cases, the desire for cohesion prevails over rationality, sometimes leading to poorly grounded or even irrational decisions.

In summary, the Delphi method enables a group of privileged informants to collectively contribute to the analysis of a problem, recreating the advantages of group work while avoiding the distortions typical of simultaneous physical presence (Pacinelli, 2008).

Although much of the literature on the Delphi method was produced in the last century, recent studies continue to confirm its effectiveness whenever it is necessary to gather the informed judgment of a group of knowledgeable individuals on a specific topic. Despite the many variants developed since the early applications at RAND, the structure of the classical Delphi method remains anchored to the fundamental phases already described.

As Pacinelli (2008) observes, the method rests on three essential principles:

- **Iterative structure** (controlled feedback): allows participants to reconsider their evaluations in light of aggregated panel responses.
- **Anonymity**: protects participants' identities, reducing the influence of hierarchies, leadership, or social pressure.
- **Asynchronous communication**: enables panel members to contribute from different places and at different times, reducing pressures linked to simultaneous interaction.

In the 1970s, the Delphi method was subject to several criticisms, particularly concerning an alleged lack of scientific rigor, although it was never clarified why it should be considered less reliable than other qualitative techniques such as interviews, case studies, or life histories. Among the main issues reported is the risk of participant dropout during the rounds, often due to the duration of the process, which may extend over several weeks. It has also been observed that convergence of responses may sometimes reflect implicit pressures toward conformity rather than genuine opinion change (Rowe et al., 1991; Woudenberg, 1991). In particular, those holding positions far from the median may feel compelled to modify them rather than justify them adequately (Linstone and Turoff, 2002).

Originally, Delphi aimed primarily at achieving consensus (or "convergence of opinions"), considered more robust than individual forecasts. Over time, however, attention has progressively shifted toward analysing the reasons for dissent, now regarded as a valuable element for understanding the complexity of the issue under examination. In this perspective, response variability becomes an informative indicator in itself, capable of revealing the structure and nature of underlying uncertainty.

The apparent simplicity of the method has sometimes encouraged poorly rigorous applications. Linstone and Turoff (2002) highlight a series of recurring errors that can compromise its effectiveness, including:

- the introduction of preconceived notions or excessively rigid frameworks;
- the unfounded belief that Delphi can replace any other form of communication;
- insufficiently accurate synthesis and presentation of results;
- the tendency to overlook extreme positions, thereby discouraging more critical contributions;
- underestimating the commitment required of participants, who should be adequately acknowledged for their time.

These criticisms concern the way the method has sometimes been applied rather than the method itself. When conducted with care and rigor, Delphi remains a reliable, powerful, and versatile tool. Recent literature attests to its renewed vitality, as demonstrated by the growing diffusion of methodological variants and adaptations.

Indeed, the method has undergone numerous adaptations and reformulations, giving rise to a series of variants that expand its application possibilities and merit brief examination.

Following the foundational contribution of Dalkey and Helmer (1963), the first major development of the method is attributed to Murray Turoff, who in 1970 proposed the Policy Delphi, designed for public policy analysis and decision-making support. This variant involves large and heterogeneous panels, engaging actors capable of influencing future developments, and evaluates scenarios not only in terms of probability but also desirability, feasibility, and relevance (Pacinelli, 2008). From this derives the Public Delphi, which extends participation to interested citizens.

In 1972, Olaf Helmer introduced the Mini Delphi, or Estimate-Talk-Estimate, an accelerated version combining written responses, face-to-face discussion, and subsequent individual reassessment synthesized through the median. Although it abandons the isolation typical of the classical Delphi, this variant offers greater speed and adaptability.

In 1974, De Groot proposed the Markov-Delphi, which integrates probabilistic models: expert opinions evolve according to a stochastic matrix based on a Markov chain. The weights assigned to others' evaluations may be constant (De Groot, 1974), variable (Chatterjee, 1975), or optimized to reduce overall variance (Marbach, 1980).

In 1975, Ford developed the Shang method (Ford, 1975), which maintains anonymity but eliminates the repetition of identical questions, replacing them with a sequence of progressive items that foster convergence and avoid initial anchoring, simplifying the experts' task. In the same year, the Nominal Group Technique (NGT) was introduced, a problem-solving method combining the advantages of direct interaction with those of individual elaboration, particularly useful when rapid decision-making is required (Delbecq et al., 1975).

In 1979, Rauch proposed the Decision Delphi, oriented toward coordinating decision-making among institutional actors, in which the quality of forecasts also depends on the future behaviour of participants (Rauch, 1979).

Toward the late 1980s, the Abacus-Delphi emerged, using a colour scale to express degrees of agreement or disagreement, making qualitative assessment more immediate and facilitating the participation of a large number of experts (Régnier, 1987).

A major methodological leap occurred in 2006 with Gordon and Pease's Real-Time Delphi, a fully computerized version that eliminates successive rounds: evaluations, statistics, and feedback are updated in real time, increasing efficiency and making the method suitable for large-scale studies (Gordon and Pease, 2006).

In 2011, Di Zio and Pacinelli introduced the Spatial Delphi, designed to address territorial decision-making problems (Di Zio and Pacinelli, 2011). Experts place "opinion points" on a map, from which a circle containing 50% of the points is derived – the spatial analogue of the interquartile range. In subsequent rounds, participants may reposition their points, justifying any choices outside the circle. The method is intuitive, reduces dropout risk, and is easily integrated with GIS systems.

Finally, the Real-Time Spatial Delphi (Di Zio et al., 2017) combines the advantages of Real-Time and Spatial Delphi: points on the map are dynamically updated and the convergence circle adjusts in real time, offering a particularly effective tool for complex territorial analyses.

Fig. 1 - The main stages in the development of the Delphi method and its derivatives

1.2 The Scenario Method

The scenario method has its roots in the 1950s and 1960s within the RAND Corporation, where it was developed as a tool for addressing strategic uncertainty in a context dominated by the Cold War. In this early phase, scenarios were used primarily to explore possible geopolitical and military developments, with the aim of preparing decision-makers and analysts for a plurality of potential futures (Kahn and Wiener, 1967). The approach was still strongly anchored in the logic of defence and deterrence, yet it already introduced the key idea of constructing alternative narratives to guide present-day choices.

In the 1980s and 1990s, the method underwent a significant shift thanks to Royal Dutch Shell, which successfully adopted it to anticipate oil shocks and transformations in the energy market. The Shell experience contributed to formalizing and disseminating the approach, introducing practices such as the construction of divergent scenarios, the analysis of driving forces, and the identification of critical uncertainties (Schwartz, 1991). This period marked the transition from a predominantly military use to a strategic application in the private sector, demonstrating how scenarios can support organisational resilience and adaptive capacity.

From the 2000s onwards, the method became consolidated within Futures Studies and spread across a wide range of fields: territorial planning, public policy, education, health, environmental sustainability, and social innovation. In this phase, scenarios were often integrated with analytical tools such as SWOT, PESTEL, systems analysis, and participatory methods, giving rise to more structured and multidisciplinary processes. From 2010 onwards, the introduction of dedicated software, online collaborative platforms, and artificial intelligence applications further expanded accessibility and dynamism (Wright et al., 2020), fostering the emergence of methodological variants such as the Mānoa Method, Wind Tunneling, and Delphi-based scenarios.

Overall, the scenario method enables the construction of plausible representations of alternative futures, offering strategic support through the simulation of future contexts, the assessment of the robustness of options, and the anticipation of emerging risks and opportunities. Beyond its analytical dimension, scenarios also perform a cognitive and cultural

function: they stimulate creative and systemic thinking, promote a holistic understanding of problems, and facilitate stakeholder engagement through participatory processes and shared narratives. In this sense, scenarios are not merely forecasting tools but genuine devices for collective learning and strategic orientation.

Over the decades, the development of the scenario method has given rise to three major methodological traditions, each reflecting a different conception of the future and of how it can be explored. These traditions are not mutually exclusive: they often overlap, interact, and are combined in contemporary foresight processes. Nevertheless, they represent three distinct lineages that have contributed to structuring the field of Futures Studies and diversifying approaches to scenario construction.

The first tradition comprises qualitative and interpretive approaches, which value intuition, expert judgment, and narrative construction. The second consists of quantitative and probabilistic approaches, grounded in mathematical models, simulations, and data analysis. The third tradition includes normative approaches, oriented not toward predicting possible futures but toward designing desirable ones and identifying the pathways needed to achieve them. Alongside these three main traditions stands the French school of la prospective, which, while sharing elements with the other approaches, is distinguished by its systemic vision and its emphasis on the active role of social actors in processes of transformation.

Accordingly, the methodological landscape can be summarized in the following approaches:

- **Intuitive Logic:** the most widely used approach internationally, originally developed by Royal Dutch Shell. It combines rational analysis and expert intuition to construct qualitative, coherent, and narratively robust scenarios. It focuses on identifying critical uncertainties and building divergent scenarios that help explore strategic alternatives.
- **Quantitative and probabilistic approaches:** based on mathematical models, simulations, historical series analysis, and probabilistic techniques. These are particularly used in fields such as economics, energy, environment, and demography, where data availability and the structure of phenomena allow for modelling complex dynamics and assessing the relative likelihood of different futures.
- **Normative scenarios:** oriented toward defining desirable futures, often constructed through back casting techniques, which start from a future objective and work backwards to identify the conditions, decisions, and trajectories required to achieve it. They are widely used in sustainable planning, public policy, and participatory processes.
- **French school of *la prospective*:** developed by authors such as Gaston Berger and Michel Godet, it proposes a systemic, strategic, and action-oriented approach (Godet, 2001). La prospective emphasizes the role of social actors, their capacity to influence the future, and the need to integrate structural, dynamic, and decision-making analyses. It combines methodological rigor with attention to collective processes of future construction.

The scenario method has demonstrated considerable effectiveness in addressing contexts characterized by high uncertainty and complexity, finding application in numerous areas of strategic planning. In the public sector, it has been used to support inclusive decision-making processes and to facilitate dialogue among actors with divergent visions. A notable example is the "Mont Fleur" project in South Africa, which helped create a space for political dialogue during the delicate post-apartheid transition, fostering convergence toward shared visions of the national future (Kahane, 2012).

In the tourism sector, scenarios have been employed to anticipate changes in demand, assess the impact of new technologies, and define sustainable development strategies, as evidenced by the growing attention of international research to scenario planning applied to tourism (Seyitoğlu & Costa, 2022; Hartman & Postma, 2024). In various regional contexts, the use of scenarios has made it possible to explore growth alternatives, manage seasonality, diversify offerings, and strengthen destination resilience to external shocks such as economic crises or climatic transformations. These processes have often involved local administrations, tourism operators, and resident communities, contributing to the construction of shared visions and more robust long-term plans.

The method has also played a significant role in educational and environmental fields, supporting the definition of strategies oriented toward sustainability, community participation, and the development of collective adaptive capacities. Overall, the use of scenarios has enabled the integration of diverse perspectives, the stimulation of systemic thinking, and the facilitation of more inclusive decision-making processes, particularly in contexts where future trajectories are especially difficult to predict.

In the analysis of possible futures, it is essential to remember that scenarios, in any context, are never predictions but tools for exploration, reflection, and strategic orientation. Their function is not to anticipate what will happen but to broaden the spectrum of possibilities, make uncertainties visible, and support more informed decisions in the present.

From this perspective, the choice made in this work to represent three scenarios – including two extreme configurations, one highly desirable and one dystopian – is intentional: it serves to delineate the boundaries within which a complex and inherently unpredictable system may evolve. Since no scenario will ever coincide with the real future, producing many intermediate variants would risk adding complexity without increasing interpretive capacity. Extreme scenarios, although they may appear less plausible, should not be read as probable futures but as boundary references that help clarify what should be encouraged and what should be avoided.

For this reason, when a dystopian scenario is included among the proposed alternatives, its role is not predictive but preventive. It functions as a warning and guides present policies and decisions toward preventing its realization. If the dystopian scenario does not occur, this does not demonstrate that the scenario was "wrong" but rather that the objective has been achieved. This confirms once again that scenarios are not anticipations of the future but conceptual maps for navigating uncertainty and guiding collective action.

In this sense, according to the main sources in Futures Studies, the key principles of a scenario-based approach are the following:

- The future remains **open** and inherently **uncertain**, especially when analysing complex systems such as the one considered in this study. It is precisely this indeterminacy that underpins the exploratory approach to scenario construction.
- Scenarios are not intended to anticipate what will occur but to outline the set of **plausible possibilities**. They are representations of the future that enable strategic reasoning and broaden the decision-making horizon.
- The choice to include extreme scenarios – one highly desirable and one decidedly negative – serves to stimulate critical thinking, counter the tendency to focus only on what appears realistic, and **orient policies toward desired transformations**.
- The guiding question is not "What will happen?" but "If this scenario were to occur, how could we respond?" This framing supports the design of **flexible strategies** capable of adapting to changing contexts.

The methodology of Delphi-based future scenarios, already well established in the literature and applied here to sustainable tourism, combines the Delphi method with scenario planning to explore possible futures and support strategic decision-making in high-uncertainty contexts. The process involves iterative consultations with a panel of experts through Delphi questionnaires, aimed at collecting assessments on critical variables for the evolution of the tourism sector in the Apulia region – such as key factors, weak signals, wild cards, and drivers of change – from which scenarios are constructed. The preliminary scenarios are then reviewed by the same experts to assess their internal coherence, plausibility, and strategic relevance for destination sustainability.

Artificial intelligence can support this process, for example in the scanning phase for key factors or by generating draft policies or thematic clusters through semantic analysis, which are subsequently validated and integrated by the expert panel.

Both the Delphi method and scenario planning are widely used in sustainable tourism planning to address uncertainty, foster participatory processes, and orient long-term strategies. Delphi is particularly useful for defining priorities, assessing impacts, and identifying convergence among stakeholders (Linstone & Turoff, 2002; Tapio, 2003), while scenario planning enables the construction of alternative visions of territorial development and supports adaptive and resilient forms of governance (Ratcliffe, 2002; Albrechts, 2004). When integrated, these tools provide robust support for guiding tourism destinations toward more sustainable, shared, and future-adaptive development models.

2. Methodology and Results

As discussed in the previous section, within Futures Studies the Delphi method represents a particularly effective tool for constructing coherent and well-structured future scenarios, grounded in variables identified, discussed, and validated by a panel of experts. When applied to tourism, this approach makes it possible to explore alternative trajectories of territorial development, linking present-day decisions to the social, economic, environmental, and regulatory dynamics that may emerge in the long term.

To analyse the future of tourism in Apulia with a time horizon to 2045, an integrated methodological framework was adopted, combining the qualitative contribution of experts with quantitative analytical tools. This integration makes it possible to capture both the interpretative dimension of change and its potential systemic evolution, thereby providing a more robust foundation for scenario construction.

Adopting a long-term perspective is not only useful but indispensable. Tourism policies require extended periods for design, approval, and implementation, and their effects often become visible only after several years. Without an anticipatory vision, there is a risk that decisions taken today will be obsolete by the time they begin to produce effects, resulting in wasted resources and missed strategic opportunities.

Scenario-based approaches respond precisely to this need: they allow for the exploration of alternative futures, the assessment of policy resilience, and the orientation of choices toward trajectories compatible with expected social, environmental, and technological transformations. Scenario use also enables the design of flexible and adaptive interventions capable of maintaining their relevance over time, even in the presence of uncertainty, change, and external shocks. In this sense, the methodology adopted does not merely describe possible futures but provides concrete support for the construction of more robust, sustainable, and forward-looking territorial strategies.

In this study, we employed the Delphi-based scenario method (Di Zio et al., 2021; Calleo et al., 2025), which begins with the construction of an exhaustive list of factors characterizing the tourism system and necessary for building future scenarios. These factors can be technically classified into the following categories: Weak Signals, Wild Cards, Key Factors, and Drivers of Change.

Weak Signals represent subtle, often marginal and difficult-to-detect indications that anticipate the emergence of future changes. They may originate from diverse domains – technological innovations, social transformations, environmental shifts, new cultural practices – and, when observed over time, may evolve into structured trends or phenomena capable of altering system behaviour. Their usefulness lies precisely in their ability to capture what is emerging "at the margins" before it becomes evident.

Wild Cards, by contrast, are not weak signals but sudden, rare, high-impact events such as pandemics, geopolitical shocks, or climate-related disasters. Although difficult to predict, their inclusion in the analytical process is essential because they can radically alter established trajectories and render existing policies or strategies obsolete. Weak signals and wild cards together enable the construction of more robust scenarios, capable of integrating both the gradual evolution of systems and potential abrupt disruptions.

Key Factors are the structural variables that define the configuration of a system, such as infrastructure, demographic dynamics, regulatory frameworks, or economic models. They are relatively stable elements that determine the overall functioning of the context under analysis. Drivers of Change, instead, are the forces acting upon these factors: technological innovations, economic crises, shifts in social behaviour, environmental pressures. They are the engines of change, the forces that push the system toward new configurations.

A useful distinction for understanding the functioning of complex systems concerns the

relationship between key factors and drivers of change. The former may be imagined as the supporting pillars of a bridge: structural, relatively stable elements that sustain the entire system and define its basic architecture. The latter represent the wind blowing across the bridge, exerting variable and sometimes unpredictable pressures on its structures. They do not directly alter the nature of the pillars but test their resilience, reveal their weaknesses, and may require them to be reinforced or redesigned. This metaphor makes the relationship between stability and change immediately visible: while key factors provide shape and continuity to the system, drivers of change are the forces that push it toward new configurations. Understanding how the "wind" acts upon the "pillars" makes it possible to anticipate significant transformations, identify strategic levers, and design more resilient policies capable of adapting even to unexpected external pressures.

Through an extensive literature review and consultation with Apulian tourism stakeholders (conducted through a series of focus groups), we defined an initial list of 124 factors. These were subsequently analysed, refined, and selected by experts, resulting in a final list of 57 factors (see Tab. A.1 in the Appendix).

The analysis of the factors selected by experts reveals a multifaceted framework spanning several strategic dimensions of Apulian tourism. A first cluster concerns infrastructure, accessibility, and mobility, including both the strengthening of connections and the challenges posed by their obsolescence. Alongside this lies the sphere of environmental sustainability and territorial management, encompassing ecosystem protection, overtourism prevention, and the adoption of responsible practices. Another central area is the enhancement of cultural heritage and local identity, including initiatives related to culture, gastronomy, rural tourism, and authentic experiences. Complementing this is the dimension of service quality and professional training, essential for ensuring high standards of hospitality and adequate sectoral competencies. Governance and public policy also play a decisive role, including institutional coordination, regulation, community participation, and public-private collaboration. Transversal to all these areas is the impetus of technological innovation and digitalization, which is reshaping modes of consumption, booking, and service management. On the demand side, emerging market trends and new tourism segments appear, from seasonality reduction to experiential, sports, regenerative, and international tourism. Finally, a cross-cutting category concerns risks, vulnerabilities, and security, including phenomena such as crime, real-estate speculation, environmental degradation, and political instability, all of which may compromise the reputation and sustainability of the regional tourism system (Tab. A.1, Appendix).

These 57 factors were used to construct the Delphi questionnaire, administered using the CAWI technique (Computer-Assisted Web Interviewing) to a sample of 163 stakeholders and 235 citizens of the Apulia Region. Data collection took place between October and November 2025 across two rounds. The first round involved 398 respondents, while the second involved 95, reflecting on the one hand the usual (and inevitable) dropout phenomenon and on the other the robustness of the dataset, given the high number of completed questionnaires.

The panel in the first round (398 respondents) shows a heterogeneous composition but

with a strong prevalence of tourism sector operators. The most represented age group is between 35 and 54 years (approximately 57%), while young people under 34 account for about one fifth of the total. In terms of gender, the panel is well balanced, with 54% male and 46% female respondents (Fig. 2). From the perspective of participant roles, the panel covers several sectors, confirming a plurality of voices that ensures variability in factor assessments and broad coverage of the visions and interests of actors involved in the tourism system. In particular, the majority of participants are entrepreneurs or self-employed professionals active in tourism (36%, Tab. 1), followed by private-sector employees (24%) and private citizens (17%). The remaining categories – associations, public bodies, and educational institutions – represent smaller but valuable shares for ensuring a diversity of perspectives.

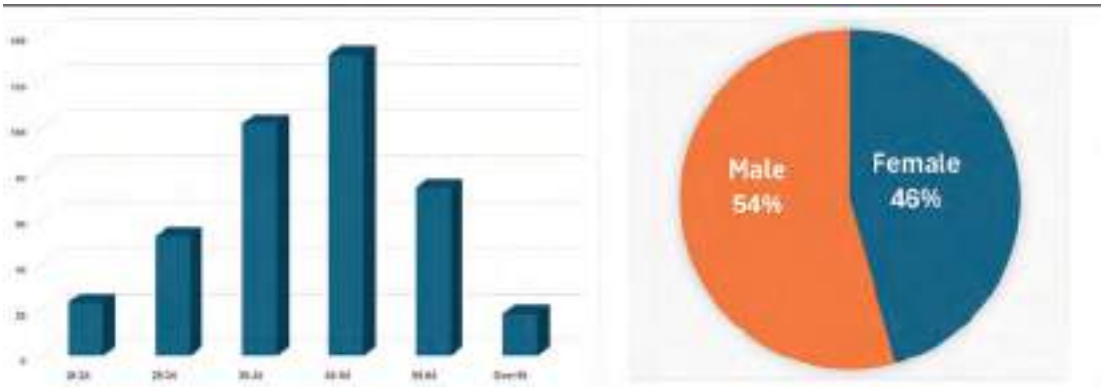

Fig. 2 - Distribution of the Panel by Age and Gender.

Tab. I. Distribution of the Panel by Role

Role	N	%
Entrepreneur / Self-Employed Professional	144	36%
Employee of a Private Company	97	24%
Private Citizen	67	17%
Employee of a Public Institution	29	7%
Member of Associations / Non-Profit Organisations	18	5%
Educational / Research Institutions	10	3%
Other	33	8%
	398	

The 57 factors were assessed, with a future horizon to 2045, according to the following three variables, each measured on a 1-10 Likert scale:

1. **Impact**: the extent to which the factor will affect the Apulian tourism system (regardless of whether the impact is positive or negative: 1 = minimal impact; 10 = maximum impact);
2. **Probability**: the likelihood that the factor will manifest by 2045 (1 = very low probability; 10 = very high probability);

3. **Desirability**: the extent to which the factor is desirable for Apulian tourism (1 = not desirable at all; 10 = extremely desirable).

At the conclusion of the first Delphi round, standard descriptive statistics were computed (in particular the first, second, and third quartiles) in order to construct, for each factor, the interquartile range to be presented in the second-round questionnaire. Based on this information, participants were invited to complete the questionnaire again (second Delphi round), taking the proposed intervals into account and providing written comments to justify any deviations or confirmations.

As noted earlier, 95 responses were collected in the second round, including more than 100 comments, confirming the strong participation and active engagement of respondents (see the Appendix for the full list of comments).

At this stage, the applied methodology requires the construction of a network of Delphi factors in order to classify them through a fuzzy approach (Calleo et al., 2025). Specifically, participants' responses in the Delphi survey are transformed into a network (Borgatti et al., 2009) based on correlations, allowing the identification of groups of interrelated factors through community-detection techniques and the assessment of their structural influence using centrality measures. A fuzzy clustering procedure is then applied to capture overlapping relationships among factors, reflecting the multidimensional nature of perceptions regarding the future of Apulian tourism. Finally, the fuzzy clusters are translated into narrative future scenarios and subsequently used to outline preliminary strategic guidelines for the sustainable development of tourism in Apulia.

2.1 Network community detection and centrality measures

The data from the second Delphi round constitute three matrices – one for each variable v – which we denote by $X^{(1)}, X^{(2)}, X^{(3)} \in \mathbb{R}^{E\times 3}$, where each $X^{(v)}$ contains the scores assigned by all participants to all factors for variable $v = 1,2,3$. In this study, the variables considered are $V = 3$ (Impact, Probability, Desirability). Since the scores expressed in the Delphi survey are ordinal in nature, Spearman's rank correlation is computed in order to measure the monotonic relationship between pairs of factors (Zar, 1972). This method ranks the values and calculates the correlation based on these ranks, making it appropriate for our data. For each variable $v = 1,2,3$, the correlation between factors i and j is computed as follows:

$$p_{ij}^{v} = 1 - \frac{6\sum d^2}{n(n^2-1)} \quad (1)$$

In which d represents the difference between ranks and n denotes the number of observations. To synthesise the three matrices into a single correlation matrix, we compute the average of the correlations across the variables. In this case, we apply the simplest assumption – assigning the same weight to all variables – although it is also possible to compute a weighted average with differentiated weights, in order to attribute varying importance to each variable:

$$Y = [y_{ij}] = \left[\sum_{v=1}^{V} p_{ij}^{v}/V\right] \quad (2)$$

It is important to note that alternative strategies may also be adopted, such as the use of a min-max correlation, since the method is flexible with respect to different procedures and compensation criteria. Following the indications provided by previous studies (e.g., Artusi et al., 2002), we adopt a threshold of 0.4 to determine the presence of a correlation between two factors. Values above this threshold are considered indicative of significant relationships and therefore determine the presence of a link between factors i and j within the network.

As a result, an adjacency matrix – denoted by $G = [g_{ij}]$ – is obtained, defining an undirected graph in which the nodes represent the Delphi factors and the edges represent correlations that exceed the established threshold ($y_{ij} \geq 0.4$). A *force-directed layout* is used to visualize the structure of the network. However, a simple undirected graph is not sufficient to rep-

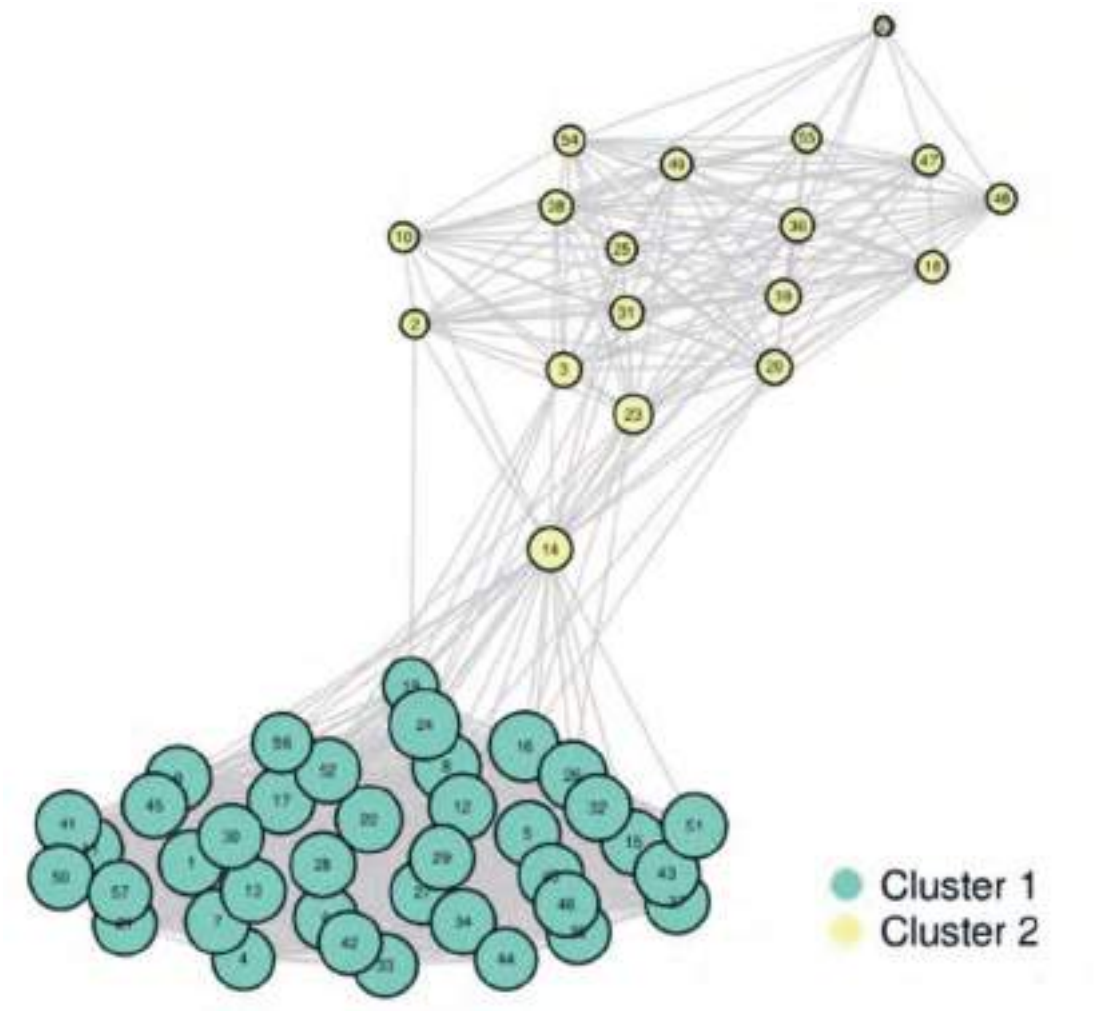

Fig. 3 - Spearman Correlation Network with Community Detection via the Louvain Algorithm

resent the Delphi factors in a structured way or to show how cohesive groups may emerge. For this reason, we adopt a *network community-detection* procedure (Fortunato and Newman, 2022) to identify clusters of strongly connected items within the network (Fig. 3). This aggregation process is essential for uncovering latent patterns in the Delphi responses. Community-detection algorithms – widely used in fields such as social network analysis, recommendation systems, and anomaly detection – allow these structures to emerge.

Compared to network analyses involving a large number of nodes and interconnections, Delphi networks consist of a relatively small set of factors (57 in our case). The choice of the most appropriate algorithm must therefore be evaluated carefully, and for this reason we adopt the Louvain algorithm (De Meo et al., 2011). This choice derives from its ability to optimize modularity, thereby quantifying the density of connections within clusters relative to those between different clusters. The algorithm operates in two distinct phases: a first phase in which it locally optimizes the nodes, and a second phase in which it hierarchically aggregates communities into "super-nodes." This efficiency and effectiveness in small-scale graphs makes it well suited to Delphi data, and for this reason we define the modularity function as:

$$Q = \frac{1}{2m}\sum_{ij}\left(g_{ij} - \frac{k_i k_j}{2m}\right)\ \delta(c_i, c_j) \quad (3)$$

where g_{ij} denotes the element of the adjacency matrix, k_i and , k_j represent the degrees of the nodes, m is the total number of edges, and δ is the Kronecker delta function: $\delta(c_i, c_j) = 1$ if nodes i and j belong to the same community (i.e., $c_i = c_j$) and 0 otherwise. Once the network has been constructed, we apply centrality metrics to quantify the relevance or influence of individual nodes within the network structure. Moreover, centrality measures make it possible to identify which factors received higher levels of agreement or disagreement.

The use of these measures represents an innovation within the scenario-planning literature and opens new interpretative possibilities for the results of Delphi studies. Accordingly, this work integrates four well-established centrality measures: degree, betweenness, closeness, and eigenvector centrality.

- **Degree centrality** reflects the number of direct connections a node has with others. It captures the number of strong correlations an item exhibits relative to the rest, based on respondents' evaluations. A high value indicates that a factor shares significant associations with many others, suggesting that it may represent a common or central element within the network.
- **Betweenness centrality** assesses how frequently a node lies along the shortest paths between pairs of other nodes. Applied to Delphi factors, it identifies those that act as "bridges," connecting factors or clusters that would otherwise be weakly linked. Such factors may be crucial for understanding transversal or transitional themes.
- **Closeness centrality** measures how close a node/factor is to all others, based on the distances of the shortest paths. Factors with high closeness values are well positioned

to influence the network rapidly, offering a broad and integrated perspective on participants' Delphi judgments.

- **Eigenvector centrality** considers not only the number of a node's connections but also the importance of the nodes to which it is connected. A node/factor with high eigenvector centrality is therefore linked to other influential nodes/factors, becoming a key concept within the structure of respondents' evaluations.

These metrics are particularly useful for interpreting Delphi data when modelled as a network, as they provide insights into the relevance of each factor based on its relationships with the others.

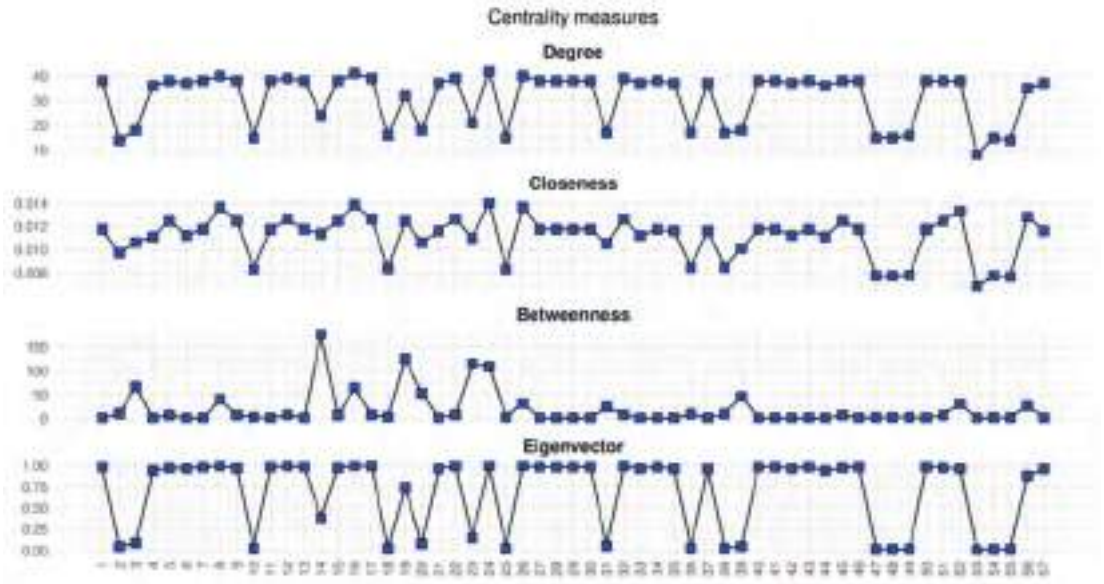

Fig. 4 - Centrality Measures for the Factor Network

The network analysis of the 57 Delphi factors provides a systemic representation of how different drivers of change may influence the future trajectory of Apulian tourism by 2045. The interpretation of centrality measures enables a multidimensional understanding of the structural and dynamic roles played by each factor within the network shaping the future of tourism (Fig. 4). Factors with high **degree centrality** are those most strongly connected to other elements in the network, indicating their transversal influence across multiple domains. In our case, most factors exhibit particularly high degree values, reflecting their capacity to affect both environmental and socio-economic processes. The high connectivity of these factors highlights the systemic importance of sustainability-oriented strategies for the long-term transformation of Apulian tourism. Conversely, items such as **53** (Negative impact of mass tourism: the excessive exploitation of natural and cultural resources may cause irreversible damage to the environment and local communities), **2** (Deterioration of transport infrastructure: lack of investment or degradation of airports, ports, roads, and railways, making access to the region more difficult), **10** (Overtourism: an

excessive influx of tourists into a specific area may cause environmental degradation, pressure on infrastructure, and negative impacts on local communities, potentially leading to "tourism-phobia" among residents), **47** (Expansion of aquatic and adventure tourism: development of water sports – kayaking, sailing, windsurfing, diving – and adventure activities linked to the sea and coastline, with investments in safety, accessibility, and specialized infrastructure), and **48** (Unjustified price increases: speculation on accommodation and service prices, which may deter tourists seeking good value for money) show very low degree values. This suggests that they are perceived as more isolated issues – certainly relevant, but not structurally integrated into the broader strategic discourse. Closeness centrality measures how efficiently a node can reach all others in the network – that is, how rapidly a factor can influence or be influenced by the entire system. Factors such as item **8** (Innovation in transport: collaborations with airlines to increase international connections), item **16** (Promotion of Apulia as an international destination: strengthening international marketing campaigns to attract more foreign tourists), item **24** (Public-private collaboration: incentives for cooperation between public bodies and private actors to develop innovative and sustainable tourism initiatives), item **26** (Sustainable and accessible tourism: efforts to create experiences for families and people with disabilities by improving accessibility and usability of attractions), and item **52** (Advocacy for responsible tourism: growth of organizations and movements promoting sustainable and community-respectful tourism practices) show very high values on this measure. Their proximity to many other nodes/factors implies that changes or policies in these areas can propagate rapidly through the system of interdependencies. This means that any intervention on a factor with high closeness centrality triggers cascading effects across multiple domains, making related policies particularly delicate. For example, increasing international air connections (factor 8) does not only affect transport, but immediately reshapes tourism demand, service needs, marketing strategies, public-private cooperation, and even environmental pressures. Factors with high betweenness act as connectors or mediators between different clusters (and therefore scenarios) within the network. They control the main channels of interaction and function as bridges between subsystems that would otherwise remain weakly connected. The factor that stands out most clearly in this regard – already noted earlier – is item **14** (Infrastructure problems: issues related to internal mobility, particularly in rural or less accessible areas), followed by items **19** (Wine tourism and experiential gastronomy: weak signal of growth in wine tourism and gastronomic experiences linked to Apulian traditions, focusing not only on tasting but also on participation in production processes), **23** (Lack of professional training in the tourism sector: insufficient skills among tourism operators, which may lead to a decline in service quality), and **24** (Public-private collaboration: incentives for cooperation between public bodies and private actors to develop innovative and sustainable tourism initiatives). Their high betweenness values indicate that they function as linking mechanisms between infrastructure, specialized professions, and public-private partnerships. One possible implication emerging from these results is that, since internal mobility, professional training, experiential wine tourism, and public-private collaboration act as connecting nodes across multiple domains, policies should focus on integrated interventions

that strengthen them simultaneously. For example, improving transport in rural areas should be accompanied by training programs for local operators and by public-private partnerships aimed at developing experiential food-and-wine products. In this way, a single infrastructural intervention generates positive effects on service quality, innovation in the tourism offer, and the overall cohesion of the tourism system. While degree centrality measures the number of connections, eigenvector centrality assesses the quality of those connections, assigning higher scores to factors linked to other highly central nodes. Most nodes in the network display very high values on this measure (Fig. 4), indicating structurally influential elements connected to other key drivers with strong systemic relevance. Their prominence reveals the hierarchical backbone of the future development of Apulian tourism, in which integrated governance, anticipatory policies, and transitions toward sustainability mutually reinforce one another. High eigenvector values indicate that these domains not only influence many other factors but are themselves embedded within the most critical clusters of the network. This result suggests that the success of the transition toward a sustainable and fully mature tourism model depends less on isolated sectoral interventions and more on the strength and coherence of relationships among the many highly central elements. Factors that appear more marginal in this regard include items **47** (sports and adventure tourism), **48** (unjustified price increases), **49** (crime and insecurity), **53** (negative impact of mass tourism), **54** (decline of traditional tourism), and **55** (tourism seasonality). The interaction among the four centrality dimensions reveals a polycentric network rather than one dominated by a single driver. The joint interpretation of degree, closeness, betweenness, and eigenvector centrality makes it possible to identify not only which factors are most connected, but also which ones most rapidly diffuse transformations, which act as bridges between subsystems, and which occupy structurally influential positions within the overall architecture of the network. This integrated reading allows us to distinguish nodes that generate immediate effects from those that orchestrate deeper, systemic changes, offering a richer understanding of the leverage points on which to intervene in order to steer the future evolution of the Apulian tourism system. Having briefly described the results of the centrality measures, we now turn to the construction of the fuzzy clusters required for the development of future scenarios.

2.2 Fuzzy Clustering on the Factor Network

Once the community network has been constructed and the centrality measures calculated, a *fuzzy clustering* procedure is applied to capture overlapping group structures among the Delphi factors. Unlike *hard-clustering* approaches, fuzzy clustering allows each factor (in this case, each node) to belong to multiple clusters with different degrees of membership, reflecting the nature of participants' opinions in contexts – such as ours – characterized by uncertainty. Fuzzy clustering is a crucial component of this approach because it enables the grouping of factors into overlapping sets and makes it possible to identify – unlike classical scenario-building approaches – the embryonic forms of scenarios through an objective method, thereby avoiding subjective influences and biases. Starting from the community

structure identified through the Louvain algorithm, a binary affinity matrix is constructed, denoted by $\boldsymbol{A} = [a_{ij}]$, which encodes the similarity between pairs of nodes based on their shared membership in the same clusters. Specifically, the affinity between items *i* and *j* is defined as:

$$\boldsymbol{A} = [a_{ij}] = \begin{cases} 1 \text{ if } c_i = c_j \\ 0 \text{ if } c_i \neq c_j \end{cases} \quad (4)$$

where c_i and c_j represent the communities to which nodes *i* and *j* belong, respectively. Each node *i* is represented by the corresponding row of the affinity matrix, $x_i = (a_{i1}, a_{i2}, \ldots, a_{iN})$, which summarises its similarity relationships with all other nodes. This representation is then used as input for the Fuzzy C-Means (FCM) algorithm, which minimises the following

$$J_m(U,V) = \sum_{i=1}^{N}\sum_{j=1}^{C} u_{ij}^{m} \|x_i - v_j\|^2 \quad (5)$$

where *N* is the number of nodes, *C* the number of clusters, u_{ij} the membership degree of item *i* in cluster *j*, v_j the centroid of cluster *j*, and *m* the fuzziness parameter (typically set to 2). The distance function used is generally the squared Euclidean distance.

Once the optimal number of clusters has been determined using the elbow method (Bholowalia et al., 2002), fuzzy clustering is performed, assigning each factor a set of membership values across the different clusters (which will later become the future scenarios). The sum of a node's membership degrees across all clusters must equal 1. For example, a factor may have a membership degree of 0.7 in cluster 1, 0.2 in cluster 2, and 0.1 in cluster 3. This means that the node is primarily associated with scenario 1, while still showing some affinity with the other two scenarios.

To facilitate interpretation and visualization, factors are then assigned to the cluster in which they exhibit the highest membership degree. The final network visualization reflects these fuzzy assignments and, for a clearer interpretation in terms of Delphi results, node colours indicate cluster membership, while node size represents the interquartile range (IQR) of the scores, which can be used as a reliable indicator of consensus or disagreement on the specific topic. Larger nodes correspond to greater variability (lower agreement among participants), whereas smaller nodes indicate stronger consensus.

To assess the internal coherence of each cluster, we compute *Cronbach's alpha* for polychoric correlations, that is, a version of the traditional Cronbach's alpha adapted to ordinal or non-continuous data. This coefficient measures how well the factors within a cluster represent a single latent construct, effectively serving as an indicator of the cluster's quality and, consequently, of the coherence of the scenario derived from it.

It is calculated as:

$$\alpha_{poly} = \frac{I}{I-1}\left(1 - \frac{\sum_{i=1}^{I} \sigma_{X_i}^2}{}\right) \quad (6)$$

where I is the number of factors in the cluster, $\sigma_{X_i}^2$ is the variance of factor i, and σ_X^2 is the variance of the total score aggregated across the factors.

A coefficient value of $\alpha_{\text{poly}} \geq 0.9$ is considered excellent. If the coefficient falls below this threshold, possible explanations include: (a) internal inconsistency in the responses to the Delphi factors; (b) reduced variance due to unbalanced cluster sizes; or (c) the presence of outliers that distort variance estimates. In such cases, we employ diagnostic tools such as Z-scores or outlier-detection methods based on the IQR to identify problematic factors. To improve cluster reliability, it is possible to examine how α_{poly} changes when individual items are removed or reassigned. If removing an item from a cluster increases α_{poly}, this suggests that the item is not aligned with the others and may be more appropriately placed in a different cluster. Conversely, if α_{poly} improves when an item is added to a new cluster, such an addition is considered beneficial. This flexible and fuzzy approach allows items to be reassigned across clusters when justified by internal coherence, accommodating the complex and overlapping structure that often characterizes data derived from Delphi studies. The fuzzy clustering analysis of the 57 nodes describing the Apulian tourism system in a future-oriented perspective to 2045 reveals a multidimensional structure, characterized by partial memberships distributed across three main clusters. The fuzzy partition coefficients indicate that most factors display dominant memberships above 0.70 (see Tab. 2), suggesting clear thematic coherence but also overlapping influences among clusters – an indication of the systemic interdependence typical of complex systems, with a Cronbach's α_{poly} value of 0.93.

Cluster 1 includes the nodes with the highest membership values, ranging from 0.43 to 0.83, among which are factors 17 (experiential tourism, $u_{ij} = 0.829$), 8 (innovation and transport, $u_{ij} = 0.823$), 13 (integrated tourism packages, $u_{ij} = 0.819$), and 16 (Apulia as an international destination, $u_{ij} = 0.790$). Together with the other factors, these elements define a cluster characterised by integrated and sustainable tourism aimed at strengthening international attractiveness. These initiatives seek to enhance Apulia's tourism appeal through an integrated, experiential, and sustainability-oriented approach.

Cluster 2 exhibits very high membership levels, ranging from 0.52 to 0.99. The factors that primarily characterize it include item 49 (crime and insecurity, $u_{ij} = 0.993$), item 54 (decline of traditional tourism, $u_{ij} = 0.991$), item 39 (fragmented tourism system, $u_{ij} = 0.989$), and item 47 (sports tourism, $u_{ij} = 0.986$). Together with the other factors in the cluster, these elements outline a negative future, marked by deteriorating infrastructure, tourism pressure, and weak governance mechanisms – a critical, almost dystopian scenario that threatens the economic, social, and environmental sustainability of the region.

Finally, Cluster 3 shows membership levels ranging from 0.52 to 0.76. Among the factors with the highest membership values are item 52 (advocacy activities for responsible tourism, $u_{ij} = 0.757$), item 41 (growing interest in sustainable and regenerative tourism, $u_{ij} = 0.751$), item 30 (growth of sustainable tourism, $u_{ij} = 0.746$), and item 50 (collaboration between public and private entities, $u_{ij} = 0.742$). All the factors included in this cluster depict a region with a strong international tourism vocation, capable of combining sustainability,

inclusiveness, and innovation. It represents a region endowed with an advanced, robust, and highly competitive tourism sector, able to attract travellers from both traditional and emerging markets while ensuring positive and tangible benefits for local communities and the wider territory.

Tab. II - Membership values for the Fuzzy Clusters

Factor	u_{i1}	u_{i2}	u_{i3}	Assigned Cluster	Factor	u_{i1}	u_{i2}	u_{i3}	Assigned Cluster
1	**0.6667**	0.0061	0.3272	1	30	0.2527	0.0011	**0.7462**	3
2	0.0504	**0.8949**	0.0547	2	31	0.0168	**0.9654**	0.0178	2
3	0.0387	**0.9176**	0.0436	2	32	0.4244	0.0047	**0.5709**	3
4	**0.5945**	0.0071	0.3984	1	33	0.4321	0.0050	**0.5629**	3
5	**0.6404**	0.0046	0.3549	1	34	0.4595	0.0041	**0.5364**	3
6	**0.7316**	0.0026	0.2658	1	35	**0.5059**	0.0052	0.4888	1
7	**0.7822**	0.0022	0.2156	1	36	0.0066	**0.9856**	0.0078	2
8	**0.8235**	0.0010	0.1755	1	37	0.3932	0.0130	**0.5938**	3
9	**0.5275**	0.0199	0.4526	1	38	0.0124	**0.9737**	0.0138	2
10	0.0246	**0.9494**	0.0260	2	39	0.0053	**0.9889**	0.0058	2
11	**0.7253**	0.0019	0.2727	1	40	0.4712	0.0118	**0.5170**	3
12	**0.6673**	0.0032	0.3295	1	41	0.2427	0.0061	**0.7512**	3
13	**0.8193**	0.0024	0.1783	1	42	0.3924	0.0087	**0.5989**	3
14	0.2476	**0.5089**	0.2435	2	43	0.3354	0.0027	**0.6618**	3
15	**0.7299**	0.0038	0.2663	1	44	0.3244	0.0087	**0.6669**	3
16	**0.7899**	0.0075	0.2026	1	45	0.4061	0.0181	**0.5759**	3
17	**0.8288**	0.0011	0.1701	1	46	0.2562	0.0056	**0.7382**	3
18	0.0087	**0.9823**	0.0090	2	47	0.0067	**0.9857**	0.0076	2
19	**0.4257**	0.1713	0.4029	1	48	0.0112	**0.9765**	0.0123	2
20	0.0203	**0.9629**	0.0169	2	49	0.0033	**0.9929**	0.0038	2
21	**0.6276**	0.0077	0.3647	1	50	0.2562	0.0017	**0.7420**	3
22	**0.6330**	0.0017	0.3653	1	51	0.2947	0.0073	**0.6980**	3
23	0.0182	**0.9649**	0.0169	2	52	0.2315	0.0109	**0.7576**	3
24	**0.5145**	0.0098	0.4757	1	53	0.0184	**0.9607**	0.0209	2
25	0.0218	**0.9521**	0.0261	2	54	0.0045	**0.9908**	0.0047	2
26	0.3829	0.0032	**0.6138**	3	55	0.0175	**0.9653**	0.0172	2
27	0.3918	0.0025	**0.6057**	3	56	0.4111	0.0563	**0.5326**	3
28	0.4282	0.0018	**0.5700**	3	57	0.3483	0.0200	**0.6317**	3
29	0.3969	0.0048	**0.5983**	3					

As emerges from these initial analyses and from the visual representation of the clusters

on the factor network (Fig. 5), Clusters 1 and 3 clearly reflect a positive and desirable future, and they intertwine with one another while keeping Cluster 2 isolated. The latter stands out sharply from the others, being characterized by a negative and entirely undesirable future. Moreover, Clusters 1 and 3 display considerable variability in participants' responses, as indicated by the size of the network nodes. By contrast, in Cluster 2 there was strong consensus in identifying the factors as undesirable, underscoring the need for immediate action to prevent this dystopian future.

The fuzzy nature of the clustering, unlike classical scenario-building approaches, highlights significant cross-cutting connections among environmental, social, and economic dimensions (Tab. 2). Factors such as wine tourism and experiential gastronomy (19), infrastructure (14), accommodation capacity (56), innovation in transport (9), or the development of emerging markets (40) exhibit partial memberships across different clusters, con-

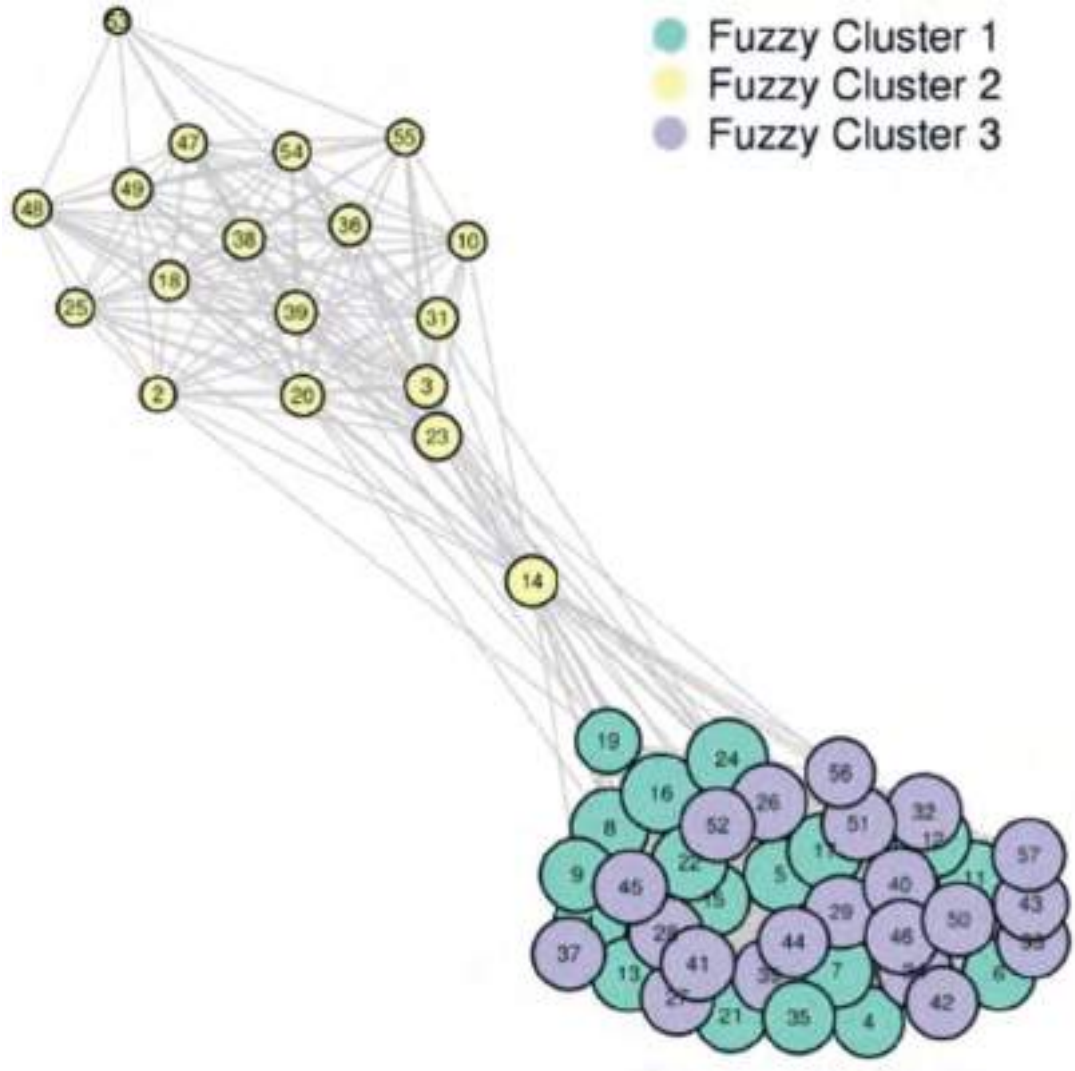

Fig. 5 - Network of the 57 Factors with Their Assigned Clusters

firming that sustainable tourism development in the Apulia region cannot follow a linear sequence but is instead characterized by multi-domain co-evolution.

The transition from Cluster 2 – dominated by vulnerability – to the other clusters oriented towards innovation and sustainability is clearly mediated by factor **14** (infrastructural problems related to internal mobility, particularly in rural or less accessible areas), as well as by factors **23** (lack of professional training in the tourism sector: insufficient skills among tourism operators, which can lead to a decline in service quality) and **19** (wine tourism and experiential gastronomy: a weak signal of growth in wine-related tourism and gastronomic experiences rooted in Apulian tradition, focusing not only on tasting but also on participation in production processes). A serious long-term planning effort cannot overlook the strategic relevance of these variables, which act as a crossroads between a desirable future and a dystopian one.

From a governance perspective, the results of the fuzzy clustering provide a preliminary framework (further elaborated in the scenario analysis) for defining intervention priorities based on their systemic leverage.

- **Cluster 1** highlights a region growing harmoniously thanks to modern infrastructure, high-quality services, and sustainability, becoming a competitive and well-governed international tourism hub.
- **Cluster 2** warns of the possibility of a region facing a future in crisis, marked by infrastructural decay, overtourism, and ineffective governance, where tourism becomes a source of conflict and loss of value.
- **Cluster 3** outlines an innovative and regenerative tourism ecosystem, grounded in sustainability, community participation, and soft mobility, capable of generating widespread well-being and new opportunities.

The partial memberships highlight that policy actions cannot be addressed in a sectoral manner. On the contrary, inter-cluster governance mechanisms (for example, in areas such as wine tourism and experiential gastronomy, infrastructure, accommodation capacity, and transport innovation) are essential to achieving systemic coherence by 2045.

3. Construction of Future Scenarios

After applying the network-based fuzzy clustering procedure, the resulting cluster structures are interpreted as coherent sets of interrelated factors that form the basis for constructing corresponding future scenarios for tourism. Each fuzzy cluster represents a possible configuration of strategic, social, economic, and environmental dynamics emerging from the convergence of the Delphi participants' opinions. These configurations therefore reflect the shared future vision of the key informants. Interpreting these clusters as "scenario nuclei" makes it possible to transform quantitative relationships into meaningful narratives that can stimulate debate and, above all, inform long-term policy thinking (Wright et al. 2020).

The output of the fuzzy clustering inherently captures the multidimensional nature of

tourism development processes. In this context, the partial and overlapping membership of factors across clusters reflects the real complexity of tourism systems, in which policy domains and strategic issues are interdependent rather than neatly separated. This interpretative flexibility is particularly valuable for foresight analysis, as it embraces uncertainty and recognizes that future trajectories may evolve through the combination or coexistence of different scenario components (Di Zio et al. 2021).

To enhance the readability and communicability of the results, each scenario will be represented not only through narrative description but also through the graphical and descriptive network tools introduced earlier. Network visualizations are useful for illustrating the interconnections among key factors within each scenario, highlighting high-centrality nodes that play a crucial role in shaping the evolution of the complex Apulian tourism system. These visual representations are then translated into narrative texts that describe the main features, drivers, and implications of each scenario.

3.1 Three scenarios for Apulian tourism in 2045 and their implications for stakeholders and policy makers

The combined approach of correlation analysis, network construction, community detection, centrality measures, and fuzzy clustering makes it possible to identify the complex relationships among the key factors of the Apulian tourism system, to group them into coherent and plausible scenarios, and to quantify the relative importance of each factor. This provides a solid foundation for formulating long-term planning and governance strategies. Each scenario is analysed by identifying the most influential factors within each cluster, in order to pinpoint specific intervention points, and is classified as desirable or undesirable based on the median desirability scores of the factors it contains.

Overall, this phase transforms the analytical results of the future scenarios into a decision-support tool, offering public decision-makers and local stakeholders a structured framework for imagining and evaluating alternative policy pathways. The emphasis is on promoting adaptive governance, capable of responding flexibly to emerging challenges while maintaining coherence with broader sustainability and resilience objectives. In this sense, the scenario representation and policy-development phase not only synthesizes the outcomes of the Delphi-based statistical analysis but also operationalizes them by translating them into strategic guidance for territorial decision-making.

The three scenarios emerge when the factors identified through fuzzy clustering are translated into coherent narratives. With the support of Artificial Intelligence tools (Microsoft Copilot), used solely to develop the narrative based on the set of factors identified in each scenario, the experts involved in the PRIN project outlined three future visions in narrative form, each accompanied by a title that encapsulates its specific identity. It is important to emphasize that scenarios do not predict which future will occur – they are never forecasts – but instead help to rethink the present by making alternatives, uncertainties, and margins for choice visible.

Scenario 1: Apulia as an International Hub of Sustainable and Experiential Tourism

A Connected and Regenerated Apulia in 2045

In 2045, Apulia stands as one of the most recognized and desirable tourist destinations in Europe, thanks to a combination of strategic choices and forward-looking investments. The region has successfully integrated infrastructural modernization, transport innovation, cultural enhancement, and environmental protection, creating a sustainable development model that generates economic, social, and environmental benefits.

Accessibility and Connectivity

Modernized airports and ports, together with upgraded railway networks, have made Apulia easily accessible from all parts of the world. Collaboration with airlines has multiplied international connections, while sustainable mobility solutions (electric vehicles, car-sharing) have reduced the environmental impact of internal travel. The region is perceived as a connected and green Mediterranean hub capable of attracting diversified tourist flows.

Seasonality Reduction and Resilience

Through cultural, sporting, and conference events organized during autumn and winter, Apulia has overcome the logic of tourism concentrated solely in summer. The favourable climate has made the region a preferred destination for Northern European visitors even in the low season, ensuring economic and employment stability throughout the year.

Culture, Nature, and Authenticity

Investments in cultural and artistic heritage have revitalized villages, archaeological sites, and museums, transforming them into major attractions, while the protection of natural parks and marine reserves has preserved biodiversity and strengthened Apulia's image as an environmentally respectful destination. Experiential tourism has become the core of the regional offer: stays in *masserie*, artisanal workshops, and personalised guided routes have made the visitor experience authentic and engaging.

Food and Wine as a Strategic Lever

Wine tourism and experiential gastronomy have evolved from weak signals to strong pillars of regional tourism. Winery tours, olive harvesting, and traditional cooking workshops have turned Apulian food and wine into participatory experiences. At the same time, the promotion of local products has reinforced territorial identity and generated new high-value market niches.

Skills and Governance

Professional training programs have raised the quality of hospitality, turning tourism operators into ambassadors of local culture. Collaboration between public and private actors has fostered innovative and sustainable initiatives, supported by an inclusive and par-

ticipatory governance model. Meanwhile, international marketing campaigns have consolidated Apulia's global reputation, amplified by positive reviews that strengthen visitor trust.

This scenario portrays Apulia in 2045 as a laboratory of sustainable and experiential tourism, balancing accessibility, authenticity, and territorial protection.

Implications for Stakeholders and Policy Makers

- **Local stakeholders:** must continue investing in quality, authenticity, and sustainability to maintain the reputation achieved.
- **Policy makers:** must ensure coherence between infrastructural development and environmental protection, supporting training and incentivizing public-private collaboration.
- **Local communities:** benefit from year-round tourism, with positive effects on employment, income, and social cohesion.

Scenario 2: Apulia Between Infrastructural Decay and Unsustainable Overtourism

A Fragile and Overburdened Apulia in 2045

In 2045, Apulia finds itself in a critical condition: although the region has retained some degree of tourist appeal, it is trapped in a fragile and unbalanced development model. The combination of degraded infrastructure, tourist overcrowding, and weak governance has produced a dystopian context that threatens economic, social, and environmental sustainability.

Infrastructure in Decline

Airports, ports, and railway networks have not received adequate investment, becoming obsolete and inefficient. Connections between airports and cities are poor, taxis are insufficient, and internal mobility in rural areas remains marginalized. As a result, visitors face poor services and logistical difficulties, reducing the region's competitiveness compared to other Mediterranean destinations.

Service Quality and System Fragmentation

Insufficient linguistic and professional training has compromised hospitality standards. The absence of structured training programs has led to a decline in overall service quality, and the tourism system appears fragmented, lacking coordination between operators and institutions, with widespread perceptions of inefficiency and improvisation.

Overtourism and Tourism-Phobia

Excessive tourist inflows in certain areas have caused environmental degradation, pressure on infrastructure, and loss of cultural authenticity. Local communities have developed forms of tourism-phobia, perceiving tourism as invasive and harmful. Extreme seasonality, concentrated in summer months, has exacerbated economic and logistical sustainability issues.

Speculation and Land Misuse

Uncontrolled construction of tourist facilities in natural areas has caused irreversible ecosystem damage and biodiversity loss. Real-estate speculation has compromised landscape attractiveness and Apulia's reputation as an authentic destination.

Security and Reputation

Rising crime rates and widespread perceptions of insecurity have discouraged visitors, undermining international trust. This sense of instability is aggravated by inconsistent policies and slow bureaucracy, which have hindered new investments and revitalization projects.

Sports and Adventure Tourism as a Weak Niche

Despite the development of outdoor activities (cycling, trekking, water sports), these initiatives have not compensated for the decline of traditional tourism. Unjustified price increases have further discouraged visitors seeking good value for money.

This scenario represents a future to avoid, but its non-negligible probability makes it a warning signal. It serves as a tool for awareness, guiding strategic decisions and preventing a decline that, if unmanaged, could become irreversible.

Implications for Stakeholders and Policy Makers

Local stakeholders: risk losing competitiveness and reputation without coordinated quality-oriented strategies.

Policy makers: must urgently address infrastructural decay, system fragmentation, and governance weaknesses.

Local communities: face growing conflict between economic benefits and social/environmental costs, with risks of cultural alienation.

Possible Preventive Actions

Targeted infrastructural investments to ensure accessibility and quality services.

Professional training programmes to raise skills and hospitality standards.

Tourism management strategies to reduce seasonality and contain overtourism.

Sustainable planning to counteract real-estate speculation and protect ecosystems.

Security policies and transparent governance to rebuild trust and international reputation.

Scenario 3: Apulia as a Laboratory of Sustainable, Inclusive, and Innovative Tourism

2045: An Inclusive and Green Apulia

In 2045, Apulia emerges as an international destination capable of combining sustainability, inclusiveness, and innovation. The region has transformed today's weak signals into a mature, resilient, and competitive tourism system, able to attract visitors from both estab-

lished and emerging markets while ensuring tangible benefits for local communities and the territory.

Accessibility and Inclusion

Tourist attractions are designed to be accessible to families and people with disabilities, with dedicated routes and inclusive services. This focus on accessibility has strengthened Apulia's reputation as a welcoming and responsible destination, expanding its visitor base and reducing social barriers.

Communities and Governance

Local communities are actively involved in planning and managing tourism activities, generating direct economic and cultural benefits. Collaboration between public and private actors has produced a participatory governance model that ensures policy coherence and investment stability. Advocacy activities have consolidated a widespread movement in favour of responsible tourism, reinforcing collective awareness.

Mobility and Innovation

Improvements in regional rail transport and integration with bus services have made internal mobility more efficient and sustainable. Investments in green infrastructure have created a network of cycling routes and pedestrian paths, promoting slow tourism and reducing environmental impact. Technological innovations – especially dedicated apps and digital platforms – have made booking and experience management more personalised and transparent.

Sustainability and Regeneration

The growth of sustainable and regenerative tourism has transformed the way the regional offer is conceived: eco-friendly farm stays, responsible tourism projects, and conscious consumption practices have become established standards. Travelers' environmental awareness has increased demand for ecological and community-respectful experiences. Cultural heritage conservation has been supported by restoration projects and dedicated infrastructure, ensuring accessibility without compromising authenticity.

Diversification of the Offer

Rural tourism has enhanced lesser-known areas, distributing flows and reducing pressure on coastal zones. Sports and adventure tourism (cycling, trekking, water sports) has expanded the range of outdoor experiences. Health and wellness tourism has grown thanks to investments in spas, wellness centres, and natural treatments, positioning Apulia as a destination for health and relaxation. The rise of luxury accommodation has attracted high-end segments, balancing growth with quality services.

International Markets

Apulia has strengthened its presence in traditional markets and successfully captured

new flows from emerging countries (Poland, United Kingdom, United States, Argentina, Brazil, Eastern Europe). Targeted campaigns have promoted off-season tourism, reducing dependence on summer concentration and ensuring economic stability.

This third scenario portrays Apulia in 2045 as a sustainable and inclusive tourism ecosystem, capable of integrating innovation, community, and nature.

Implications for Stakeholders and Policy Makers

Local stakeholders: must continue investing in quality, accessibility, and innovation to maintain the reputation achieved.

Policy makers: must ensure regulatory coherence and support investments in green and digital infrastructure.

Local communities: benefit from distributed and inclusive tourism, with positive effects on employment, income, and social cohesion.

A comparative table of the three future scenarios for Apulia in 2045 is presented below (Tab. 3), designed to provide a concise and operational overview. The impact, probability, and desirability values correspond to the respective medians from the second round of the Delphi survey.

Tab. III - Comparative Overview of Future Scenarios for Apulia in 2045

Scenarios	Impact	Probability	Desirability	Main Characteristics	Strategic Implications
Scenario 1 Sustainable International Hub	8.3	7.0	8.4	• Modern and Connected Infrastructure • Seasonality Reduction through Cultural and Sporting Events • Experiential and Food-and-Wine Tourism • Environmental Protection and Cultural Enhancement • Public–Private Collaboration and Professional Training	• Consolidate Infrastructural Investments • Strengthen International Marketing • Support Training and Service Quality Enhancement • Ensure a Balance Between Growth and Environmental Protection
Scenario 2 Dystopian Future of Overtourism and Degradation	8.0	6.5	4.4	• Obsolete Infrastructure and System Fragmentation • Overtourism and Tourism-Phobia • Real-Estate Speculation and Environmental Degradation • Crime and Perceived Insecurity	• Urgent Need for Infrastructural Interventions • Need for Coordinated Governance • Management of Tourist Flows and Seasonality • Counteracting Speculation and Crime • International Reputational Risk

				• Incoherent Policies and Slow Bureaucracy	
Scenario 3 Sustainable and Inclusive Tourism	8.3	6.9	8.2	• Accessibility for Families and People with Disabilities • Active Involvement of Local Communities • Green Mobility and Slow Tourism • Technological Innovations and Green Infrastructure • Diversification of the Offer: Rural, Sports, Wellness, and Luxury Tourism • Emerging Markets and Seasonality Reduction	• Promote Inclusivity and Accessibility • Foster Participatory Governance • Invest in Green and Digital Infrastructure • Support Slow and Regenerative Tourism • Diversify Markets and Offer Segments

3.2 Policy proposal

Building on the future scenarios outlined above, it is possible to advance a set of policy proposals aimed at steering Apulia's tourism system toward more sustainable, resilient, and competitive trajectories. The following indications do not represent definitive interventions, but rather preliminary hypotheses that can serve as a basis for reflection in the development of more structured and shared policies. They should therefore be understood as operational insights – derived from the scenario analysis and the systemic dynamics that emerged – which can support public decision-makers and stakeholders in defining integrated strategies consistent with the challenges of the coming decades.

Scenario 1 - Connected and Regenerated Apulia (desirable and probable)

Policy interventions to facilitate its realization:

- Sustainable Infrastructural Upgrading: investments in airports, ports, and railways based on advanced environmental and technological standards.
- Seasonality-Reduction Strategies: fiscal incentives and support for cultural, sporting, and conference events held outside the peak season.
- Continuous Training in the Tourism Sector: high-quality programs for operators, with a focus on languages, hospitality, and sustainability.
- Targeted International Marketing: coordinated campaigns to strengthen Apulia's reputation as a sustainable global destination.
- Public-Private Collaboration: creation of partnerships to develop integrated packages combining culture, nature, and food-and-wine experiences.

Scenario 2 - Fragile and Overburdened Apulia (dystopian, to be avoided)

Policy interventions to prevent its occurrence:

- Extraordinary Plan for Infrastructure Maintenance and Innovation: targeted investments to counter degradation and obsolescence.
- Tourist Flow Management: regulatory measures to limit overtourism, including access quotas and visitor redistribution mechanisms.
- Sustainable Territorial Planning: strict regulations against real-estate speculation and land misuse, supported by rigorous environmental monitoring.
- Strengthening Security and Governance: policies to combat crime and streamline bureaucratic procedures.

Mandatory Training Programmes: raising service quality and reducing system fragmentation through compulsory professional development.

Scenario 3 - Inclusive and Green Apulia (desirable and probable)

Policy interventions to facilitate its realization:

- Universal Accessibility: incentives to make attractions and facilities accessible to families and people with disabilities.
- Local Community Engagement: participatory tools and co-management mechanisms ensuring direct benefits for local communities.
- Investment in Green Infrastructure and Slow Mobility: cycling routes, sustainable public transport, and promotion of slow tourism.
- Digital Innovation in Tourism: integrated platforms for bookings, personalised experiences, and flow management.
- Diversification of the Tourism Offer: support for rural, wellness, sports, and luxury tourism to reduce seasonality and expand markets.

A priority matrix follows, positioning the policy measures from the three scenarios according to their level of urgency and potential impact. This tool translates the complexity of the scenarios into a concise and immediately readable representation, useful for guiding strategic decision-making. The matrix enables policymakers to quickly identify which interventions require immediate activation – either because they are highly urgent or because they can generate significant systemic effects – and which measures can instead be planned as medium-term actions. In this way, the matrix not only facilitates the definition of priorities but also contributes to building an operational roadmap aligned with the trajectories emerging from the scenarios, supporting more informed and proactive governance (Tab. 4).

Tab. IV - Urgency–Impact Matrix of Policy Measures

Urgency \ Impact	Medium Impact	High Impact
High Urgency	• Tourist Flow Management (Scenario 2) • Strengthening Security and Governance (Scenario 2)	• Sustainable Infrastructural Upgrading (Scenario 1) • Extraordinary Infrastructure Maintenance Plan (Scenario 2)
Medium Urgency	• Seasonality-Reduction Strategies (Scenario 1) • Diversification of the Tourism Offer (Scenario 3)	• Local Community Engagement (Scenario 3) • Investment in Green Infrastructure and Slow Mobility (Scenario 3) • Sustainable Territorial Planning (Scenario 2)
Low Urgency	• Targeted International Marketing (Scenario 1) • Digital Innovation in Tourism (Scenario 3)	• Continuous Training in the Tourism Sector (Scenario 1) • Mandatory Training Programmes (Scenario 2) • Public–Private Collaboration (Scenario 1)

In the High-Urgency/High-Impact quadrant lie the priority policies: infrastructure, security, and accessibility. These are the measures that determine the system's immediate sustainability. In the Medium-Urgency/High-Impact quadrant we find the consolidation policies: local communities, green infrastructure, and territorial planning. These are essential for stabilizing the model in the medium term. Finally, the Low-Urgency/High-Impact quadrant includes long-term policies such as training and public-private collaboration, which strengthen the system's resilience and overall quality.

Operational Summary:

- **Scenario 1 (Connected and Regenerated Apulia):** priority actions focus on infrastructure and seasonality-reduction, with training and marketing serving as medium- to long-term levers.
- **Scenario 2 (Fragile and Overburdened Apulia):** urgent interventions concern infrastructure maintenance, security, and flow management; medium-term measures include territorial planning and training.
- **Scenario 3 (Inclusive and Green Apulia):** accessibility and green infrastructure represent the main priorities, while community engagement and digital innovation act as consolidation measures; diversification functions as a medium-term lever.

The following Policy Roadmap translates the priorities emerging from the scenarios into an operational sequence of actions, offering a practical guide for scheduling the most rele-

vant strategic decisions over time. As with the previous tools, these indications should be considered preliminary – working drafts that will require further assessment, dialogue, and co-design processes with policymakers and institutional stakeholders.

Short Term (by 2030): urgent and structural actions (infrastructure, security, accessibility)

Scenario 1 - Connected and Regenerated Apulia

- Sustainable infrastructural upgrading
- Seasonality-reduction strategy

Scenario 2 - Fragile and Overburdened Apulia

- Extraordinary infrastructure maintenance plan
- Strengthening security and governance
- Tourist flow management

Scenario 3 - Inclusive and Green Apulia

- Universal accessibility
- Investment in green infrastructure and slow mobility

Medium Term (2030-2040): system consolidation (communities, planning, diversification)

Scenario 1 - Connected and Regenerated Apulia

- Public-private collaboration

Scenario 2 - Fragile and Overburdened Apulia

- Sustainable territorial planning
- Mandatory training programmes

Scenario 3 - Inclusive and Green Apulia

- Local community engagement
- Diversification of the tourism offer

Long Term (beyond 2040): resilience and reputation (training, marketing, digital innovation)

Scenario 1 - Connected and Regenerated Apulia

- Continuous training in the tourism sector
- Targeted international marketing

Scenario 2 - Fragile and Overburdened Apulia

- Governance consolidation and continuous flow monitoring

Scenario 3 - Inclusive and Green Apulia

- Digital innovation in tourism
- Strengthening regenerative tourism and slow tourism

3.3 Analysis of the Delphi questionnaire comments

As described earlier, in the second round of the Delphi process, participants were given the opportunity to provide written comments in addition to the quantitative assessments of impact, probability, and desirability. These textual contributions made it possible to collect open observations, contextual perceptions, and personal reflections on each factor under analysis. Together with the scenarios and the factor network, the comments represent a valuable qualitative component, as they offer a more nuanced reading of expert opinions, highlight emerging criticalities, suggest operational priorities, and enrich the interpretation of the scenarios with elements of lived experience, direct observation, and contextual judgement.

Overall, the sentiment expressed by the key informants is critical yet constructive, characterised by a strong awareness of the structural limitations of the Apulian tourism system and, at the same time, by the perception of a largely untapped potential. On the one hand, there is widespread frustration with contextual conditions: political instability, weak governance, chronic infrastructural deficiencies, limited environmental sustainability, insufficient professional skills, and security concerns. These elements are perceived as systemic obstacles that slow development and risk undermining the region's future competitiveness. On the other hand, a sense of confidence emerges regarding territorial resources, the intrinsic quality of places, cultural and landscape richness, the strength of food-and-wine traditions, and the growing demand for authentic, outdoor, and cultural experiences. Participants acknowledge that Apulia possesses a unique heritage, but they believe it remains underutilized and insufficiently valorised.

The overall tone is therefore one of clear-eyed concern, accompanied by a strong desire for change: Delphi respondents call for investment, professionalization, sustainability, public-private collaboration, and more modern and coherent governance. Personal testimonies confirm that when services and infrastructure function effectively, tourist responses are immediate and positive.

In summary, the prevailing sentiment is that the system has significant room for growth but requires urgent and coordinated interventions to prevent current weaknesses from becoming structural barriers to future development.

The analysis of the comments aligns remarkably well with the findings emerging from the scenarios developed through network-based fuzzy clustering. Participants' perceptions – critical of the structural fragilities of the tourism system yet aware of the territory's potential – faithfully reflect the three trajectories identified: a regenerated and connected Apulia, a fragile and overburdened Apulia, and an inclusive and innovative Apulia. This convergence between quantitative data, latent structures, and qualitative judgements

strengthens the robustness of the entire foresight exercise, demonstrating that the scenarios are not abstract constructs but plausible and shared representations of the dynamics that stakeholders already recognize as decisive for the future of regional tourism in Apulia.

For the full list of comments, see Appendix A.

Conclusions

Building on the evidence gathered throughout the study, this research has examined the long-term trajectories of sustainable tourism development in Apulia toward 2045 through an integrated methodological framework that combines the Delphi technique with network analysis and fuzzy clustering. The results portray a regional tourism system marked by substantial structural complexity and by dense interdependencies across environmental, socio-cultural, infrastructural, and technological dimensions. The identification of three coherent yet interconnected clusters – *Connected and Regenerated Apulia*, *Fragile and Overburdened Apulia*, and *Inclusive and Green Apulia* – provides a systemic interpretation of how the sector may evolve depending on its capacity for resilience, adaptation, and innovation.

The three narrative scenarios derived from these clusters outline future pathways that differ significantly in their developmental logic, yet remain structurally linked. The first scenario envisions Apulia as an international hub for sustainable and experiential tourism, capable of integrating infrastructural modernization, transport innovation, environmental stewardship, and cultural valorisation, ultimately positioning itself as a competitive and recognized European destination. The second scenario, by contrast, sketches a dystopian trajectory in which obsolete infrastructure, fragmented governance, unsustainable overtourism, and environmental degradation converge into a condition of systemic vulnerability. The third scenario imagines Apulia as a laboratory for sustainable, inclusive, and innovative tourism, where weak signals of the present are transformed into a mature ecosystem grounded in accessibility, territorial regeneration, and social and technological innovation.

The fuzzy overlaps between clusters – and therefore between scenarios – highlight that transitions toward sustainability rarely follow linear or mutually exclusive paths. Instead, they unfold through hybrid and co-evolutionary processes. Several factors – such as wine and food tourism, experiential gastronomy, infrastructure, accommodation capacity, transport innovation, and the development of emerging markets – display similar degrees of membership across multiple domains. This confirms that the adaptive capacity of Apulia's tourism system depends on the integration of environmental sustainability, technological innovation, service quality, and active involvement of local communities. This multidimensional interdependence, further supported by the high Cronbach's α_{poly}, strengthens the internal coherence and statistical robustness of the scenario architecture.

The network analysis of the 57 Delphi factors reinforces the polycentric nature of the system: many elements exhibit high centrality and simultaneously influence environmental, economic, and social dimensions. Factors with the highest degree centrality underscore the transversal relevance of sustainability and service-quality levers; those with high closeness centrality – such as transport innovation, international promotion, public-private collabora-

tion, and accessible tourism – are capable of rapidly propagating change across the system; factors with high betweenness centrality, including internal mobility, professional training, and experiential wine tourism, act as bridges between subsystems, pointing to the need for integrated policies. Finally, eigenvector centrality reveals a structural core of highly influential factors that constitute the backbone of Apulia's future tourism transformation.

From a methodological perspective, the integrated Delphi-network-fuzzy clustering approach proved particularly effective in capturing the multidimensional and uncertain nature of complex tourism systems. The combination of community detection and fuzzy memberships enabled a realistic representation of overlaps, ambiguities, and interdependencies, offering a replicable, data-informed framework that can support medium- and long-term strategic planning.

The policy roadmap derived from the three scenarios should be interpreted as a preliminary proposal – a working draft that translates scenario-based priorities into sequences of actionable steps. It is not intended as a prescriptive plan, but rather as a foundation for further assessment, dialogue, and co-design with policymakers, industry stakeholders, and local communities.

Ultimately, the entire exercise demonstrates that shaping the future of tourism in Apulia requires anticipatory governance: a capacity to detect weak signals, coordinate diverse actors, integrate policies, and intervene before emerging issues become irreversible. Only a systemic, participatory, and long-term approach can transform the region's potential into a sustainable, inclusive, and competitive development model within the Mediterranean landscape.

A crucial insight emerging from this work concerns the very nature of the adopted approach. Futures studies and scenario building differ fundamentally from traditional planning, which typically starts with predefined objectives and designs policies to achieve them. Anticipatory analysis, by contrast, does not merely imagine desirable futures; it also employs negative and dystopian scenarios (such as Scenario 2) as cognitive tools to expose risk trajectories already unfolding. In this sense, "futures to avoid" are not marginal narrative exercises but strategic levers that foster awareness, responsibility, and urgency in present-day action. Reflecting on what could occur in the absence of adequate interventions helps illuminate the vulnerabilities of Apulia's tourism system and guides decision-making toward pathways capable of preventing undesirable outcomes. The transformative value of future scenarios lies precisely in this dual function: they do not predict the future, but they help create the conditions for desirable futures to emerge while preventing negative trajectories from consolidating or becoming irreversible.

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APPENDIX A

Data and Results

Tab A.1 - List of the 57 Factors used in the Delphi survey

id	Factors
1	**Improvement of transport infrastructure:** expansion and modernisation of airports, ports, and railway networks to facilitate access to the region.
2	**Deterioration of transport infrastructure:** lack of investment or degradation of airports, ports, roads, and railways, making access to the region difficult.
3	**Infrastructural problems:** lack of integrated and adequate transport (e.g., poor airport–city connections and insufficient taxi services).
4	**Increase in international connectivity:** greater number of flights and rail links facilitating access to the region from different parts of the world.
5	**Positive feedback through reviews:** positive reviews of sustainable facilities and destinations strengthen the reputation of sustainable tourism and attract environmentally conscious visitors.
6	**Seasonality-reduction initiatives:** promotion of cultural, sports, and conference events during autumn and winter months.
7	**Seasonality-reduction initiatives:** leveraging favourable climate conditions to attract Northern European tourists in the low season.
8	**Transport innovation:** collaborations with airlines to increase international connections.
9	**Transport innovation:** development of sustainable mobility solutions such as electric vehicles and car-sharing.
10	**Overtourism:** excessive tourist inflows causing environmental degradation, pressure on infrastructure, and negative impacts on local communities, potentially leading to "tourism-phobia".
11	**Enhancement of cultural and artistic heritage:** investments in restoration and cultural events that attract visitors.
12	**Protection of the natural environment:** safeguarding natural parks, marine reserves, and local biodiversity.
13	**Development of integrated tourist packages:** offers combining gastronomy, culture, and nature.
14	**Infrastructural problems:** issues related to internal mobility, especially in rural or less accessible areas.
15	**Training and quality:** investments in specialised training to improve hospitality and tourist services.
16	**Promotion of Apulia as an international destination:** strengthening international marketing campaigns to attract more foreign tourists.
17	**Experiential tourism:** offering unique, authentic, and interactive experiences involving local culture (e.g., stays in masserie, craft workshops, personalised guided tours).
18	**Obsolete infrastructure:** lack of investment in tourist infrastructure leading to poor services and negative visitor experiences.

19	**Wine tourism and experiential gastronomy:** emerging interest in wine and food experiences linked to Apulian traditions, including participatory activities (e.g., olive harvesting, traditional cooking).
20	**Service quality:** insufficient linguistic and professional skills among staff.
21	**Development of food and wine tourism:** promotion of local products such as wine and olive oil through tours and tastings.
22	**Training and professional development:** implementation of training programmes to improve the skills of local tourism operators.
23	**Lack of professional training:** inadequate skills among tourism operators, leading to lower service quality.
24	**Public–private collaboration:** incentives for cooperation between public bodies and private actors to develop innovative and sustainable tourism initiatives.
25	**Tourist overcrowding:** increased visitor numbers in already populated areas causing environmental degradation and loss of cultural authenticity.
26	**Sustainable and accessible tourism:** creating experiences for families and people with disabilities, improving accessibility and usability of attractions.
27	**Collaboration with local communities:** involving local communities in planning and managing tourism activities, generating positive and reinforcing effects.
28	**Transport innovation:** improvements in regional rail transport and integration with bus services.
29	**Improvement of tourism management policies:** governmental initiatives to ensure sustainable and well-regulated tourism development.
30	**Growth of sustainable tourism:** increase in ecological and responsible tourism initiatives.
31	**Political and bureaucratic uncertainty:** inconsistent policies or bureaucratic delays hindering new projects and investments.
32	**Growth in environmental awareness:** increasing interest among travellers in sustainable and responsible tourism practices.
33	**Technological innovations in tourism:** development of apps and online platforms for bookings, personalised experiences, and tourist information.
34	**Growth of nature-based tourism:** rising interest in outdoor activities such as trekking, birdwatching, and water sports.
35	**Increase in wine tourism:** growing interest in Apulian wine, with tours and tastings in local wineries.
36	**Crime and security:** rising crime rates damaging the region's reputation.
37	**Health and wellness tourism:** potential for Apulia to become a destination for health and wellness tourism, including natural treatments, spas, and wellness facilities.
38	**Real-estate speculation and land misuse:** construction of tourist infrastructure in unsuitable or natural areas, damaging ecosystems and biodiversity.
39	**Fragmented tourism system:** lack of coordination among operators and services, resulting in a poorly structured tourism system.

40	**Development of emerging markets:** growing interest from tourists from Poland, the UK, the USA, Argentina, and Brazil.
41	**Growing interest in sustainable and regenerative tourism:** increasing demand for environmentally respectful and community-supportive experiences.
42	**Slow tourism and sustainable mobility:** emerging trend of travellers exploring the region on foot, by bicycle, or via other sustainable modes.
43	**Cultural heritage conservation:** protection and promotion of historical and cultural sites.
44	**Growth of rural tourism:** development of agritourism and countryside-based tourism.
45	**Increase in luxury accommodation:** creation of high-end resorts and hotels to attract upscale tourism.
46	**Growth of outdoor sports tourism:** development of activities such as cycling, trekking, climbing, and trail running.
47	**Expansion of water and adventure tourism:** promotion of water sports (kayak, sailing, windsurfing, diving) and coastal adventure activities.
48	**Unjustified price increases:** speculation on accommodation and service prices, potentially deterring value-seeking tourists.
49	**Crime and insecurity:** rising crime rates or safety issues discouraging visitors.
50	**Collaboration between public and private entities:** joint initiatives between local authorities and tourism operators.
51	**Investment in green infrastructure:** creation of cycling paths, walking trails, and sustainable public transport.
52	**Advocacy for responsible tourism:** growth of organisations promoting sustainable and community-respectful tourism practices.
53	**Negative impact of mass tourism:** excessive exploitation of natural and cultural resources causing irreversible damage.
54	**Decline of traditional tourism:** loss of traditions and cultural practices reducing the region's authenticity.
55	**Tourism seasonality:** concentration of tourism in summer months, creating economic and logistical sustainability issues.
56	**Accommodation capacity:** need to increase high-quality lodging, especially in the luxury segment.
57	**Development of emerging markets:** opportunities to promote off-season tourism in Eastern European markets.

Tab. A.2 - Normalised Centrality Measures

Factor	Degree	Closeness	Betweenness	Eigenvector
1	0.6786	0.6588	0.0005	0.9826
2	0.2500	0.5437	0.0065	0.0457
3	0.3214	0.5957	0.0435	0.0882
4	0.6429	0.6222	0.0000	0.9404
5	0.6786	0.7000	0.0044	0.9731

6	0.6607	0.6292	0.0001	0.9633
7	0.6786	0.6588	0.0005	0.9826
8	0.7143	0.7671	0.0263	0.9945
9	0.6786	0.7000	0.0045	0.9681
10	0.2679	0.4667	0.0018	0.0272
11	0.6786	0.6588	0.0005	0.9826
12	0.6964	0.7089	0.0048	0.9925
13	0.6786	0.6588	0.0005	0.9826
14	0.4286	0.6364	0.1157	0.3796
15	0.6786	0.7000	0.0044	0.9731
16	0.7321	0.7778	0.0422	0.9984
17	0.6964	0.7089	0.0048	0.9925
18	0.2857	0.4706	0.0022	0.0277
19	0.5714	0.7000	0.0817	0.7429
20	0.3214	0.5957	0.0346	0.0796
21	0.6607	0.6512	0.0004	0.9597
22	0.6964	0.7089	0.0048	0.9925
23	0.3750	0.6154	0.0748	0.1478
24	0.7500	0.7887	0.0712	1.0000
25	0.2679	0.4667	0.0017	0.0273
26	0.7143	0.7671	0.0207	0.9963
27	0.6786	0.6588	0.0005	0.9826
28	0.6786	0.6588	0.0005	0.9826
29	0.6786	0.6588	0.0005	0.9826
30	0.6786	0.6588	0.0005	0.9826
31	0.3036	0.5895	0.0159	0.0537
32	0.6964	0.7089	0.0048	0.9925
33	0.6607	0.6292	0.0001	0.9633
34	0.6786	0.6588	0.0005	0.9826
35	0.6607	0.6512	0.0004	0.9597
36	0.3036	0.4746	0.0059	0.0278
37	0.6607	0.6512	0.0005	0.9577
38	0.3036	0.4746	0.0059	0.0278
39	0.3214	0.5657	0.0297	0.0472
40	0.6786	0.6588	0.0005	0.9826
41	0.6786	0.6588	0.0005	0.9826
42	0.6607	0.6292	0.0001	0.9633
43	0.6786	0.6588	0.0005	0.9826

44	0.6429	0.6222	0.0001	0.9381
45	0.6786	0.7000	0.0044	0.9731
46	0.6786	0.6588	0.0005	0.9826
47	0.2679	0.4341	0.0013	0.0168
48	0.2679	0.4341	0.0014	0.0172
49	0.2857	0.4375	0.0016	0.0179
50	0.6786	0.6588	0.0005	0.9826
51	0.6786	0.7000	0.0044	0.9731
52	0.6786	0.7467	0.0201	0.9620
53	0.1429	0.3810	0.0000	0.0050
54	0.2679	0.4341	0.0013	0.0168
55	0.2500	0.4308	0.0011	0.0160
56	0.6250	0.7179	0.0174	0.8775
57	0.6607	0.6512	0.0005	0.9577

Tab. A.3 - Fuzzy Membership Matrix

Factor	u_{i1}	u_{i2}	u_{i3}	**Factor**	u_{i1}	u_{i2}	u_{i3}
1	0.6667	0.0061	0.3272	30	0.2527	0.0011	0.7462
2	0.0504	0.8949	0.0547	31	0.0168	0.9654	0.0178
3	0.0387	0.9176	0.0436	32	0.4244	0.0047	0.5709
4	0.5945	0.0071	0.3984	33	0.4321	0.0050	0.5629
5	0.6404	0.0046	0.3549	34	0.4595	0.0041	0.5364
6	0.7316	0.0026	0.2658	35	0.5059	0.0052	0.4888
7	0.7822	0.0022	0.2156	36	0.0066	0.9856	0.0078
8	0.8235	0.0010	0.1755	37	0.3932	0.0130	0.5938
9	0.5275	0.0199	0.4526	38	0.0124	0.9737	0.0138
10	0.0246	0.9494	0.0260	39	0.0053	0.9889	0.0058
11	0.7253	0.0019	0.2727	40	0.4712	0.0118	0.5170
12	0.6673	0.0032	0.3295	41	0.2427	0.0061	0.7512
13	0.8193	0.0024	0.1783	42	0.3924	0.0087	0.5989
14	0.2476	0.5089	0.2435	43	0.3354	0.0027	0.6618
15	0.7299	0.0038	0.2663	44	0.3244	0.0087	0.6669
16	0.7899	0.0075	0.2026	45	0.4061	0.0181	0.5759
17	0.8288	0.0011	0.1701	46	0.2562	0.0056	0.7382
18	0.0087	0.9823	0.0090	47	0.0067	0.9857	0.0076
19	0.4257	0.1713	0.4029	48	0.0112	0.9765	0.0123
20	0.0203	0.9629	0.0169	49	0.0033	0.9929	0.0038

21	0.6276	0.0077	0.3647
22	0.6330	0.0017	0.3653
23	0.0182	0.9649	0.0169
24	0.5145	0.0098	0.4757
25	0.0218	0.9521	0.0261
26	0.3829	0.0032	0.6138
27	0.3918	0.0025	0.6057
28	0.4282	0.0018	0.5700
29	0.3969	0.0048	0.5983

50	0.2562	0.0017	0.7420
51	0.2947	0.0073	0.6980
52	0.2315	0.0109	0.7576
53	0.0184	0.9607	0.0209
54	0.0045	0.9908	0.0047
55	0.0175	0.9653	0.0172
56	0.4111	0.0563	0.5326
57	0.3483	0.0200	0.6317

The following section presents the list of comments provided by participants during the second round of the Delphi survey. The comments have been grouped by thematic area and duplicate statements have been removed.

1. Politics, Governance, and National Context

- The absence of a coherent economic policy and the high national debt hinder investment.
- The political class is unable to project the country into the future.
- Universities are poorly connected to real-world needs and have limited impact on change.
- Italian legislation does not improve the socio-economic situation.
- Italy is less sustainable than other countries.
- Italy does not adequately address the needs of people with disabilities.
- There is a lack of financial resources, especially in the South.
- Political uncertainty and inconsistency slow down tourism development.
- Few credible government initiatives exist.

2. Infrastructure and Transport

- The deterioration of infrastructure reduces tourism competitiveness.
- Inefficient transport makes it difficult to reach inland areas and small towns.
- Strengthening transport networks is a priority.
- Direct connections are needed (e.g., Lecce-Brindisi Airport).
- Airport-city links are essential.
- Many rural areas are not accessible by public transport.
- The NCC (chauffeur service) market is poorly regulated and expensive.
- Cycling paths and connections between towns are lacking.
- Buses should allow bicycles on board.
- Extra-urban roads require improvement.
- Continuous roadworks on major routes slow down mobility.
- Without investment in transport, welcoming tourists will be difficult.

- Better infrastructure would make travel more convenient, safe, and efficient.
- An efficient transport network is a strategic asset for any region.
- Transport issues in Apulia are long-standing.
- There are not enough taxis and buses connecting to airports.
- More flights, trains, and taxis are needed to support tourism.

3. Sustainability and Environment

- Apulia is still far from achieving sustainability.
- Environmental protection, including marine ecosystems, requires stronger oversight.
- Land exploitation is a serious issue.
- Tourist facilities should be sustainable.
- Eco-friendly facilities are appreciated by visitors.
- Conservation of natural environments is essential.
- Safeguarding natural landscapes is crucial.
- Overtourism is a serious problem.
- Protecting and preserving the territory must be a priority.

4. Training, Skills, and Employment

- Limited knowledge of English is a major constraint.
- Tourism operators need to improve their skills.
- Too few staff are hired, so improvements are not visible.
- Professional training is essential.
- Continuous training courses are needed.
- Better language skills would significantly benefit the sector.

5. Attractiveness, Tourism Products, and Quality of the Offer

- Apulia is rich in beautiful and still undiscovered places.
- Prices are increasing excessively.
- Some areas show signs of degradation.
- Sports facilities are few but of good quality.
- The mild climate allows for an extended tourist season.
- Tourism could be better distributed throughout the year.
- Events, festivals, and concerts can support seasonality reduction.
- Wine tourism and local products are attractive but poorly promoted.
- Apulian wine is less advertised than northern Italian wine.
- Cultural tourism is highly appreciated.
- Apulian cities deserve greater tourist attention.
- Luxury tourism brings limited benefits compared to mass tourism.
- Local traditions and customs are fundamental.
- Apulia offers ideal locations for outdoor activities.
- Services for outdoor tourism (cycling, trekking, etc.) are lacking.
- Experiential tourism is highly appreciated.

- Thermal facilities are concentrated in northern Italy and should be developed in the South as well.

6. Safety

- Crime is an issue that should not be underestimated.
- More controls are needed.
- Safety strongly influences tourists' perceptions.

7. Local Collaboration and Governance

- Public-private collaboration is essential.
- Local communities must be involved in decision-making.
- A more modern entrepreneurial mindset is needed.
- Cooperation across tourism sectors is crucial.

8. Personal Experiences and Testimonies

- Apulia experienced a decline in tourism in the past but is now recovering.
- International events (e.g., water sports in Manfredonia) have attracted many visitors.
- Some cities have great potential but lack essential services (e.g., Margherita di Savoia).
- Abandoned coastal areas could be converted into tourism facilities.

Future scenarios for Sustainable Tourism development in Puglia: the role of Managerial Styles and Temporal Trajectory Analysis

1. Introduction

The contemporary tourism landscape is undergoing structural transformations that necessitate a profound revision of development strategies. Factors such as the climate emergency, social inequalities, and the breakthrough of digital technologies are no longer merely external variables; they have become constituent elements of new, truly sustainable models of prosperity. In this context, the capacity for anticipation has emerged as a strategic asset. Operating without a forward-looking projection risks condemning territorial management policies and interventions to rapid obsolescence.

The primary constraint currently faced by decision-makers often lies in the nature of available data. Conventional statistical surveys, while methodologically robust, function as "snapshots of the past." Consequently, they offer limited utility in capturing local nuances or identifying emerging signals of change. To address this information asymmetry, the present study was developed within the framework of the PRIN 2022 PNRR project "Future of Sustainability" (CUP: H53D23009470001). This research initiative is a collaborative effort between the University of Bari "Aldo Moro," the University of Naples Federico II, and the "G. D'Annunzio" University of Chieti-Pescara.

Methodologically, the investigation shifts from purely descriptive analysis to the field of Futures Studies. The use of scenario-based models and integrated qualitative-quantitative methods – such as the Delphi approach – facilitates the delineation of evolutionary trajectories projected toward a 2045 horizon. This integrated framework does not seek to provide deterministic predictions; rather, it aims to serve as a strategic support tool for territorial governance. By engaging industry operators as privileged witnesses, it has been possible to map the entrepreneurial fabric's sensitivity toward fundamental pillars: the ecological transition, the application of Artificial Intelligence, the pursuit of authentic experiential models, and the management of tourist flows (overtourism).

The objective is to formulate strategies that align present-day choices with a future that is plausible, desirable, and sustainable, thereby minimizing the impact of external shocks and global uncertainties. Specifically, this study identifies distinct managerial styles based on behavioural profiles derived from the survey responses described below. From a methodological standpoint, this involves the application of a non-hierarchical classification method known as k-means clustering. Once these behavioural clusters were identified, they were cross-referenced with the socio-demographic characteristics of the respondents to detect any characterizing patterns. Furthermore, the study hypothesizes specific trajectories based

on the concepts of likelihood and desirability of long-term objectives, identifying their feasibility over time by estimating a projected temporal horizon.

The chapter is organized as follows: the next section outlines the characteristics of the survey that generated the responses from the participating stakeholders. Subsequently, preliminary results are presented to introduce the k-means clustering methodology and its primary findings. Section 4 outlines the theoretical framework, which identifies the trajectories and their corresponding results. Finally, Section 5 provides preliminary conclusions and discusses potential future developments.

2. A Delphi-based survey on the evolution of the Apulian tourism

To map the evolution of the Apulian tourism system over a twenty-year horizon, this research adopts the Delphi-based scenario method (Di Zio et al., 2021; Calleo et al., 2025). This approach is grounded in the identification of a complex taxonomy of factors essential for interpreting the dynamics of a system in transition. The methodology primarily distinguishes between different types of signals: Weak Signals – fragile and marginal clues that anticipate future changes in technological or social spheres – and Wild Cards – rare, sudden, high-impact events (such as geopolitical shocks or health crises) capable of radically altering established trajectories. Alongside these elements of uncertainty, the model identifies Key Factors, which are the stable structural variables defining the system's architecture (infrastructure, demographics, regulations), and Drivers of Change, the dynamic forces that propel these factors toward new configurations.

The factor selection process followed a rigorous path, starting from an in-depth bibliographic analysis and direct consultation with stakeholders through focus groups, to generate an initial list of 124 variables. This list was subsequently refined by an expert panel, resulting in 57 final factors representative of the territory's strategic dimensions. Key themes emerging from these factors include accessibility and mobility, environmental sustainability linked to overtourism management, the enhancement of cultural identity and authentic experiences, and the quality of professional training. A cross-cutting role is assigned to digital innovation and the analysis of new market trends (such as regenerative, sports, and international tourism), while also addressing systemic risks related to security and environmental degradation.

The 57 identified factors formed the core of the Delphi questionnaire, administered to a heterogeneous and representative sample consisting of key stakeholders and citizens of the Puglia Region. The survey was structured in two successive rounds – an iterative procedure fundamental for fostering opinion convergence and consolidating consensus among participants. Although a decrease in participation was observed between the two phases – a physiological dropout phenomenon widely documented in Delphi methodologies – the large number of validated questionnaires ensures the statistical robustness and consistency of the dataset. This methodological solidity provides a high-profile empirical basis, essential for the subsequent calculation of temporal trajectories and the definition of reliable strategic scenarios for the territory.

The survey was conducted between September 22 and October 31, 2025, utilizing a mixed-mode administration methodology: CAWI (Computer Assisted Web Interviewing) for email-based contact and CATI (Computer Assisted Telephone Interviewing) for telephone-based contact. This mixed approach allowed for broader sample coverage and the inclusion of less digitized operators, thereby ensuring greater territorial representativeness.

This study is based on the analysis of a total sample of 960 stakeholders from Puglia, stratified across tourism segments as follows:

- **Hospitality**: 231 observations.
- **Food and Wine Tourism**: 175 observations.
- **Tour Operators and Travel Agencies**: 330 observations.
- **Beach and Nautical Tourism**: 103 observations.
- **Tourism and Major Events**: 121 observations.

Respondents were asked to share their vision regarding the critical factors that will influence tourism over the next twenty years by providing an assessment based on three variables:

- **Impact**: The extent to which the factor will affect the tourism system in Puglia (Very Negative, Negative, Positive, or Very Positive).
- **Likelihood**: The probability of the factor manifesting by 2045 (where 0 represents the minimum possibility and 100 represents the maximum possibility of occurrence).
- **Desirability**: The degree to which the factor is desirable for tourism in Puglia (where 0 is extremely undesirable and 100 is extremely desirable).

3. Methodology and Results

In this section, preliminary results are reported, and the k-means clustering techniques used to identify managerial styles are described. The analysis of the survey results in this study was conducted with the technical support of the B-ASC (Bicocca Applied Statistics Centre) at the University of Milano-Bicocca. The survey described in the previous section utilizes a homogeneous flow of questions repeated across all five tourism sub-sectors, focusing on 14 well-defined areas listed below:

- Environmental sustainability in the tourism of the future
- Involvement of local communities in tourism strategies
- Regulation to prevent overtourism phenomena
- Accessibility of tourism facilities for people with disabilities
- Cultural and sporting events to reduce tourism seasonality
- Investing in the training of tourism operators
- Impact of climate change on tourism destinations and strategies
- Strengthening security in destinations
- Innovation in sustainable transport
- Transport integration to improve tourism accessibility
- Artificial Intelligence and its impact on the tourism experience

- Virtual tourism as an integration of the physical experience
- Increased demand for authentic tourism experiences
- Cultural heritage as a driver for tourism attraction

For each of these areas, respondents were asked to provide an assessment of the expected impact using a 4-point Likert scale. These judgments were quantified by assigning the following values:

- Very Negative = 1
- Negative = 2
- Positive = 3
- Very Positive = 4

The descriptive analysis of the mean values, as reported in Table I, reveals a general consensus on the necessity of investing in operator training (mean of 3.69) and on the relevance of transport integration and authentic experiences (means of 3.57 and 3.61, respectively). In contrast, virtual tourism (mean of 2.43) and the perceived impact of climate change (mean of 2.73) show lower average values, suggesting a possible underestimation of these factors or lower confidence regarding their integration into future business models.

Table I - Distribution of responses by tourism segment (mean value).

Factors	Coastal and Nautical	Food and Wine Tourism	Major Events	Hospitality	Tour Operators	Total
1) Environmental sustainability	3,17	3,21	3,29	3,17	3,18	3,19
2) Local community	3,23	3,28	3,23	3,28	3,25	3,26
3) Overtourism regulation	3,17	3,05	2,98	3,13	3,11	3,09
4) Disability access	3,13	3,22	3,40	3,34	3,30	3,29
5) Cultural and sporting events	3,10	2,95	2,99	3,17	3,08	3,07
6) Operator training	3,67	3,71	3,73	3,65	3,69	3,69
7) Climate change	2,81	2,56	2,79	2,87	2,68	2,73
8) Strengthening security	3,42	3,51	3,51	3,47	3,48	3,48
9) Sustainable transport	3,53	3,62	3,59	3,56	3,55	3,57
10) Transport integration	3,40	3,55	3,57	3,63	3,58	3,57
11) Artificial Intelligence	2,81	2,82	2,91	2,90	2,86	2,86
12) Virtual tourism	2,41	2,46	2,63	2,34	2,40	2,43
13) Authentic tourism experiences	3,56	3,64	3,69	3,60	3,58	3,61
14) Cultural heritage	3,50	3,60	3,60	3,55	3,54	3,56

A significant finding is the homogeneity of responses: based on the data collected for the selected questions, no distinctive behaviour emerges across the tourism sub-sectors. Indeed, the response patterns appear consistent and transversal across all sectors considered.

3.1 K-means Cluster Analysis

The preliminary descriptive analysis did not reveal significant differences in responses among stakeholders operating across the five tourism sub-sectors. However, it remains possible to hypothesize the existence of similar behavioural patterns that determine diverse attitudes toward the stimuli provided. To test this hypothesis, a k-means clustering analysis was applied to identify groups of respondents with as homogeneous a distribution as possible relative to the five segments considered. This is one of the most widely used non-hierarchical classification methods in the statistical literature, with numerous applications in the tourism sector (Yildirim et al., 2022; Sun et al., 2021).

This multivariate analysis technique allows for grouping observations into k clusters – selecting the desired number of groups a priori – by minimizing within-cluster variance and maximizing the distance between cluster centres. Specifically, the algorithm developed by Hartigan and Wong (1979) was employed using the R language. In the present application, a four-cluster solution was hypothesized; consequently, four distinct managerial styles will be identified and described, initially based on responses concerning the 14 areas of interest for future scenarios and subsequently according to socio-demographic characteristics.

An exploratory analysis of the clusters' composition relative to the 14 areas of interest (see Table II) suggests that Cluster 1 shows a higher interest in accessibility for people with disabilities than the general average. Clusters 2 and 3 exhibit a greater focus on climate change relative to the other groups. Finally, Cluster 4 demonstrates a higher-than-average interest in cultural heritage.

Table II - Distribution of responses by cluster (mean value) regarding the 14 areas describing future scenarios.

Factors	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Total
1) Environmental sustainability	3,22	3,24	3,22	3,08	3,19
2) Local community	3,30	3,30	3,19	3,25	3,26
3) Overtourism regulation	3,09	3,07	3,13	3,08	3,09
4) Disability access	3,38	3,26	3,29	3,25	3,29
5) Cultural and sporting events	3,07	3,06	3,13	3,00	3,07
6) Operator training	3,69	3,70	3,70	3,67	3,69
7) Climate change	1,75	3,43	3,38	1,75	2,73
8) Strengthening security	3,50	3,45	3,49	3,49	3,48
9) Sustainable transport	3,59	3,53	3,57	3,60	3,57

10) Transport integration	3,54	3,57	3,57	3,59	3,57
11) Artificial Intelligence	2,85	2,80	2,97	2,80	2,86
12) Virtual tourism	3,15	1,76	3,17	1,69	2,43
13) Authentic tourism experiences	3,56	3,60	3,66	3,60	3,61
14) Cultural heritage	3,50	3,57	3,52	3,63	3,56

Regarding demographic characteristics, a homogeneous distribution of the five tourism segments is observed within each group (see Tables III and IV). From an age and professional standpoint, Cluster 3 is characterized by less experienced personnel (35% have less than 10 years of experience in the sector) and a higher male presence compared to the average. In contrast, Cluster 4 comprises more experienced stakeholders (nearly 80% with over 10 years of experience) and a higher proportion of female respondents.

Table III - Distribution of clusters by industry experience.

Experience	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Less than 6 years	18%	18%	21%	13%
Between 6 and 10 years	12%	13%	14%	9%
Between 11 and 20 years	16%	26%	23%	33%
Between 21 and 30 years	32%	22%	25%	22%
More than 31 years	23%	22%	17%	24%
TOTAL	100%	100%	100%	100%

Table IV. Distribution of clusters by gender.

Gender	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Male	64%	62%	67%	58%
Female	36%	38%	33%	42%
TOTAL	100%	100%	100%	100%

This dual definition of the clusters – based on the exploratory analysis of demographic data and the distribution of responses regarding the impact of the analysed factors on tourism in Puglia over the next twenty years – enabled the formulation of four managerial profiles. These profiles are defined not by the specific type of tourism practiced, but rather by the managers' attitudes toward future challenges.

- **Attention to the Territory**. This profile is characterized by seasoned entrepreneurs with deep ties to the local territory and its infrastructure, particularly regarding integrated and sustainable transport. While they believe in the potential of virtual tourism, they are sceptical about the actual impact of climate change.

- **Sustainable Tradition**. This identifies young female owners of private facilities who prioritize professional training, the valorisation of cultural heritage, and environmental sustainability, while maintaining a critical distance from more advanced technologies.
- **The Positive Entrepreneur**. Representing the most proactive and optimistic profile, this group holds a vision that integrates sustainability, technology (AI), and social change as opportunities for innovation. According to this view, in 20 years tourism professionals should reflect this ideology.
- **The Traditionalist Proprietress**. This profile represents an experienced and more conservative perspective typical of established owners. It is characterized by low sensitivity to ecological and technological issues, as well as to cultural and sporting events, while maintaining a strong dedication to the conservation of the territory and its existing cultural heritage.

Finally, Table V presents the distribution of the four managerial styles across the five tourism sub-sectors to verify any potential association between the identified behaviours and the stakeholders' specific areas of operation.

Table V - Distribution of tourism segments by cluster (percentage values).

Managerial profiles	Coastal and Nautical	Food and Wine Tourism	Major Events	Hospitality	Tour Operators
Attention to the Territory	17%	21%	20%	14%	20%
Sustainable Tradition	28%	22%	25%	35%	29%
The Positive Entrepreneur	32%	31%	43%	28%	27%
The Traditionalist Proprietress	23%	26%	12%	22%	24%
TOTAL	100%	100%	100%	100%	100%

The Attention to the Territory managerial profile appears to be most prevalent within the food and wine sector. The Sustainable Tradition profile is particularly significant in the hospitality industry. The Positive Entrepreneur stands out as a primary reference point within the major events sector. Finally, the Traditionalist Proprietress – mirroring the distribution of the Attention to the Territory profile – is also prominently represented in the food and wine industry.

4. Time Trajectories: The Temporal Projection Model

The ultimate goal of this study, in alignment with the overarching project guidelines, is to provide policymakers and social stakeholders with rigorous analytical tools to guide the development of tourism in Puglia over the next twenty years. Within this context, translat-

ing prospective visions into tangible, operational scenarios is a crucial challenge, both methodologically and in practice.

By leveraging the extensive data collected, we introduce an innovative methodology focused on determining temporal trajectories. This approach allows for translating stakeholder perceptions into a precise, chronological dimension, estimating not only the degree of importance of the critical factors destined to shape the sector but also the specific time horizon – between now and 2045 – within which these phenomena are most likely to manifest.

The novel element lies in applying this procedure to the tourism sector: while typically employed in corporate environments for quantitative data analysis, it is adapted here for processing empirical evidence from a sample survey. The scientific challenge, therefore, is to validate the effectiveness of this predictive model when applied to perceptual variables, transforming the knowledge assets of experts into a concrete, temporal roadmap to support regional strategic planning.

4.1 Methodology

In the field of foresight studies and long-term strategic planning, the construction of future scenarios is grounded in the analytical distinction between possible, plausible, and desirable futures, as well as in the assessment of the expected impact of the phenomena under consideration (Bell, 2003; Börjeson et al., 2006). Within this framework, the literature acknowledges stakeholder perceptions as a privileged source of information for analysing complex systems characterized by high uncertainty and strong reliance on collective decision-making processes.

In particular, participatory methods and Delphi techniques jointly employ assessments of probability (or plausibility) and desirability to structure expert judgments regarding the future development of events and strategic drivers (Linstone & Turoff, 1975). These dimensions enable distinguishing between what is considered plausible over time and what is deemed desirable by the actors involved, thereby highlighting the active role of preferences and intentionality in shaping development pathways.

Scenario planning often distinguishes plausibility, probability, and desirability. In these studies, subjective evaluations are not seen as forecasts but as tools for exploring paths of change (Ramirez & Selin, 2014). Here, desirability is more than a value judgment; it is a variable that can guide and accelerate decision-making and transformation dynamics.

Consistent with methodological standards in futures research, which emphasize transparency in scenario construction and the analytical separation of evaluative dimensions, this contribution integrates plausibility, desirability, and impact within a single analytical framework applied to the tourism sector (Steinmüller et al., 2015). The element of originality lies in systematically translating stakeholders' perceptual evaluations into a quantifiable temporal dimension to support territorial strategic planning.

Following this line of research, the present contribution adopts a perspective that integrates plausibility, desirability, and impact within a unified analytical framework, extending

these approaches to the tourism sector. The originality of the proposed methodology lies in systematically transforming stakeholders' perceptual evaluations into a quantifiable temporal dimension, thereby supporting territorial strategic planning. To outline future scenarios over a twenty-year horizon, the model utilizes three key variables: Likelihood, Desirability, and Impact.

The twenty-year timeframe considered (extending to 2045) has been subdivided into five four-year intervals. The Likelihood variable (V_i) serves as a probability indicator: intuitively, a phenomenon deemed highly probable by operators is expected to manifest in the short term. To translate this probability into a chronological placement, a complementary transformation is applied to the value expressed by the *i*-th observer:

$$P_i = 100 - V_i$$

In order to normalize the variability of responses – which often oscillate between precise estimates and rounding to whole numbers – the P_i value is reclassified into four temporal classes (Y_i), expressed in years:

$$Y_i = \begin{cases} 4\ years, if\ 0 \leq P_i \leq 25 \\ 8\ years, if\ 25 < P_i \leq 50 \\ 12\ years, if\ 50 < P_i \leq 75 \\ 16\ years, if\ 75 < P_i \leq 100 \end{cases}$$

An important aspect of the model is the introduction of Desirability (D_i) not merely as a value judgment, but as a kinetic force. If an operator considers a change to be "desirable," they will tend to implement decisions and behaviours aimed at accelerating its realization. From this perspective, desirability acts as a catalyst that shortens the time to the phenomenon's occurrence. This force is quantified in quarters (Q_i) through a reclassification that mirrors the previous one:

$$Q_i = \begin{cases} 1\ quarter, if\ 0 \leq D_i \leq 25 \\ 2\ quarters, if\ 25 < D_i \leq 50 \\ 3\ quarters, if\ 50 < D_i \leq 75 \\ 4\ quarters, if\ 75 < D_i \leq 100 \end{cases}$$

The final trajectory (T_i), expressed in years and quarters, is the result of combining the theoretical positioning (Y_i) with the acceleration generated by the stakeholders' intent (Q_i). Given that the forecast starts from a minimum threshold of 4 years (inclusive) – a choice that allows the strategic scenario vision to be distinguished from short-term cyclical fluctuations and reflects the technical timeframes required for tourism policies to yield measurable effects – the formula for the Temporal Trajectory for each respondent is:

$$T_i = 4 + Y_i - Q_i$$

Finally, the Impact variable (I_i) defines the extent to which the factor under consideration will profoundly transform the tourism system. Assessments were mapped onto a four-point Likert scale, symmetrical around the origin: −2 (Very Negative), −1 (Negative), +1 (Positive), and +2 (Very Positive). Each impact value was converted into an angular value θ according to the following function:

$$\theta(I_i) = 45 * (I_i + 2)$$

This transformation assigns a specific direction to each judgment: 0° (−2), 45° (−1), 135° (+1), and 180° (+2). In this manner, the model indicates not only "when" an event will occur (the magnitude of the vector) but also the "direction" (the vector's inclination) in which it will influence the region's future.

The visualization of these trajectories occurs in a vector space defined by a goniometric semicircle, where each tourism driver is represented as a vector originating at the centre (0). The representational logic is structured around two fundamental parameters:

Inclination (Angle θ): This represents the expected degree of importance or impact of the factor. The vector's displacement along the semicircle's arc reflects the magnitude of stakeholders' judgment: a greater inclination toward the extremes of the quadrant indicates greater critical relevance, ranging from "Very Negative" to "Very Positive".

Vector Length (Magnitude): This represents the projected temporal trajectory. The extension of the arrow quantifies the chronological horizon within which the event is expected to manifest or consolidate (reaching the outer edge of the semicircle at the year 2045). Longer vectors indicate more extended temporal projections, while shorter vectors signal phenomena with an impact anticipated in a shorter timeframe.

5. Results

Temporal trajectories were calculated for each of the 14 factors considered and for every stakeholder interviewed. The results presented below refer to the four managerial profiles previously identified through k-means clustering. Table VI reports the mean values of the trajectories and the Impact calculated for each profile.

The analysis of the trajectories reveals a clear distinction between phenomena that will affect tourism in Puglia in the short term (imminent impacts) and those relegated to a more distant future.

The factors with the lowest absolute scores are Cultural Heritage and Authentic Experiences. This indicates that, for all managerial profiles, the consolidation of local identity is not a future challenge but a current necessity. The impact of these factors is already underway and requires immediate management responses to prevent the dilution of the regional offering. Professional Training and Safety/Security fall in the intermediate range. The transformation of human skills is perceived as a process that will begin to bear fruit within a few years, acting as a bridge between the present and technological innovations.

Table VI - Average Temporal Trajectories by Managerial Profile (values in years).

Factors	Attention to the Territory	Sustainable Tradition	The Positive Entrepreneur	The Traditionalist Proprietress
1) Environmental sustainability	10,4	10,9	11,0	11,3
2) Local community	10,8	11,1	11,0	11,3
3) Overtourism regulation	11,4	11,8	11,5	11,7

4) Disability access	10,9	10,9	11,0	11,1
5) Cultural and sporting events	11,5	11,1	11,0	11,8
6) Operator training	9,7	10,1	9,7	10,1
7) Climate change	10,5	10,1	10,5	11,2
8) Strengthening security	10,8	10,9	10,3	10,1
9) Sustainable transport	11,1	10,7	10,5	10,9
10) Transport integration	10,9	11,1	10,7	11,2
11) Artificial Intelligence	9,9	10,7	10,0	10,8
12) Virtual tourism	11,5	12,4	11,3	12,2
13) Authentic tourism experiences	9,2	9,3	9,1	9,2
14) Cultural heritage	9,7	9,2	8,9	9,1

Higher scores indicate phenomena with a projected impact farther in the future. Virtual Tourism is the factor with the most extended temporal projection. Stakeholders agree that integrating virtual reality into the tourism experience is not a current priority but rather a transformation that will fully mature over the long term. Similarly, the regulation of excessive flows (Overtourism) is viewed as an issue whose maximum pressure will manifest in the near future, suggesting that there is still room for manoeuvre before reaching a critical tipping point.

Fig. 1 displays the temporal trajectories for the Attention to the Territory managerial profile, showing that the absolute priority is the "here and now" of authenticity (9.2-year forecast), perceived as a fragile value requiring immediate protection. Conversely, this pro-

Fig. 1 - Average Temporal Trajectories by Attention to the Territory managerial profile.

file views the integration of major events and virtual technologies (11.5 years) as distant scenarios that will not alter the region's character in the short term.

The forecasts according to the Sustainable Tradition profile, shown in Fig. 2, emphasize the urgent need to protect historical heritage (9.2 years). This is the most sceptical or cautious profile regarding digitalization: it projects virtual tourism (12.4 years) at a very long temporal distance, as if to clearly separate the real experience from the simulated one.

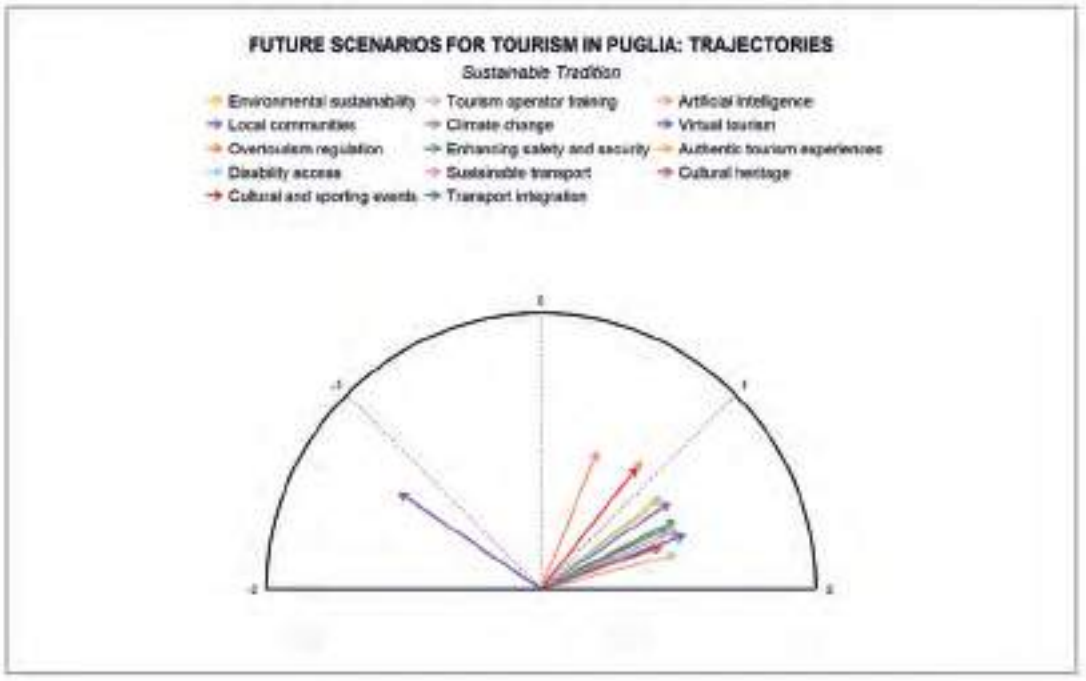

Fig. 2 - Average Temporal Trajectories by Sustainable Tradition managerial profile.

The Positive Entrepreneur is the profile most oriented toward immediate action on cultural capital (8.9-year forecast), which it considers the fastest and most concrete driver for investment. Conversely, it projects concerns regarding the management of overtourism further into the future (11.5 years), believing there is still margin before overcrowding becomes a critical emergency (Fig. 3).

The Traditionalist Proprietress, as shown in Fig. 4, while beginning from an immediate defence of the authenticity of experiences (9.2-year forecast), is the profile that anticipates the most radical transformations in the long term. This profile envisions a distant future in which the sector will be dominated by major events and virtual platforms (12.2 years), marking a trajectory of very profound change compared to the current state.

The trajectory tool has enabled observation of the four managerial styles extracted from the cluster analysis from a new perspective: a dynamic rather than merely descriptive vision that assigns a well-defined time horizon to each of the 14 future scenario domains.

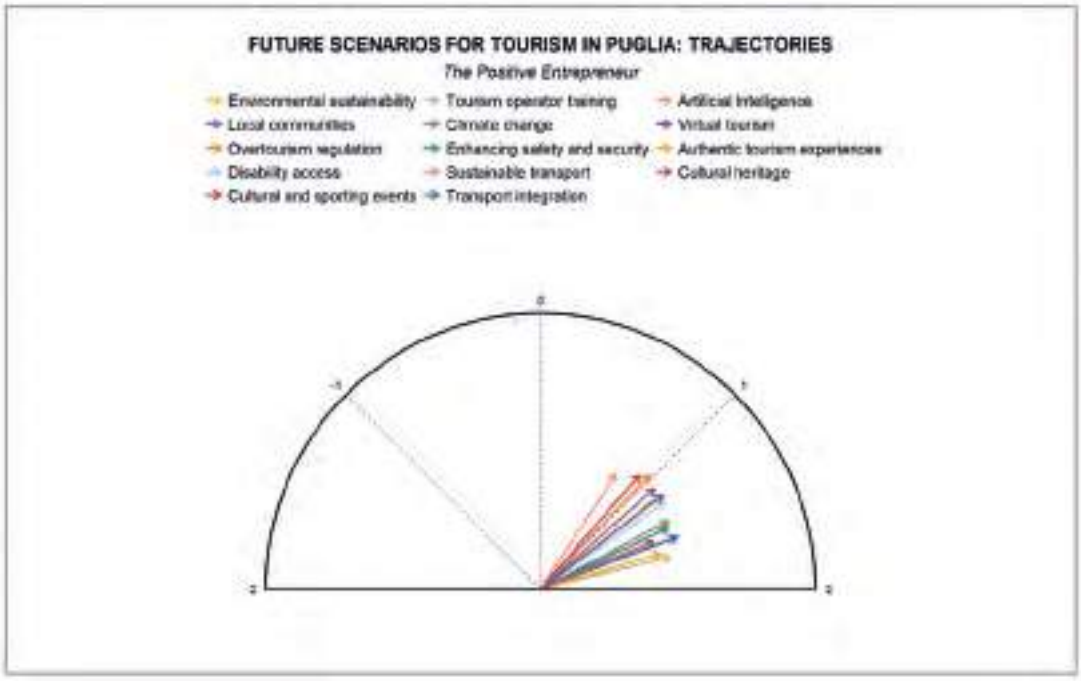

Fig. 3 - Average Temporal Trajectories by Positive Entrepreneur managerial profile.

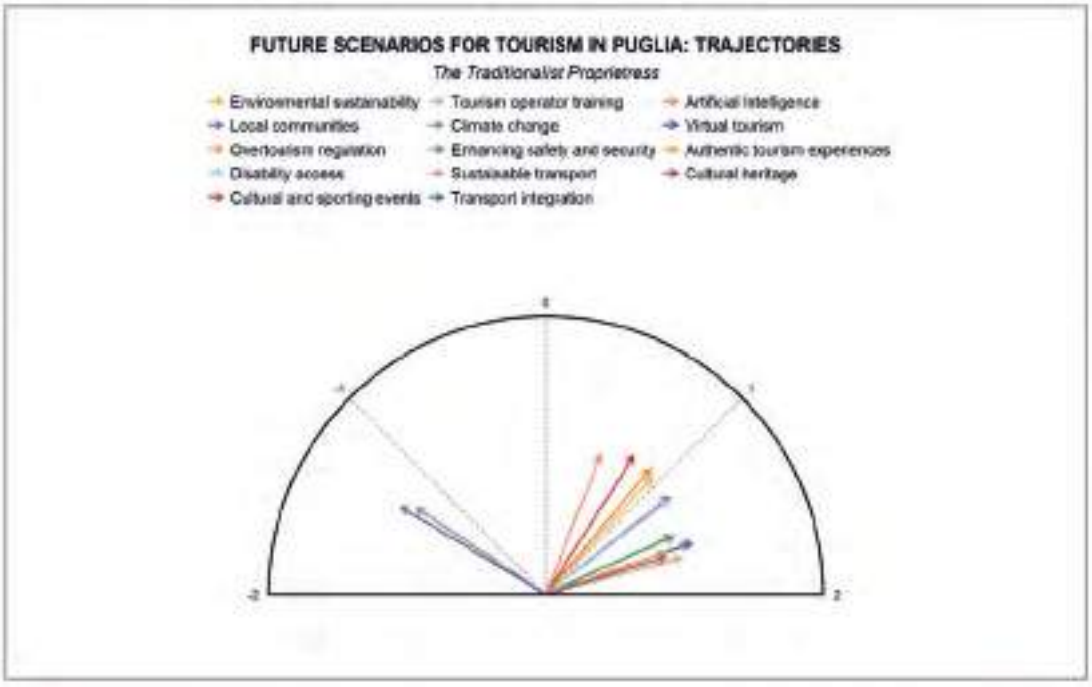

Fig. 4 - Average Temporal Trajectories by Traditionalist Proprietress managerial profile.

6. Conclusions

The analysis conducted within the framework of the PRIN 2022 PNRR project demonstrates that the vision for the Italian tourism system over the next twenty years is already clearly defined in the minds of stakeholders, regardless of their specific operational segment. The cross-cutting nature of emerging managerial profiles suggests that future governance strategies should be calibrated to the attitudinal profiles of operators (e.g., incentivizing innovation among "Positive Entrepreneurs" or supporting the ecological transition among "Traditionalists") rather than on simple categorical distinctions.

The key sectors of the Italian tourism system lend themselves to defining future development trajectories through the likelihood and desirability of potential futures. The methodological approach adopted here transforms subjective perceptions into measurable temporal trajectories, offering decision-makers a novel tool to distinguish immediate urgencies from long-term challenges. The results highlight convergence on the imminent protection of heritage and authenticity, while the impact of overtourism and virtual technologies is projected into a more distant horizon, enabling proactive, differentiated resource planning.

The proposed stakeholder segmentation is the result of a rigorous methodological approach that identified four distinct perspectives regarding future scenarios. Indeed, although an initial descriptive analysis showed the groups to be quite similar – especially regarding future scenarios – the trajectory method yielded two significant pieces of evidence: first, it helped highlight existing differences between the four managerial styles; second, it offered the possibility of estimating a plausible time interval for each of the 14 proposed future scenario domains.

While this represents a robust approach, the proposed model could undoubtedly be made more stable by hypothesizing alternative transformations for the evaluation scales of likelihood and desirability and comparing the current results with these new findings. Another potential development could involve replicating the survey with a new sample of tourism stakeholders outside the Apulian region, thereby allowing these results to be generalized at a national level.

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1. Concentration of supply

Fig. 1 - Airbnb density - September 2025

Identifying territorial clusters makes it possible to interpret the accommodation supply as a spatially organized system, articulated into functional areas characterized by different configurations in terms of density and types of hospitality. Within this framework, the analysis of the concentration of short-term rental supply in Puglia makes it possible to identify the five municipalities with the highest absolute number of listings, based on data from Inside Airbnb.

Bari emerges as the municipality with the highest number of listings, followed by Ostuni, Lecce, Gallipoli, and Porto Cesareo. This initial comparison makes it possible to immediately identify the main hubs of supply in absolute terms, highlighting the central role of large urban centres and the most established tourist destinations. However, an interpretation based exclusively on raw values risks underestimating the intensity of the phenomenon in smaller municipalities, where even a lower number of listings can translate into significant pressure on the local housing market. Therefore, it was deemed necessary to proceed with the construction of a map capable of representing the municipal-level distribution of Airbnb listings in Puglia, highlighting for each municipality the total number of accommodations available on the platform.

Spatial analysis thus makes it possible to move beyond a simple ranking based on overall volumes and to observe how the supply of short-term rentals is organized across the regional territory.

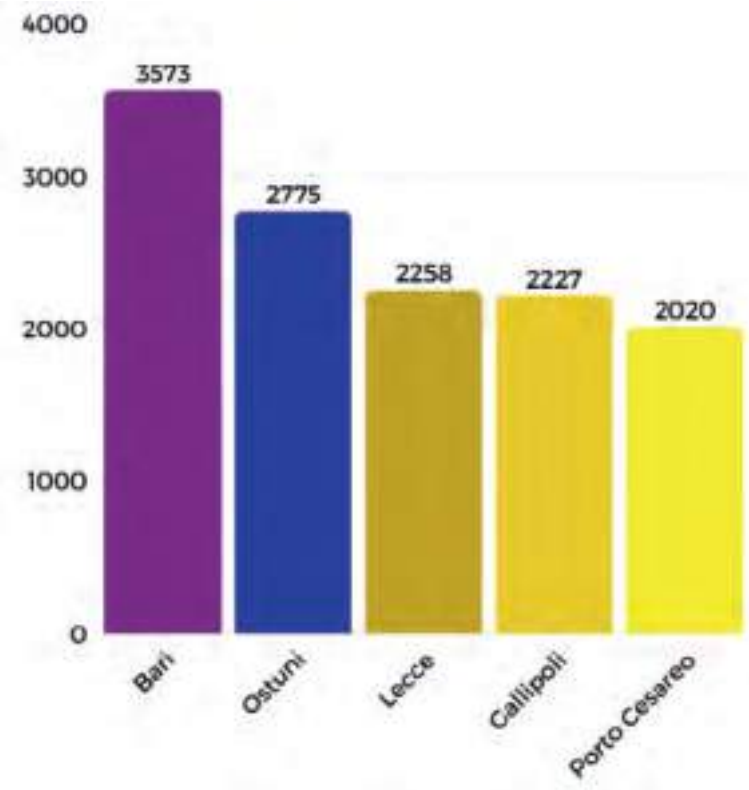

Fig. 2 - Airbnb density - Top 5 cities.

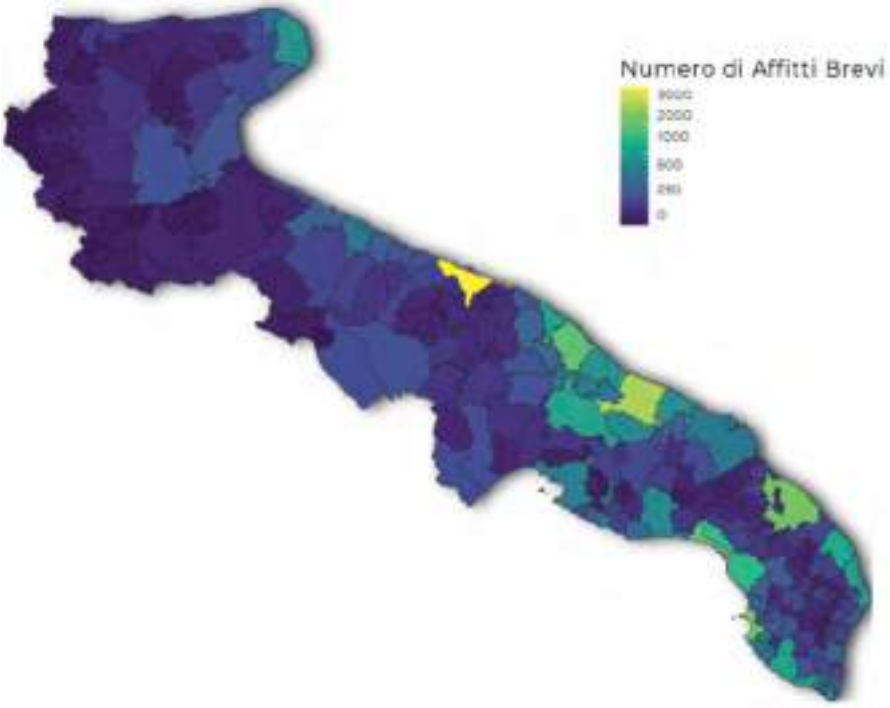

Fig. 3 - Airbnb density Map - Absolute number

Colour intensity clearly highlights the areas with the highest concentration, which are mainly located along the coastal belt and in the region's major urban centres, while inland municipalities show significantly lower values.

This pattern reflects the structure of the Apulian tourism system, characterized by a strong polarization toward coastal destinations and the most accessible urban centres, and suggests that the spread of short-term rentals follows logics of territorial attractiveness rather than a uniform distribution.

In particular, the analysis shows that the phenomenon is strongly concentrated in a small number of municipalities, corresponding to the main tourist and urban hubs of the region. Among these, Bari, Ostuni, Lecce, Gallipoli, and Porto Cesareo stand out as the municipalities with the highest number of Airbnb listings.

The recurrence of the same municipalities already identified through the analysis of absolute values confirms the existence of areas in which the short-term rental market is structurally more developed and consolidated, becoming a significant component of the local housing system.

In these contexts, the pressure exerted by the short-term rental market appears particularly relevant, suggesting that issues related to housing availability and competition with the residential market are concentrated primarily in these areas rather than being evenly distributed across the entire region.

To fully capture this pressure, it is nevertheless necessary to complement the analysis of overall volumes with a measure of relative intensity, which relates the supply of short-term rentals to the available housing stock.

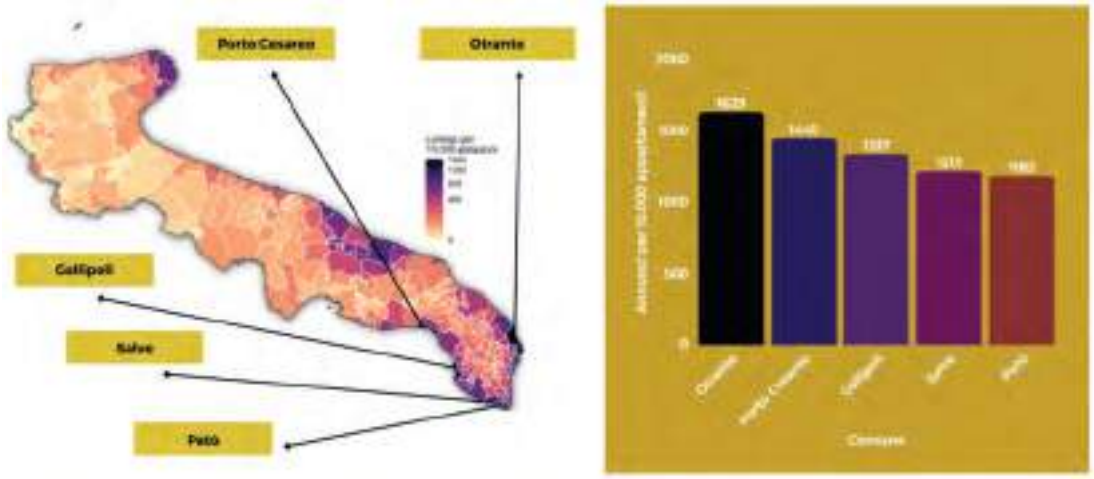

Fig. 4 - Airbnb density per 10.000 housing stock

The map shown in Fig. 7 displays the density of Airbnb listings per 10,000 dwellings. It reveals a strong concentration of listings in the southern areas of the region and along the coast. This perspective highlights how, especially in medium-to-small coastal municipalities, the incidence of short-term rentals on the housing stock is particularly high. In these

contexts, even a relatively limited absolute number of listings can translate into significant pressure on the residential market, making these territories potentially more exposed to saturation dynamics.

Evidence on the spatial concentration of the short-term rental supply provides an initial measure of the phenomenon's territorial polarization, but it does not allow its intensity and complexity to be fully captured.

For this reason, it is necessary to complement descriptive indicators with a synthetic approach capable of integrating multiple dimensions of the pressure exerted on the territory. Section 3.2 therefore introduces a composite stress indicator, aimed at systematically measuring the degree of strain generated by the supply of short-term rentals across different municipal contexts.

2. Composite indicator of housing market stress

While the concentration of supply provides relevant insights into the territorial distribution of short-term rentals, it does not fully capture the complexity of the pressures exerted on local contexts. The composite stress indicator integrates multiple dimensions of the phenomenon – appropriately standardized – allowing for a comparative assessment of the intensity of pressure at the municipal level.

Motivations and research hypotheses

Cities subject to pressure from short-term rentals tend to share a common structure:

- a high concentration of listings in the hands of a small number of highly professionalized hosts;
- a high diversification of host types (from single listers to large multi-hosts);
- a high intensity of Airbnb listings relative to the available housing stock.

These three dimensions were used to construct a composite indicator of housing market stress, based on Inside Airbnb data and official dwelling counts.

This approach makes it possible to move beyond a purely quantitative reading of the phenomenon, introducing a structural perspective that combines the composition of supply, market organization, and pressure on the housing stock.

For each spatial unit i, we define: $j = 1, \dots, n_i$

- Listings per host: x_{ij}
- Total listings per area (L_i):

$$L_i = \sum_{j=1}^{n_i} x_{ij}$$

- Total dwellings per area: D_i

Listing concentration – Gini index

The first dimension considered is the degree of concentration of listings among hosts, in order to provide a direct measure of the level of professionalization of the local market.

The Gini index measures how unequally listings are distributed among hosts. It captures the degree of market concentration, distinguishing whether listings are controlled by many small hosts or by a few large multi-hosts.

Let x_{ij} be the number of listings managed by host j in municipality i. Then:

Average listings per host

$$\mu_i = \frac{1}{n_i} \sum_{j=1}^{n_i} x_{ij}$$

Gini coefficient

$$G_i = \frac{\sum_{j=1}^{n_i} \sum_{k=1}^{n_i} |x_{ij} - x_{ik}|}{2\, n_i^2\, \mu_i}$$

If $G_i = 0$, each host manages the same number of listings; conversely, if $G_i = 1$, all listings are managed by a single host.

Host diversification – Shannon index

Alongside concentration, a second fundamental dimension is the diversification of host types, which reflects the organizational complexity of supply. This dimension captures the heterogeneity and the organizational complexity of Airbnb supply.

$$H_i = -\sum_c p_{ic} \log(p_{ic})$$

where p_{ic} represents the share of listings belonging to host class c in municipality i. A high value of the Shannon index indicates the coexistence of very different hosts, ranging from small individual owners to large professional operators.

Short-term rental density

The third dimension measures the pressure exerted by short-term rentals (STRs) on the local housing stock. It reflects how relevant the presence of STRs is relative to the number of dwellings available in area i.

$$Q_i = \frac{L_i}{D_i} \times 100$$

A higher value of Q_i indicates a larger share of the housing stock absorbed by short-term rentals, and thus potentially higher pressure on the availability and affordability of residential housing.

The final indicator

The three dimensions are measured on different scales. For this reason, each component is rescaled to the interval [0,1] using min-max normalization. The final indicator combines the three dimensions using normative weights that reflect our conceptual framework:

50% housing market pressure (Airbnb intensity);

50% host professionalization (concentration + diversification).

$$S_i = 0.25\, G_i^* + 0.25\, H_i^* + 0.5\, Q_i^*$$

When the indicator is high, the area exhibits a combination of concentrated hosting activity, diversified host profiles, and a significant presence of Airbnb within the housing stock. When it is low, the local market is less professionalized and Airbnb plays a much more limited role in housing availability.

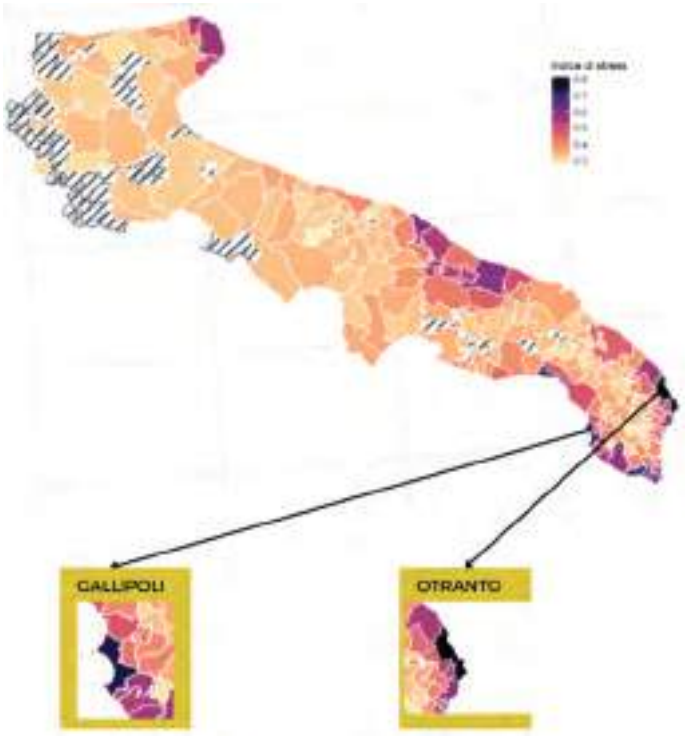

Fig. 5 - Airbnb density map - composite indicator
Focus: STRs in Bari - Georeferencing and Civic Address Linkage

The analysis presented in this work is based on the integration between the Data Management System (DMS) of the Municipality of Bari and the official municipal civic address registry. The main objective was to move beyond the approximate spatial information typically available from platform scraping and to reconstruct, with greater precision, the actual localization of short-term rental (STR) activities within the municipality of Bari. Thanks to that, we assigned each structure to a certified civic address, allowing a clearer distinction between residential buildings and properties partially or predominantly devoted to short-term rentals.

The linkage between DMS records and the municipal civic registry was implemented through a structured matching procedure. Street names and civic numbers were first normalized in order to eliminate inconsistencies due to abbreviations, spelling variations or formatting differences. The algorithm then attempted an exact match between the DMS address and the official registry. When an exact correspondence was not available, correction procedures and fuzzy matching techniques were applied to account for minor discrep-

ancies. In the most problematic cases, the procedure relied on the closest compatible civic number within the same street segment.

The spatial outcome of this process is illustrated in Fig. 6. The map shows a clear polarization of STR activity within a limited number of neighbourhoods. San Nicola (the historic centre), Murat, Madonnella and parts of Libertà emerge as the areas with the highest concentration of listings. Overall, the pattern is not uniform: short-term rentals cluster in central and coastal districts characterized by higher accessibility, tourism attractiveness and commercial vitality.

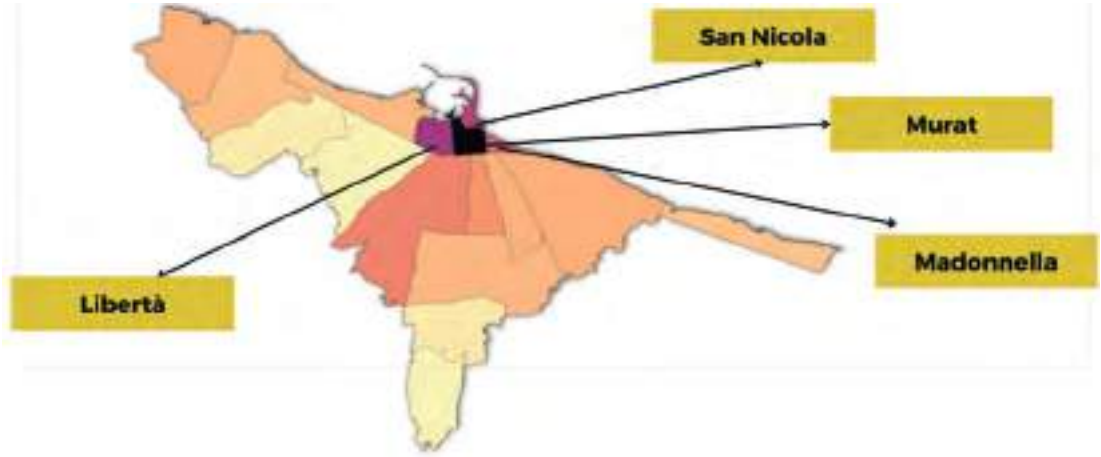

Fig. 6 - Neighbourhood-level concentration of short-term rentals in Bari.

A further refinement of the analysis was conducted at the street level. After aggregating listings by street name, we were able to identify the specific urban streets characterized by the highest density of STR activity. As shown in Fig. 7, the phenomenon seems to follow a linear pattern, with the most intense concentrations within the Murat neighbourhood.

This level of detail is particularly important from a public policy perspective. Having information at the street level provides in fact a degree of spatial granularity which can be used by local public administrations in order to regulate the market. In this way, decision-makers can identify the exact streets where short-term rentals exert the greatest pressure, allowing for more targeted and proportionate interventions with the aim of improving the capacity of public authorities to manage the local impacts of short-term rental activity.

Another useful point is that the integration between DMS administrative records and Inside Airbnb data allow for a detailed comparison at the street level. As shown in Fig. 8 there can be some discrepancies between the two sources. In certain streets, DMS records report higher values, while in others the platform-based data indicate a greater presence. These differences may reflect different reasons, such as updating procedures, visibility rules, license scheme problems or classification criteria.

For all these reasons, the civic-level linkage can be considered as a significant methodological advancement. We were in fact able to move from an approximate geolocation to

Fig. 7 - Streets with the highest density of short-term rentals in Bari.

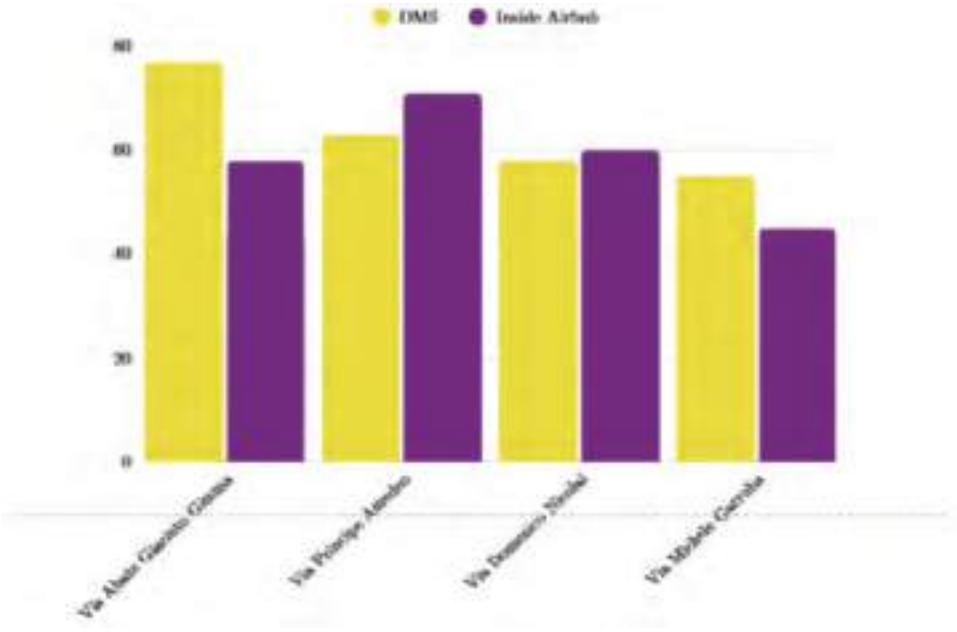

Fig. 8 - Comparison between DMS and Inside Airbnb counts at the street level

certified address-based identification, gaining both spatial precision and interpretative depth. This approach not only improves the reliability of the empirical evidence, but also opens the way to more sophisticated analyses of building-level concentration, ownership

structures and localized housing market pressures. Future research will further develop this framework, exploring longitudinal dynamics and extending the methodology to other urban contexts.

Shaping the future of cultural, musical and sporting touristic mega-events

1. Introduction

Major sporting, musical, and cultural events currently represent one of the most significant drivers of tourism flow generation and amplification. They function as territorial development instruments capable of enhancing international visibility, stimulating visitor mobility, and improving the economic performance of host destinations. Within the domain of sport tourism, mega-events such as the Olympic Games, World Championships and major competitive circuits (e.g., Formula 1, professional cycling tours) act as global attractors, generating both direct flows (spectators, teams, media) and indirect flows associated with reputational and infrastructural legacy effects (Fourie and Santana-Gallego, 2011).

Similarly, music events and cultural festivals foster forms of tourism mobility characterized by high expenditure propensity, strong emotional engagement and the capacity to build temporary communities that may evolve into long-term bonds with the destination (Richards, 2018). In particular, cultural festivals are increasingly interpreted as place-making devices, capable of strengthening local identity, extending visitor length of stay and promoting processes of tourism seasonality mitigation.

Recent literature emphasizes that the tourism value of events does not lie solely in their capacity to attract audiences, but rather in their ability to operate as ecosystem platforms, where territorial offerings, hospitality value chains, institutional governance and digital technologies converge to generate integrated experiences and long-term impacts (Buhalis, 2020). In this perspective, the event becomes an augmented territorial product, whose effectiveness depends on the integration of physical and digital infrastructures, coordination among public and private actors, sustainable flow management, and the quality of human capital involved (Mariani & Bonetti, 2020; Giampiccoli et al., 2015).

Moreover, the growing adoption of artificial intelligence, big data analytics and phygital systems is reshaping both organizational processes and visitor engagement modalities, enabling advanced demand segmentation, dynamic pricing strategies, real-time flow monitoring and the extension of pre and post-event experiential dimensions.

Within this framework, the present study investigates the role of major events as drivers of territorial attraction and growth through an empirical analysis conducted on a sample of 96 stakeholders operating in the Italian tourism sector. The findings portray the sector as a system in transition, in which large-scale sporting, cultural, and musical events emerge as enablers of off-season flows, hybrid experiential hubs, technological engagement platforms and arenas for collaborative governance.

The exploratory analysis highlights stakeholders' perception of events as powerful development tools whose effectiveness is contingent upon the degree of supply-side integra-

tion. Moreover, it shows a preference for flexible infrastructures and hybrid venues, an orientation toward advanced public-private partnership models, convergence around multichannel communication strategies and the centrality of customer experience management. Furthermore, technological innovation and qualified human capital emerge as transversal determinants of competitiveness and resilience.

These findings corroborate existing literature indicating that event tourism development requires a systemic balance between territorial competitiveness, sustainability, human capital and digital innovation (Richards, 2018).

The study provides an empirical foundation for modelling decision-making profiles and deriving policy implications aimed at fostering seasonally balanced growth and sustainable governance in event-driven tourism systems.

To identify the strategic priorities underpinning future decision-making processes, cluster analysis was employed.

This contribution is structured as follows: the first section introduces the research context and objectives; the second outlines the adopted methodological framework; the third presents the results of the exploratory data analysis and cluster analysis, describing stakeholders' desirable and plausible future projections; the fourth concisely discusses the main results and the fifth concludes with final considerations and selected policy recommendations.

2. Data and Methods

To understand the opinions of Italian stakeholders in the tourism sector regarding major events, a survey was conducted from September to October 2025 using CATI (Computer-Assisted Telephone Interviewing) and CAWI (Computer-Assisted Web Interviewing) questionnaires. Due to the specific characteristics of the tourism sector analysed, the initial sample comprised 120 respondents, of whom only 96 provided complete and usable responses for the analysis.

The analyses were first conducted using a descriptive approach, followed by a multidimensional framework.

Cluster analysis was used in the multidimensional stage to move beyond an aggregated reading of the interviews and to identify recurrent configurations of orientations, expectations, and representations of the future within the sample examined. In this context, the method was conceived as an exploratory and interpretative tool aimed at identifying actor profiles rather than constructing a rigid classificatory scheme. The clustering procedure was applied to content-related variables selected for cluster construction, specifically those referring to: (i) roles and instruments of action; (ii) evaluations of the desirability of future scenarios; and (iii) assessments of the plausibility of such scenarios. Structural variables were excluded from the clustering phase and subsequently employed for descriptive purposes.

In particular, a k-means cluster analysis was conducted on the selected variables as described above. Numeric variables were standardised using z-scores to ensure comparability

and the solution was estimated with multiple initialisations (number of initialisation = 20) to reduce sensitivity to initial "centroids" (random starting points), which can lead to different results each time the analysis is run. This approach allows the algorithm to run 20 times with different starting points and select the solution that minimises internal variance, ensuring that the four clusters identified are stable and not random. The resulting partition yielded four relatively balanced clusters.

3. Results

3.1 Main results from exploratory analysis

The descriptive analysis of responses from the 96 Italian operators active in the major musical, sporting, and cultural events sector is summarised below, first highlighting the structural characteristics of the firms, followed by the main thematic areas explored in the questionnaire.

The sample consists predominantly of micro and small enterprises, a configuration consistent with the productive structure of the Italian tourism system and, more broadly, Southern European destination economies. The prevalence of small firms is well documented in the literature on tourism and event-driven local development, which emphasises that fragmented entrepreneurial ecosystems underpin destination competitiveness, particularly in experience-based sectors (Buhalis, 2020).

Most organisations report employing between 0 and 5 employees (47 cases, 48.96%) or between 6 and 10 employees (25 cases, 26.04%). Larger organisational structures are progressively less represented: 11-15 employees (8.33%), 16-20 (3.13%), 21-50 (6.25%), and 51-100 (5.21%), while firms employing more than 100 employees account for only 1.04% in each of the highest categories. This distribution confirms the dominance of small-scale enterprises with lean organisational structures and operational flexibility features frequently associated with the adaptive capacity required in event-based tourism systems (Getz, 2008; Fourie and Santana-Gallego, 2011). In event-led development models, competitiveness often derives from networks of SMEs capable of mobilising local resources rather than from vertically integrated corporations (Dredge and Whitford, 2011).

The revenue distribution mirrors the employment structure, revealing a strong concentration in the lower and medium turnover brackets. A total of 34.38% of firms report an annual turnover of up to € 499,000 (33 cases), 31.25% fall within the € 500,000-€ 999,999 range (30 cases), and 27.08% report revenues between € 1,000,000 and € 4,999,999 (26 cases). Firms with annual revenues between € 5 million and € 9.9 million account for 4.17% (4 cases), while those exceeding € 10 million represent 3.13% (3 cases). This economic profile reinforces the image of a fragmented entrepreneurial landscape in which SMEs constitute the backbone of event-related tourism activities. Such a configuration aligns with studies on mega-events and legacy effects, which emphasise that long-term benefits depend on the capacity of local firms to embed events within broader territorial value chains and innovation networks (Hjalager, 2010; Novelli, Schmitz and Spencer, 2006).

Regarding individual characteristics, respondents report an average sectoral experience of 11.21 years (± 8.89 years), indicating consolidated professional knowledge within a context marked by heterogeneous career trajectories. From a gender perspective, 67.71% of respondents are female, highlighting the significant presence of women in managerial and organisational roles within the event tourism ecosystem. This finding resonates with research documenting the growing role of female entrepreneurship and leadership in service-intensive and creative tourism industries, including event production and destination management.

In terms of organisational roles, the sample is largely composed of senior and strategic decision-makers. Thirteen respondents hold the position of Chief Executive Officer/General Manager, and thirteen serve as Manager/Operations Director, followed by Marketing and Communication Managers (3 cases) and Quality and Sustainability Managers (3 cases). Other roles are marginally represented and include external consultants/freelance professionals (1 case), Sales Managers (1 case), operational staff (1 case), and other specified positions (5 cases). The predominance of top-level managerial figures enhances the interpretative relevance of the findings, as the perspectives collected reflect strategic-level assessments of competitiveness, governance and long-term development trajectories within the major events tourism sector, where strategic coordination and legacy planning are critical (Preuss, 2015).

Overall, the sample depicts an event-driven tourism system grounded in SMEs, led by experienced managerial actors and embedded within collaborative networks. This configuration is consistent with theoretical frameworks conceptualising event tourism destinations as multi-actor ecosystems in which competitiveness and sustainable legacy outcomes emerge from coordinated governance and local entrepreneurial capacity (Dredge and Whitford, 2011; Preuss, 2015).

From a managerial perspective, the results outline a sector characterised by strategic awareness and a systemic view of territorial development. Regarding the deseasonalisation of tourist flows, operators attribute an enabling but not self-sufficient role to major events: 39% consider their effectiveness dependent on integrated offers and structured experiential packages, while 28.5% regard them as the primary lever of attraction during the low season. This reflects a pragmatic perspective in which deseasonalisation is interpreted as the outcome of long-term strategies, consolidated territorial networks and coherent integration of the offer, rather than as an automatic effect generated by the event itself.

With regard to infrastructure, preferences converge towards hybrid, flexible and sustainable models. Thirty-nine per cent indicate large adaptable outdoor venues as a competitive asset, 29.3% favour covered multi-purpose hubs ensuring year-round usability, 24.4% emphasise multi-purpose sports facilities, and 7.3% highlight immersive technologies such as smart ticketing and augmented and virtual reality solutions to broaden engagement and strengthen territorial reputation. Infrastructure is, thus, conceived not merely as physical capacity but as an experiential and identity-enhancing platform.

In terms of governance, 44.6% of respondents identify balanced public-private partnerships as the most effective model, followed by 23.6% favouring private leadership supported by the public sector, 22% advocating permanent joint committees, and 9.8% assign-

ing a predominant coordinating role to public authorities. These findings indicate a clear preference for collaborative and non-hierarchical arrangements based on shared responsibility and stable coordination.

Communication and promotion strategies display a hybrid, multi-channel orientation. While 33.8% favour partnerships with traditional media to enhance legitimacy and visibility, 28.3% identify targeted digital campaigns as the most effective channel, 19.7% emphasise co-promoted tourism packages, and 18.2% refer to screen tourism strategies to consolidate destination image. Communication is therefore conceptualised as a shared narrative process in which visitors function as digital amplifiers of the territory.

Regarding the economic and tourism impact of sporting events, responses highlight a strong territorial dimension. Cultural and gastronomic side events (33.4%), logistical accessibility and hospitality quality (33.3%), dedicated packages for athletes and companions (18.7%), and the inclusion of local businesses (14.6%) are identified as key factors. The event is, therefore, interpreted as a systemic multiplier of territorial value.

Looking ahead twenty years, growth is attributed to four interconnected drivers: customer experience and personalisation (45.5%), digitalisation and process automation (28.5%), expansion of international tourism through global platforms (17.1%), and sustainability as a structural requirement (8.9%). Technological innovation, particularly artificial intelligence and big data, is seen as enhancing optimisation and engagement, yet always in complementarity with human capital, which is considered essential for resilience and qualitative competitiveness.

The evolution of sales channels points towards a phygital model. Online travel agencies and global platforms (49.6%) are perceived as dominant, while physical agencies (26%) retain relevance for high-personalisation services. AI-based vertical software (17.1%) and direct supplier channels (7.3%) complete the picture. The integration of digital tools and human interaction is regarded as a source of competitive balance. Among technological innovations, artificial intelligence and virtual assistants (55.2%) are most prominent in logistics, ticketing, and flow management, followed by virtual and augmented reality (17.8%), big data and predictive analytics (14.7%), and smart buildings (12.3%). Technology is seen as an integrated cognitive and managerial infrastructure that supports sustainability and personalisation throughout the event life cycle.

Finally, the main organisational challenges concern continuous training and human capital enhancement (44.7%), digital innovation investment (30.9%) and the development of stable networks (22.8%), while exclusive concern with external risks remains marginal (1.6%). In attracting demand, service quality and reliability (48%) clearly outweigh price leverage (14.6%) and safety alone (5.7%), pointing towards a future competitiveness model grounded in trust, perceived quality and coherent personalisation.

3.2 Profiles emerging from the cluster analysis

The cluster analysis identified four distinct actor profiles, differentiated by the practices adopted, future expectations, and, most notably, the relationship between desira-

bility, plausibility and expected long-term growth drivers. The question regarding the main growth driver over the next twenty years allows actors' evaluations to be situated within an extended temporal horizon, thereby strengthening the strategic interpretation of the clusters.

The four clusters display the following profiles (Table 1).

Cluster 1 - Realistic visionaries, characterised by high levels of both desirability and plausibility regarding future scenarios, along with a clear identification of structural and systemic growth drivers. Members of this group mainly identify long-term development engines related to organisational and governance innovation; integration between public and private actors; the capacity to build collaborative ecosystems. The growth driver is not seen as an exogenous or contingent factor, but rather as the result of intentional and coordinated processes. Qualitative responses reveal a perspective in which the desired future is considered realistic precisely because it is grounded in dynamics already underway or capable of being activated in the medium term. In this cluster, the growth driver serves as an element of alignment between aspirations and feasibility.

Cluster 2 - Critical aspirationalists, who exhibit a high level of desirability regarding future scenarios, accompanied by relatively lower perceived plausibility compared to desirability. Within this profile, the identified growth drivers are often transformative, such as cultural and demand-side changes; new forms of participation and engagement; radical innovation in supply models.

However, these drivers are frequently described as necessary yet difficult to activate due to institutional, organisational, or coordination constraints. In this context, reference to growth drivers serves a primarily normative function, expressing what should guide development rather than what will realistically do so. The gap between desirability and plausibility reflects a future-oriented vision strongly focused on change, yet marked by uncertainty regarding the conditions for its realisation.

Cluster 3 - Cautious pragmatists. This cluster is characterised by intermediate levels of desirability and plausibility, and by a predominantly incremental conception of growth drivers. Actors associated with this profile tend to identify as main development engines: optimisation of existing resources; gradual process improvement; adaptation to already established trends.

The growth driver is conceived as evolutionary continuity rather than disruption. Textual responses suggest a stance oriented towards managing the present and the short-to-medium term, in which the future is envisioned as an extension of the current trajectory. In this cluster, plausibility takes priority over desirability, thereby constraining the horizon of expectations.

Cluster 4 - Structural sceptics. The fourth cluster is characterised by comparatively lower levels of plausibility and a more fragmented pattern of desirability across dimensions, associated with difficulty in identifying clear and shared long-term growth drivers. Actors belonging to this profile tend to refer to: structural and economic constraints; sectoral saturation; dependence on external factors perceived as weakly gov-

ernable. When identified, the growth driver is often located outside the actors' sphere of control, acquiring an exogenous and uncertain character. This perspective reinforces a defensive orientation, in which future expectations are scaled down and change appears scarcely desirable precisely because it is considered difficult to achieve.

Table 1 - Relationship between clusters, growth drivers, and levels of desirability and plausibility

Cluster	Interpretative Profile	Predominant Growth Drivers (20-year horizon)	Perceived Desirability	Perceived Plausibility	Desirability–Plausibility Relationship
1 (n = 21)	Realistic visionaries	Systemic innovation, collaborative governance, public–private integration	High	High	Alignment. the desired future is perceived as achievable
2 (n = 24)	Critical aspirationalists	Cultural change, new demand patterns, radical innovation in supply models	Very high	Medium to moderately high	Moderate tension. aspirations tend to exceed perceived feasibility
3 (n = 23)	Cautious pragmatists	Optimisation of existing resources, incremental adaptation	Moderate	Moderate	Prudent balance. feasibility shapes expectations
4 (n = 28)	Structural sceptics	Exogenous factors, macroeconomic conditions, structural constraints	Variable / selective	Low	Limited confidence in feasibility and defensive orientation

4. Discussion

Overall, the analysis shows that expected growth drivers serve as a key mediating element between desirability and plausibility. In the more proactive clusters, these are seen as levers that can be activated through strategic action; in the more cautious or sceptical clusters, they are viewed as external or difficult-to-govern factors.

The varying degrees of centrality and controllability attributed to growth drivers help explain the different stances adopted by actors regarding the sector's future.

The classification of growth drivers was derived from an interpretative analysis of re-

sponses to the open-ended question about the main engine of sectoral development over the next twenty years, considered alongside the profiles emerging from the cluster analysis.

The cluster analysis highlights that the main dimension differentiating actors lies in the degree of alignment between desirability and plausibility of future development scenarios. The four profiles reflect distinct strategic postures shaped by how growth drivers are interpreted and assessed in terms of feasibility.

In the group of *realistic visionaries*, high desirability is matched by high plausibility: growth drivers such as systemic innovation and collaborative governance are perceived as actionable and embedded within institutional processes. The *critical aspirationalists* express very high desirability but comparatively lower plausibility, revealing a tension between transformative aspirations and perceived structural constraints. The *cautious pragmatists* adopt a balanced and incremental approach, while the *structural sceptics* display comparatively lower plausibility and frame growth drivers as largely exogenous or weakly governable.

These findings resonate with strategic foresight literature, which distinguishes between normative (desirable) and exploratory (plausible) futures. Actors' perceptions of plausibility shape their strategic orientation: where future trajectories are seen as achievable, proactive and coordination-oriented strategies prevail; where feasibility is doubted, adaptive or defensive behaviours dominate.

From a policy perspective, the heterogeneity of profiles suggests that uniform governance approaches may be insufficient. Policies should both leverage proactive actors as innovation partners and support more cautious groups through instruments that reduce uncertainty and strengthen institutional coordination. Ultimately, enhancing the perceived plausibility of desirable futures emerges as a key lever for fostering shared, sustainable development pathways within event-driven tourism systems.

5. Conclusion and policy implications

This study set out to investigate the role of major sporting, musical and cultural events as drivers of territorial attraction and long-term growth within the Italian tourism ecosystem. Through an integrated analytical framework combining descriptive statistics and multivariate analysis, the research provides a structured interpretation of how stakeholders conceptualise development trajectories in event-driven tourism systems.

The findings portray a sector characterised by strong experiential orientation, a consolidated SME-based structure and a clear awareness of the strategic relevance of governance coordination and technological innovation. Major events are not perceived as self-sufficient growth engines; rather, their effectiveness depends on systemic integration, collaborative public-private arrangements, and the embedding of events within broader territorial value chains.

The cluster analysis further refines this picture by identifying four distinct strategic postures (Realistic visionaries, Critical *aspirationalists*, Cautious pragmatists and Structural sceptics) differentiated primarily by how actors assess the relationship between desirable futures and their plausibility. Growth drivers are not interpreted uniformly: in some profiles they

are framed as actionable levers embedded in governance systems, while in others they are perceived as exogenous or weakly controllable conditions.

Taken together, the results suggest that the future of event-driven tourism development depends less on the intrinsic attractiveness of events and more on actors' capacity to translate desirable visions into credible and operational pathways. The degree of alignment between aspiration and feasibility emerges as a central explanatory variable shaping strategic orientation and adaptive capacity within the sector.

5.1 Policy Implications

The empirical evidence points to several strategic implications for policymakers and destination governance bodies.

First, the heterogeneity of stakeholder profiles indicates that uniform policy approaches may generate uneven engagement. Proactive actors, particularly those aligned with the Realistic visionaries profile, can be strategically involved as early adopters and co-design partners in innovation-oriented initiatives, including digital transformation, sustainable mobility and integrated event ecosystems. At the same time, more cautious or sceptical actors require targeted support mechanisms aimed at strengthening managerial capabilities, facilitating network participation and reducing perceived uncertainty.

Second, governance coherence emerges as a critical enabling condition. The effectiveness of event-led development strategies depends on stable public-private coordination, institutional alignment and long-term legacy planning. Policy interventions should therefore prioritise mechanisms that enhance coordination capacity, shared strategic vision and collective accountability.

Third, digital innovation and human capital investment must be treated as complementary pillars. Artificial intelligence, big data and phygital infrastructures are perceived as central drivers of competitiveness, yet their impact depends on skilled personnel capable of integrating technological tools into experiential design and territorial branding.

Finally, bridging the gap between desirability and plausibility should become an explicit policy objective. Strengthening the perceived feasibility of sustainability, accessibility and deseasonalisation strategies requires interventions at systemic nodes-regulatory frameworks, financial instruments, knowledge transfer platforms and inter-organisational networks. By enhancing the credibility of desirable futures, policy can foster greater strategic mobilisation and collective commitment.

In this perspective, major events should be conceived not merely as temporary attractions, but as long-term governance platforms capable of activating innovation ecosystems and generating cumulative territorial benefits. The capacity to align strategic aspiration with operational feasibility ultimately determines whether event-driven tourism systems evolve toward resilient and sustainable development trajectories.

Future research could extend the present analysis by comparing the strategic postures identified in the major events tourism sector with those emerging in other tourism segments, such as cultural heritage tourism, leisure travel, or business tourism. A comparative

perspective would allow for the assessment of whether the alignment between desirability and plausibility represents a distinctive feature of event-driven systems or a broader structural characteristic of tourism governance dynamics. Such cross-segment analyses could further clarify how different tourism ecosystems conceptualise growth drivers, sustainability pathways and long-term development trajectories, thereby enriching both strategic foresight studies and destination management theory.

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Understanding Growth Dynamics in the Hospitality Sector: Perceptions, Strategies, and Territorial Patterns

1. Introduction

The hospitality sector represents one of the most dynamic and complex domains within contemporary economies, as it directly reflects the interaction between social transformations, technological innovation, and evolving consumer preferences. Over the past two decades, the sector has undergone profound processes of reconfiguration that have progressively challenged consolidated models of service provision and intermediation. The traditional distinction between hotel-based and non-hotel accommodation, historically grounded in organizational and regulatory differences, appears increasingly inadequate to describe a landscape characterized by hybrid solutions, networks of independent operators, and digital platforms capable of coordinating supply and demand on a global scale.

At the same time, tourism demand has experienced a significant shift toward experiential consumption patterns, prioritizing authenticity, personalization, and relational quality over the mere utilization of accommodation services. In this context, the guest experience tends to be conceived as a multidimensional process unfolding across the entire customer journey, in which material, symbolic, and relational dimensions interact. This evolution has important implications for operators, who are required to reconsider their competitive strategies in an environment marked by high uncertainty, seasonality of flows, and increasing competitive pressure.

An additional layer of complexity is introduced by the growing role of digitalization and technological innovation. Online platforms, data management systems, and artificial intelligence tools are progressively transforming market access, customer interaction, and internal organizational processes. However, recent literature suggests that technological innovation does not operate as an autonomous driver of growth, but rather as an enabling factor whose impact depends on its integration with experience-oriented and value-based strategies. Consequently, understanding the sector's evolutionary trajectories requires an analytical approach that accounts for the combination and interdependence of multiple strategic levers.

Within this framework, the analysis of operators' perceptions assumes a central role. The expectations and evaluations expressed by industry actors do not merely reflect individual opinions, but rather embody processes of collective learning and strategic adaptation to structural constraints and emerging opportunities. Examining these perceptions therefore makes it possible to capture early signals of transformation and to identify the levers considered most relevant for future growth.

Moreover, the analysis of hospitality models cannot be detached from a territorial per-

spective. Organizational strategies, intermediation mechanisms, and guest experiences are embedded in specific spatial contexts, characterized by varying levels of supply density, functional specialization, and coordination capacity among actors. Understanding where and how accommodation supply is spatially organized thus represents a preliminary step for interpreting competitive dynamics and development trajectories within the sector.

For this reason, the following section adopts a spatial analytical approach based on the DBSCAN algorithm, aimed at identifying territorial hospitality systems that go beyond simple accommodation concentration patterns and provide a functional geography of regional tourism areas.

2. From density to territories: what DBSCAN clusters reveal

The territorial analysis of hospitality in Apulia adopts a spatial clustering approach based on the DBSCAN algorithm (Ester et al., 1996). This technique allows tourism territories to emerge endogenously from the geographical distribution of accommodation facilities, overcoming the limitations of traditional density maps. While standard heatmaps merely illustrate where listings are concentrated, the DBSCAN-based map identifies functional tourism systems: continuous areas where the supply is sufficiently dense and spatially connected to operate as a single territorial system.

2.1. Methodology and Macro-Clusters Identification

The identification of these tourism territories relies on cluster analysis techniques designed to discover inherent structures within the spatial distribution of data (Kaufman & Rousseeuw, 2009). The algorithm relies on two fundamental parameters: ε (epsilon), the neighbourhood radius, and *minPts*, the minimum density threshold. In this study, ε was set at approximately 3 km to connect facilities within the same territorial context while avoid-

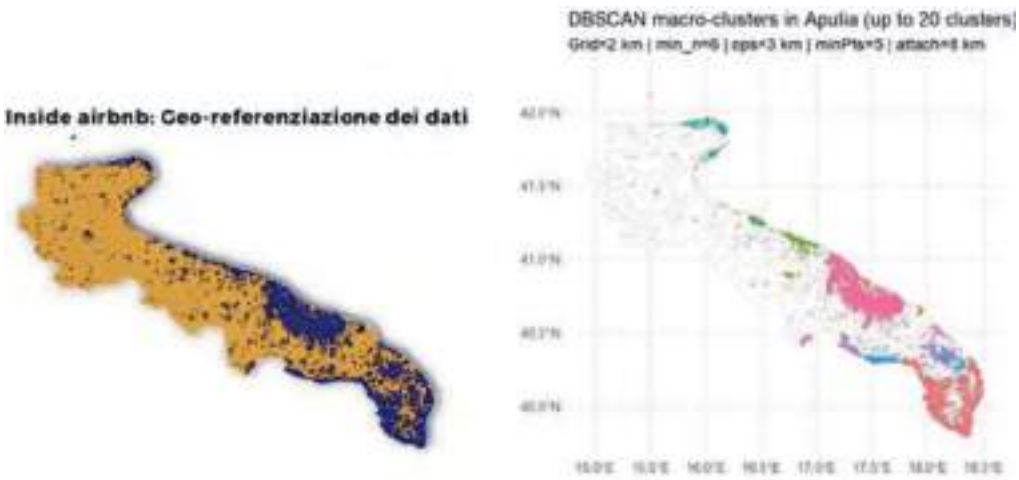

Fig. 1 - Geo-referencing and DBSCAN macro-clusters

ing the artificial merging of distinct areas. The *minPts* threshold was set between 5 and 6 units to ensure that a zone is recognized as a tourism territory only in the presence of a continuous supply. Isolated listings failing to meet these criteria are classified as "noise," representing supply that does not form a territorially cohesive system.

The map illustrates the functional geography of regional tourism, where clusters represent homogeneous macro-areas rather than administrative municipalities. The most significant clusters coincide with the region's main tourism poles: the Salento coastal area, the metropolitan area of Bari, the Lecce urban system, the Itria Valley (including the Monopoli-Ostuni axis), and the Gargano peninsula.

2.2. Diversity of hospitality models by typology

Beyond identifying the borders of these territories, the analysis explores their internal composition. Although the "entire home/apartment" category dominates the non-hotel model across all major clusters – particularly in the Salento and Itria Valley areas – other typologies follow distinct spatial patterns.

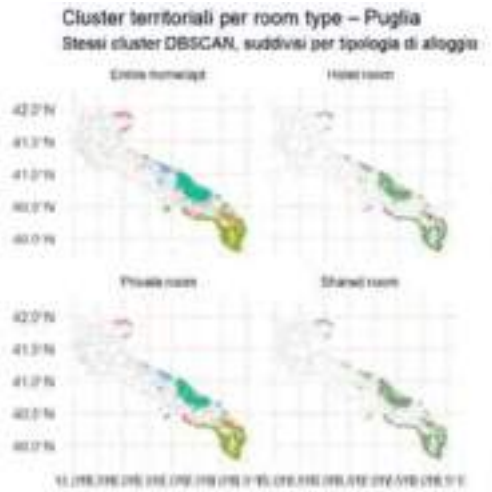

Fig. 2 - Territorial clusters by room type in the Apulian hospitality system

Disaggregating the supply reveals that each tourism territory exhibits a distinctive "supply profile". Hotel rooms are primarily concentrated in major urban centres and structured coastal destinations with long-standing traditions. Private rooms show a more discontinuous distribution linked to medium-sized cities and inland areas, while shared rooms concentrate in high-intensity clusters popular with international and younger travellers. This spatial differentiation confirms that Apulia's tourism development is not a uniform process but a mosaic of diverse hospitality models embedded in specific geographical contexts.

Consequently, the identification of these "functional territories" suggests that a "one-size-fits-all" policy for regional tourism would be ineffective. The transition from simple

density to functional geography proves that competitive dynamics are driven by local territorial specialization. These findings provide the necessary groundwork for the following section, which moves from the general spatial organization of hospitality to a specific analysis of the pressures generated by short-term rentals (STR) within these consolidated markets.

2.3 Concentration patterns and relative intensity

To fully capture market pressure, absolute volumes were complemented with a relative intensity measure, relating STR supply to the available housing stock. The density of Airbnb listings per 10,000 residential units highlights a strong concentration in southern coastal areas and along the regional shoreline more broadly.

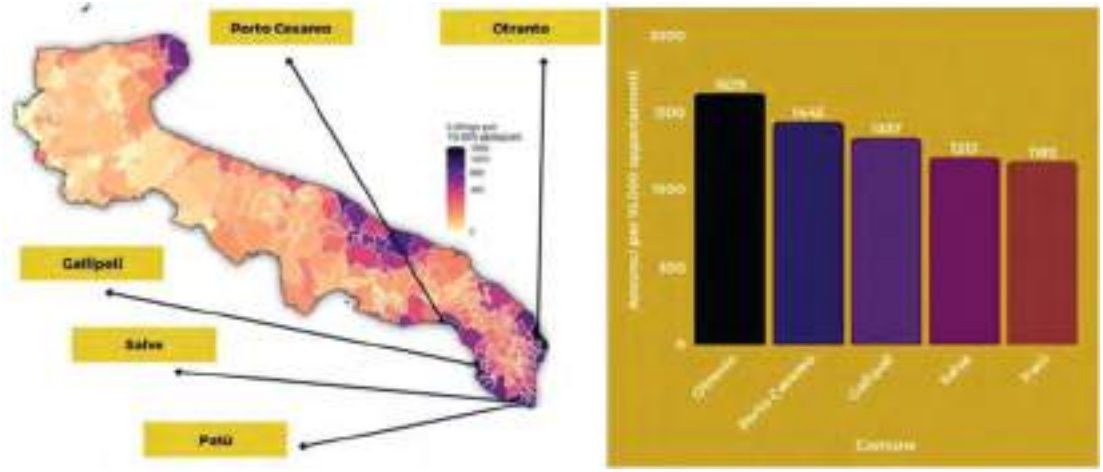

Fig. 3 - Relative intensity of STR supply per 10,000 dwellings

This perspective reveals that medium- and small-sized coastal municipalities often experience particularly high STR incidence rates. In these contexts, even moderate absolute listing numbers can generate significant housing market stress, rendering these territories especially vulnerable to saturation dynamics.

While spatial concentration measures provide an initial assessment of territorial polarization, they are insufficient to fully capture the multidimensional nature of STR-related pressures. This motivates the adoption of a synthetic approach integrating multiple dimensions of market stress.

2.4 Composite stress indicator for local housing markets

Although concentration metrics offer valuable insights into STR distribution, they do not exhaust the complexity of pressures exerted on local housing systems. The composite

stress indicator integrates multiple standardized dimensions, enabling a comparative evaluation of pressure intensity at the municipal level.

Conceptual rationale

Municipalities experiencing STR-related pressure tend to share a common structural configuration:

- high concentration of listings in the hands of a limited number of highly professionalized hosts;
- strong diversification of host typologies, ranging from individual landlords to large multi-host operators;
- high STR intensity relative to the available housing stock.

These three dimensions were combined to construct a composite housing market stress indicator using Inside Airbnb data and official housing stock statistics. This framework makes it possible to move beyond a purely quantitative interpretation of the phenomenon by introducing a structural perspective that combines supply composition, market organization, and pressure on the housing stock.

For each spatial unit *i*, let $j = 1, \dots, n_i$ denote individual hosts. We define:

- Listings per host: x_{ij}
- Total listings in area *i*:

$$L_i = \sum_{j=1}^{n_i} x_{ij}$$

- Total number of dwellings in area *i*: D_i

Market concentration: Gini index

The first dimension captures the degree of listing concentration among hosts, providing a direct measure of market professionalization. The Gini index (Gini, 1912) assesses inequality in the distribution of listings across hosts, distinguishing markets dominated by many small operators from those controlled by a few large multi-hosts.

Let x_{ij} denote the number of listings managed by host *j* in municipality *i*, with total listings:

Average Listings per Host $\mu_i = \frac{1}{n_i}\sum_{j=1}^{n_i} x_{ij}$ Gini Index $G_i = \frac{\sum_{j=1}^{n_i}\sum_{k=1}^{n_i}|x_{ij}-x_{ik}}{2n_i^2\mu_i}$

A Gini value of zero indicates perfect equality (each host manages the same number of listings), while a value of one reflects total concentration under a single operator.

Host diversification: Shannon index

Alongside concentration, organizational heterogeneity is captured through the Shannon diversity index (Shannon, 1948), reflecting the coexistence of different host typologies within each municipality.

$$H_i = -\sum_c p_{ic} \log (p_{ic})$$

where p_{ic} represents the share of listings belonging to host category c in municipality i. Higher Shannon values indicate greater diversity, implying a more complex and stratified market structure involving both small-scale hosts and professional operators.

STR density relative to housing stock

The third dimension measures the absorption of residential housing by short-term rentals:

$$Q_i = \frac{L_i}{D_i} \times 100$$

where D_i denotes the total number of residential dwellings in municipality i. Higher values of Q_i signal stronger pressure on housing availability and affordability.

Construction of the composite index

Since the three dimensions operate on different scales, each component was normalized to the [0,1] interval using min-max normalization. The final stress indicator combines the components using normative weights reflecting the conceptual framework:

- 50% housing market pressure (STR density)
- 50% host professionalization (concentration + diversification)

$$S_i = 0.25G_i^* + 0.25h_i^* + 0.5Q_i^*$$

Higher index values indicate territories characterized by concentrated hosting activity, diversified operator profiles, and significant STR penetration within the housing stock. Lower values reflect less professionalized markets with limited STR impact.

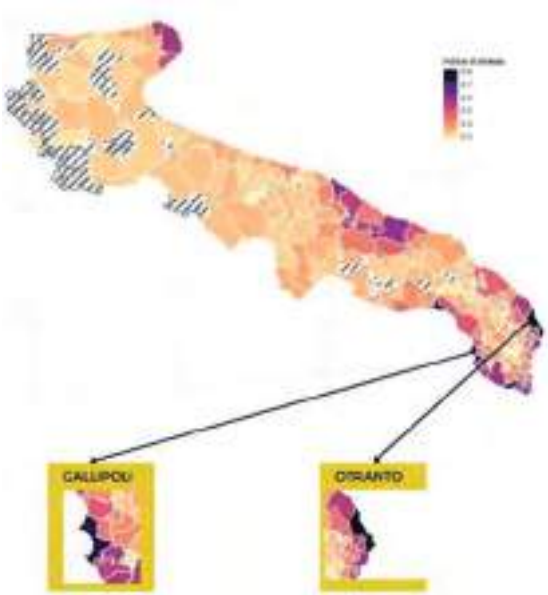

Fig. 4 - Absolute distribution and top municipalities for short-term rental (STR) listings.

The map illustrates the spatial distribution of the synthetic index. The focus on the Salento area, specifically Gallipoli and Otranto, highlights the highest levels of stress (indicated by the darker shades). In these hotspots, the combination of high STR density and professionalized market structures creates the most significant pressure on the local housing system.

3. Data and analytical framework

The empirical analysis is based on a survey administered to operators and stakeholders within the hospitality and tourism sector, aimed at collecting information on organizational characteristics, strategic expectations, and perceptions regarding future growth dynamics. The questionnaire was structured into multiple thematic sections, capturing both descriptive contextual elements – such as business model, role within the organization, and tenure in the sector – and forward-looking evaluations concerning demand evolution, technological innovation, and perceived growth drivers over the medium to long term.

The final sample comprises 206 respondents drawn from a range of business types and organizational forms. While the sample cannot be considered statistically representative of the broader population, its composition reflects substantial heterogeneity in organizational models and competitive positioning. In this sense, the survey provides a diversified set of perspectives suitable for exploratory analysis.

Most variables are categorical in nature and derived from single- or multiple-response questions designed to capture judgments, preferences, and expectations. This data structure supports the use of descriptive statistics based on frequency distributions and percentages as a first analytical step. The tables reported in the results section summarize these distributions, ensuring transparency and empirical traceability.

Alongside descriptive analysis, the study adopts an exploratory segmentation approach through a cluster analysis of operators' perceptions. Because most survey items are categorical (single- and multiple-choice), responses were encoded through one-hot (dummy) variables, while multiple-response technology items were treated as binary indicators. Clusters were then identified using the k-means algorithm on the resulting feature space, selecting the number of groups by jointly considering internal validation (silhouette) and substantive interpretability. The aim is not causal inference, but the identification of coherent perception profiles that summarize how organizational, strategic, and technology-related views tend to co-occur within the sample.

Unlike parametric models, clustering is particularly suited to exploratory settings in which the goal is to identify latent groupings of respondents without imposing a priori typologies. In this study, the cluster solution is employed for interpretative purposes: it summarizes how organizational models, perceived demand trends, growth drivers, and technology expectations tend to co-occur in the surveyed sample. To preserve interpretability, the final number of clusters was kept limited and profiles were described through within-cluster distributions of the main survey items.

Overall, the adopted framework integrates rigorous descriptive analysis with a structur-

al exploration of inter-variable relationships, maintaining a high level of transparency and interpretability. This approach is consistent with the study's objective, which is not to estimate causal effects but rather to clarify the perceptual hierarchies and decision configurations emerging within the surveyed sample.

4. Descriptive results

The composition of respondents reveals a clear predominance of non-hotel accommodation providers (64.4%), followed by independent hotels (24.9%). International hotel chains and branded properties account for a marginal share (4.3%), while hybrid or alternative models represent 6.4% of the sample. This distribution aligns with the Italian hospitality context, characterized by a prevalence of micro-operators and flexible accommodation solutions deeply embedded within local territories and capable of offering highly personalized guest experiences.

Regarding expectations about demand evolution, more than half of respondents foresee a "dynamic equilibrium" between hotel-based and non-hotel accommodation (51.4%). A substantial proportion anticipates the expansion of hybrid models (29.5%), while further growth of non-hotel accommodation as the dominant form is indicated by 13.5% of respondents. Only 5.6% expect traditional hotels to prevail. Overall, these results suggest that the hotel/non-hotel dichotomy is increasingly perceived as analytically insufficient, with attention shifting toward integrated operational configurations combining services, standards, and distribution channels.

Respondents converge on two business models perceived as particularly promising: networks and consortia of coordinated non-hotel accommodations (35.8%) and integrated digital platforms (35%). These are followed by specialized independent hotels (24.9%), while hotel chains receive limited support (4.3%). This pattern points toward a competitive horizon envisioned as both cooperative and platform-based – where territorial networks facilitate service coordination and joint promotion, while digital platforms act not merely as sales channels but as integration infrastructures for data, pricing, guest relationships, and experience bundling.

On the demand side, authenticity and local experiences emerge as the dominant trend influencing guest choices (61%), followed by value for money (33.3%). Environmental and social certifications (3.9%) and technological innovation as a differentiating factor (1.8%) appear marginal. This does not imply that sustainability and technology are irrelevant; rather, they seem to function as "hygiene factors" – baseline expectations that no longer provide strong competitive differentiation. Consequently, competitive advantage increasingly shifts toward relational and experiential dimensions, with technology serving as an enabling mechanism for efficiency, personalization, and journey fluidity.

When examining long-term growth drivers, personalization and customer experience rank first (40%), followed by international tourism flows and global platforms (22.5%), sustainability centrality (21.5%), and process digitalization (16%). This hierarchy reflects an integrated vision of growth, in which individual needs are anticipated across the customer

journey through digital infrastructures and data utilization, while preserving the human dimension of hospitality. The prominence of international platforms also signals intensifying global competition, where market access increasingly depends on participation in digital ecosystems.

Among technological innovations, artificial intelligence is perceived as having the strongest future impact (44%), followed by virtual and augmented reality (23%), big data and predictive analytics (19%), and smart building solutions (14%). The centrality of AI aligns with experience-driven strategies, as recommendation systems, dynamic pricing, conversational agents, and process automation enhance efficiency and perceived service quality. VR and AR are mainly associated with inspiration and pre-trip engagement phases, while data analytics supports operational planning and seasonality management.

5. Cluster analysis and perception profiles

To explore the heterogeneity of operators' strategic perceptions and expectations, a cluster analysis was conducted on the main variables capturing perceived growth drivers, preferred future business models, demand trends, and the expected role of technological innovation. After standardization of variables, a k-means clustering procedure was applied. The optimal three-cluster solution was selected based on within-cluster variance reduction and interpretability of resulting profiles.

The analysis reveals the existence of three distinct strategic orientations within the hospitality sector, reflecting differentiated development visions and adaptation trajectories.

Cluster 1 - Experience-driven and relational development model (approximately 45% of respondents).

Operators in this cluster strongly emphasize personalization, authenticity, and customer experience as the primary drivers of long-term growth. They predominantly support business models based on coordinated networks of non-hotel accommodations and locally embedded organizational structures, highlighting the importance of territorial identity and service integration. Technological innovation is perceived mainly as an enabling tool to enhance service quality and customer interaction rather than as a growth driver in itself. This profile reflects a development strategy grounded in experiential value creation and relational competitiveness.

Cluster 2 - Platform-oriented and technology-enabled growth model (approximately 34% of respondents).

This group is characterized by a strong belief in the role of digital platforms, artificial intelligence, and data-driven management as central engines of future competitiveness. Respondents within this cluster tend to favour integrated digital platforms and globally connected business models, viewing international tourism flows as a key expansion opportunity. Customer experience remains important, but is framed within a technologically mediated ecosystem emphasizing efficiency, scalability, and market access.

Cluster 3 - Sustainability-centered and structurally cautious model (approximately 21% of respondents).

Operators in this cluster prioritize sustainability, environmental responsibility, and long-term territorial balance as the main growth drivers. They express comparatively lower expectations regarding rapid technological transformation and platform dominance, instead favouring gradual development paths compatible with social and ecological constraints. This profile reflects a precautionary and resilience-oriented vision of hospitality growth, emphasizing quality over expansion intensity.

Overall, the cluster structure highlights that operators' expectations do not converge toward a single dominant trajectory but rather articulate multiple coexisting strategic logics. While experiential personalization emerges as the most widespread orientation, a substantial share of operators anticipates platform-based technological expansion, and a smaller yet significant group foregrounds sustainability as the core development principle. These differentiated profiles underscore the path-dependent and plural nature of hospitality sector transformation, suggesting that future growth will likely unfold through a combination of relational, technological, and sustainability-driven strategies rather than through a uniform model.

Beyond the specificities of each profile, the analysis reveals cross-cutting criticalities that affect the entire sector and condition its development trajectories. A prominent theme is the fragmentation of supply, which limits the coordination and investment capacity of local operators. This structural atomization increases dependence on global digital platforms, exposing the system to asymmetric power relations and reducing the ability to retain value within the territory. Furthermore, the system exhibits a marked vulnerability to exogenous shocks – whether economic, environmental, or geopolitical – which can amplify existing internal fragilities. In parallel, competition mediated by platforms raises concerns regarding the risk of a progressive standardization of the tourism experience, which could erode the elements of authenticity and personalization identified by operators as the primary drivers of future growth.

6. Conclusions

This study investigated hospitality sector operators' perceptions regarding future development trajectories, identifying the strategic choices and growth drivers considered most relevant over the long term. The analysis combined descriptive statistics and an exploratory cluster analysis of perception profiles to map the complexity of the regional hospitality landscape.

The findings clearly indicate that no single growth strategy applies uniformly; instead, future expectations are strongly conditioned by the business models currently adopted, revealing a pronounced path dependence. A robust result concerns the centrality of personalization and customer experience, which emerge as the primary perceived growth drivers, conceptualized as a composite of relational quality and authenticity rather than mere technological investment.

Moreover, these perceptions are strictly linked to the territorial context: operators in high-pressure coastal clusters (as identified in Section 3) show a higher awareness of the need for structured governance compared to those in less saturated areas.

At the same time, the analysis underscores persistent structural limitations, such as supply fragmentation and limited coordination capacity, which act as obstacles to future development. Furthermore, the study reveals that highly desirable trajectories related to sustainability and advanced digital integration are viewed as difficult to implement through individual action alone, as their realization depends heavily on external policy frameworks and territorial coordination.

6.1 Policy implications

The evidence indicates that hospitality development policies should move beyond standardized interventions and instead focus on creating enabling conditions for the emergence and consolidation of high-quality, territorially embedded experiences. Given the central role of personalization and customer experience, public strategies should prioritize investments in workforce training, cultural heritage valorisation, and relational service competencies.

A second critical area concerns the reduction of supply fragmentation. Since operators increasingly recognize the limits of individual action, policy frameworks should actively support the formation and strengthening of cooperative networks, territorial consortia, and shared digital infrastructures. Fiscal incentives, targeted funding schemes, and governance facilitation mechanisms may play a central role in fostering coordination.

While digital technologies and artificial intelligence are perceived as important, they function primarily as enabling tools rather than strategic ends in themselves. Innovation policies should therefore avoid purely technology-driven approaches and instead emphasize programs that help operators leverage digital tools to enhance guest experience, service integration, and data-driven management while reducing dependency on external platform monopolies.

Territorial governance emerges as another key dimension. Issues such as sustainability, accessibility, and tourism flow management are considered highly desirable yet difficult to address at the individual level. This calls for integrated destination-scale policies coordinating transport systems, service provision, regulatory frameworks, and urban planning to mitigate congestion effects and preserve resident quality of life. Specifically, in municipalities identified as high-stress hotspots (e.g., Otranto and Gallipoli), policy interventions should prioritize the balance between tourism attractiveness and housing affordability to prevent the erosion of local social capital. Finally, the development of hospitality should be understood as a long-term and path-dependent process requiring policy stability and institutional continuity. Short-term or emergency-driven interventions are unlikely to generate lasting impacts. Instead, medium- to long-term strategies aimed at building local capacity, fostering cooperation, and enhancing experiential quality offer more robust pathways toward sustainable and resilient sectoral growth.

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Food and Wine Tourism: Measuring Local Identity and Sustainable Value Creation

1. Introduction

Contemporary tourism is characterized by a gradual transition from standardized consumption models to experiential, identity-based, and sustainable forms. In this context, food and wine tourism emerges as a privileged area of integration between culture, territory, and local economic development. Food is not only a consumer product but also takes on a symbolic and identity-based function, contributing to the construction of the territorial image and the competitive differentiation of destinations. Scientific interest in food and wine tourism has intensified in relation to its ability to generate economic value, strengthen territorial capital, and promote sustainable development models. This study analyses the perception and strategic orientation of operators in the sector, with the aim of identifying evolutionary trajectories and implications for territorial policies. In particular, the research proposes an empirical analysis based on the segmentation of orientations towards sustainability in Apulian food and wine tourism, offering useful guidance for public decision-makers and destination managers in defining differentiated strategies based on empirical evidence, capable of considering the diversity of stakeholders and the multidimensional nature of sustainable tourism development at the regional level. Food and wine tourism is a strategic lever for promoting regional identity and creating sustainable value. This study analyses the perceptions, expectations, and strategies of operators in the sector, with a particular focus on sustainability, innovation, and future competitiveness. The study applies a Two-Step Cluster Analysis to data relating to sustainability aspects in the food and wine tourism sector in Apulia, with the aim of identifying homogeneous stakeholder profiles based on perceptions of desirability and plausibility of different tourism development trajectories. This technique, which is particularly suitable for managing mixed data, allows the optimal number of clusters to be determined automatically according to criteria of statistical quality and interpretability. The clusters identified outline differentiated configurations of actors, characterized by different levels of maturity, sustainability orientation, and ability to anticipate future scenarios, ranging from more traditional operators rooted in the territory to more innovative and sustainability-oriented profiles.

2. Theoretical framework and literature review

2.1. Experiential tourism and territorial identity

The literature on experiential tourism highlights how, in contemporary tourism consumption dynamics, the value of a destination is no longer determined exclusively by the

availability of material resources or the quality of services offered, but above all by the ability to create meaningful, authentic, and memorable experiences. In this context, tourists are no longer simply consumers of products, but active individuals seeking emotional involvement, participation, and connection with the local area. Food and wine tourism fits perfectly into this paradigm, taking the form of cultural tourism in which the consumption of food transcends its functional dimension to take on a symbolic, narrative, and relational value. Through food, visitors connect with local history, traditions, and knowledge, enjoying an experience that integrates sensory, cultural, and social dimensions.

From this perspective, territorial identity emerges as a multidimensional construct, the result of the interaction between cultural heritage and local traditions, rural landscape and typical products, as well as social and community practices that contribute to defining the distinctive character of a place.

Food and wine, therefore, are not just part of the tourist offering, but are a real vehicle for localizing the experience, capable of strengthening the bond between visitors and the territory and contributing to the construction of coherent and recognizable narratives of identity.

2.2. Sustainability and creation of territorial value

The paradigm of sustainability has gradually redefined the logic of tourism development, leading to a shift from extractive models, geared towards maximizing flows and resource consumption, to regenerative models, focused on the protection, enhancement, and reproducibility of territorial capital. In the context of food and wine tourism, sustainability takes on a systemic and multidimensional configuration, articulated along three main lines.

The environmental dimension concerns the protection of natural resources, the promotion of sustainable agricultural practices, and the reduction of environmental impacts throughout the entire agri-food and tourism supply chain. The socio-cultural dimension refers to the preservation of traditions, the enhancement of local communities, and the promotion of authenticity as a distinctive element of the tourist experience. Finally, the economic dimension concerns territorial resilience, the strengthening of short supply chains, and the ability of the local system to generate competitive value in the long term. The balanced integration of these three dimensions allows for the construction of sustainable tourism development models capable of producing lasting territorial value and strengthening the economic, social, and environmental cohesion of local contexts.

2.3. Literature review

Literature on food and wine tourism has gradually consolidated a complex interpretative framework, which can be traced back to four main areas of research.

The first strand concerns the relationship between gastronomy and territorial competitiveness, highlighting how food is a key factor in the attractiveness and differentiation of destinations. From this perspective, typical products and culinary traditions contribute to

building the image of a territory and strengthening its competitive position in the tourism market.

The second strand focuses on the role of food and wine tourism in rural and local development, emphasizing how it promotes economic diversification, the enhancement of inland areas, and the revitalization of local production systems. In this sense, food and wine become a tool for integrated territorial development, capable of connecting agriculture, tourism, and culture.

The third strand emphasizes the concept of authenticity and the centrality of the tourist experience, highlighting the importance of immersive, multisensory, and narrative experiences in building tourist value. Food and wine tourism is interpreted as a complex experience, in which sensory, symbolic, and relational dimensions intertwine in the production of meaning and memory.

The fourth strand concerns sustainability and regenerative tourism, analyzing the transition towards tourism models with low environmental impact and high territorial value. In this perspective, sustainability is no longer considered exclusively as a regulatory constraint, but as a strategic lever for the competitiveness and resilience of destinations.

Overall, the literature converges in recognizing food and wine tourism as an integrated system in which product, territory, and experience are inseparable elements. This integration represents the theoretical foundation for understanding the evolutionary dynamics of the sector and interpreting the role of food and wine in contemporary processes of sustainable territorial development.

3. Empirical analysis

3.1. Research design and sample

The research is based on an empirical survey of operators in the food and wine tourism sector, with the aim of systematically exploring the main evolutionary dynamics that characterize the sector. Data collection was conducted between September 22 and October 31, 2025, using assisted interview methodologies, combining CATI (Computer-Assisted Telephone Interviewing) and CAWI (Computer-Assisted Web Interviewing) techniques, in line with the mixed-mode survey approaches commonly adopted in tourism and sustainability research to improve data coverage and reliability (Dolnicar, 2004). The final sample includes 94 operators in the food and wine tourism sector in Italy.

From a structural point of view, the sample is mainly composed of micro and small enterprises, a characteristic widely recognized as typical of the tourism and agri-food sectors in Italy and southern Europe (ISTAT, 2022; Hardy et al., 2002). In particular, most operators report employing between 1 and 5 people (39 respondents) or between 6 and 10 people (30 respondents), while medium and large enterprises are significantly underrepresented. Consistently, the distribution of turnover shows a strong concentration in the lower income brackets: the majority of respondents report an annual turnover of less than €499,000 (64 cases), followed by the €500,000-999,999 range (15 cases) and the €1,000,000-

4,999,999 range (11 cases). Companies with an annual turnover of more than €5 million are marginal. This structure reflects the fragmented and strongly locally rooted nature of food and wine tourism systems, which are often based on small-scale entrepreneurial initiatives closely linked to local resources (Briassoulis, 2002).

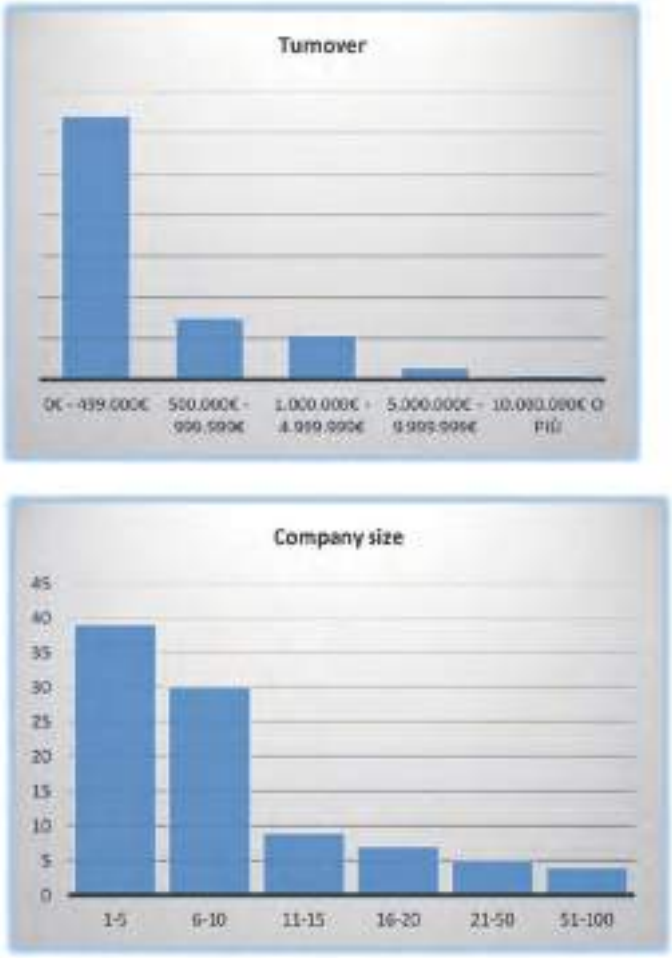

Fig. 1a) e 1b) - Sample composition (company size and turnover).
Source. Authors' elaboration based on a 2025 survey; N=94.

In terms of professional experience, the sample shows a high level of seniority in the sector: the largest proportion of respondents report over 20 years of experience, followed by those who have been working in the sector for 16 to 20 years. This confirms that participants have a solid knowledge of the sector and its evolutionary dynamics, reinforcing the interpretative value of their assessments of future tourism development trajectories (Swarbrooke, 1999).

In particular, the analysis focused on understanding how the ways in which tourist experiences are enjoyed are changing, with an increasing trend towards immersive, authentic, and personalized forms, as well as identifying changes in tourists' expectations and con-

sumption patterns in the medium to long term. The survey also examined the strategies adopted by operators to promote typical products, considering the role of quality, territorial identity, and product storytelling as factors of competitive differentiation.

Fig. 2a) e 2b) - Desirability and Plausibility of tourism development drivers
Source. Authors' elaboration based on 2025 survey; N=94.

A further area of analysis concerned the identification of the main drivers of growth in the sector, including the integration of tourism, culture, and sustainability, the expansion of experiential markets, and the growing demand for authenticity. Attention was paid to the role of technological innovations, both in terms of digitization of processes and sales channels, and in relation to the development of new forms of interaction with tourists and experience design. Finally, the research examined the main organizational and competitive challenges perceived by operators, with reference to the need to strengthen professional skills, improve territorial coordination, and adapt business models to an increasingly complex, dynamic, and sustainability-oriented tourism context.

Another section of the questionnaire concerned the assessment of the various drivers of tourism development, analysed along two distinct dimensions: desirability and plausibility. These dimensions form the basis for both the segmentation analysis. Regarding desirability, the most valued aspects include the protection of cultural heritage, the promotion of authentic tourist experiences, and training. Comparing desirability with plausibility reveals a gap in the need for training, transport integration, and innovation in mobility and safety systems as highly desirable factors. Conversely, virtual tourism and artificial intelligence show lower levels of desirability than plausibility, suggesting a more cautious attitude towards technology-driven transformations.

3.2. Two-Step Cluster Analysis

To identify homogeneous stakeholder profiles, a Two-Step Cluster Analysis was applied to datasets containing mixed variables, both qualitative and quantitative.

Cluster analysis is a particularly effective exploratory technique, as it allows the identification of "relatively distinct" clusters (i.e., heterogeneous among themselves), each composed of units characterized by a high degree of internal homogeneity or "natural association." The different clustering methodologies share the fundamental need to define a dissimilarity or distance matrix between the n pairs of observations, which represents the starting point for the construction of each clustering algorithm (Banfield & Raftery, 1993).

The most recent studies in the field of data mining and applied statistics have focused on the development of algorithms capable of handling both large datasets and data characterized by mixed variables, combining numerical and categorical information.

A representative example is the k-prototypes algorithm, which extends the k-means approach to mixed data, assuming that dissimilarity on numerical variables is measured using Euclidean distance, while dissimilarity on categorical variables is defined as the number of "misalignments" between the categories of two objects (Huang, 1997; Huang, 1998). In this context, the overall measure of dissimilarity between two observations is defined as:

$$\gamma s_n + (1 - \gamma) s_c$$

where S_n indicates the dissimilarity calculated on numerical variables, S_c is the dissimilarity based on categorical variables, and γ is a weighting parameter introduced to prevent one type of attribute from prevailing over another. One of the main limitations of this approach lies precisely in the arbitrariness of the choice of weight, which can influence the clustering results and reduce their robustness.

A clustering technique that overcomes this critical issue is Two-Step Cluster Analysis, which is an extension of the distance measures proposed by Banfield and Raftery (1993), originally developed for continuous data. The Two-Step algorithm has two main advantages: the ability to simultaneously handle mixed-type variables and the automatic determination of the optimal number of clusters, while allowing the researcher to set the number of clusters a priori if this is theoretically justified.

The Two-Step procedure, highly efficient in processing large datasets, is a scalable clustering algorithm capable of simultaneously handling categorical and continuous variables. The procedure consists of two successive steps:

In the first step, called pre-clustering, the observations are preliminarily grouped into a large number of small sub-clusters. In the second step, the sub-clusters generated in the first phase are aggregated into a smaller number of clusters, optimizing the Bayesian Information Criterion (BIC).

The pre-clustering phase is a segmentation process in which the algorithm produces an initial partition of the data space, considering both the relative importance of the variables and the distances between observations. This partition is represented by a tree structure called the Cluster Features Tree, defined by different levels of nodes (Banfield & Raftery, 1993). All observations are assigned sequentially starting from the root node, passing through intermediate nodes until reaching the terminal nodes, which group very similar cases within a predefined distance threshold.

If a suitable match is found, the observation furthest from the others initiates the creation of a new terminal node. If a terminal node exceeds the distance threshold, it is divided into two nodes, identifying the furthest pair according to the selected criterion and redistributing the remaining observations based on the proximity criterion. If this recursive process causes the tree to exceed the available memory limits, the structure is rebuilt by increasing the distance threshold, thus allowing the inclusion of new records. The process ends once all observations have been examined.

In the second step, the sub-clusters produced in the pre-clustering phase are further aggregated. At this stage, given the reduced dimensionality of the problem, traditional hierarchical clustering methods can also be effective.

The Two-Step procedure determines the optimal partition by minimizing the Bayesian Information Criterion (BIC), which for a solution with k clusters is defined as:

$$BIC_K = 2l_K + r_K \log n$$

where r_K indicates the number of independent parameters and $l_k = \sum_{v=1}^{k} \xi_v$ represents the log-likelihood function associated with the solution with k clusters. This quantity can be

interpreted as a measure of intra-cluster dispersion and, in the case of only categorical variables, as the entropy within the k clusters.

The automatic determination of the number of clusters occurs in two successive steps:

1. Initial estimates of the number of clusters are obtained using the BIC criterion, which provides a reliable estimate of the maximum number of clusters. This maximum value is identified as the highest number of clusters for which the ratio BIC_K/BIC_1 is less than a very small constant c_1.
2. The initial estimates are subsequently refined through the ratio $R(k) = \frac{d_{k+1}}{d_k}$, for the two highest values of $R(k)$, with $k = 1,2,\ldots,k_{max}$ (where k_{max} is determined in the first phase). If this ratio exceeds a pre-established threshold c_2 (with $c_2 > c_1$), the number of clusters is set equal to k_1; otherwise, the solution associated with the maximum value of $R(k)$ is selected.

The Two-Step algorithm proceeds by merging clusters at each iteration until all observations are included in a single cluster and, unlike traditional hierarchical aggregation techniques, is based on an explicit statistical model.

The analysis was conducted using two fundamental interpretative dimensions: perceived desirability, understood as the degree of attractiveness and relevance attributed by operators to specific sustainable development trajectories, and perceived plausibility, i.e., the level of feasibility and achievability that the same operators associate with these trajectories in the real operating context. The Two-Step methodology allows, through a two-step procedure, an initial pre-clustering of cases and a subsequent aggregation of sub-clusters into final homogeneous groups, while allowing the automatic identification of the optimal number of clusters using the Bayesian information criterion (BIC). This approach has made it possible to construct a detailed typology of sustainability profiles, highlighting significant differences in the strategic orientations, perceptions, and priorities of the stakeholders analysed.

4. Results

The empirical analysis has identified a variety of strategic orientations and different interpretative models of sustainability within the food and wine tourism sector. In particular, the segmentation obtained through cluster analysis has highlighted distinct configurations both in terms of the priorities attributed to sustainable development and in terms of the perception of its concrete feasibility. The results show that operators do not constitute a homogeneous group, but are distributed along different strategic trajectories that reflect different visions of the relationship between territory, tourist experience, and sustainability.

Two interpretative levels can be distinguished: desirability, which reflects the value-based and strategic priorities of operators, and plausibility, which represents the perception of feasibility in the operational context.

Analysing only the variables related to sustainability, it emerges that Clusters 1 and 4 for desirability are those with the highest values in terms of environmental sustainability, access

for people with disabilities, protection of cultural heritage, climate change, and the creation of authentic experiences. For plausibility, Cluster 4 prevails, with some elements also present in the other clusters.

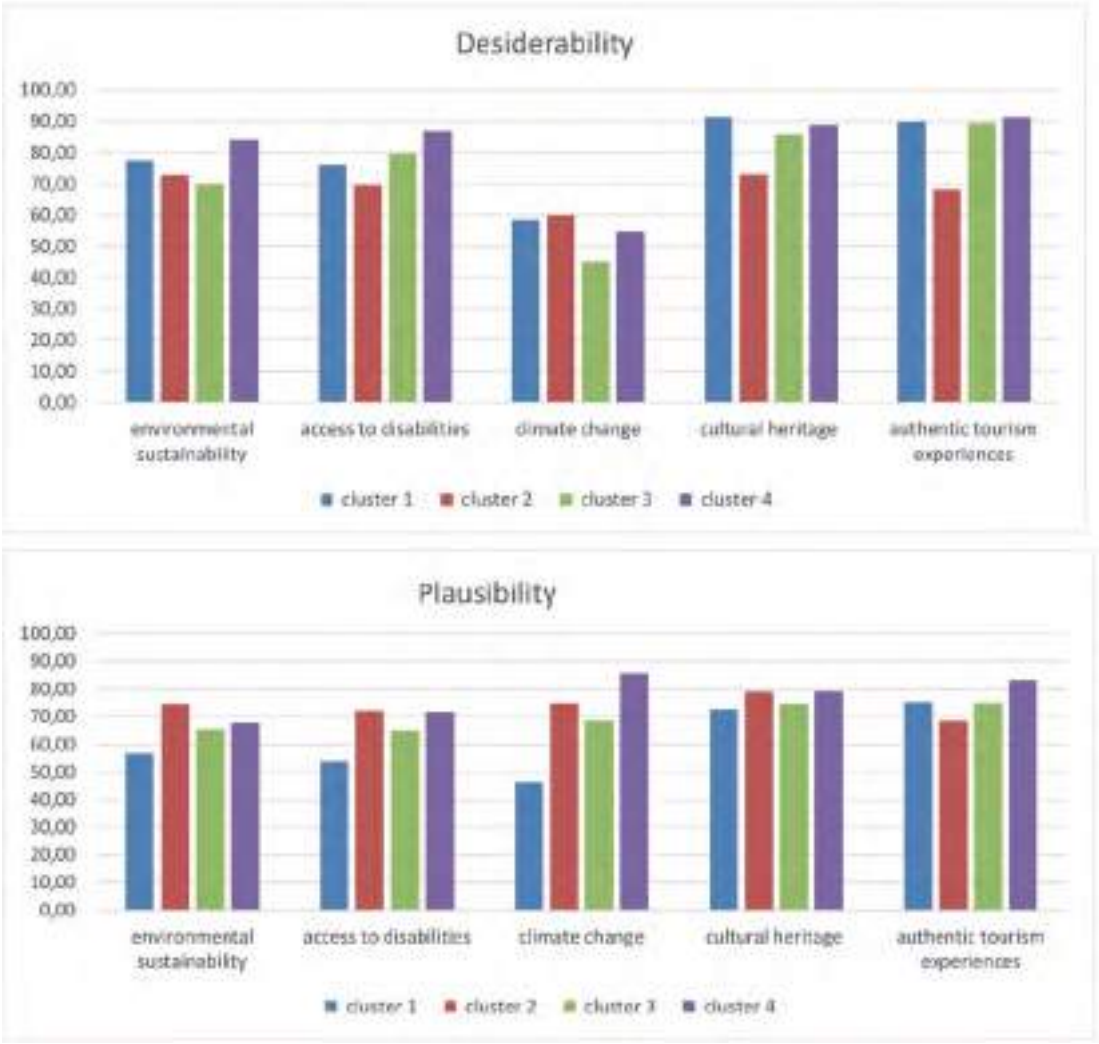

Fig. 3a) e 3c) - Desirability and plausibility by cluster
Source. Authors' elaboration based on 2025 survey; N=94.

4.1. Desirability-based Profiles

The analysis of the desirability dimension made it possible to identify four main orientation profiles, distinguished according to the degree of attractiveness attributed to specific food and wine tourism development strategies.

The first profile, defined as Guardians of the Territory, is characterized by a strong orientation towards enhancing the cultural and community dimension of food and wine tourism. Operators belonging to this group focus on territorial authenticity, the preservation of

local traditions, and the promotion of practices that strengthen the link between community, landscape, and gastronomic heritage.

The second profile, called Curious Gastronomes, is distinguished by a marked focus on gastronomic products and the quality of the culinary experience. In this case, the attractiveness of food and wine tourism is mainly associated with the promotion of agri-food excellence, attention to the sensory experience, and the creation of high-quality gastronomic itineraries.

The third profile, identified as Active Explorers, expresses an orientation towards the integration of food and wine tourism, the natural environment, and outdoor activities. Operators in this cluster attribute high desirability to experiential models that combine gastronomy, landscape, and movement, promoting itineraries that combine territorial authenticity and the outdoor dimension.

The fourth profile, defined as Eco-Sustainable Advanced, highlights a strong propensity towards environmental sustainability and the development of immersive and multisensory experiences. Operators belonging to this group interpret sustainability as a strategic and innovative element, oriented towards quality, environmental responsibility, and the transformation of the tourist experience within a regenerative perspective.

4.2. Plausibility-based Profiles

The analysis of the plausibility dimension made it possible to identify four additional profiles, defined on the basis of the degree of feasibility and achievability attributed by operators to the various sustainable development trajectories.

The first profile, called Traditionalists of the Territory, interprets sustainability mainly as the protection of local roots and the preservation of cultural heritage. In this group, sustainability is perceived as achievable mainly through the strengthening of local identity and traditional practices.

The second profile, identified as Experience Professionals, attributes high plausibility to the intentional and structured construction of the tourist experience. Operators belonging to this cluster conceive food and wine tourism as the result of strategic planning focused on customer experience, service quality, and personalization of the offer.

The third profile, defined as Eno-green Pioneers, is characterized by a vision of sustainability as the integration of gastronomy, nature, and physical activity. In this case, the feasibility of sustainable strategies is associated with the development of active, experiential, and wellness-oriented tourism models.

The fourth profile, called Visionaries of Sustainability, represents operators who attribute an identity-building and strategic role to sustainability in the construction of the territorial brand. In this group, sustainability is perceived as concretely achievable through innovation, environmental certifications, healthy products, and regenerative tourism models, constituting a central element of competitive differentiation.

4.3. Profile Summary

Table I summarizes the main characteristics of the stakeholder clusters identified through the Two-Step Cluster Analysis.

Table I - Summary characterization of stakeholder clusters

Dimension	Cluster	Main orientation	Strategic focus
Desirability	**Guardians of the Territory**	Community and Heritage	Protection of local identity
	Curious Gastronomes	Food and sensory experiences	Tourism driven by gastronomy
	Active Explorers	Nature and movement	Experiential integration
	Eco-Sustainable Advanced	Sustainability and innovation	Immersive eco-experiences
Plausibility	**Traditionalists of the Territory**	Tradition and continuity	Conservation-oriented models
	Experience Professionals	Experience Design	Quality of service and premium offers
	Eno-Green Pioneers	Food-nature integration	Experiential green innovation
	Visionaries of Sustainability	Regenerative sustainability	Sustainability as a strategic identity

5. Conclusions

The research findings highlight a structural transformation of food and wine tourism, which is progressively evolving from a complementary activity to an integrated system of territorial development. This transformation reflects a paradigm shift in the logic of building tourism value, increasingly less based on isolated products and increasingly oriented towards the integration of tangible and intangible resources, local identity, and experience. Food and wine tourism therefore emerges as a complex territorial platform, capable of connecting agri-food production, cultural heritage, landscape, and local communities.

The analysis highlights four main evolutionary trajectories: the strengthening of territorial identity, the growing centrality of the tourist experience, the integration of nature, well-being, and gastronomy, and the transition towards sustainable and regenerative models. In this context, sustainability takes on a dual function: on the one hand, it contributes to the protection and enhancement of territorial resources, on the other, it becomes an element of identity for the territorial brand and a factor of competitive differentiation.

Empirical evidence suggests significant implications for territorial policies and management strategies. Specifically, it highlights the need to strengthen infrastructure and accessibility in rural areas, promote coordinated territorial governance, develop integrated digital platforms, and invest in training innovative professional skills geared toward experience

design and sustainability management. From this perspective, integration between local stakeholders is a fundamental condition for improving the competitiveness, resilience, and sustainability of the food and wine tourism system.

Overall, food and wine tourism appears increasingly oriented toward integrated, experiential, and sustainable models, in which quality of offerings, territorial authenticity, and innovation are key development factors. However, strengthening the sector's role in territorial development processes will depend on the ability of local systems to overcome existing fragmentation and coherently integrate sustainability, innovation, and experience within coordinated strategies.

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Analysis and Future Perspectives on Seaside and Nautical Tourism

Samuela L'abbate,

1. Introduction

This work summarizes the results of a survey conducted in 2025 and the outcomes of a Round Table held on May 29, 2025, at Palazzo Ateneo in Bari, dedicated to the future of seaside and nautical tourism in Apulia. The meeting brought together representatives of beach operators' unions (SIB, Federterziario), trade associations (Confesercenti, Confcommercio, Assoviaggi, FIPE, FIBA), nautical operators (Assonautica, Circolo Vela Bari), entrepreneurs in the sector, and the academic community of the University of Bari, offering a shared reflection on the future of the sector in light of four major transformative forces: new lifestyles, digitalization, climate change, and market regulations. From the interaction of these factors, the central role of the environmental dimension clearly emerges, no longer seen merely as a constraint to be respected, but as a strategic value to be integrated into policies and development models. The quality of the marine and coastal environment is therefore set to become the main discriminating factor for the future competitiveness of coastal and nautical tourism.

This sector represents a strategic lever for the development of a solid and sustainable coastal economy capable of generating widespread employment (European Commission, 2020), both directly in seaside and nautical activities and indirectly through related sectors such as catering, hospitality, crafts, services, and local supply chains (OECD, 2016). Marine tourism plays a decisive role in enhancing territories, counteracting depopulation in smaller coastal areas and strengthening the link between local communities and visitors. However, to fully express its potential, bold choices are required, particularly in overcoming the infrastructural, organizational, and regulatory limits that still hinder its growth and competitiveness compared with other Mediterranean destinations.

1.1 The Four Major Transformative Forces

Four major forces interact closely: evolving lifestyles, the push of digitalization, the growing impact of climate change and the decisive role of market regulations. Each of these directly affects operators' choices, the quality of the offer, and the competitiveness of destinations (SGA Studio Giaccardi & Associati, 2025). Understanding these dynamics is essential for guiding the sector's future strategies. Tourist behaviours and expectations have changed profoundly compared with the past. Travel is no longer seen as the simple consumption of services, but as an opportunity to live authentic and meaningful experiences

aligned with personal values. Visitors increasingly seek to feel part of the places they visit, to connect with local communities, and to give meaning to their leisure time.

Digitalization has played a decisive role in this transformation. Today, tourists use online platforms, social networks, and mobile applications to gain inspiration, gather information, compare offers, book services, and share their experiences. The journey begins long before departure and continues after returning home through reviews, images, and stories that influence the choices of other travellers.

At the same time, attention to environmental sustainability has grown significantly. Increasingly, travellers evaluate the impact of their travel choices, favouring facilities, services, and destinations that respect the environment, reduce waste, and protect natural heritage (Dolnicar, 2004). In coastal and nautical tourism, this translates into attention to water quality, coastal protection, responsible resource use, and sustainable navigation and bathing practices (UNWTO, 2018).

Another central element is the growing demand for wellness and well-being. Holidays are increasingly experienced as a time for physical and mental regeneration, slowing down, self-care, and restoring balance. The sea, nature, outdoor activities, healthy food, and contact with the environment become essential components of a tourism experience oriented toward health and psychological well-being.

Alongside this, there is a strong demand for personalization. Tourists no longer want rigid, standardized packages but flexible services tailored to their needs, age, interests, time, and spending capacity. This requires operators to develop stronger listening skills, adaptability, and the ability to design customized offers.

Experiential tourism is becoming increasingly prominent, where what matters less are the places "to see" and more the experiences "to live." Activities related to the sea, sailing, fishing, local cuisine, maritime traditions, and territorial culture become central elements for creating an authentic bond between visitor and destination. In this context, seaside and nautical tourism is not only leisure but also an opportunity for encounter, knowledge, and the enhancement of local identities.

The digital revolution has deeply influenced all stages of seaside and nautical tourism, changing how people choose, purchase, and experience travel. From inspiration to post-trip sharing, technology now accompanies tourists at every stage, making the sector increasingly interconnected, fast, and data-driven.

Online booking platforms have revolutionized the selection and purchasing processes of tourism services. Today, it is possible to compare in real time prices, availability, reviews, and services offered by beach resorts, marinas, nautical charters, and accommodation facilities. This has increased market transparency but also competition among operators, who must pay increasing attention to their digital presence and the quality of information provided.

Artificial intelligence is playing a growing role in personalizing the experience. By analysing online behaviour, preferences, and user searches, intelligent systems can suggest destinations, itineraries, activities, and services aligned with individual tastes, enabling more targeted experiences and increasing visitor satisfaction and loyalty.

In nautical tourism, intelligent navigation systems are also of great importance. Integrated applications allow route planning, monitoring of weather and sea conditions, identification of available ports and moorings, and efficient management of docking. These technologies improve safety at sea, reduce navigation time, and optimize activity organization.

Drones and monitoring technologies are increasingly used for coastal surveillance, protected area control, fleet management, and safety operations. At the same time, drones have become powerful tools for tourism promotion, enabling spectacular images and videos of coastlines, ports, and nautical activities.

Finally, advanced data analytics represents a strategic resource for destination management. AI-based systems allow the collection and interpretation of large volumes of information on tourist flows, visitor behaviour, seasonality, and satisfaction levels. These data enable operators and administrations to improve planning, optimize supply, manage tourist loads, and design more effective and sustainable interventions (Dodds & Butler, 2019).

Climate change represents one of the most complex and structural challenges for seaside and nautical tourism, as it directly affects environmental quality, safety, and the planning of activities. It is no longer a future risk but an already visible reality that is progressively altering the natural conditions on which the entire sector is based.

Rising temperatures, particularly evident in the Mediterranean area, are altering marine and coastal ecosystem balances. On one hand, this phenomenon tends to extend the tourist season, making sea use possible even in traditionally low-season months; on the other, it makes the climate more unstable and less predictable, with extreme heat waves that can reduce visitor comfort and put infrastructure and services under stress.

Another significant effect is coastal erosion, aggravated by rising sea levels. Many beaches are gradually shrinking, with direct consequences for coastal tourism supply and destination attractiveness. This forces administrations and operators to implement coastal defence measures such as artificial nourishment, which involve high costs and often temporary solutions.

In addition, the unpredictability of extreme weather events is increasing. Violent storms, storm surges, strong winds, and sudden meteorological phenomena are becoming more frequent and intense, affecting the safety of bathers and boaters, the management of ports and beach facilities, and the ability to plan nautical and tourism activities in advance. Climate variability therefore makes sector organization more complex and requires increasingly advanced strategies for adaptation, prevention, and risk management.

The regulatory framework is currently one of the main sources of uncertainty for the development of seaside and nautical tourism. Operators often perceive rules not as a tool for balanced territorial protection and growth, but as obstacles that hinder investment, slow innovation, and discourage long-term planning.

A central issue is bureaucracy and regulatory fragmentation. Uncertainty related to the implementation of the Bolkestein Directive, combined with the lack of clear and stable rules on state concessions, makes entrepreneurial projects risky. Without certain time horizons, operators struggle to invest in quality, sustainability, and innovation, with negative effects on the entire tourism system.

The management of marinas also presents several critical issues. Many facilities remain "closed to the city," poorly integrated with the urban fabric and with limited accessibility for citizens and visitors. The lack of onshore services, inefficient connections, and weak integration with the hospitality system reduce the potential of marinas as true tourism and cultural hubs.

This is compounded by regional regulations that are often inconsistent or outdated. Landscape and urban planning constraints designed for past contexts can block or slow new projects, even when aimed at redevelopment, sustainability, and improving supply. The lack of an integrated vision between protection and development generates ongoing conflicts and procedural delays.

Meanwhile, international competition is becoming increasingly strong. Destinations such as Croatia and Greece offer modern infrastructure, clearer regulations, and faster decision-making processes, often making them more attractive to tourists and investors. This highlights the risk of losing competitiveness without decisive action on the regulatory and organizational framework.

From this emerges a clear request from operators: simple and reliable regulation capable of providing certainty and supporting sector development while protecting the environment without suffocating economic initiative. This is accompanied by the need for bold political action capable of taking responsibility for strategic choices.

Discussions during the Round Table conveyed a unanimous message: a policy capable of saying "yes" is needed, changing market rules. Stakeholders stressed the need to integrate the two "souls" of coastal tourism, beach and nautical, into a single ecosystem, overcoming historical divisions and sectoral logic. The key message that emerged was:

"Coastal and nautical tourism is not only economy. It is identity. It is future. But it requires vision, coherence, and action." Without action, the risk is that Apulia may miss its "blue train", the opportunity to transform its extraordinary marine and coastal heritage into a lasting engine of sustainable development.

2. Research Methodology

2.1. Sample Survey

The survey was conducted on a sample of 103 stakeholders from the sector, distributed across the entire national territory, with 99 questionnaires completed fully and considered valid for analysis. Data collection was carried out using CATI (Computer-Assisted Telephone Interviewing) and CAWI (Computer-Assisted Web Interviewing) methods, during the period from September 22 to October 31, 2025. The objective of the research was not only to describe the characteristics of the sector, but above all to understand how operators envision the future: which changes they desire, which they consider necessary, and which they believe are realistically achievable.

The analyses provide a clear and consistent picture of the sector's future. Seaside and nautical tourism will be driven by sustainable infrastructure, modern ports, and integrated

services. Marinas will become multifunctional hubs, not only places of mooring but also spaces for social interaction, culture, and services. Multifunctional marinas respond to increasingly complex experiential demand. Digitalization (AR/VR, smart ticketing) improves both the use and promotion of destinations. Boat rental managed through apps is growing, in line with the sharing economy. The goal is a more accessible, innovative, and sustainable tourism model. Logistic efficiency and tourist experience become complementary. Territorial regeneration plays a central role, and the port becomes a local economic engine. The future model is connected and inclusive (Fig. 1 a).

Promotion is evolving toward digital tools and experiential storytelling. Social media are becoming key instruments for communicating territorial identity and building lasting relationships with tourists. Collaboration with tour operators and OTAs strengthens international visibility. Events and festivals linked to the sea continue to play an important role as direct promotional tools. Artificial intelligence enables personalized and predictive market-

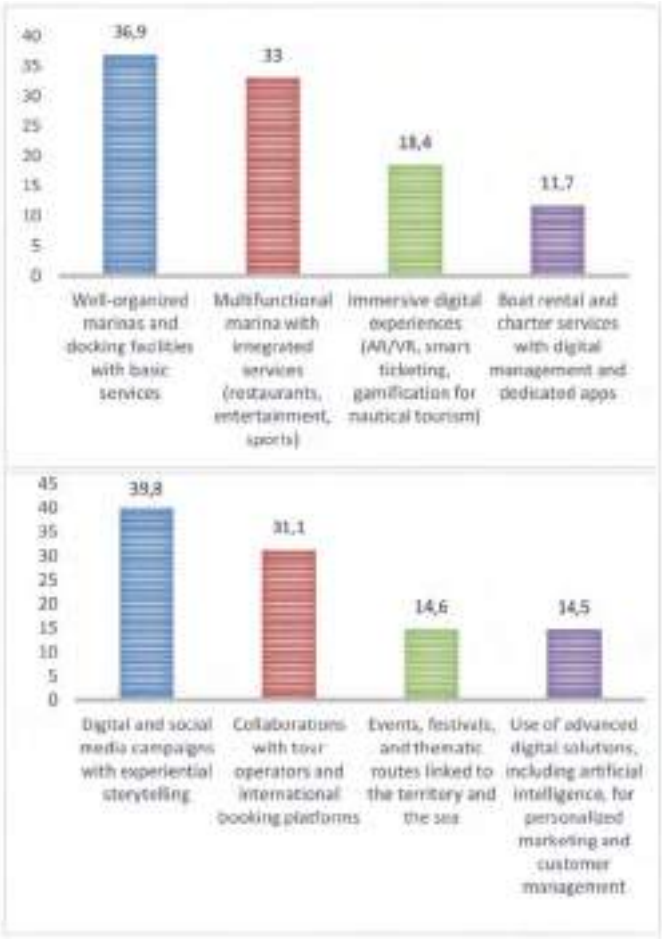

Fig. 1 - Percentage distribution of respondents to the following questions: a) Which infrastructures and services will be most strategic for attracting tourists over the next 20 years? b) Which promotional strategy do you consider most effective for enhancing your facility in the future?
Source. Authors' elaboration based on a 2025 survey

ing. Communication becomes multichannel and integrated. Digital tools amplify the human dimension, where authenticity and technology coexist. The tourist becomes an active protagonist, and promotion itself becomes an experience (Fig. 1 b).

The winning model is experiential, integrated with culture, sports, and nature. Businesses focus on territorial ecosystems capable of generating widespread value. Digitalization improves the efficiency and accessibility of nautical services. Traditional facilities remain relevant but risk losing competitiveness without innovation. The importance of sustainable networks and consortia is growing, as collaboration strengthens both marketing and environmental protection. Tourism becomes less seasonal, while technology and local identity increasingly integrate. The future model is hybrid, with experience, sustainability, and cooperation at its core (Fig. 2 a).

Tourists increasingly seek authenticity and local experiences. Contact with communities and traditions is a strong factor in their choices. Price remains important, but it is closely

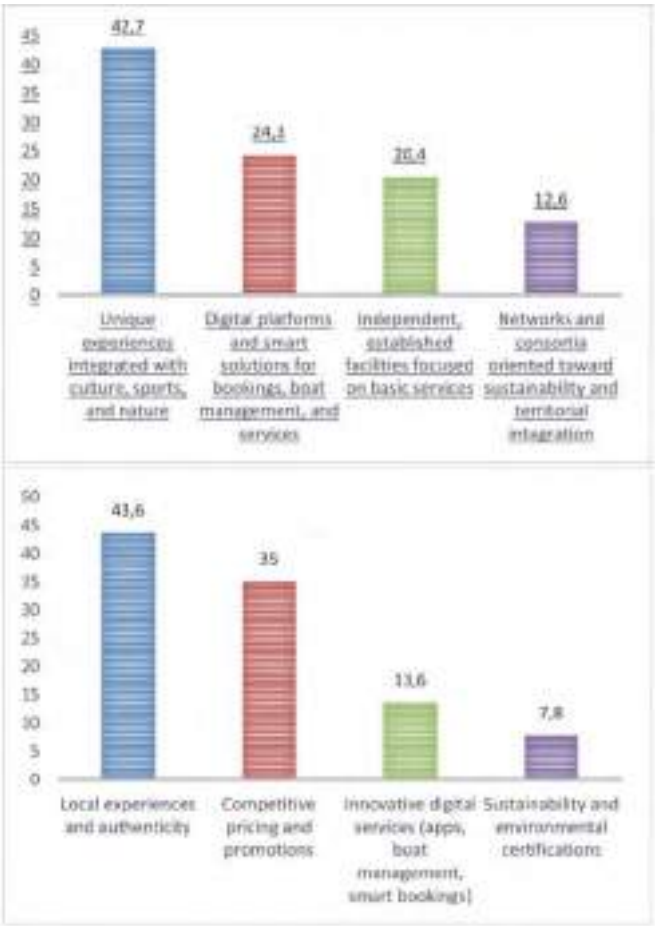

Fig. 2 - Percentage distribution of respondents to the following questions.
a) In which business model will it be most advantageous to invest according to your vision of the future? b) Which trend will most influence customers' choices?
Source. Authors' elaboration based on a 2025 survey

linked to perceived value. Digital services facilitate the experience, especially for younger visitors. Sustainability is appreciated, though not yet decisive. Tourism becomes more identity-driven and experiential, with the relationship with the territory playing a key role. Technology and authenticity must coexist. Tourists want to feel part of a story, and experience prevails over the simple provision of services (Fig. 2 b).

Beach facilities are evolving into sustainable and multifunctional spaces. Attention to environmental integration and the use of eco-friendly materials is increasing. Beaches are becoming places for sports, wellness, and social interaction. Technology improves comfort, safety, and management, while smart systems make the experience smoother. Modularity allows seasonal flexibility, and spaces must adapt to climate and market changes. Design becomes dynamic, and tourism takes on a regenerative dimension, where environment and innovation reinforce each other (Fig. 3 a)).

Personalization of the experience is the main driver of growth. Tourists seek tailored services and authentic relationships. Digitalization makes processes more efficient and interactive, while automation improves organization and safety. International tourism offers new opportunities, and sustainability becomes a basic condition for the future. Technology and human value must integrate, transforming facilities into experiential hubs. Experience stands at the centre of the offer, and growth increasingly means perceived quality (Fig. 3 b)).

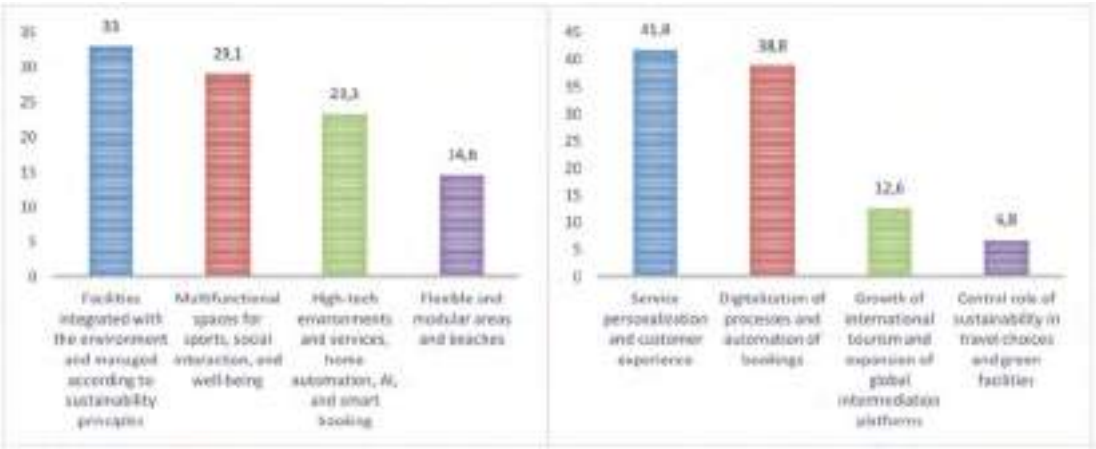

Fig. 3 - Percentage distribution of respondents to the following questions.
Which transformation of spaces and services will be most in demand over the next 20 years? b) What will be the main driver of growth for the sector over the next 20 years?
Source. Authors' elaboration based on a 2025 survey

OTAs and digital platforms dominate tourism distribution, offering global visibility and ease of booking. Physical travel agencies maintain a consulting role, while direct channels remain marginal but strategic for customer loyalty. The future points toward a hybrid model in which technology and human relationships integrate. Territorial branding helps reduce dependence on platforms, artificial intelligence supports personalized sales, trust remains central, and digital tools amplify relationships (Fig. 4 a).

Artificial intelligence is the main innovation in the sector, enabling personalization, au-

tomation, and predictive management. VR and AR enhance promotion and storytelling, while big data support planning and sustainability. Home automation optimizes comfort and energy efficiency. Technology improves the experience without replacing human interaction. Destinations become "smart," innovation becomes a competitive lever, efficiency and inclusiveness increase, and tourism becomes more intelligent and interactive (Fig. 4 b).

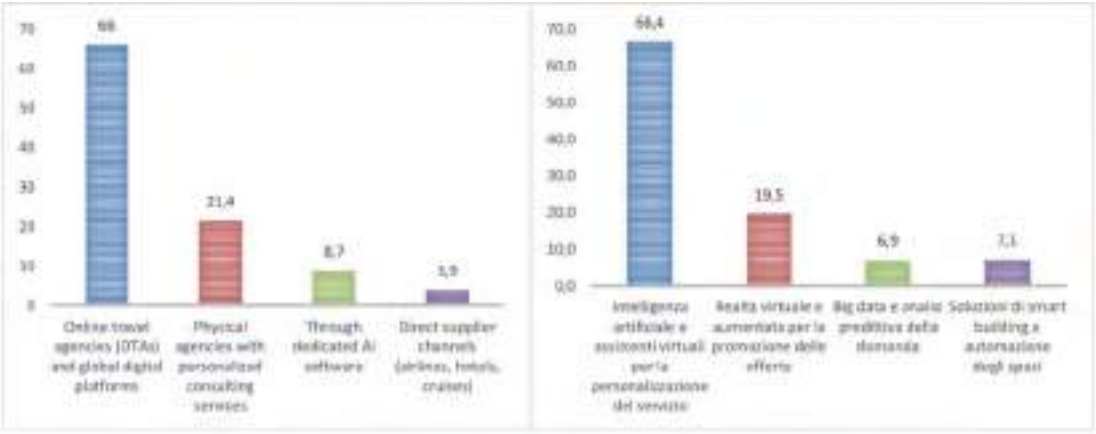

Fig. 4 - Percentage distribution of respondents to the following questions.
What will be the main sales channel? b) Which technological innovations will most influence the sector?
Source. Authors' elaboration based on a 2025 survey

The main challenge is to invest continuously in digital innovation, while staff training is equally crucial. Technology and skills must grow together, supported by agile and participatory organizational models. Territorial networks strengthen competitiveness and sustainability, and public-private partnerships are strategic. Resilience comes from preparation rath-

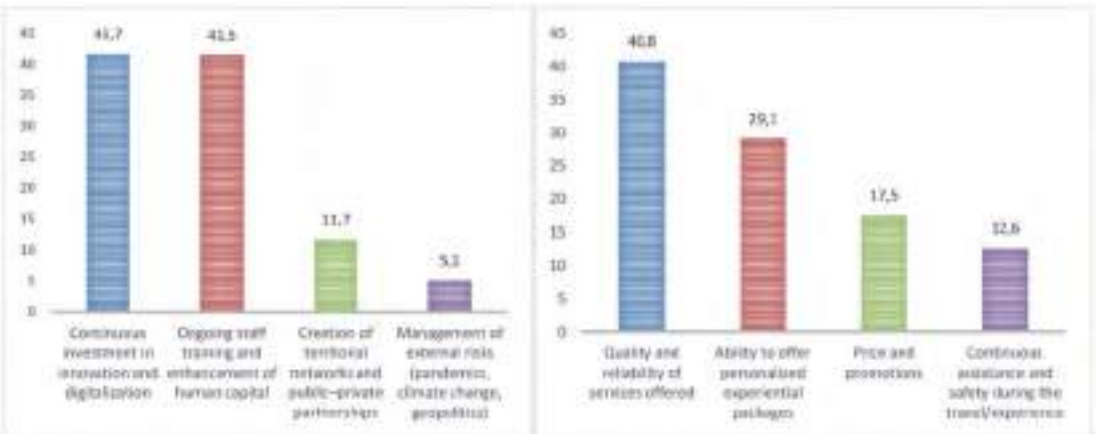

Fig. 5 - Percentage distribution of respondents to the following questions.
a) What will be the main organizational challenge to address in order for your company to remain competitive? b) Which competitive factor will be most relevant for attracting customers?
Source. Authors' elaboration based on a 2025 survey

er than emergency, and innovation is also cultural. People give meaning to technology, and competitiveness means learning together (Fig. 5 a)).

Service quality and reliability are the main factors of attraction. Personalization of the experience strengthens customer loyalty. Price matters, but in relation to perceived value. Safety and assistance are essential standards, and tourism is built on trust. Authentic experiences create lasting relationships, reputation becomes central, and the sea turns into a space to be lived rather than simply visited. Service excellence distinguishes businesses, and the future lies in quality, experience, and relationships (Fig. 5 b)).

2.2 Two - Step Cluster Analysis

To analyse the heterogeneity of the sector, a Two-Step Cluster Analysis was applied, a clustering technique particularly suited to handling both categorical and quantitative variables simultaneously. The method operates in two stages: an initial pre-clustering phase that identifies preliminary groups, followed by a final aggregation of clusters using the BIC (Bayesian Information Criterion) (Banfield & Raftery, 1993), which allows the automatic determination of the optimal number of groups.

The Two-Step procedure determines the optimal partition by minimizing the Bayesian Information Criterion (BIC), which for a solution with k clusters is defined as:

$$BIC_K = -2l_k + r_k \log n$$

where r_k indicates the number of independent parameters and $l_k = \sum_{i=1}^{k} \xi_i$ represents the log-likelihood function associated with the solution with k clusters. This quantity can be interpreted as a measure of intra-cluster dispersion and, in the case of only categorical variables, as the entropy within the k clusters.

The automatic determination of the number of clusters occurs in two successive steps:

1. Initial estimates of the number of clusters are obtained using the BIC criterion, which provides a reliable estimate of the maximum number of clusters. This maximum value is identified as the highest number of clusters for which the ratio BIC_K/BIC_1 is less than a very small constant c_1.
2. The initial estimates are subsequently refined through the ratio $R(k) = \frac{dl_{k-1}}{dl_k}$, for the two highest values of $R(k)$, with $k = 1,2, \ldots k_{max}$ (where k_{max} is determined in the first phase). If this ratio exceeds a pre-established threshold c_2 (with $c_2 > c_1$), the number of clusters is set equal to k_1; otherwise, the solution associated with the maximum value of is selected $R(k)$.

The Two-Step algorithm proceeds by merging clusters at each iteration until all observations are included in a single cluster and, unlike traditional hierarchical aggregation techniques, is based on an explicit statistical model.

Both the structural characteristics of firms (size, experience in the sector, resources) and operators' evaluations in terms of desirability and plausibility of key factors for the future of the sector were analysed. Desirability refers to the extent to which a given change or

factor (such as sustainability, accessibility, or authentic experiences) is considered desirable and consistent with the ideal vision of the sector's development. Plausibility, on the other hand, indicates how realistically the same change is perceived to be achievable, considering the economic, organizational, and contextual conditions perceived by operators.

The quantitative variables included: number of employees, years of experience in the tourism sector, and turnover range. These were complemented by evaluations of desirability and plausibility regarding the following factors: environmental sustainability, climate change, cultural heritage, accessibility for people with disabilities, and authentic tourism experiences.

The categorical variables concerned responses to strategic vision questions about the future of the sector over the next 20 years, in particular:

- which business model would be most advantageous to invest in according to their vision of the future;
- which trend would most influence customer choices;
- which transformation of spaces and services would be most in demand;
- what the main driver of growth would be.

The integration of these different types of variables made it possible to identify clusters that reflect not only firms' structural characteristics but also different visions, expectations, and levels of confidence regarding the future transformations of seaside and nautical tourism.

With regard to the desirability dimension (Table I), the analysis of the four identified clusters shows that the vision of the sector's future is strongly influenced both by firms' structural characteristics and by their numerical weight within the sample. Cluster 1 includes 24% of respondents and is composed of small firms, with an average of about 7 employees, medium-low turnover (around €1.18 million), and relatively limited experience in the tourism sector, just under 8 years. These are generally young or less established businesses that express ambitious aspirations for change, often constrained by limited resources. Cluster 2 represents 20% of the sample and includes medium-large firms, with an average of nearly 23 employees, medium-high turnover (around €1.79 million), and strong sector experience exceeding 20 years. Although numerically less represented, this is the most structured and mature cluster, characterized by a long-term strategic vision oriented toward sustainability, innovation, and territorial integration.

Table I - Structural characteristics of the clusters. average number of employees, turnover range, and years of experience in the tourism sector for each cluster. Desirability dimension.

Cluster	Percentage of respondents	What is the current number of employees in your company?	What is your company's turnover range? (Average annual turnover €)	How many years have you worked in the tourism sector?
Cluster 1	24	7,38	1.187.375	7,83

Cluster 2	20	22,88	1.787.300	21,65
Cluster 3	32	9,27	1.322.500	9,10
Cluster 4	24	6,08	822.708	9,08

Source. Authors' elaboration based on a 2025 survey

Cluster 3 is the largest, accounting for 32% of respondents, and represents small-medium enterprises, with about 9 employees on average, intermediate turnover (around €1.32 million), and moderate experience in the sector, roughly 9 years. Its quantitative weight indicates that a significant part of the sector is in a transitional position, between more traditional models and openness to innovation, expressing realistic yet still cautious aspirations for change. Finally, Cluster 4 includes 24% of the sample and is composed of small firms, with just over 6 employees, low turnover (around €823 thousand) but relatively solid experience in the sector, exceeding 9 years. These are established yet economically fragile businesses that show a strong desire for change, often as a response to the need to survive and adapt.

Overall, the percentage distribution of clusters shows that most firms are concentrated in the small and small-medium size ranges, while larger and more structured firms represent a numerical minority. This means that the desirable vision of the future of seaside and nautical tourism is shaped mainly by firms with limited or intermediate resources, whose expectations and ambitions are inevitably conditioned by their economic and organizational size. The desirability of change is therefore not uniform, but directly reflects firms' structure, economic solidity, and experience, which decisively influence how the future is envisioned.

With regard to the plausibility dimension (Table II), the analysis of the four identified clusters shows that perceptions of what is realistically achievable in the future of the sector depend strongly on firms' economic structure and experience, as well as on their numerical weight within the sample. Cluster 1, representing 38% of respondents and thus the largest group, includes small firms with an average of about 7 employees, low turnover (around €892 thousand), but solid experience in the sector, close to 9 years. These are businesses that, despite having developed operational competencies, perceive mainly gradual and limited transformations as realistic. Cluster 2, accounting for 22% of the sample, includes similarly small firms, with just over 7 employees, medium-low turnover (around €1.02 million), and intermediate experience of about 10 years. These firms show a cautious outlook, evaluating the feasibility of change selectively and prudently.

Cluster 3 represents 17% of respondents and consists of small-medium firms, with more than 17 employees on average, relatively low turnover (around €779 thousand) but strong sector experience exceeding 18 years. These are organizations with solid competencies but limited financial capacity, which perceive as realistic mainly improvements based on organization, efficiency, and experience rather than major structural investments. Finally, Cluster 4, representing 23% of the sample, includes medium-large firms with around 14 employees, high turnover (over €2.4 million), and intermediate experience of about 11 years. These firms display the greatest confidence in their ability to implement significant transformations, thanks to a combination of financial resources and organizational capacity.

Table II - Structural characteristics of the clusters. average number of employees, turnover range, and years of experience in the tourism sector for each cluster. Plausibility dimension.

Cluster	Percentage of respondents	What is the current number of employees in your company?	What is your company's turnover range? (Average annual turnover €)	How many years have you worked in the tourism sector?
Cluster 1	38	7,43	891.729	8,92
Cluster 2	22	7,61	1.022.590	10,05
Cluster 3	17	17,24	779.176	18,94
Cluster 4	23	14,46	2.445.587	10,78

Source. Authors' elaboration based on a 2025 survey

Overall, the percentage distribution shows that many firms fall within clusters characterized by small size and limited resources, while more structured firms, although displaying greater confidence in change, represent a minority share. The plausibility clusters thus confirm that perceptions of what is feasible in the future of seaside and nautical tourism are strongly linked to firm size and economic solidity, more than to experience alone.

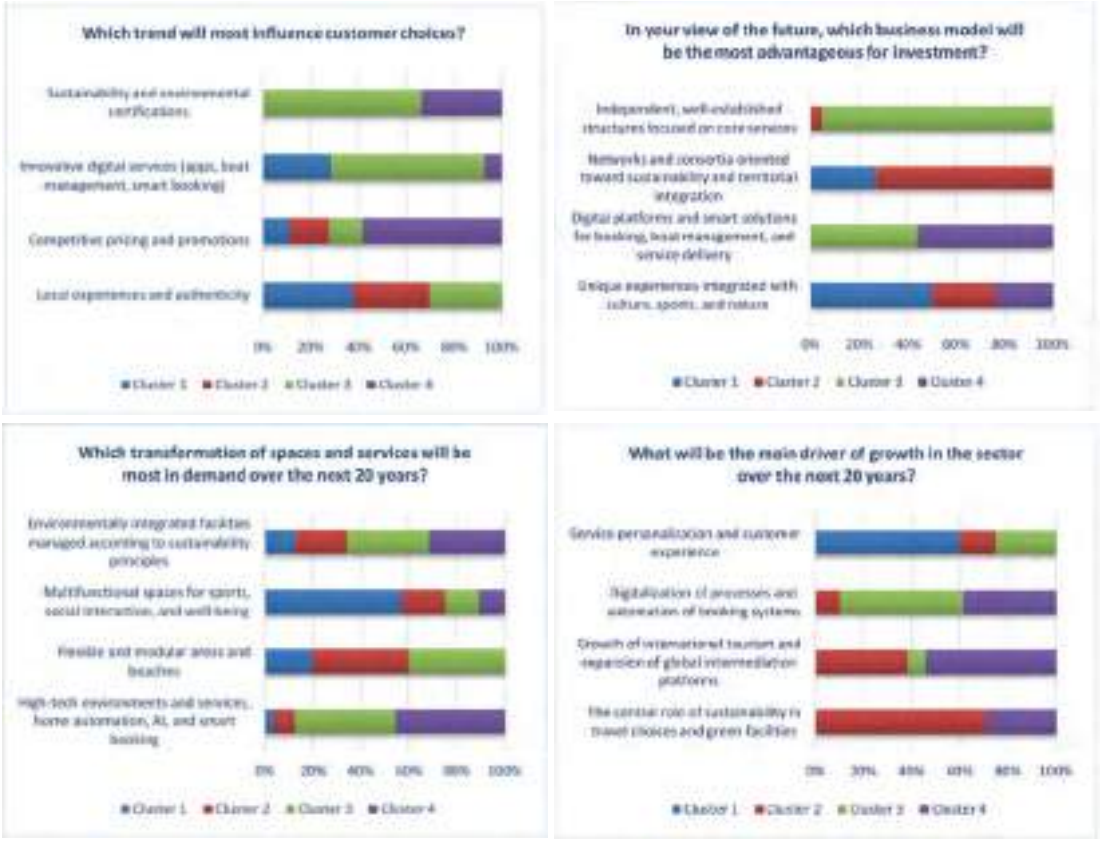

Fig. 6 a-b-c-d - Distribution of the four clusters in terms of desirability with respect to the categorical variables considered.
Source. Authors' elaboration based on a 2025 survey

From the overall cluster analysis, after considering their structural characteristics and how the different clusters position themselves with respect to the categorical variables included in the analysis, paying particular attention to sustainability, distinct profiles clearly emerge in terms of desirability (Fig. 6) and plausibility (Fig. 7) of change. In other words, firms differ not only in size, turnover, and experience, but also in how they envision the future and in what they believe is realistically achievable.

In terms of desirability, the cluster analysis identified four main profiles: the Experiential Pragmatists, oriented toward concrete and immediately applicable solutions; the Aware, true leaders of change, characterized by strategic vision and greater resources; the Evolving Traditionalists, representing a transitional cluster between established models and innovation; and the Operationally Resilient, mainly focused on survival and adaptation to everyday challenges.

Within the plausibility clusters, four distinct profiles emerge, reflecting different levels of confidence in the possibility of achieving change. The Realists mainly believe in incremental and gradual improvement, prioritizing what is feasible in the short term rather than radical transformations. The Rationally Cautious adopt a wait-and-see approach: they carefully assess future trends and look for clear signals before investing in innovation. The

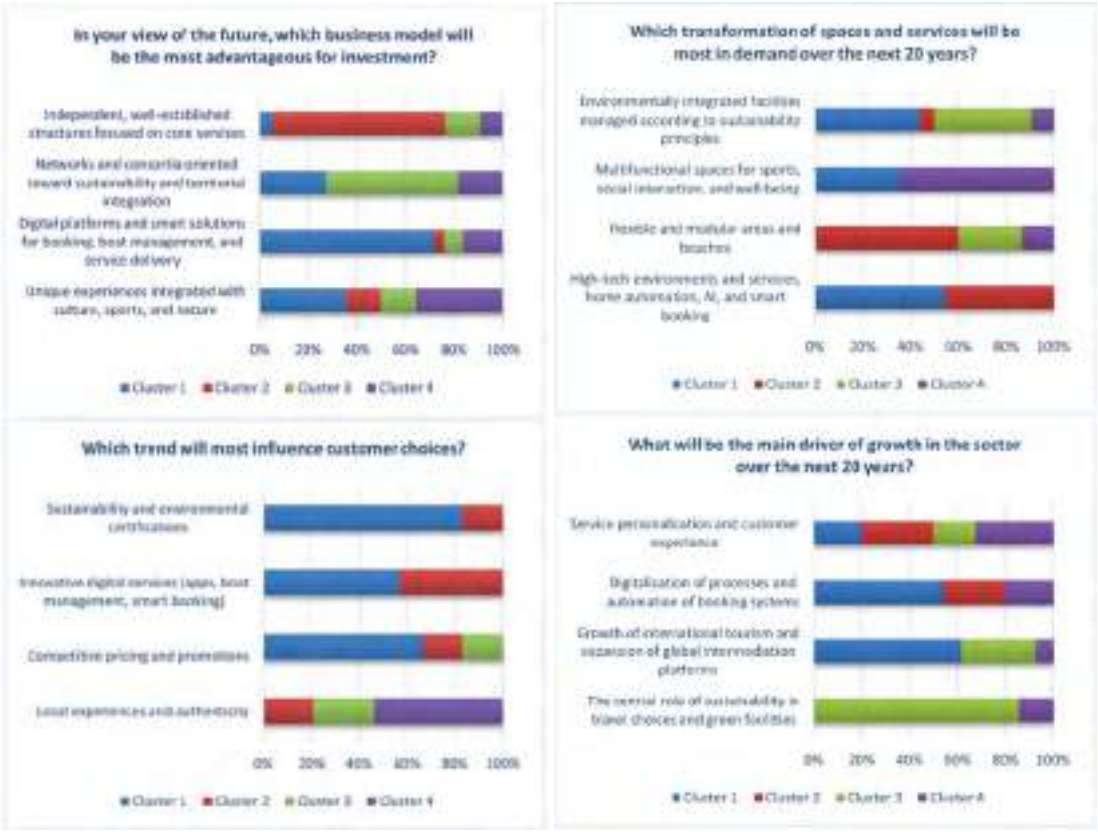

Fig. 7 a-b-c-d - Distribution of the four clusters in terms of plausibility with respect to the categorical variables considered.
Source. Authors' elaboration based on a 2025 survey

Disenchanted Experts are firms with strong experience that hold a realistic yet critical view of the system: they recognize structural challenges (climate, sustainability, accessibility) but doubt the overall capacity to address them effectively, preferring gradual adaptation. Finally, the Pragmatic Structured firms, characterized by stronger organizational and financial capacity, see the transition as achievable, provided it is supported by policies, investments, and coordinated governance.

The cluster analysis portrays a highly heterogeneous sector in which size, resources, and experience directly shape both aspirations and perceptions of feasibility. More structured firms show greater alignment between what they desire and what they consider realistically achievable, whereas smaller firms tend to adopt more cautious strategies, oriented toward gradual change rather than radical transformation. Structural and economic capacity thus emerges as the key variable influencing confidence in change.

This gap between vision and feasibility represents one of the most significant findings of the study. Fig. 8 highlights the difference between what operators consider desirable and what they believe to be realistically achievable with respect to the main drivers of future transformation in the sector: environmental sustainability, accessibility, climate change, authentic experiences, and cultural heritage. Overall, the two dimensions are largely aligned, indicating good coherence between values, expectations, and perceptions of reality.

Desirability levels are generally slightly higher than plausibility levels, confirming the existence of a small gap between what firms aspire to and what they consider realistically achievable, with a particularly evident critical issue regarding climate change. Climate change is perceived as undesirable but highly likely. This discrepancy reflects widespread

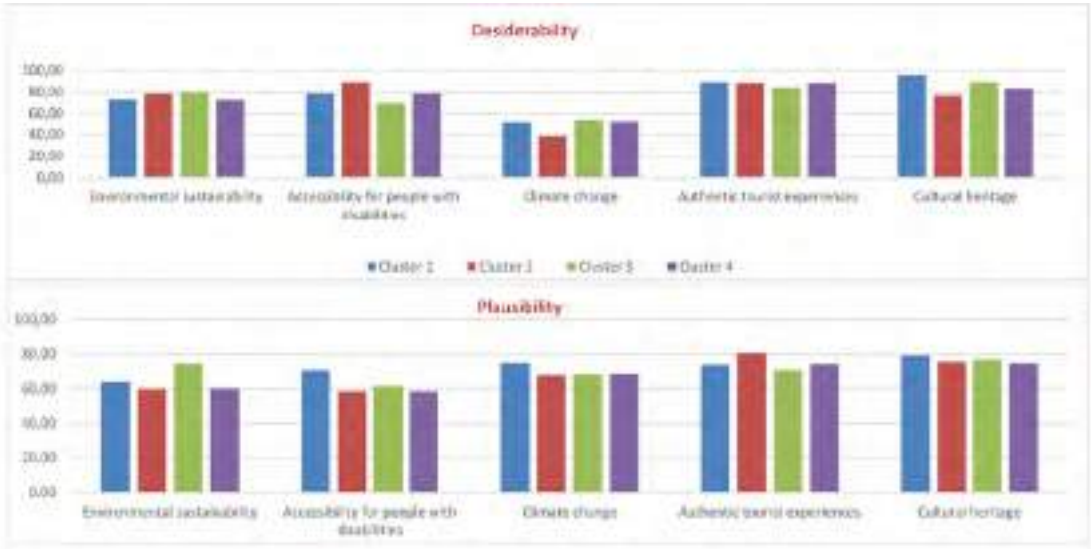

Fig. 8 - Percentage distribution comparing desirability and plausibility of the main transformation drivers (environmental sustainability, accessibility, climate change, authentic experiences, cultural heritage) across the different clusters.
Source. Authors' elaboration based on a 2025 survey

awareness of its negative impacts, combined with a perception of limited capacity for prevention or mitigation, both at the individual and system level.

3. Analysis of Exogenous and Endogenous Factors in the Seaside and Nautical Sector

The main internal and external factors characterizing the sector can be summarized through a SWOT perspective. This analysis makes it possible to relate structural strengths and weaknesses with contextual opportunities and threats, providing an integrated interpretative framework to guide strategic choices in seaside and nautical tourism, with particular attention to the Apulia case and considering insights from the Round Table with sector experts (Focus Group Apulia).

3.1. Strengths

One of the main strengths of the sector is its strong orientation toward sustainability and authentic experiences. All clusters identified in the survey, particularly the Aware and the Evolving Traditionalists, attribute very high value to environmental protection, the enhancement of cultural heritage, and the creation of experiences linked to the territory. This orientation is not only aspirational but partly perceived as achievable, especially by firms with stronger structural capacity. The gap between what is desired and what is considered feasible is relatively limited here, indicating that sustainability and authenticity represent a shared and attainable direction.

A second strength is the widespread awareness of the importance of digitalization. Technological innovation, from booking platforms to artificial intelligence and smart services, is recognized as a critical factor for growth, personalization of the offer, and management efficiency. Desirability is high across all clusters, while feasibility is considered moderate: many operators believe digital tools can be realistically applied to operational processes, whereas more advanced and strategic uses are perceived as accessible mainly to more structured firms.

The sector can also rely on experienced human capital. Most operators have long-standing experience in seaside and nautical tourism, providing a solid foundation for transition. Continuous training and staff development are considered both an organizational priority and a realistic objective, thanks to already consolidated competencies.

Finally, geographical position and maritime vocation represent a structural strength. Italy, and Apulia in particular, possess a unique coastal heritage in terms of extension, diversity, and landscape value. This is not a goal to be achieved but a starting condition, an unquestionable asset forming the basis of any development strategy for seaside and nautical tourism.

3.2. Weaknesses

Alongside strengths, significant structural weaknesses emerge. The first is the high heterogeneity and fragmentation of the business fabric. This condition is not desired but

is perceived as a clear reality. The gap between small, less structured firms and larger, more organized ones directly affects prospects for change, making coordinated action difficult.

Closely related is the gap between vision and implementation capacity. Many operators have clear ideas about what would be desirable for the sector's future but do not believe they possess sufficient financial and organizational resources to achieve it. This gap is particularly strong in smaller clusters, where the difference between aspirations and actual possibilities is perceived as wide. Structural and economic capacity emerges as the main factor amplifying this gap.

Another weakness is the limited capacity for investment and risk management. Investments in systemic sustainability, advanced technologies, and deep innovation are highly desired but appear unrealistic for many operators due to limited financial resources and a perceived unstable environment.

Finally, organizational models are not always agile or collaborative. The creation of networks, consortia, and partnerships is seen as necessary and highly desirable, yet difficult to implement. Sector fragmentation and internal competition make stable forms of collaboration complex, despite widespread recognition of their usefulness.

3.3. Opportunities

The external context offers significant opportunities. Tourist demand is increasingly oriented toward authentic, sustainable, and territory-based experiences. This trend aligns almost perfectly with the vision shared by most operators and is considered not only desirable but also realistic, representing a concrete opportunity for competitive differentiation.

Digitalization constitutes another major enabling factor. Digital technologies are viewed as tools capable of improving accessibility, personalization, and efficiency. Already available solutions, from OTAs to digital marketing and data analytics, are considered realistically usable to reach new markets, improve service, and optimize costs.

Another opportunity lies in the integration between seaside and nautical tourism. Analyses and focus groups highlight the idea of creating true coastal ecosystems based on business networks, consortia, and stronger integration among ports, cities, beach facilities, and services. This model is strongly desired but considered realistically achievable mainly if supported by public policies and public-private partnerships.

Finally, deseasonalization represents a strategic perspective. Changes in lifestyles and growing interest in culture, wellness, and nature allow for envisioning tourism less strictly tied to summer seaside activities. Experiential offers can extend the tourist season. This opportunity is highly desired and considered moderately realistic.

3.4. Threat

The most significant threat is climate change. It is perceived as highly undesirable yet very likely and difficult to control. Coastal erosion, rising sea levels, and increasing meteor-

ological unpredictability are seen as concrete and structural risks, with operators feeling they have limited capacity for prevention and mitigation.

Another major threat is the complex and fragmented regulatory framework. Bureaucracy and regulatory uncertainty are perceived as real and current obstacles that hinder investment, generate distrust, and favours competition from better-organized countries. Simplification is highly desired, but the current situation is still viewed as problematic.

International competition and the growing influence of global platforms represent an additional risk. OTAs are considered an established market reality, but their strength may marginalize local operators if not properly managed. Their dominance is viewed ambivalently useful for visibility but risky for autonomy and profitability.

Finally, there is a risk of losing competitiveness due to inertia or non-differentiated policies. Many stakeholders fear that without targeted and courageous action, Italy and Apulia region may "miss the blue train", the opportunity to transform their marine and coastal heritage into a lasting engine of sustainable development (Fig. 9).

Fig. 9 - SWOT Analysis of the Seaside and Nautical Tourism Sector

Strengths Very strong foundations. maritime vocation, experienced human capital, and an increasingly clear vision oriented toward sustainability, authenticity, and digitalization.	**Weaknesses** Structural fragility due to fragmentation, limited investment capacity, and difficulties in collaboration.
Opportunities Clear opportunities aligned with the sector's vision. sustainable demand, integration between seaside and nautical tourism, and deseasonalization.	**Threats** Climate change, bureaucracy, and international competition make it urgent to move from vision to action through targeted policies and differentiated strategies.

Source. Authors' elaboration based on a 2025 survey

4. Conclusions

The analysis clearly shows that seaside and nautical tourism is undergoing a profound structural transformation, driven by evolving lifestyles, digitalization, climate change, and the growing centrality of sustainability within market dynamics. This is not a temporary adjustment, but a true paradigm shifts reshaping business models, organizational structures, and relationships with territories. There is broad consensus on this direction: most operators share a vision of a sustainable, digital, and experiential future. However, this convergence on objectives is not matched by a similar convergence in the capacity to achieve them. Perceptions of feasibility vary and reflect the sector's structural heterogeneity: different clusters, in terms of size, financial resources, skills experience change differently some as a concrete opportunity for growth, others as a difficult risk to manage. This results in a clear gap between desirability, generally high, and plausibility, more limited especially among smaller and less structured firms. Economic and organizational capacity thus emerges as

the key variable determining the extent of this gap, distinguishing between actors capable of driving the transition and those at risk of being left behind. Within this context lies the climate challenge, perceived as highly probable, strongly impactful, and difficult to control, with the potential to affect safety, attractiveness, and the economic sustainability of coastal destinations.

These findings suggest several strategic implications: the sector's heterogeneity requires differentiated policies, with advanced measures for more structured firms and basic support actions, particularly in digital, organizational, and financial areas, for more fragile ones; integration between seaside and nautical tourism within a single coastal ecosystem becomes a priority; investment in skills, technological innovation, and artificial intelligence is essential to bridge gaps and modernize processes; in terms of climate change, coordinated and continuous governance based on monitoring, planning, and resilience investment is necessary; finally, regulatory simplification and a clear political vision are indispensable to ensure that desired investments become realistically achievable. In summary, the sector possesses a shared vision of the future, but its actual realization will depend on the ability to translate the drive toward sustainability, innovation, and experience into concrete actions, supported by targeted policies for the different clusters characterizing the sector and by tools capable of empowering leading actors without leaving the most vulnerable behind.

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Detection of tourist profiles through cluster analysis and PLS-SEM

1. Introduction

The primary objective of this analytical phase is to develop a robust, interpretable classification of respondents based on their prospective evaluations of the medium- to long-term evolution of the tourism market (Valle & Assaker, 2015). This classification is designed as a functional methodological tool for a subsequent multivariate analysis phase, in which the identified groups will be used to stratify the sample, enabling the application of Partial Least Squares models in a multi-group approach (PLS-MGA) (Hair et al., 2017).

In this sense, the classification serves a dual purpose. On one hand, it aims to reduce the latent heterogeneity of the sample by identifying clusters of respondents characterized by homogeneous views on growth drivers, technological trajectories, business models, and expected organizational transformations. On the other hand, the classification is designed to ensure adequate sample size and comparability between groups, a necessary condition for the subsequent multi-group PLS analyses to be estimated in a stable and interpretable manner (Sarstedt et al., 2011). Consequently, the quality of the classification is evaluated not only in terms of internal cohesion and separation between groups but also regarding its operational utility as a stratification variable in structural models.

2. Methodological Approach

2.1. Gower's Distance and Data Coding

Given the mixed nature of the variables, the classification was based on Gower's distance, a dissimilarity measure designed to handle simultaneously categorical, ordinal, and binary variables. This choice avoids artificial data transformations, such as one-hot encoding of nominal variables, which would have increased dimensionality and led to a more unstable clustering process (Hennig & Liao, 2013).

Attention was paid to the treatment of technological variables derived from multiple-choice questions. These were encoded as asymmetric binary variables, distinguishing between the presence and absence of a selection. In this way, the distance between two respondents is influenced exclusively by co-selections of technologies, while common non-selections do not contribute to similarity. This setup accurately reflects the informative meaning of the responses and is consistent with established practices in the analysis of prospective survey data. Consequently, the use of Gower's distance allows for the construction of a similarity space where the proximity between respondents is interpretable in terms of shared strategic visions rather than mere numerical closeness.

2.2. Algorithm and Model Selection

The classification of respondents was achieved using the Partitioning Around Medoids (PAM) method, applied to the Gower distance matrix. PAM was preferred over more common alternatives because it does not require Euclidean assumptions and uses real observations (medoids) as cluster representatives, thereby enhancing the robustness and interpretability of the results.

To support the choice of the number of clusters, several alternative solutions were compared by jointly evaluating partition quality and size distribution. Table I reports, for each considered value of k, the average silhouette width, the minimum and maximum cluster sizes, and a synthetic balance indicator.

Although the five-cluster solution exhibits a marginally higher silhouette value, methodological literature suggests that the selection of the number of groups should not rely exclusively on statistical fit criteria but must satisfy requirements of substantiality and parsimony (Dolnicar et al., 2004). Indeed, excessive fragmentation would compromise the stability of the solutions and the statistical power needed for subsequent multi-group analyses, making the three- and four-cluster solutions preferable for their greater solidity and interpretive utility. Considering these factors, the four-cluster solution was selected as it represents the best compromise between internal cohesion, separation between groups, and the operational robustness of the classification.

Table I. Quality Indicators and Balance of Clustering Solutions

Number of Clusters (K)	Avg. Siluette	Min Sample Size	Max Sample Size
3	**0.1230**	**312**	**331**
4	**0.1250**	**182**	**277**
5	**0.1288**	**141**	**233**
6	**0.1044**	**130**	**211**

This approach reflects the application-oriented objective of the classification: to identify distinct yet sufficiently comparable groups, avoiding both residual clusters and overly fragmented segmentations that would have compromised the subsequent multi-group analysis.

2.3. Classification Results and Role in the Overall Analytical Framework

The outcome of the clustering procedure is a partition that is numerically balanced and characterized by distinct profiles in terms of strategic, technological, and organizational orientations. This solution represents an effective compromise between analytical granularity and statistical stability, as shown in Table II.

Table II. Clustering Evaluation

Cluster	n	%
1	**252**	**26.1%**
2	**256**	**26.5%**
3	**277**	**28.6%**
4	**182**	**18.8%**

Within the overall research design, these classes should not be interpreted as market segments in a strict sense, nor as definitive typologies of actors. Instead, they constitute analytical strata built to make explicit the heterogeneity of views present in the sample and to allow for the comparative analysis of the relational mechanisms that will be subsequently estimated using PLS models in a multi-group approach.

From this perspective, the classification serves as a methodological infrastructure: it organizes the sample in a manner consistent with the complexity of the responses, without predetermining or conditioning the results of the subsequent structural analyses, which remain conceptually and methodologically distinct.

2.4. Partial Least Squares Path (PLS-PM)

Partial Least Squares Path Modeling (PLS-PM) represents a second-generation statistical approach belonging to the family of Structural Equation Models (SEM). Unlike covariance-based models (CB-SEM), PLS-PM is defined as a variance-based technique whose primary objective lies in the prediction of latent variables and the explanation of the variance of endogenous constructs through a partial least squares algorithm (Hair et al., 2017). This methodology has been extensively developed for contexts where theory is still in the exploratory phase, or the main objective is to maximize predictive power.

The model architecture is developed on two interconnected levels known as the Inner Model and the Outer Model. The first, the structural model, describes the theoretical relationships and influences between latent constructs; in this specific case, it allows for the analysis of how the

dimensions of Impact, Likelihood, and Desirability act on the Assessment indicator. The second level is the measurement model, which defines the link between abstract constructs and their observed empirical indicators. The choice of this methodology is justified by its remarkable distributional flexibility, as PLS-PM does not require data to follow a multivariate normal distribution, making it an extremely robust non-parametric method (Reinartz et al., 2009). Furthermore, it is particularly effective in managing complex models with small sample sizes while maintaining a high predictive purpose aimed at identifying which exogenous drivers exert the greatest impact on the target variable (Hair et al., 2017).

Validation of the results takes place through specific performance indices. The coefficient of determination measures the portion of the variance of the dependent variable explained by the model, while the Goodness-of-Fit (GoF), although debated in more recent

literature, provides a global index of the quality of the system in both its structural and measurement components (Tenenhaus et al., 2005). Path Coefficients, which indicate the strength and direction of the relationships, are finally subjected to Bootstrapping procedures to determine their statistical significance through the calculation of P-Values. The integration of Multi-Group Analysis (MGA) enriches the model by allowing for the verification of the invariance of relationships between different subpopulations (Sarstedt et al., 2011). This approach allows for establishing whether the mechanisms of influence between variables remain constant or undergo significant variations based on the specific context, such as the various tourism sectors analyzed in the research.

3. Data overview

The classification is constructed using exclusively the questionnaire variables that capture expert opinions on strategic and prospective aspects of the sector. These include the primary growth drivers expected in the long term, the sales channels and competitive factors deemed most relevant, emerging organizational challenges, and the most influential enabling technologies derived from multiple-choice questions. Additionally, the analysis incorporates the business and organizational models considered most advantageous, as well as expected shifts in customer preferences, lifestyles, and forms of experience.

These variables were selected because they represent a coherent synthesis of the cognitive and strategic dimensions through which respondents interpret the future of the sector. At the same time, they do not overlap with the variables employed in the subsequent PLS models, thereby avoiding conceptual redundancy and risks of endogeneity during the structural analysis phase. From a data-type perspective, the information set is heterogeneous, comprising nominal categorical variables and binary variables derived from multiple-choice responses. This characteristic decisively guided the methodological choices adopted in the classification phase.

4. Results

4.1. Interpretation of classification results: typical respondent profiles

The clustering analysis allows for the identification of four representative profiles of respondents, reflecting differentiated yet internally consistent visions regarding sectoral development trajectories, organizational models, and demand transformations. While sharing some common elements, notably the recognition of the centrality of service quality and the guest experience, the profiles are clearly distinguished by how they combine technology, organization, sales channels, and the interpretation of changes in customer behaviour. These "personae" do not represent market segments in a strict sense but rather ideal configurations of strategic orientations, useful for making the sample's heterogeneity interpretable.

Profile 1 - "Experience-oriented digital integrators" outlines a vision of the sector where

experience personalization is identified as the primary growth driver, in line with the Experience Economy paradigm theorized by Pine and Gilmore (2011), according to which value lies in the creation of memorable and transformative events for the guest. Respondents in this cluster combine a guest-oriented focus with a systemic integration of technologies; the prevalent use of digital platforms and OTAs is seen not as simple disintermediation, but as a fundamental e Tourism tool for value co-creation and reaching global market segments. From a business management perspective, the main organizational challenge lies in the continuous training of personnel. This choice reflects a competitive strategy based on quality and reliability, recognizing that, even in a digitized context, human capital remains the only asset capable of ensuring service authenticity and relationship management. The profile interprets demand evolution through an experiential and cultural lens, valuing a "reinterpreted tradition." This approach transforms the territory into a "creative place", where seasonal events and food and wine itineraries become vehicles of rooted authenticity. What emerges is a business model oriented toward building local ecosystems, promoting collaboration among territorial actors and strengthening the role of small municipalities, thus transforming local scale into a distinctive competitive advantage over mass destinations.

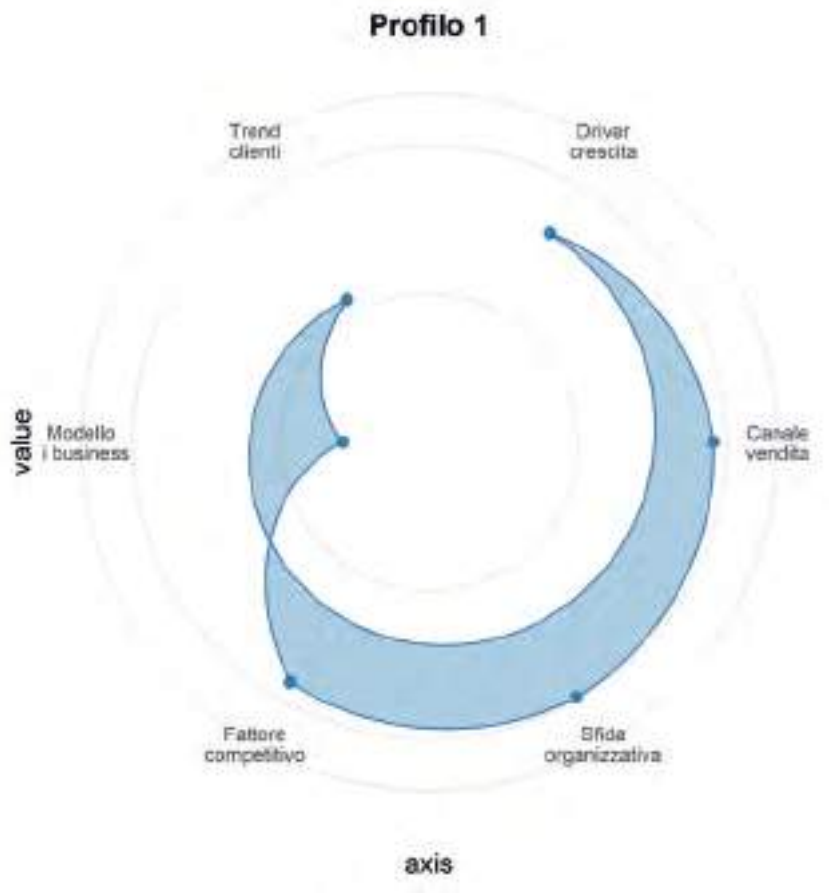

Fig. 1 - Experience-oriented digital integrators

Profile 2 - "Traditional advisors with process digitalisation" – characterizes a vision where process digitalization is functional to operational efficiency rather than a radical transformation of sales channels. In contrast to the previous profile, the pillar of competitiveness remains the specialized physical agency, which acts as a guarantor of the fiduciary relationship. This approach aligns with the "High-Tech, High-Touch" theory, which suggests that the increase in technology must be balanced by a stronger human component to preserve customer satisfaction. The strategic orientation is defensive and rational: service quality and after-sales assistance are the primary levers used to mitigate demand sensitivity toward price and convenience. As suggested by Sheldon (1997) in his analysis of tourism distribution systems, this "niche agency" model survives digital disintermediation precisely through its ability to manage complexity and offer expert consultancy. At an organizational level, the profile promotes hybrid solutions and invests in internal training to optimize back-office operations, while maintaining a business model centered on relational stability and consumer security. What emerges is the figure of a "digitally enhanced traditional consultant," focused on operational efficiency to protect margins in a competitive market.

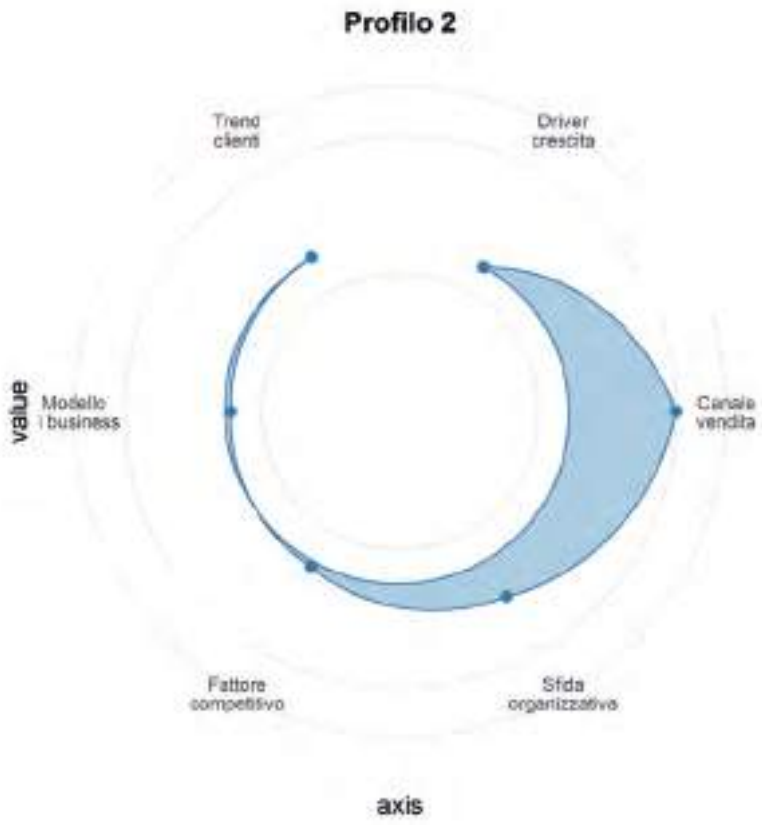

Fig. 2 - Traditional advisors with process digitalisation

Profile 3 - "Tech-driven experience" represents the vanguard of Smart Tourism, where technological innovation is not merely a support tool but the strategic lever for value co-cre-

ation (Gretzel et al., 2015). Digitalization is utilized to enhance experiential content, responding to a demand that seeks immersion and personalization through outdoor activities and thematic itineraries.

Unlike the other groups, this profile views technology to generate augmented experiences, balancing cost efficiency with the authenticity of the content. The organizational challenge shifts toward managing an integrated network of operators, where systemic collaboration among actors is the only way to ensure a seamless and competitive offering.

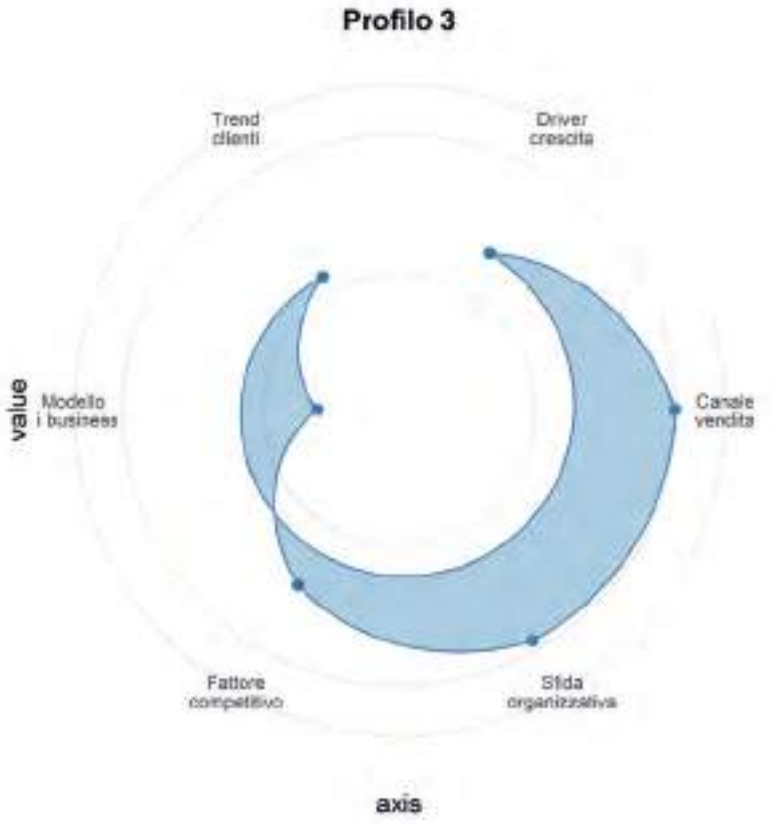

Fig. 3 - Tech-driven experience builders

Finally, Profile 4 - "Sustainability-oriented territorial networkers" outlines a vision where sustainability and personalization are complementary and inseparable drivers of development. In

this case, innovation is not merely technological adoption, but a collective process aimed at creating social and environmental value, in line with the principles of sustainable tourism integrated into the 2030 Agenda. The technological orientation is advanced: the integration of Artificial Intelligence and management software is geared toward optimizing territorial impact and responding to a demand with strong ethical and cultural values. The organizational challenge shifts toward shared governance, where the construction of territorial networks and public-private partnerships (PPP) is essential for managing the destination as

a common good. What emerges is a model based on consortia and local networks, which interpret authenticity as an asset rooted in the territory's social capital.

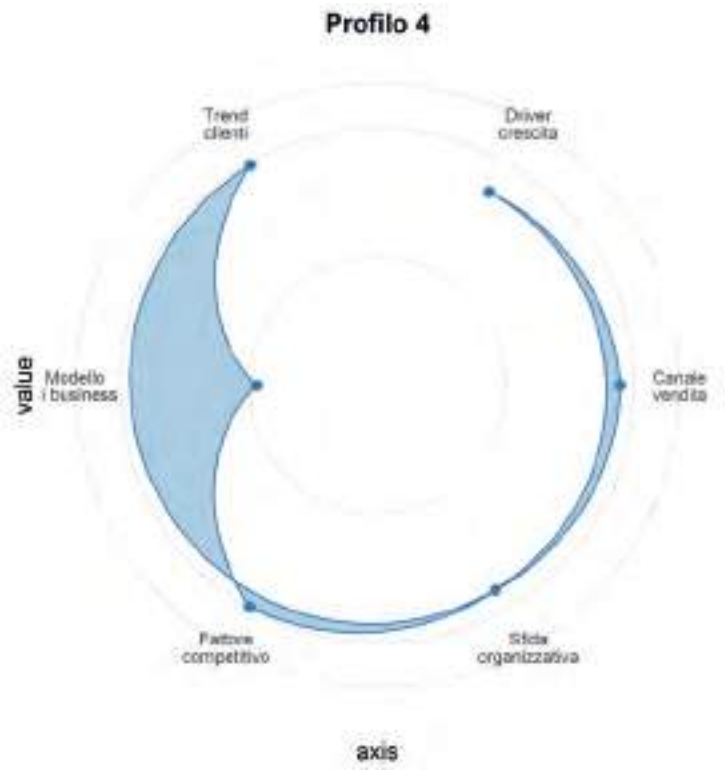

Fig. 4 - Sustainability-oriented territorial networkers

Overall, the classification highlights that the sample is not characterized by a simple dichotomy between traditional and digital approaches, but rather by distinct "personae" that articulate technology, organization, and experience in different ways. This reading through representative profiles provides a conceptually solid foundation for the subsequent stratification of the sample and for the comparative analysis of relational mechanisms via PLS models in a multi-group approach.

4.2. Result of the Global PLS-PM model

Before proceeding to the multi-group analysis, it is appropriate to examine the results of the PLS-PM model estimated on the entire sample (N = 967), based on 4 latent variables and 22 manifest variables (Fig. 5). The global model shows excellent overall fit, with a Goodness-of-Fit (GoF) index of 0.5359 and high explanatory power, evidenced by an R^2 of 0.968 for the endogenous construct. The latter, the Assessment Indicator, was methodologically defined as a second-order construct using a mixed two-step approach, allowing for a more accurate synthesis of the underlying dimensions. The impact of the three main drivers is balanced and statistically solid. The IMPACT dimension emerges as the strongest

predictor with a coefficient of 0.464 (95% CI: [0.380; 0.520]), followed by DESIRABILITY with a value of 0.437 (95% CI: [0.360; 0.513]) and LIKELIHOOD, which records a weight of 0.400 (95% CI: [0.185; 0.456]). The significance of all paths is confirmed by confidence intervals that do not include zero, indicating that each dimension contributes decisively and stably to the formation of the overall evaluation within the total sample.

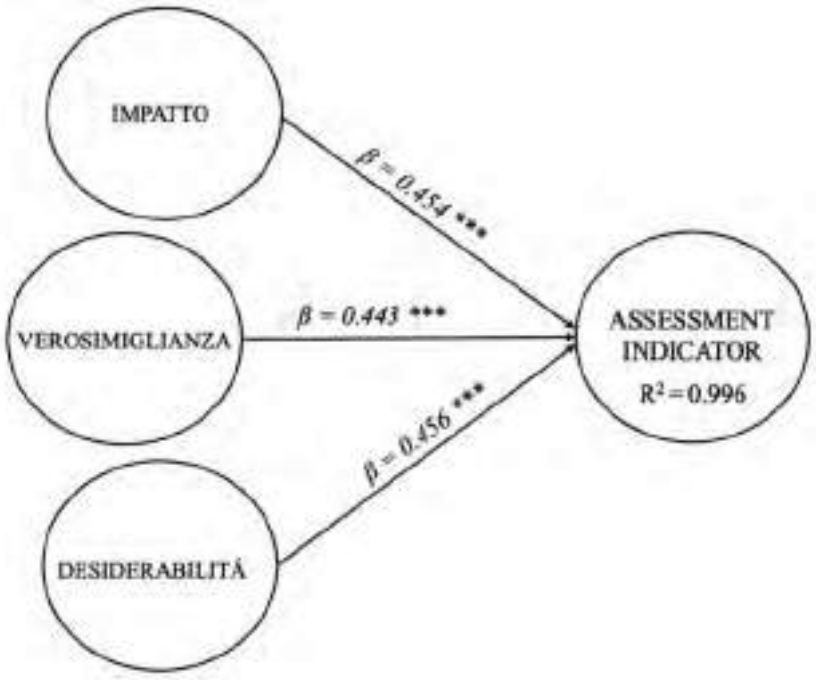

Fig. 5 - Path diagram of global model

4.3. Results for the beach sector

In the beach tourism sector, the model reveals a particularly solid and coherent evaluative structure, supported by a Goodness-of-Fit (GoF) index of 0.489 and a high explanatory power, with an R2 of 0.941. This value indicates that the three latent dimensions (Impact, Likelihood, and Desirability) effectively explain the variance of the final assessment, suggesting the existence of well-defined and highly integrated evaluative mechanisms among operators in the sector.

The analysis of path coefficients shows that all dimensions exert a positive and significant influence, with a slight prevalence of Likelihood, which emerges as the primary driver (β = 0.401; 95% CI: [0.229; 0.555]). This is followed by Desirability (β = 0.398; 95% CI: [0.250; 0.548]) and perceived Impact (β = 0.395; 95% CI: [0.297; 0.552]) with comparable weights. These results indicate that, within the beach tourism context, the judgment of the future is anchored in a pragmatic vision: operators assign the greatest weight to the concrete plausibility of phenomena occurring in the medium-to-long term, filtering their normative aspirations through a lens of structural realism.

This centrality of likelihood reflects the characteristics of a sector heavily conditioned

by environmental, seasonal, and regulatory constraints. Consequently, the evaluation of the future favors factors perceived as realistically implementable or inevitable, such as the effects of climate change or the regulatory evolution of beach concessions, over purely aspirational scenarios. However, the high coefficient for desirability confirms that evaluations are not merely adaptive but incorporate a guiding component toward a more qualitative and sustainable development model. The analysis of measurement blocks reinforces this interpretation: within the Impact block, sustainability and flow management gain prominence, while in the Likelihood block, the highest loadings are found in items related to infrastructural and regulatory changes. In summary, the model outlines a configuration where the future orientation of beach operators is driven by a dynamic equilibrium: the desirability of a change and its potential impact are constantly validated by the perception of their actual feasibility within the specific reference context.

4.4. Results for the food and wine sector

In the beach tourism sector, the model reveals a particularly solid and coherent evaluative structure, supported by a Goodness-of-Fit (GoF) index of 0.489 and a high explanatory power, with an R2 of 0.941. This value indicates that the three latent dimensions (Impact, Likelihood, and Desirability) effectively explain the variance of the final assessment, suggesting the existence of well-defined and highly integrated evaluative mechanisms among operators in the sector.

The analysis of path coefficients shows that all dimensions exert a positive and significant influence, with a slight prevalence of Likelihood, which emerges as the primary driver ($\beta = 0.401$; 95% CI: [0.229; 0.555]). This is followed by Desirability ($\beta = 0.398$; 95% CI: [0.250; 0.548]) and perceived Impact ($\beta = 0.395$; 95% CI: [0.297; 0.552]) with comparable weights. These results indicate that, within the beach tourism context, the judgment of the future is anchored in a pragmatic vision: operators assign the greatest weight to the concrete plausibility of phenomena occurring in the medium-to-long term, filtering their normative aspirations through a lens of structural realism.

This centrality of likelihood reflects the characteristics of a sector heavily conditioned by environmental, seasonal, and regulatory constraints. Consequently, the evaluation of the future favors factors perceived as realistically implementable or inevitable, such as the effects of climate change or the regulatory evolution of beach concessions, over purely aspirational scenarios. However, the high coefficient for desirability confirms that evaluations are not merely adaptive but incorporate a guiding component toward a more qualitative and sustainable development model. The analysis of measurement blocks reinforces this interpretation: within the Impact block, sustainability and flow management gain prominence, while in the Likelihood block, the highest loadings are found in items related to infrastructural and regulatory changes. In summary, the model outlines a configuration where the future orientation of beach operators is driven by a dynamic equilibrium: the desirability of a change and its potential impact are constantly validated by the perception of their actual feasibility within the specific reference context.

4.5. Results for the major events sector

In the Major Events sector, the PLS-PM model exhibits a high-performance evaluative structure, supported by a Goodness-of-Fit index of 0.5359 and high explanatory power, with an R^2 of 0.968. Based on a sample of 121 cases, the model demonstrates that the three latent dimensions explain the overall judgment in an extremely consistent manner, confirming the robustness of the framework even in a sector characterized by high organizational complexity and strong exposure to external factors.

The analysis of path coefficients reveals a less symmetrical configuration compared to other sectors, with a clear hierarchy of influence. The Impact dimension emerges as the primary lever in constructing the final assessment ($\beta = 0.464$; 95% CI: [0.380; 0.520]), followed by Desirability ($\beta = 0.437$; 95% CI: [0.360; 0.513]). Likelihood, while remaining significant, shows a relatively lower coefficient ($\beta = 0.400$) and greater variability, as indicated by the wider confidence interval ([0.185; 0.456]).

This centrality of impact appears consistent with the very nature of major events, which are high-intensity phenomena capable of producing significant economic, infrastructural, and symbolic effects even in the short term. The operators' evaluation seems to prioritize the transformative scope of interventions over their practical certainty. In parallel, the high value of desirability indicates that the normative dimension linked to sustainability, security, and experience quality remains a fundamental pillar of the sector's strategic vision. Conversely, likelihood assumes a less dominant role, suggesting that in the major events sector, uncertainty is accepted as a structural component of the decision-making process. The overall judgment is thus less anchored in immediate predictability and more oriented toward ambitious project scenarios. In summary, the model outlines a configuration where the assessment is driven by the combination of expected impact and normative desirability, clearly distinguishing this sector by its propensity to evaluate the future through its potential for change rather than through mere temporal plausibility.

4.6. Results for the hospitality sector

In the Hospitality sector, the PLS-PM model shows an exceptionally high explanatory power, reaching an R^2 value of 0.994 for the assessment indicator. Supported by a robust Goodness-of-Fit (GoF) index of 0.5949, this result obtained from a sample of 236 cases indicates that the overall judgment on the future of the sector is almost entirely explained by the latent dimensions considered. Compared to the other sectors analyzed, hospitality emerges as the context where the theoretical framework finds its maximum empirical adherence and statistical stability.

The analysis of path coefficients reveals a perfectly balanced configuration, characterized by extremely narrow confidence intervals that testify to the precision of the estimates. The three dimensions contribute almost identically to the construction of the final assessment: desirability presents a coefficient of 0.423 (95% CI: [0.399; 0.450]), followed by likelihood with 0.417 (95% CI: [0.373; 0.442]), and impact with 0.415 (95% CI: [0.372; 0.426]).

This symmetry clearly distinguishes hospitality from both the pragmatism of the beach tourism sector and the impact-oriented approach typical of major events.

In the accommodation sector, the judgment of the future appears more "mature" and systemic: no single dimension prevails, indicating that operators evaluate transformations through a multidimensional lens where desirability, plausibility, and expected impact are considered inseparable elements. This balance reflects the complex nature of the sector, which integrates infrastructural and relational components within a context of high professionalization. The analysis of measurement indicators confirms this integrated vision. In the Likelihood block, the highest loadings are found in items related to sustainability and service innovation, perceived as processes already underway. In Desirability, the quality of experience and social responsibility define the normative component, while Impact is closely linked to organizational and territorial consequences. In summary, for hospitality operators, the future is interpreted as a continuous evolutionary process, making the sector particularly receptive to systemic and coordinated policy interventions that avoid one-dimensional approaches.

4.7. Results for the Tour Operator sector

The model estimated for the tour operators sector highlights an extremely robust evaluative structure, supported by a GoF index of 0.4955 and an R2 value of 0.985. Based on a sample of 330 cases, the results indicate an almost total capacity of the three latent dimensions to explain the future evolution of the sector, reflecting a highly structured vision of the future characterized by a high degree of strategic awareness.

Unlike the previously analysed sectors, the profile of tour operators is distinguished by an overall higher intensity of path coefficients, with all values exceeding the 0.49 threshold. Desirability emerges as the primary driver ($\beta = 0.515$; 95% CI: [0.465; 0.535]), followed by Impact ($\beta = 0.501$; 95% CI: [0.449; 0.520]) and Likelihood ($\beta = 0.496$; 95% CI: [0.432; 0.522]). This configuration suggests that judgment regarding the future is primarily driven by a normative and proactive vision: what is considered desirable acts as a strategic compass, while remaining strictly anchored to assessments of feasibility and concrete impact.

This intensity of coefficients distinguishes the sector both from hospitality, where a more moderate balance prevails, and from major events, where impact dominates more in isolation. A distinctive element is the low correlation between latent variables, indicating that operators tend to keep evaluative levels clearly separate: desirability is not confused with probability, nor the latter with expected impact. Such rational decomposition is typical of actors operating as orchestrators of complex systems (intermediaries), who must balance strategic visions with operational constraints.

In summary, the model outlines a logic of active strategic adaptation. For tour operators, the future is not a phenomenon to be endured but a room for manoeuvre in which normative preferences guide professional choices. Multi-Group Analysis (MGA) represents the crucial step to statistically validate the differences observed in the local models. Through the application of Henseler's non-parametric test, it is possible to determine whether the

variations in Path Coefficients across the different tourism sectors are due to sampling fluctuations or reflect real divergences in the respondents' evaluative dynamics.

4.8. Comparison between sectors

The Beach Tourism sector stands out as having the most intense structural relationships in the entire analysis. Statistical comparison reveals that the influence of drivers on the assessment is significantly higher in the Beach sector than in the Food & Wine and Hospitality sectors, as confirmed by extreme p-values ($p = 0.000$). Methodologically, this indicates that beach operators react much more markedly to variations in impact, likelihood, and desirability, manifesting a more "sensitive" and polarized judgment model. In contrast, the Food & Wine sector shows the opposite behaviour, appearing as the most structurally moderate model, where relationships, though solid, present less extreme coefficients than their counterparts in the beach sector.

A highly interesting element emerges from the comparison between the Beach sector, Major Events ($p = 0.667$), and Tour Operators ($p = 0.333$). In these cases, the lack of statistical significance suggests a partial structural convergence: these three sectors share a similar evaluative "posture," characterized by strong reactivity to the model's drivers. Specifically, the link with the Tour Operator world indicates that the vision of the future for those managing intermediation and those managing beach concessions follows comparable cause-and-effect logics, likely related to a similar perception of risk and territorial impact.

Finally, the analysis highlights a clear separation between the "services and culture" block (Food & Wine and Hospitality) and the "strategic-operational" block (Major Events and Tour Operators). Although structurally different from the Beach sector, the Hospitality sector shows similarities with Major Events ($p = 0.667$) but diverges drastically from Tour Operators and Food & Wine ($p = 0.000$). These discrepancies confirm that there is no single "mindset" within the tourism industry: the evaluation of the future is a fragmented process, where the specific nature of the business activity radically shapes the weight the operator assigns to what is desired versus what is considered probable.

4.9. Profile Comparison

The class analysis reveals a clear hierarchy in the strength of structural relationships, demonstrating how strategic and technological orientation conditions operators' reactivity toward the model's drivers. The MGA test highlights distinct differences, allowing for the mapping of profiles based on the intensity of their path coefficients.

The "Traditional advisors with process digitalisation" (Profile 2) emerges as the group where the model operates with maximum intensity. The coefficients for this profile are significantly higher than all other groups (p-value B vs C = 1.000; B vs D = 1.000; A vs B = 0.000). This evidence suggests that Profile 2 operators possess an extremely sensitive evaluative system, where any variation in the drivers translates into an immediate and powerful impact on the final assessment.

At an intermediate level of reactivity lies the "Tech-driven experience builders" (Profile 3). While showing significantly stronger structural relationships compared to Profile 1 (p = 0.000) and Profile 4 (p = 1.000), this group does not reach the intensity levels of Profile 2. Technological propensity aimed at experience thus acts as a positive moderator of the model's strength, albeit with less polarized dynamics than the digitalized consultants.

Finally, the "Experience-oriented digital integrators" (Profile 1) and "Sustainability-oriented territorial networkers" (Profile 4) represent the area of lowest relational intensity. The lack of significant differences between the two (p = 0.667) indicates a similar evaluative posture, characterized by more "nuanced" links between variables. For these operators, judgment regarding the future seems to be mediated by qualitative or contextual factors that mitigate the determinism of classic drivers. In summary, the strength of the model's causal mechanisms follows a descending scale: Profile 2 (Maximum) > Profile 3 > Profile 4 > Profile 1 (Minimum), confirming that digital maturity and strategic vision are key variables in defining how tourism operators perceive and shape the sector's evolution.

Table III - Comparison Between Sectors

Group A	Group B	P-Value	Significance
Seaside	Food & Wine	0.000	Yes
Seaside	Major Events	0.667	No
Seaside	Hospitality	0.000	Yes
Seaside	Tour Operator	0.333	No
Food & Wine	Major Events	0.333	No
Food & Wine	Hospitality	0.000	Yes
Food & Wine	Tour Operator	0.000	Yes
Major Events	Hospitality	0.667	No
Major Events	**Tour Operator**	**0.000**	**Yes**
Hospitality	**Tour Operator**	**0.000**	**Yes**

5. Discussion

The results of the analysis demonstrate that the functioning of the structural model is not uniform across the sample but is heavily conditioned by both the sector of belonging and the strategic profile of the respondents, as identified by the previous classification. Despite a stable measurement structure and high explanatory power across all analysed groups, systematic differences emerge in the intensity of causal relationships that warrant a substantive interpretation.

From a sectoral perspective, the beach tourism sector emerges as the one where the model operates with the greatest overall intensity. Path coefficients are systematically higher than those observed in other sectors, and MGA tests indicate statistically significant differences when compared to the food and wine and hospitality sectors. This result suggests that, in the beach context, the dimensions of impact, likelihood, and desirability

play a particularly central role in forming overall judgment. A possible interpretation lies in the greater standardization of the offering and higher exposure to consolidated competitive dynamics, which make evaluative mechanisms more reactive and consistent. Conversely, the food and wine sector shows lower structural coefficients and less overall sensitivity, indicating a more nuanced evaluative structure that is less dependent on the dimensions analysed, a finding consistent with the fragmented and experiential nature of this sector.

Significant differences also emerge in the comparison between respondent profiles, representing the most informative aspect of the analysis. The identified profiles show clearly differentiated structural configurations. Specifically, those profiles more oriented toward innovation and the integration of advanced technological solutions also prove to be those where the causal model is most "active," meaning the analysed dimensions exert a more marked influence on the overall assessment. In contrast, more cautious profiles or those anchored in traditional logics show a less elastic evaluative structure.

A particularly relevant element is the absence of significant differences in loadings between groups, as verified through the measurement invariance procedure (MICOM) suggested by Henseler et al. (2016). This evidence strengthens the substantive interpretation of the results, indicating that different sectors and profiles share a substantially homogeneous understanding of the items and latent constructs. The observed differences in path coefficients do not reflect issues of measurement comparability but rather real divergences in evaluative processes. This aspect is crucial both methodologically, as it legitimizes the multi-group comparison, and practically, as it suggests that policies based on an "average" model risk underestimating the heterogeneity of decision-making mechanisms within the system. Overall, these results indicate that the integration of respondent classification and multi-group PLS analysis is an effective approach to highlighting structural differences that would not emerge from an aggregated analysis.

6. Conclusions, implications, and policy recommendations

The evidence emerging from the models suggests that uniform public policies and intervention tools risk being ineffective in a context characterized by strong sectoral and strategic heterogeneity. Specifically, the presence of significant structural differences between sectors and, even more so, between respondent profiles indicates the need to adopt a differentiated and targeted policy approach, capable of accounting for the diverse evaluative logics that guide the system's actors.

In the beach tourism sector, where the model shows greater overall reactivity and higher structural coefficients, public policies could be particularly effective if oriented toward strengthening the dimensions of impact, likelihood, and desirability in an integrated manner. Interventions aimed at supporting investments in the quality of the offering, organizational innovation, and enhancement of the visitor experience are more likely to translate into positive evaluations and consistent behaviors by operators. Conversely, in the food and wine sector, characterized by lower intensity in structural relationships, overly standardized

policies might fail to capture the sector's complexity. In this case, flexible instruments capable of enhancing territorial specificities, diversity of experiences, and local networks are more appropriate than interventions based on rigid causal schemes.

The policy implications are even more relevant when viewed through the lens of the strategic profiles identified by the classification. Profiles most oriented toward innovation, personalization, and technological integration, which show higher structural coefficients, represent contexts where policies supporting innovation, digitalization, and organizational cooperation can produce multiplicative effects. In these cases, tools such as selective incentives, pilot programs, or public-private coordination platforms can activate virtuous dynamics, reinforcing existing mechanisms and amplifying the impact of interventions.

On the other hand, for profiles characterized by a more muted and less reactive evaluative structure, there is a need for enabling rather than incentive-based policies. In these contexts, priorities such as skills training, support for project capacity, and the reduction of information barriers may prove more effective than measures focused exclusively on outputs. The evidence that these profiles share a homogeneous measurement structure but differ in their causal mechanisms suggests that the policy objective should not be to "standardize" behaviours, but rather to create conditions in which different actors can more consciously and consistently activate relevant evaluative levers.

Overall, the results indicate that a policy oriented toward the future of the sector should move along a dual track: on one hand, recognizing structural differences between sectors by adapting tools and priorities to specific contexts; on the other, using profile segmentation as an operational key to design more targeted interventions. In this perspective, the integration of quantitative analysis, profile classification, and the multi-group approach represents not just a methodological exercise, but a solid information base for a differentiated, adaptive, and evidence-based policy.

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1. Introduction

Over the past decades, textual data analysis has undergone a profound transformation within the social sciences and applied research fields. Texts, transcripts, and narrative materials are now recognized as crucial empirical sources for examining complex social processes, as they allow researchers to capture meanings, representations, expectations, and interpretive frames that rarely emerge from structured quantitative data alone. The growing volume and dimensionality of textual corpora has further stimulated the development of methods capable of ensuring comparability and methodological rigor (Grimmer & Stewart, 2013; Evans & Aceves, 2016).

Within this methodological shift, several approaches have consolidated around the idea of treating language as data. Specifically, Computer-Aided Text Analysis (CATA) and text-mining techniques apply statistical and probabilistic procedures to unstructured corpora, enabling large-scale analyses while reducing exclusive reliance on subjective interpretation. Topic modelling techniques make it possible to identify recurrent themes by leveraging patterns of lexical co-occurrence, without imposing predefined analytical categories (Grimmer & Stewart, 2013).

In tourism research, the expansion of user-generated contents – such as online reviews, social media posts, and travel blogs – has accelerated the adoption of textual analytics. These sources have been widely used to investigate destination image, tourist satisfaction, experiential drivers, and perceived weaknesses (Xiang et al., 2015; Kirilenko et al., 2021). Quantitative text analysis has proven especially valuable in transforming dispersed individual narratives into synthesized and comparable insights that inform destination management, territorial marketing, and policy-making processes (Mariani et al., 2019).

Beyond digital data, the same analytical framework can be applied to primary qualitative materials, including interviews and focus-group transcripts.

This chapter adopts such an approach. The focus groups on the future of tourism are treated as a structured textual corpus and analysed through quantitative text-analysis techniques with the aim of identifying emerging themes, examining their sectoral distribution, and translating expert perspectives into a strategic interpretation relevant to governance and policy design.

By combining topic modelling, semantic mapping, and a dictionary-based SWOT analysis, the chapter converts a complex discursive corpus into structured analytical evidence. Designing forward-looking tourism strategies requires not only quantitative indicators but also tools capable of reconstructing the visions and critical issues articulated by system actors. In this sense, discursive scenarios provide complementary insight: they reveal how

tourism's future is imagined and problematized by stakeholders, thereby highlighting perceived convergences, tensions, and strategic priorities.

2. Discursive Scenarios of Tourism

2.1. Analysing Focus Groups on the Future of Tourism

Designing policies and strategies for tourism futures requires tools that go beyond the observation of structural or performance indicators, incorporating the visions, expectations, and concerns of the actors directly involved in development processes. From this perspective, analyzing *discursive scenarios* helps reconstruct how stakeholders imagine, narrate, and problematize the future of tourism, providing an evidence base that is particularly relevant for governance and policy evaluation.

Within the PRIN 2022 PNRR project *The Future of Sustainability*, focus groups were conceived as collective-intelligence devices aimed at complementing conventional statistical information with high-granularity qualitative data grounded in the informed views of experts and practitioners. Consistent with approaches in futures studies, these subjective contributions are not treated as isolated opinions, but as inputs into a structured scenario-building process, whose robustness is strengthened through convergence across viewpoints and their translation into comparable analytical representations.

In this chapter we apply quantitative text-analysis techniques, treating focus-group transcripts as a structured textual corpus. By combining topic modelling, semantic mapping, sectoral-affinity analysis, and a dictionary-based SWOT reading, the chapter offers an integrated synthesis of the visions that emerged. In addition, each topic is visualized through an internal lexical network built from its most salient bigrams, allowing a finer-grained interpretation of its semantic structure. The findings are then discussed in relation to the Delphi-based scenarios, to highlight convergences, tensions, and strategic priorities for the future of sustainable tourism.

2.2. Research Design and Data

The empirical foundation of the analysis consists of a textual corpus generated from a series of focus groups and thematic roundtables organized within the project framework. The meetings were held in May 2025 at the *Salone Dorato* of Palazzo Ateneo (University of Bari "Aldo Moro") and brought together a heterogeneous group of stakeholders, tourism practitioners, institutional representatives, and academic experts operating across the principal domains of the regional tourism system.

The discussions were structured around specific sectoral areas, including food and wine tourism, religious tourism, wellness and thermal tourism, coastal and nautical tourism, as well as cross-cutting fields such as travel agencies and major events. Each session functioned as a guided deliberative space focused on the future of sustainable tourism, encouraging participants to articulate development trajectories, operational bottlenecks, govern-

ance needs, and forward-looking sectoral visions. The complete transcripts of these exchanges constitute the primary empirical material analyzed in this chapter.

For analytical purposes, the corpus was organized to enable computational modelling. Each intervention was treated as a document and enriched with metadata identifying the relevant tourism sector and the specific focus group in which it was delivered. This configuration makes it possible to investigate both the overarching discursive structure concerning tourism futures and the sector-specific patterns that distinguish or connect different domains.

From a substantive perspective, the focus groups revealed recurring themes that were nonetheless articulated in sector-specific ways. In food and wine tourism, for instance, participants framed gastronomy as a key identity marker and narrative resource, emphasizing immersive experiences, territorial coordination, and professionalization. Discussions in the religious tourism domain revolved around the differentiation between pilgrimage and spiritual travel, the growing relevance of walking routes, the centrality of collective rituals, and the need for accessible and structured offerings. In the wellness and thermal sector, participants highlighted the potential for territorial regeneration and seasonality mitigation, while also acknowledging infrastructural deficiencies, marketing limitations, and fragmented strategic planning. Although diverse in emphasis, these contributions coalesce into a unified corpus reflecting the plurality of visions surrounding tourism's future in Puglia.

To make the corpus amenable to quantitative modelling, a linguistic pre-processing phase was conducted to reduce noise and enhance cross-document comparability. Each intervention was tokenized and lemmatized so that different inflected forms were mapped to a common base representation. A part-of-speech filtering procedure was then applied, retaining nouns, verbs, and adjectives, as these elements are most closely associated with conceptual content, action, and evaluative expression.

Stopwords and low-information terms were removed to prevent distortion of the analytical results. Furthermore, two automated filters were implemented to avoid the dominance of unstable or non-discriminatory vocabulary: a rarity filter excluded extremely infrequent terms, while a ubiquity filter eliminated terms appearing in an excessively large proportion of documents. This step was essential to ensure that meaningful discursive differences could surface across sectors and interventions.

To capture the semantic structure of the narratives, the modelling strategy relied on bigrams – pairs of consecutive lemmatized words – rather than single tokens. This choice enables the identification of compound concepts and recurring discursive trajectories, such as "slow tourism", "soft mobility", or "territorial identity", which might otherwise be fragmented in a single-word representation. Bigrams were constructed strictly within sentence boundaries to preserve local semantic coherence and avoid artificial lexical combinations.

The resulting bigram-based corpus was analysed using Latent Dirichlet Allocation (LDA) (Blei et al., 2003), a probabilistic generative model designed to uncover latent thematic structures within large text collections. LDA assumes that each document is composed of multiple topics and that each topic is characterized by a probability distribution

over the vocabulary. Topics are not directly observable but are inferred from patterns of lexical co-occurrence across the corpus.

The model simultaneously estimates the distribution of bigrams associated with each topic and the distribution of topics within each document, allowing each intervention to be represented as a mixture of thematic components rather than being assigned to a single category.

To enhance interpretability, each extracted topic was subsequently represented through an internal lexical network built from its most salient bigrams. This network-based visualization makes explicit the core co-occurrence structures underlying each topic and supports a more transparent and substantively grounded interpretation of the latent thematic components.

3. Results: Discursive Scenarios and the Semantic Organization of Visions

3.1. Overview of the Emerging Topics

The focus-group discussions give rise to eight distinct yet interconnected topics that collectively outline a layered and territorially embedded vision of tourism's future. Through Latent Dirichlet Allocation (LDA), the corpus is condensed into eight discursive scenarios which, while differentiated in vocabulary and emphasis, display meaningful complementarities and overlaps.

The eight-topic solution was selected on substantive and interpretative grounds. It represents a balanced compromise between parsimony and thematic richness: fewer topics would have produced excessive generalization, whereas additional topics would have led to artificial fragmentation. The chosen configuration ensures conceptual clarity, semantic coherence, and sufficient differentiation to support a substantively interpretable reading of the corpus.

The graphs display, for each LDA topic, an internal lexical network constructed from the 15 most salient bigrams (i.e. those with the highest beta values). Each bigram is decomposed into its two constituent words and represented as an undirected edge connecting two nodes. Edge weights correspond to the beta values; when edges recur, weights are aggregated, although this is rare within the top-15 selection.

The spatial arrangement follows a spring layout and has no absolute metric meaning. Rather, it enhances readability: more central nodes typically exhibit higher weighted degree (strength), meaning they participate in multiple high-probability bigrams and function as semantic hubs. Stronger edges indicate highly characteristic co-occurrences, while density and sub-clustering patterns suggest whether a topic revolves around a single conceptual core or integrates multiple thematic sub-areas (e.g. experiential, logistical, governance-related, or health-oriented dimensions).

Because the visualization is limited to the top-15 bigrams, the network is intentionally sparse. It does not represent the full vocabulary of the topic, but highlights its most distinctive lexical connections, supporting interpretation and labelling.

Ritual and Experiential Tourism (Fig. 1) is structured around a ritual-cultural core, dominated by hubs such as *festa* (festival) and *pellegrinaggio* (pilgrimage), with connections to *arte*, *sacro*, and references to ageing and the pandemic. This configuration suggests a scenario in which collective religious-cultural events coexist with vulnerability-related and experiential-gastronomic elements (e.g., *assaggiare-burrata*), indicating an overlap between rituality and local food identity.

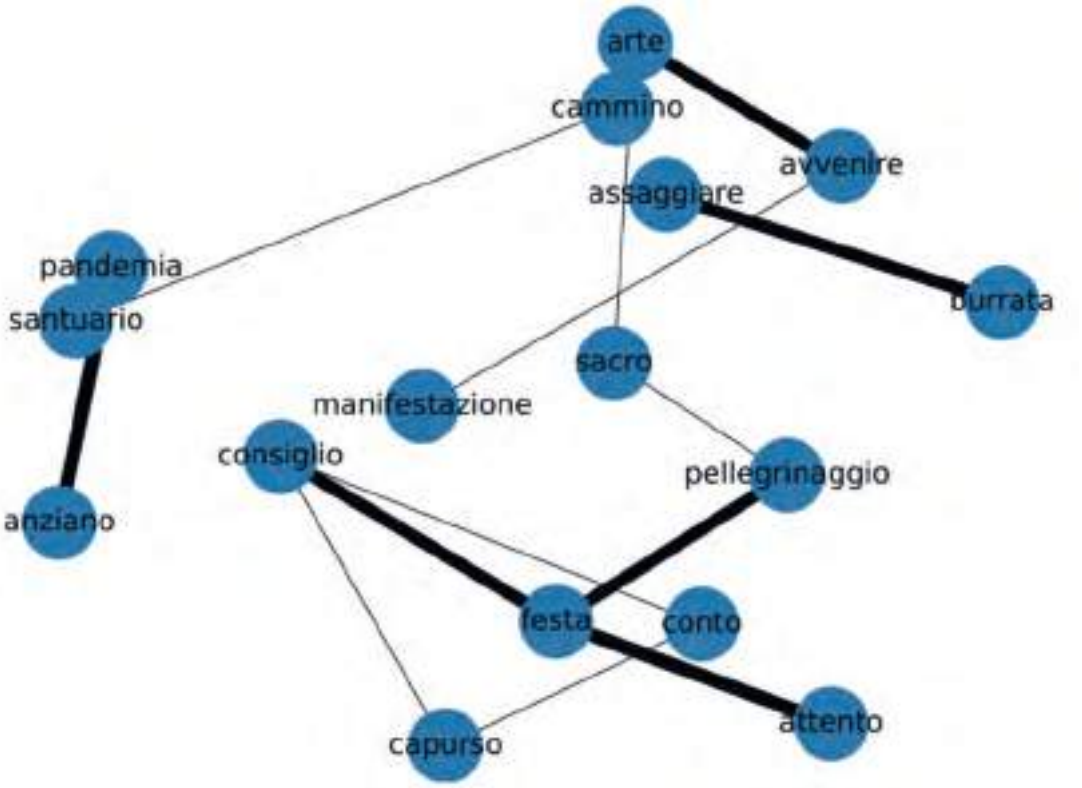

Fig. 1 - Bigram network of Ritual and Experiential Tourism

Integrated Wellbeing Tourism (Fig. 2) presents a dual structure. One nucleus revolves around *benessere fisico* (physical wellbeing), while another concerns logistical and organizational elements (*metro-imbarcazione*, *soggiorno-albergo*, *ordine-controllo*). The scenario describes organized mobility and travel practices in which wellbeing is intertwined with infrastructure, accommodation, and regulated movement.

Regulated and Infrastructural Tourism (Fig. 3) is clearly governance-oriented. The highly salient *tassa-soggiorno* (tourist tax) bigram anchors a network including control, competence, pricing, and digital elements (*online*). Alongside infrastructural terms, references to community and walking routes suggest an intersection between regulatory instruments and territorial practices.

Identity-Based and Proximity Tourism (Fig. 4) is strongly localized and institutionalized. Nodes such as *capurso*, *santuario*, and *festa* form a cohesive core, indicating a territori-

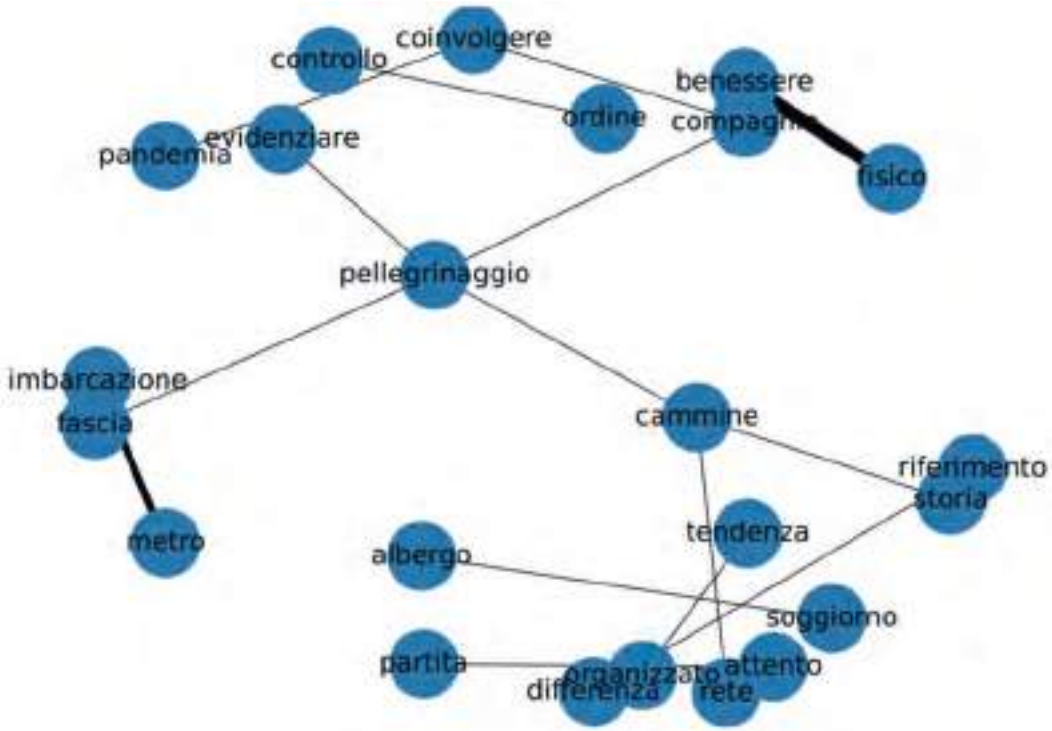

Fig. 2 - Bigram network of Integrated Wellbeing Tourism

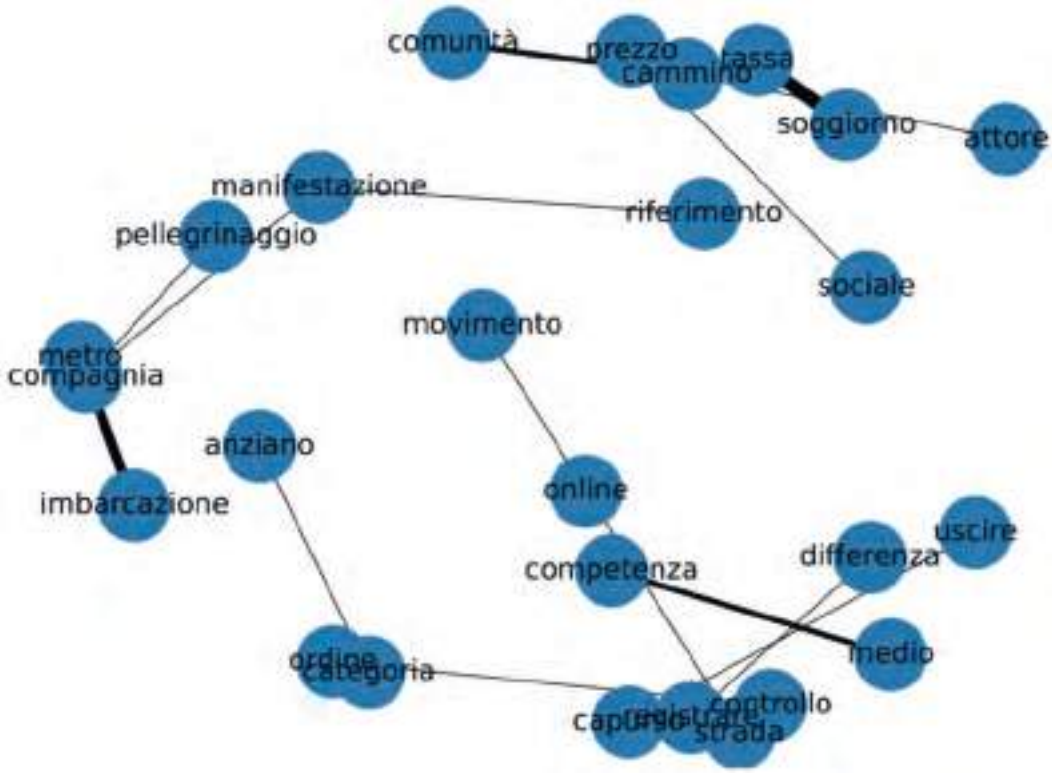

Fig. 3 - Bigram network of Regulated and Infrastructural Tourism

ally specific identity scenario. Temporal markers (*luglio*, *pandemia*) and communicative elements reinforce the idea of event-based religious tourism embedded in local narrative and calendar dynamics.

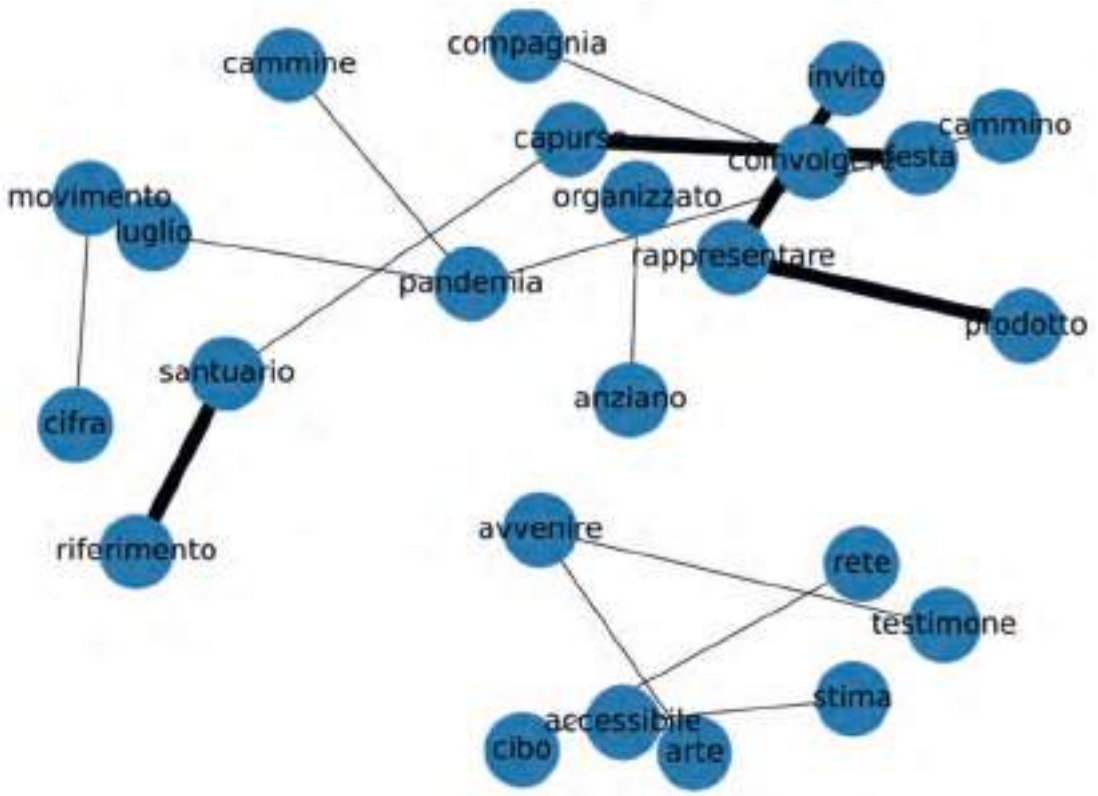

Fig. 4 - Bigram network of Identity-Based and Proximity Tourism

Care and Regenerative Tourism (Fig. 5) is centered on *cura-benessere* (care-wellbeing), extended toward *acqua* and *stabilimento medicale*, clearly delineating a thermal and medical-wellness tourism configuration. The coexistence of walking and community-related terms introduces a salutogenic dimension, where care infrastructures intersect with active and social practices.

Tourism as a Territorial Ecosystem (Fig. 6) revolves around *autorità portuale* (port authority), signaling institutional and infrastructural governance, particularly in maritime contexts. A secondary culinary-quality nucleus (*cucina-olio*) coexists with market and sustainability references, suggesting a systemic scenario combining infrastructure management with territorial production and economic trends.

Differentiating Cultural Tourism (Fig. 7) integrates gastronomy and administration. Food-related hubs (*caseario*, *burrata*, *olio qualità*) intersect with economic-regulatory elements (*soggiorno-tassa*), while pilgrimage and differentiation references point to positioning and comparative framing. This scenario reflects food and wine as both identity capital and economic lever.

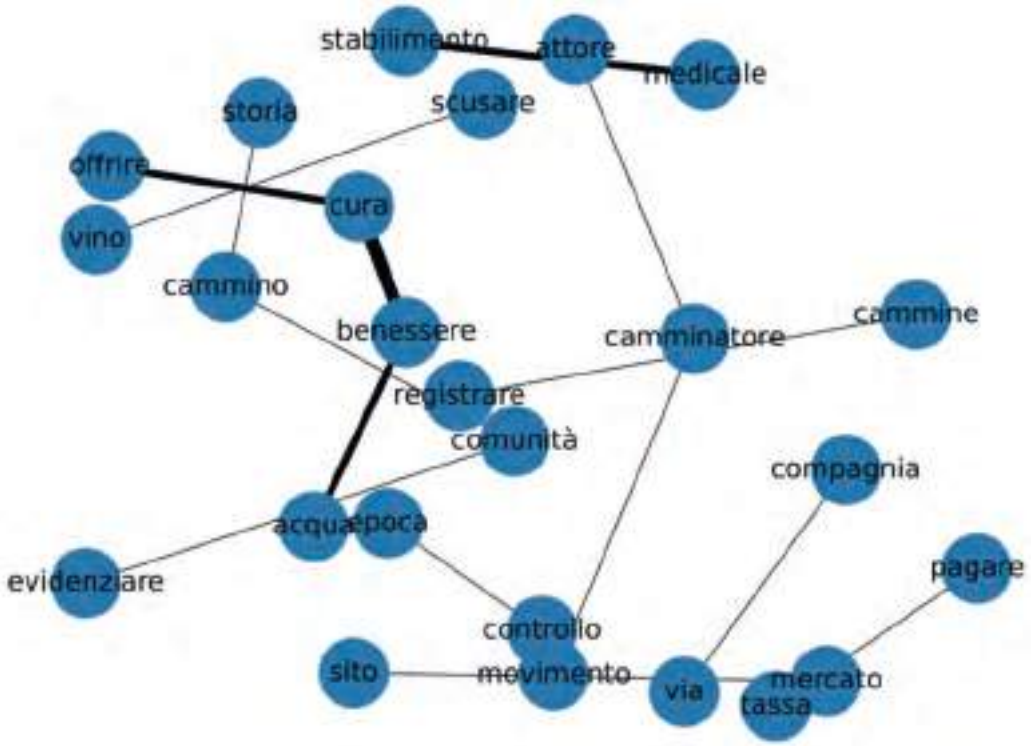

Fig. 5 - Bigram network of Care and Regenerative Tourism

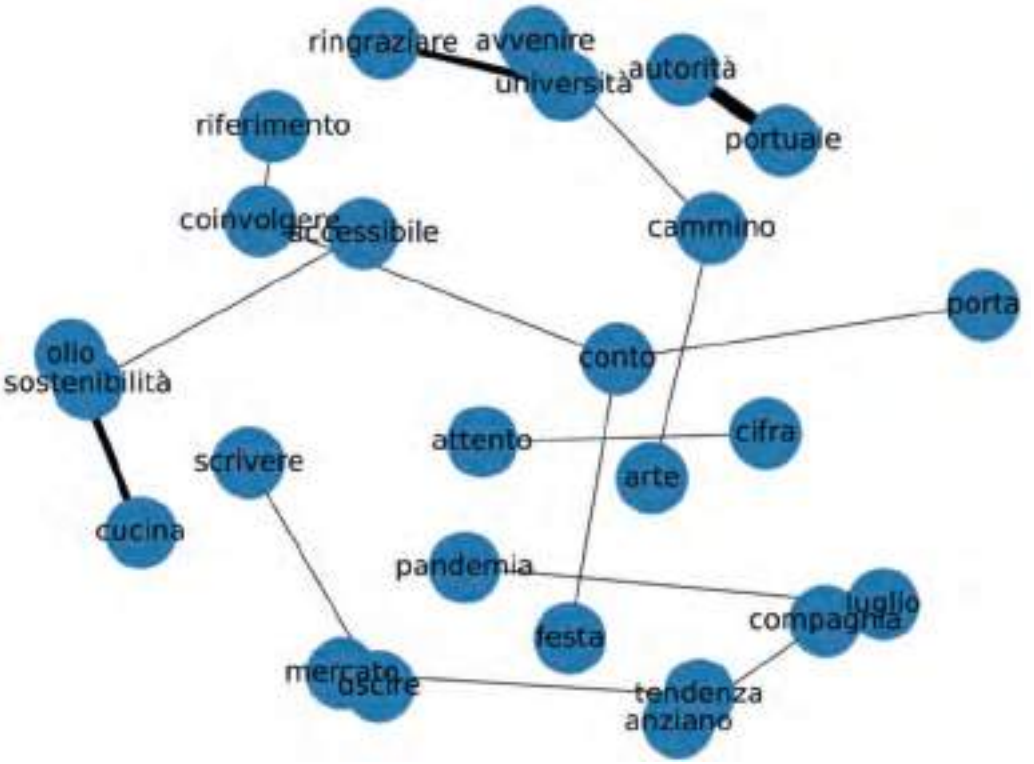

Fig. 6 - Bigram network of Tourism as a Territorial Ecosystem

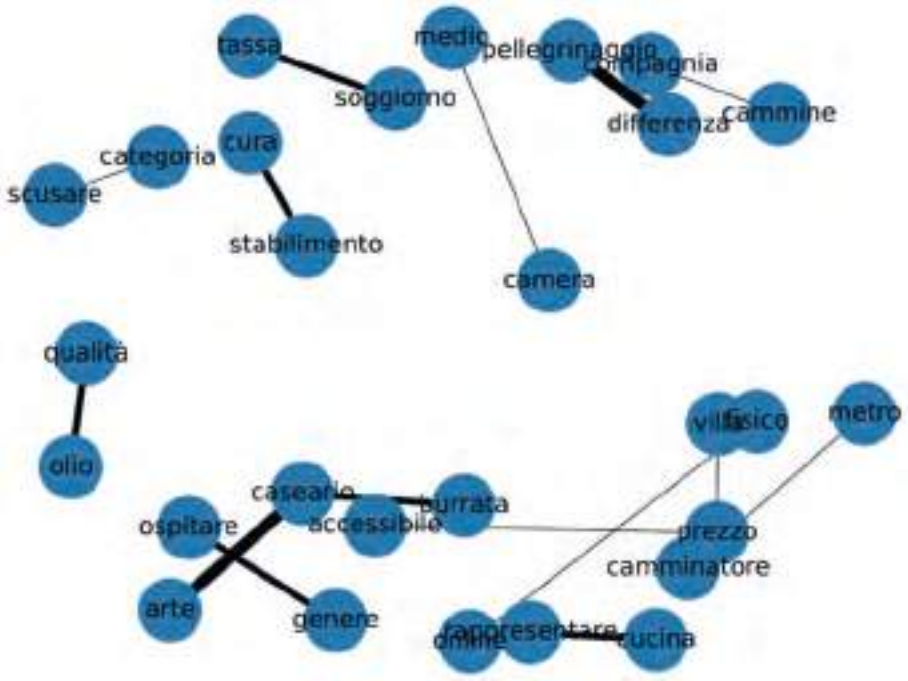

Fig. 7 - Bigram network of Differentiating Cultural Tourism

Experiential and Narrative Tourism (Fig. 8) displays two parallel hubs: experiential evaluation (*assaggiare-prodotto*, *buono*) and segmented wellbeing positioning (*benessere-destinazione*, *fascia*). Additional operational terms (*biglietto*, *mezzo*) suggest links between quality assessment, market segmentation, and access modalities, possibly reflecting analytical or evaluative discourse within the corpus.

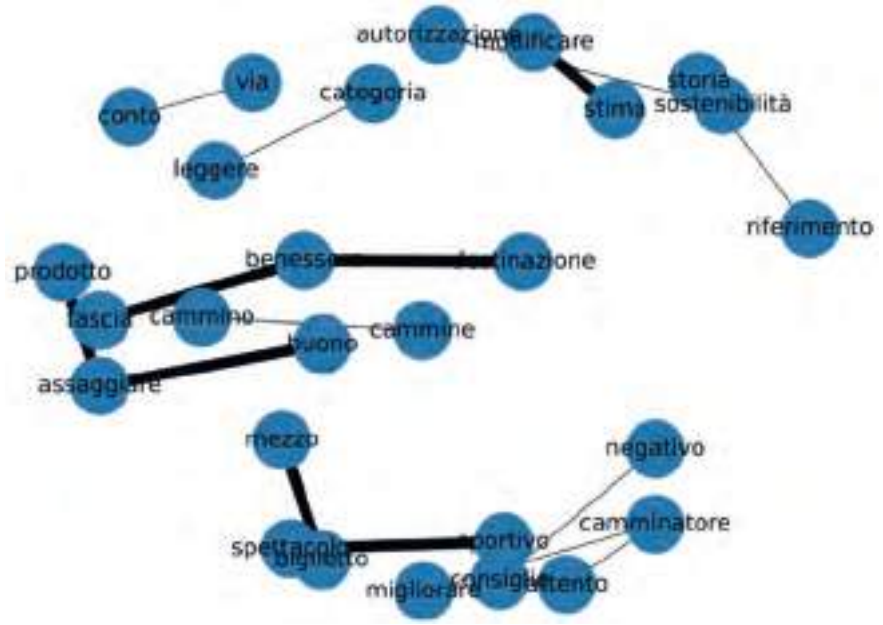

Fig. 8 - Bigram network of Experiential and Narrative Tourism

3.2. Relationships Between Scenarios: The Semantic Map of Topics

Having identified the eight discursive scenarios, the next analytical step consists in examining how these themes relate to one another. This phase reconstructs their relational structure: which scenarios are conceptually closer, which remain more autonomous, and which function as bridges between different areas of the discourse. This relational perspective makes it possible to move beyond thematic description and to highlight convergences, polarities, and potential tensions in the collective representation of tourism's future.

Fig. 9 visualizes the semantic space of the extracted topics. The map is generated through Multidimensional Scaling (MDS) (Davison & Sireci, 2000), applied to the semantic distances calculated between topics on the basis of their characteristic bigram distributions. Operationally, a dissimilarity index was computed for each pair of topics and subsequently projected from a high-dimensional space into a two-dimensional configuration that preserves, as closely as possible, their relative proximities and distances. Spatial position does not indicate importance or priority. Rather, proximity reflects semantic affinity: topics located near each other share lexical patterns and interpretive frames, whereas distant topics correspond to more differentiated or autonomous visions of tourism's future.

The resulting configuration reveals three main semantic groups.

A first area, positioned on the left side of the map, groups together topics that conceptualize tourism as a relational and narrative ecosystem. In this cluster, tourism as a territorial ecosystem and experiential and narrative tourism appear closely aligned, signalling strong lexical and conceptual overlap. Within this perspective, tourism is framed as a networked system connecting institutions, local communities, productive chains, and territorial storytelling, where visitor experience is embedded in broader social and cultural dynamics. Slightly adjacent, differentiating cultural tourism shares the emphasis on identity and culture, while displaying a more explicit orientation toward competitive positioning and offer differentiation.

A second group emerges in the central area of the map, where regulated and infrastructural tourism is located in proximity to care and regenerative tourism. Their closeness suggests a shared understanding of tourism as an organized system that requires rules, infrastructure, services, and professional competencies. In this configuration, tourism is associated with order, quality control, and the capacity to respond to complex needs – whether related to mobility management, flow regulation, or health and wellbeing provision.

A third, more detached area includes integrated wellbeing tourism and ritual and experiential tourism. The former occupies an upper position, reflecting a distinct semantic profile centered on the integration of physical wellbeing, service organization, and structured experiences. Although it intersects with regenerative tourism, it maintains a specific vocabulary emphasizing coordinated hospitality and experiential quality. By contrast, ritual and experiential tourism appears clearly separated on the right side of the map, signalling a strongly symbolic and identity-oriented trajectory grounded in collective rituals and shared events, which distinguishes it from more systemic or managerial visions.

Finally, identity-based and proximity tourism occupies an intermediate yet slightly offset

position. Its placement suggests a bridging function between community-oriented perspectives and more experiential narratives, without fully overlapping with either cluster.

Overall, the observed distances indicate that tourism's future is not imagined as a single linear pathway, but as a field of differentiated trajectories ranging from systemic and regulated models to ritual, narrative, and identity-driven configurations. The semantic map thus clarifies not only which scenarios emerge, but also how they are positioned in relation to one another, illuminating potential complementarities, tensions, and strategic alternatives.

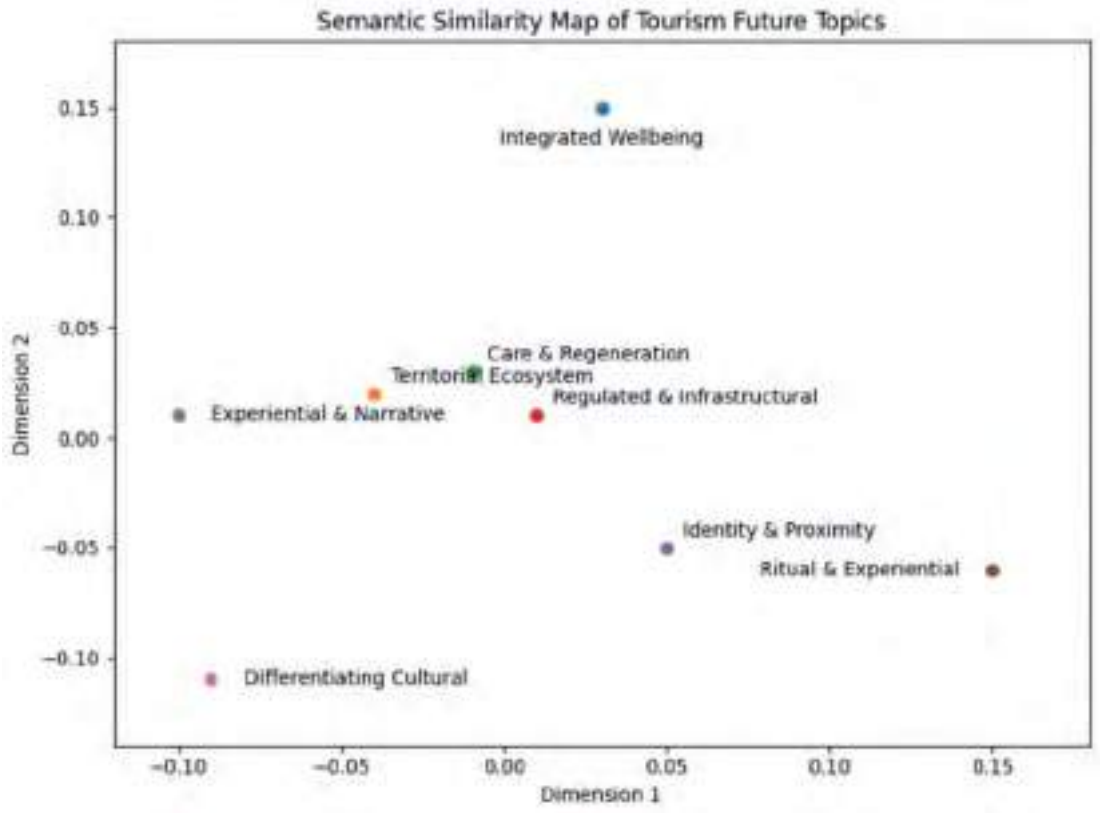

Fig. 9 - Semantic Similarity Map of the Topics on the Future of Tourism

3.3. Sectoral Affinities: Topic Distribution Across Domains

Beyond reconstructing the overall discursive structure, it is essential to examine how different visions are distributed across sectors. This step shifts the focus from a "map of themes" to a "map of positions," highlighting whether certain scenarios cut across multiple domains or whether specific sectors emphasize particular trajectories of tourism's future. From a governance perspective, this distinction is crucial: actors may share similar vocabulary regarding priorities, yet diverge in their assumptions about enabling conditions, risks, instruments, and strategic horizons.

The Sector-Topic affinity map (Fig. 10) illustrates how the various groups involved in the focus groups align, to varying degrees, with the extracted topics. Rather than assigning each

sector to a single dominant theme, the analysis considers the full probabilistic profile of topics associated with each domain. This approach provides a more nuanced and realistic interpretation of sectoral positioning, well suited to capturing hybrid and non-polarized visions.

The events sector displays strong affinities with regulated and infrastructural tourism, identity-based and proximity tourism, and care and regenerative tourism. This configuration suggests that event operators perceive tourism's future as dependent on organizational capacity, regulatory frameworks, and flow management, while also requiring territorial rootedness and attention to experiential quality. The weaker association with experiential and narrative tourism indicates that symbolic storytelling plays a less central role compared to organizational and relational dimensions.

The wellness sector presents a particularly coherent profile. Its strongest affinities lie with tourism as a territorial ecosystem and differentiating cultural tourism, followed by ritual and experiential tourism. This pattern indicates that wellness operators interpret the future not merely in terms of individual care, but as embedded within a broader territorial system where local networks, cultural identity, and environmental quality are central. The relatively weaker link to integrated wellbeing tourism suggests that wellbeing is conceived less as a narrow sectoral niche and more as a transversal systemic dimension.

The sector labelled broadly as "tourism," representing operators in general terms, occupies a relatively balanced and central position. Its strongest affinities are distributed across ritual and experiential tourism, identity-based and proximity tourism, and tourism as a territorial ecosystem. This profile reflects an integrative orientation that combines recognition of symbolic and experiential value with a systemic understanding of tourism as a territorial development tool. The comparatively lower association with regulated and infrastructural tourism indicates some distance from a purely administrative or rule-based vision of the sector's future.

The food and wine sector aligns most strongly with differentiating cultural tourism and experiential and narrative tourism, while also showing proximity to ritual and experiential tourism. This configuration underscores the role of gastronomy as a vehicle for storytelling, identity construction, and territorial distinction. Food and culinary practices emerge not as ancillary services but as strategic levers for building recognizable and competitive tourism experiences.

The nautical sector exhibits a profile heavily oriented toward regulated and infrastructural tourism and tourism as a territorial ecosystem. This pattern suggests that maritime operators view tourism's future as largely dependent on infrastructure, governance capacity, port systems, regulatory frameworks, and integration within broader territorial networks. The weaker association with narrative and experiential scenarios points to a predominantly functional and systemic perspective in which experiential value is contingent upon robust organizational conditions.

Finally, the religious sector shows strong affinities with identity-based and proximity tourism and ritual and experiential tourism, followed by regulated and infrastructural tourism. This configuration reflects a future vision deeply rooted in community practices, col-

lective rituals, and walking routes, yet accompanied by awareness of the need for organization and governance to manage concentrated and often seasonal flows. Its relative distance from more market-oriented and differentiating scenarios indicates greater emphasis on collective and community dimensions rather than competitive positioning.

Overall, the heatmap does not reveal a one-to-one correspondence between sectors and scenarios, but rather patterns of preferential combinations. General tourism operators function as integrative actors, while more specialized sectors – such as nautical, food and wine, and religious tourism – display more clearly defined trajectories. This evidence reinforces the idea that future tourism policies should be sector-sensitive, yet anchored in shared scenarios capable of serving as common platforms for coordination and development.

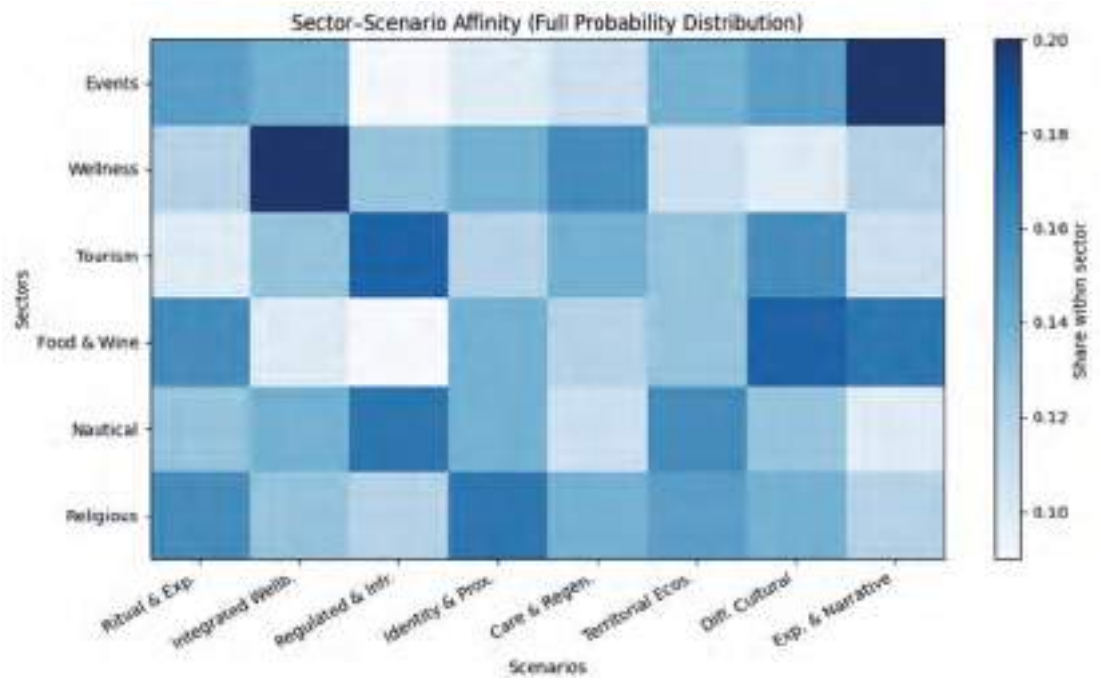

Fig. 10 - Sector–Topic Affinity Heatmap

3.4. Strategic Interpretation: A SWOT Reading of the Topics

Once the discursive scenarios have been identified, their semantic relationships mapped, and their sectoral distributions examined, a further analytical step becomes possible: translating the discursive structure into a strategic interpretative framework. This shift allows not only the identification of thematic content, but also the examination of how these themes are framed – whether as existing strengths, recurring weaknesses, emerging opportunities, or potential risks. Making this tonal dimension explicit strengthens the connection between textual analysis and policy-oriented implications.

To this end a SWOT framework (Fig. 11) is employed. It is an interpretative device capturing the dominant discursive orientation associated with each topic. Topic allocation to

the four quadrants is based on a systematic comparison between the vocabulary characterizing each topic and four distinct semantic dictionaries (Strengths, Weaknesses, Opportunities, Threats). For each scenario, the prevailing dimension was identified through lexical frequency and co-occurrence patterns, leading to its assignment to the dominant quadrant. Importantly, this classification does not imply a normative judgement on the intrinsic value of a topic, but rather reflects how it is predominantly framed within the collective discourse.

The majority of topics fall within the Strengths quadrant. This distribution suggests that a substantial portion of the debate on tourism's future is articulated in proactive and resource-oriented terms. Topics such as integrated wellbeing tourism, care and regenerative tourism, differentiating cultural tourism, tourism as a territorial ecosystem, and experiential and narrative tourism are largely associated with positive language referencing quality of experience, service organization, community engagement, cultural capital, territorial integration, and meaning-making capacity. While these scenarios do not necessarily correspond to fully implemented strategies, they function discursively as symbolic and operational assets – domains in which actors perceive credible development potential.

The Weaknesses quadrant includes a single topic: ritual and experiential tourism. This positioning does not indicate a negative evaluation of ritual practices per se, but rather reflects the way they are problematized in the discussions. The associated vocabulary highlights structural fragilities, including dependence on cyclical events, ageing participant bases, limited renewal capacity, and exposure to external shocks such as health crises. The

Fig. 11 - SWOT Analysis

topic thus captures a narrative in which symbolic and identity-based dimensions of tourism coexist with concerns about resilience and adaptive capacity.

The Opportunities quadrant is occupied by regulated and infrastructural tourism. Here, regulation, infrastructure, transport systems, professional competencies, and governance instruments are framed primarily as enabling conditions for future improvement rather than as consolidated assets. This scenario carries a forward-looking orientation: it represents the structural levers that could enhance system performance if effectively developed, coordinated, and integrated with other strategic dimensions.

Finally, the Threats quadrant includes identity-based and proximity tourism. As in the previous cases, this allocation should not be interpreted as a devaluation of territorial identity, but as an indication of the concerns expressed around it. The associated language evokes risks of local closure, saturation, dependence on fragile contexts, and vulnerability to demographic or systemic shocks. In this framing, identity becomes a potential weakness when not accompanied by openness, innovation, and broader network integration.

Overall, the SWOT reading highlights that tourism's future is discussed not only in terms of thematic trajectories, but also in terms of perceived strengths, vulnerabilities, enabling conditions, and structural risks. This interpretative layer bridges discursive analysis with strategic reflection, offering a grounded basis for governance-oriented decision-making.

4. Convergence with Delphi Scenarios: Integrated Reading and Implications

A comparative examination of the Delphi results and the topic modelling analysis applied to the focus groups reveals a substantial convergence around several key trajectories shaping tourism's future. Although grounded in distinct methodological logics – structured prospective scenario construction in the Delphi process and inductive reconstruction of stakeholder narratives through text analysis – the two approaches converge on a coherent representation of tourism as a complex, governable system deeply embedded in territorial, social, and institutional dynamics.

This convergence concerns not only substantive themes but also the way these themes are framed and problematized. The SWOT reading developed in this chapter captures the dominant discursive orientation associated with each topic – whether articulated as a strength, opportunity, weakness, or threat – while the semantic similarity map and the Sector-Topic heatmap reveal how these visions cluster and distribute across actor domains. The combined use of these analytical tools enables a structured comparison with the Delphi scenarios and reinforces the interpretative robustness of the findings.

A first and central point of alignment concerns the rejection of tourism as a self-contained industry. In the most desirable Delphi scenarios, tourism is conceptualized as an integral component of a broader territorial ecosystem in which infrastructure, public policies, private actors, local communities, and human capital interact in coordinated ways. This systemic vision corresponds directly to the topic tourism as a territorial ecosystem, which emerged in the focus groups as one of the most positively framed dimensions.

The semantic map further strengthens this interpretation: the ecosystem topic is positioned close to narrative and experiential trajectories, suggesting that territorial integration is not merely administrative coordination but also a precondition for meaningful and context-rooted visitor experiences. In both analytical frameworks, tourism functions as a coordinating platform connecting economic development, innovation, environmental sustainability, and social cohesion.

A second axis of convergence relates to regulation, infrastructure, and governance capacity. In the Delphi analysis, these elements represent a critical threshold: in positive scenarios they enable qualitative growth, whereas in negative scenarios their absence leads to conflict, degradation, and declining attractiveness.

In the focus-group analysis, this awareness is in the topic regulated and infrastructural tourism, positioned within the Opportunities quadrant of the SWOT framework. Regulation, transport systems, professional competencies, and governance tools are framed not as consolidated achievements but as future levers capable of improving efficiency, sustainability, and service quality. Its semantic proximity to care and regenerative tourism suggests that organizational capacity is not only a matter of flow control, but also of supporting service-oriented and wellbeing-driven tourism models.

Another area of convergence concerns tourism flow management and the risks associated with overtourism. The Delphi's dystopian scenario links uncontrolled growth to social tension, loss of authenticity, and reputational decline. Within the focus groups, similar concerns appear indirectly through the positioning of identity-based and proximity tourism within the Threats quadrant.

In both cases, territorial identity is not questioned as a value in itself; rather, it becomes vulnerable when disconnected from openness, innovation, and effective governance. The Sector-Topic heatmap reinforces this reading by showing that actors do not align monolithically with a single scenario but combine multiple orientations. This suggests that risk management requires differentiated sectoral policies grounded in shared frameworks of coordination and regulation.

Convergence is particularly evident in relation to experiential quality and differentiation strategies. In the development-oriented Delphi scenarios, experiential, cultural, and gastronomic tourism emerge as central levers of competitive positioning. This trajectory finds a clear correspondence in the topics differentiating cultural tourism and experiential and narrative tourism, both situated among the Strengths in the SWOT reading.

Across both approaches, culture and gastronomy are framed as strategic assets rather than peripheral attractions. Tourism experience is understood not as generic entertainment but as meaning-making grounded in authenticity and recognizability. The sectoral analysis further confirms that food and wine operators align strongly with these trajectories, reinforcing a coherent positioning strategy based on identity and quality.

A further point of alignment concerns wellbeing, care, and regenerative tourism. In the Delphi scenarios, these dimensions are embedded within sustainability-oriented and inclusive development pathways. Similarly, the focus-group analysis identifies integrated wellbeing tourism and care and regenerative tourism as discursively framed strengths.

This convergence suggests that such trajectories are perceived as structural responses to demographic change and to increasing demand for slower, safer, and more meaningful travel experiences. Their semantic proximity to governance and infrastructure themes reinforces the idea that wellbeing-based tourism requires organized systems, quality standards, and accessible services.

Finally, the placement of ritual and experiential tourism within the Weaknesses quadrant offers a nuanced dialogue with the Delphi framework. Rituality is not devalued; rather, it is associated with structural vulnerabilities – cyclicality, dependence on specific events, ageing participants, and exposure to external shocks.

Globally, the comparative evidence indicates that both the Delphi process and the discursive analysis converge on a shared vision of tourism's future grounded in territorial integration, experiential quality, effective flow governance, sustainability, and inclusion. The alignment between prospective scenario building and inductive discourse analysis enhances the robustness of the findings and provides a solid foundation for designing policies that are sector-sensitive yet strategically coherent. Such policies must respond to the structural complexity of tourism systems while remaining attentive to the evolving narratives and expectations articulated by their key actors.

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