Composite Indexes for Measuring Destination Competitiveness of Italian Regions

Livia Celardo[1] | *Italian Institute of Statistics, Rome, Italy*
Matteo Mazziotta | *Italian Institute of Statistics, Rome, Italy*

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Abstract

As tourism brings about economic benefits through spending, infrastructure development and investments, destination competitiveness has raised in the last decades interest in the scientific and academic literature. Then, researchers and policymakers are becoming more and more involved in finding the drivers of this phenomenon. However, the complexity and multidimensionality of destination competitiveness make its measurement a challenging task. One of the most powerful tools for measuring multidimensional phenomena is the composite index, and in this paper, a synthetic measure based on a non-compensatory approach for calculating destination attractiveness is proposed. This index, calculated for the Italian regions, is then compared with regional tourism performances, with the aim of assessing destination competitiveness. The results highlight the strength of this approach for the construction of a composite index, and show an original application on Italian regional data.

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Composite index, destination competitiveness, multidimensional phenomena, regional data, tourism statistics	*https://doi.org/10.54694/stat.2024.64*	*C38, C43, L83, Z32*

INTRODUCTION

In the international scenario, tourism is definitely one of the most relevant economic activities, also due to the dynamism and the diversification of the sector, which drives job creation and investment for infrastructure endowment (UNWTO, 2020). Before the emergence of COVID-19, the World Tourism Organization had estimated that destinations worldwide received around 1.5 billion arrivals in 2019 (+3.8% compared to 2018), confirming the tenth consecutive year of sustained growth since 2009 (UNWTO, 2020). As the world has faced an unprecedented global health, social and economic crisis

[1] Italian Institute of Statistics (ISTAT), Via Cesare Balbo 16, 00184 Rome, Italy. E-mail: livia.celardo@istat.it. ORCID: <https://orcid.org/0000-0002-4201-4916>.

with the COVID-19 pandemic, travel and tourism industry has been among the most affected sectors (Patrizi and Celardo, 2021).

Starting from these evidences it does not surprise that scientific and academic studies on the performance of the tourism sector are constantly growing (Cracolici and Nijkamp, 2009), in particular those regarding the measurement of the competitiveness of tourist destinations (Gómez-Vega and Picazo-Tadeo, 2019). Since tourism provides direct, indirect and induced economic benefits to destinations through visitor and government spending, infrastructure development and business investments (WTTC, 2020), researchers and policy-makers are particularly interested in finding the key factors that push the competitiveness of the destinations (Hanafiah et al., 2016).

Tourist destinations are highly involved in raising their market share due to the economic and non-economic benefits of competitive advantage; in particular, Mazanec and Ring (2011) have highlighted that a more competitive destination generates higher levels of income, employment, standard of living, well-being and wealth. Despite the growing interest of academics in destination competitiveness topic and the agreement on its valuable benefits, no general consensus has been reached on how tourism competitiveness is defined or on how to measure it (Fernández et al., 2020), mainly because it depends on multiple dimensions that could influence and determine the destination's success (Croes and Kubickova, 2013).

With the aim of comparing the level of tourism competitiveness between different countries, in the year 2007, the World Economic Forum introduced a composite index, known as the Travel and Tourism Competitiveness Index (from 2021, the Travel and Tourism Development Index). The Travel and Tourism Competitiveness Index (TTCI, hereafter) is the most used index for assessing (potential) destination competitiveness, and it is currently being used to measure and compare more than 100 countries worldwide (Kunst and Ivandić, 2021). The measurement of competitiveness is crucial for destinations to advance the performance of tourism, identify direct and indirect impacts, as well as related factors that affect key drivers and policy barriers (Wu et al., 2012). The multidimensional nature of destination competitiveness (Gooroochurn and Sugiyarto, 2005) requires, in order to measure it, the observation of this phenomenon from multiple perspectives and the utilization of suitable statistical approaches that could manage the complexity.

The aim of this paper is twofold: the first objective is to propose an alternative composite index methodology for assessing the drivers of destination competitiveness (i.e., the comparative advantage), explaining the strengths of this approach. Starting from a well-known theoretical framework for the measurement of destination competitiveness, we propose an alternative methodology that, from a statistical point of view, is more robust for the measurement of complex phenomena. The second aim of this paper is to show, through an original application of this index on tourism regional data, the link between the development and the performance level of the Italian regions, to assess the destination competitiveness. To this end, we built a composite index of tourism development for the Italian Regions (hereafter, RTDI), collecting more than 50 indicators from official data sources, each of these available for all the twenty Italian regions.

The paper is structured as follows: Section 1 explains the main issues in measuring multidimensional phenomena from a statistical point of view; Section 2 shows a literature review on destination competitiveness, with a specific focus on its measurement; Section 3 focuses on the methodology used to construct the composite index on destination development; Section 4 describes the data collected and used in this study to assess destination competitiveness of the Italian regions; Section 5 shows the main results of the study and last section draws the main conclusions.

1 MEASURING MULTIDIMENSIONAL PHENOMENA

The scientific community agrees that most socio-economic phenomena are complex, and therefore their measurement and monitoring present different challenges. Complexity often goes hand in hand with

having multiple dimensions, as seen in concepts like competitiveness and infrastructure endowment. Historically, economists tended to view these topics as one-dimensional. However, in recent decades, there has been a global consensus recognizing the multidimensional nature of these phenomena, breaking away from the traditional one-dimensional perspective. The phenomenon of destination competitiveness has become a focal point, drawing attention from stakeholders interested in both theoretical definition and quantitative measurement. Consequently, it is deemed crucial to outline effective steps in handling this complexity, aiming to derive synthetic measures that facilitate the comprehension of a phenomenon that is both fascinating and notoriously elusive to capture.

Shifting from a singular to a multifaceted perspective, broadening and enhancing the analysis scope, marks a significant theoretical advancement with notable advantages for policymaking. However, despite these merits, dealing with multiple dimensions complicates the measurement and evaluation of the phenomenon. While a single indicator could assess a single dimension, a diverse set of indicators is required when dealing with multiple dimensions. This diversity introduces various theoretical and statistical challenges, particularly when attempting comparisons across different times or locations. The primary focus is on determining the most effective approach to represent intricate phenomena and multidimensional realities. Embracing multidimensionality brings several theoretical and methodological challenges absent in the traditional one-dimensional approach (De Muro et al., 2011).

To measure multidimensional phenomena, it's necessary to "combine" various dimensions, treating them as integral components of the phenomenon (Mazziotta and Pareto, 2016). Given the inherent nature of these phenomena, it involves outlining intermediate steps, each of which should be depicted and measured using individual indicators. The statistical and mathematical combination, often referred to as aggregation, of a set of individual indicators representing different dimensions of a phenomenon, can be achieved through specific statistical methodologies, known as composite indicators or composite indexes (Fusco, 2023; OECD, 2008; Saisana and Tarantola, 2002).

The construction of a composite index is a challenging target, full of choices to make and problems to solve, as the theoretical definition of the dimensions, the availability of data, the choice of individual indicators and their treatment, in order to compare (*normalization*) and aggregate them (*weighting and aggregation*). A basic concept to consider regards the relationship among the different steps for constructing composite indices: the theoretical part is not separated from the statistical-methodological one; in fact, the selection of the individual indicators is not independent from the choice of the normalization and aggregation method. The paradigm of work requires that some issues are considered, since they can influence the validity of the results obtained: time and territorial comparisons, compensation among individual indicators, system of weights (Jiménez-Fernández et al., 2022), and robustness of the methodology.

The reduction of dimensions in space is a dangerous task, requiring rules and properties that can guide the arbitrariness of the researcher's choices. Each of these choices has very specific consequences, and in the following paragraphs, they are considered for measuring the multidimensional phenomenon of destination competitiveness of the Italian regions.

2 DESTINATION COMPETITIVENESS: STATE OF THE ART

In recent literature, the investigation and the measurement of destination competitiveness have increasingly attracted interest (Cracolici and Nijkamp, 2009; Dwyer, 2022). A unique and precise explanation of destination competitiveness does not exist (Croes and Kubickova, 2013), but the most widely accepted definition within the academic community is given by Ritchie and Crouch (1993), where it is described as the capability of increasing the number of visitors, while providing a satisfactory experience for tourists, well-being for residents and preserving the natural capital of the territories. This definition has three main elements in common with others in the scientific literature on destination competitiveness

(Fernández et al., 2020). First of all, the notion of competitiveness is strictly related to the ability to increase the attractiveness of the destination and consequently, increasing the number and the expenditure of visitors (Uyar et al., 2023). The second dimension focuses on the capability of giving a satisfactory tourism experience to visitors in comparison with other destinations, while the third and last element of competitiveness refers to the concept of destination sustainability, in terms of preserving residents and natural capital from tourism impacts.

The academic community has been concerned with the implementation of theoretical models that aim to identify, explain and measure the forces that drive destination competitiveness (Novais et al., 2018). Many models have been proposed (e.g., Dwyer and Kim, 2003; Heath, 2003; Ritchie and Crouch, 2003), but the one proposed by Ritchie and Crouch (2003) has been recognized as the most exhaustive framework (Boley and Perdue, 2012). They basically proposed a theoretical model for identifying the success in terms of competitiveness of a tourist destination based on Porter's (1990) *Diamond Model* of competitive and comparative advantages. Comparative advantages in tourism destinations regard the resources/infrastructures that are available – i.e., *resource endowments*. On the other hand, competitive advantages deal with the ability of a destination to make use of the available resources, that is, *resource deployment* (Zehrer et al., 2017). According to the model proposed by Ritchie and Crouch (2003), the competitiveness of a destination is determined by four components: (1) core resources and attractors (e.g., climate, cultural sites, events), which are the primary elements of destination attractiveness for which tourists choose one destination or another (Tang and Rochananond, 1990); (2) supporting factors and resources (e.g. infrastructure, services, accessibility) that allow a destination to develop the tourism industry; (3) destination management activities, essential to improve the attractiveness of core and supporting resources; (4) qualifying and amplifying determinants (e.g., crime rates, fiscal policy), which are a group of elements that could negatively impact on competitiveness.

Destination competitiveness can be measured from a quantitative or a qualitative point of view (Fernández et al., 2020). In the first case, the level of competitiveness is determined through the statistical analysis of data from surveys or official sources, while in the other case, this attribute is inferred from interviews with tourists, agents or experts in the sector. Several empirical studies have applied the models aimed to determine the competitiveness of territories (Crouch, 2011) in order to measure the performances and evaluate the significance of factors influencing the attractiveness of destinations. Most of these studies have measured destination competitiveness from a quantitative point of view, in particular by way of composite indexes (for an extensive review, see Mendola and Volo, 2017).

At the international level, the most important example of a composite index is the Travel and Tourism Competitiveness Index, proposed by the World Economic Forum since 2007 and published in the Travel and Tourism Competitiveness Report. This index serves as a strategic benchmarking tool for policymakers, companies and complementary sectors to advance the future development of the T&T sector by providing insights into the strengths and development areas of each country to enhance the realization of sector potential and growth. As a consequence of the last global shocks (e.g., COVID-19 pandemic), from 2021, the TTCI has been renamed as the Travel and Tourism Development Index, also including a long-term inclusivity, sustainability and resilience of the T&T sector as factors that are taken into consideration for assessing the competitiveness of the destinations (WEF, 2022).

Although the TTCI has been recognized worldwide as a valuable tool for measuring and evaluating (prospective) destination competitiveness, it has also raised a lot of criticisms, especially regarding methodological issues (Croes and Kubickova, 2013; Gómez-Vega and Picazo-Tadeo, 2019; Pulido-Fernández and Rodríguez-Díaz, 2016), which mainly regard: (1) countries are equally treated, and no differences in terms of the level of development are taken into consideration; (2) both quantitative and qualitative variables are integrated into a single composite index for the calculation of the TTCI; (3) it is not clear how to determine the weights used in the aggregation process of the individual indicators

so that many researchers have tried different alternatives for weighting the TTCI data, as for example factor analysis (Mazanec and Ring, 2011).

From a statistical point of view, in addition to these criticisms, the normalization and the aggregation processes for constructing the TTCI also present some weaknesses. The normalization method adopted for the construction of the TTCI is widely used in literature because it allows comparisons over time. However, since the TTCI does not take into consideration time comparisons, it is possible to benefit by a method that eliminates more variability from the data, so that all the individual indicators have the same implicit weight. In fact, in the current version of the TTCI, from a statistical point of view each individual indicator, if it is not appropriately standardized, assumes importance in proportion to its variability. This is not advisable because if an individual indicator has high variability, it does not imply that it should be of high importance in the model. Therefore, with the current methodology, in the construction of the TTCI the individual indicator with the highest variability weighs more than the indicator with lower variability even if, from a theoretical point of view, it must not have greater importance. The range of the standardization method (from 1 to 7) seems to be very short to analyse properly the distances between countries; in fact, there are many countries with the same score, and it is not easy to understand the differences when the variability is so flattened (this, as described below, is also reflected in the aggregation phase). A relevant problem regarding the absence of a reference value is added to this. Indeed, the average of the distributions of the standardized values is not 4 (considering the 1-to-7 scale). Therefore, the values must be read exclusively as pure numbers, without a term of comparison or a benchmark: this evidence limits the analysis of the results and any political decision. The biggest criticism concerns the aggregation method because the use of the arithmetic mean is very dangerous when the components of the phenomenon are not replaceable or have different importance from the point of view of the theoretical framework. The TTCI envisages the arithmetic mean as the one and only method of synthesis at all levels of the composition process. This choice determines the perfect compensation of the elementary indicators, pillars, sub-indices and overall index.

Statistical, economic and social literature agree that the arithmetic mean cannot be used alone to measure multidimensional phenomena, especially in the case in which it is necessary to adopt a formative measurement model (Diamantopoulos et al., 2008). The case of tourism competitiveness is no exception. From this point of view, the TTCI does not take into consideration the issue of aggregation and weighting of the components that represent the complexity of the phenomenon. Trying to approach the problem from a statistical point of view, if the individual indicators have the same weight, then using a function such as the arithmetic mean is wrong because there is a compensation between dimensions of equal importance. From this evidence, it can be understood that the TTCI produces distorted results with respect to the phenomenon to be measured. For this reason, in this paper a different statistical method for the construction of the composite index is proposed.

3 METHODOLOGY AND PARADIGM OF WORK

It would be indispensable to think of a synthesis methodology in which, in the normalization phase, the implicit variability is eliminated, and then, in the aggregation phase, a non-compensatory function is used. The literature offers various aggregation methods, all with their advantages and drawbacks. As in the TTCI case, additive methods are prevalent, but they imply conditions which are often undesirable or challenging to fulfil. Indeed, a fundamental issue concerning the aggregation is the degree of compensability or substitutability of the individual indicators.

The Mazziotta-Pareto Index (MPI) is a composite index for summarizing a set of indicators that are assumed to be not fully substitutable. The MPI is designed in order to satisfy the following properties: (1) normalization of the indicators by a specific criterion that eliminates both the unit of measurement

and the "variability effect", (2) synthesis independent of an "ideal unit", since a set of "optimal values" is arbitrary, non-univocal and can vary with time, (3) simplicity of computation and (4) ease of interpretation.

Let $\mathbf{X}=\{x_{ij}\}$ be the matrix with n rows (Italian regions) and m columns (tourism indicators), and let M_{x_j} and S_{x_j} denote the mean and the standard deviation of the j-th indicator:

$$\mathrm{M}_{x_j}=\frac{\sum_{i=1}^{n} x_{ij}}{n}; \quad \mathrm{M}_{x_j}=\frac{\sum_{i=1}^{n} x_{ij}}{n}. \tag{1}$$

The standardized matrix $\mathbf{Z}=\{z_{ij}\}$ is defined as follows:

$$z_{ij}=100\pm\frac{(x_{ij}-\mathrm{M}_{x_j})}{\mathrm{S}_{x_j}}10, \tag{2}$$

where: the sign ± depends on the relation of the j-th indicators with the phenomenon to be measured (+ if the individual indicator represents a dimension considered positive, and – if it represents a dimension considered negative).

Let cv_i be the coefficient of variation for the i-th unit:

$$\mathrm{cv}_i=\frac{\mathrm{S}_{z_i}}{\mathrm{M}_{z_i}}, \tag{3}$$

where:

$$\mathrm{M}_{z_i}=\frac{\sum_{j=1}^{m} z_{ij}}{m}; \quad \mathrm{S}_{z_i}=\sqrt{\frac{\sum_{j=1}^{m}(z_{ij}-\mathrm{M}_{z_i})^2}{m}}. \tag{4}$$

Then, the generalized form[2] of MPI is given by:

$$\mathrm{MPI}_i^{+/-}=\mathrm{M}_{z_i}(1\pm\mathrm{cv}_i^{\,2})=\mathrm{M}_{z_i}\pm\mathrm{S}_{z_i}\mathrm{cv}_i, \tag{5}$$

where the sign of the penalty (the product $\mathrm{S}_{z_i}\mathrm{cv}_i$) depends on the kind of phenomenon to be measured and the direction of the individual indicators.[3]

The MPI is based on a non-linear function, which, starting from the arithmetic mean of the standardized indicators, introduces a penalty for the units with unbalanced values of the indicators. The objective is to reward the units that, mean being equal, have a greater balance among the values of the indicators (De Muro et al., 2011). Therefore, the MPI decomposes the score of each unit in two parts: mean level and penalty. In the phase of standardization, each individual indicator is transformed in a *z-score* with mean

[2] It is a generalized form since it includes "two indices in one".

[3] For a simulated example for computing the composite index (MPI), see De Muro, Mazziotta and Pareto (2011).

equal to 100 and standard error equal to 10 (*mean* = 100 and *s.e.* = 10); the standardized values will be in the range 70–130. This procedure allows to depurate the indicators both from the unit of measure and from the variability, and it does not require the definition of a target values (ideal unit) because it replaces the vector with the average of values. In this way, it is easy to identify the units with a level of the phenomenon above average (values greater than 100) and the units with a level below the average (values less than 100). In the phase of aggregation, the function adopted (arithmetic mean of standardized values) is "corrected" by a penalty coefficient that depends, for each unit, on the variability of the indicators compared to the average value (horizontal variability). This variability, measured by the coefficient of variation (*CV*), allows to penalize the score of the units that, with the same arithmetic average, have a higher imbalance between the values of the indicators. The penalty can be added or subtracted, depending on the type of the studied phenomenon: positive (e.g., development) or negative (e.g., poverty) (Mazziotta and Pareto, 2016). This method implicitly assigns to all indicators the same weight, eliminating the variability. It is applicable to any phenomenon, changing the sign of the penalty. The index can be decomposed into two parts: the average effect (*compensatory*) and the penalty effect (*imbalance*). It is possible to make only relative comparisons of the values of the units, with respect to the average, over time.

In the literature, the comparison between different composite indexes methodology in a formative approach (Diamantopoulos et al., 2008) has shown that the MPI, due to the standardization approach (*z-score*) and the aggregation function (*penalized arithmetic mean*), guarantees a high level of robustness (Mazziotta et al., 2010; Mazziotta and Pareto, 2016). On the other hand, the use of Principal Component Analysis (PCA) or other factor analysis as synthesis methods of multidimensional phenomena in a formative approach (Lafuente et al., 2022) presents many statistical and theoretical problems.

The MPI allows to overcome the problems of the TTCI methodology and guarantees, on the one hand, individual indicators purified from the implicit weight of the variability, and, on the other hand, a non-compensatory aggregation function without the defects of the geometric mean. The weighting system provides that each indicator has equal theoretical importance. As described below, in the case study, a composite index for each of the 13 pillars is calculated, then a composite index of the composites is calculated to determine the 4 sub-indexes and again a composite index of the composites for the final index. In all steps of this process, MPI is used (when the composite index is calculated starting from other composite indices, then only the aggregation phase is applied, i.e. a new standardization is not calculated as all the values are already expressed in the same unit of measurement).

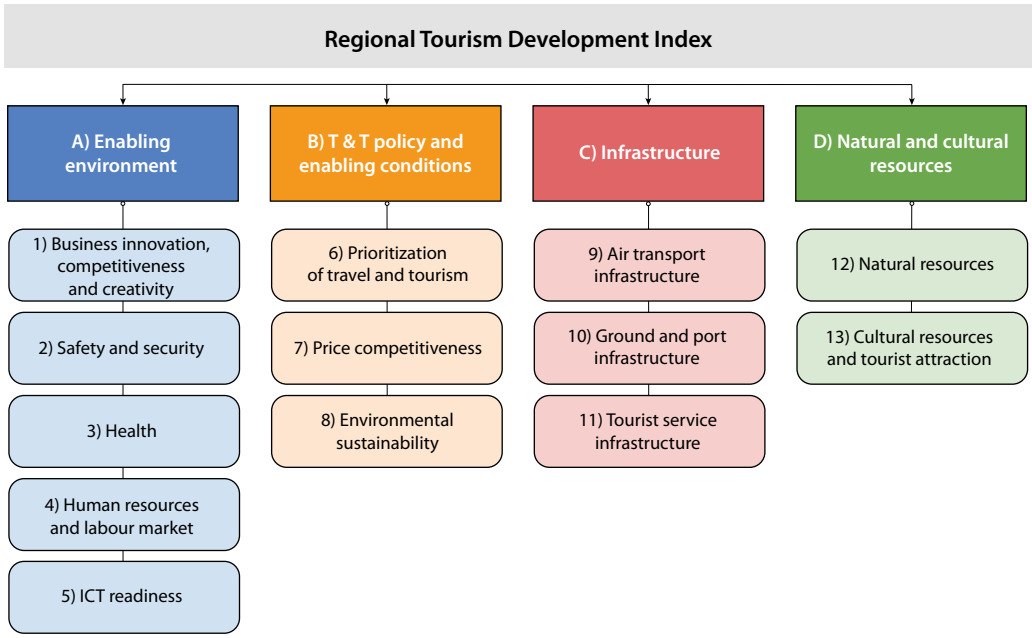
After the calculation of the composite indexes, we implemented an influence analysis in order to identify the sub-indexes that mostly determine the differences among regions. Influence analysis quantifies the weight of each sub-indexes in the calculation of the composite (Mazziotta et al., 2010). Given K indexes, K replications are performed, excluding each time a different sub-index and calculating the values of the composite indicator based on the remaining K-1 indexes. For each replication, the rankings of the regions are obtained, and for each one, the absolute differences of rank between the position in the original rank and the position in the ranking for the K-1 indicators are calculated. Finally, the arithmetic mean of absolute rank differences is calculated: the sub-index with the lowest mean value represents the dimension that influences less the composite, and then the phenomenon that less determines differences among regions.

In order to measure the destination development of Italian regions through the RTDI, we used the theoretical framework developed by the World Economic Forum for the construction of the Travel and Tourism Competitiveness Index.

However, since the measurement is focused on regions and not on countries in this study, and considering the specificities of Italy, we have adapted the framework of the index as shown in Figure 1. Comparing the proposed index to the original framework, the main changes implemented in the structure of the index are:

1. Concerning the first pillar of the first sub-index (A.1), instead of measuring the business environment just in terms of capacity development of a policy environment conducive for companies to do business, we included in this pillar also measures related to the capacity of enterprises to be innovative and creative;
2. Concerning the third pillar of the first sub-index (A.3), since the Italian regions show no differences in terms of hygiene regulations and practices, in this pillar we take into account only indicators related to health;
3. Concerning the second sub-index (B), we excluded the pillar *International Openness* related to openness and travel facilitation since, in this study, we compare regions of the same country where there are no restrictions in terms of mobility across areas;
4. Concerning the last pillar of the fourth sub-index (D.2), we modified the domains excluding business travel indicators, and including measures related to tourist attractions. The rationale behind the choice of excluding business travel domain lies in the fact that at the regional level, in the Italian context, there are no available measures related to the number of association meetings taking place, and there are neither available other measures related to associations meetings facilitations or premises. However, we included in this pillar also measures related to tourist attractions since they could represent a region catalyst for tourist arrivals, as it is for a museum or a monument.

Figure 1 Theoretical framework of the regional tourism development index (RTDI)



Source: Own elaboration

4 DATA AND RESULTS

In previous paragraph, we proposed an alternative approach for the calculation of a composite index on destination development in comparison to the TTCI methodology. As previously reported, the TTCI has been the target of significant criticism from a methodological point of view (Rodríguez-Díaz and Pulido-Fernández, 2021), while the theoretical framework is widely supported by the scientific community.

In this section, we show the application of MPI methodology to regional tourism data to assess the Italian destinations attractiveness. Other studies have investigated destination competitiveness of Italy, in relation to municipalities (Grassini et al., 2023), small versus medium destinations (Goffi and Cucculelli, 2019) or Southern destinations (Cracolici and Nijkamp, 2009), among others. In this case study, we assess the endowments of all the Italian regions, adapting the theoretical framework of the TTCI.

In order to measure the destination development of the Italian regions, we collected 54 individual indicators (Appendix – Table A1). Data refer to the latest available year in the time series for each indicator,[4] where all the indicators have been updated in October 2023. All the indicators selected for the analysis have been updated, referring to the latest available year in the time series at the time of the study. Some of the indicators used for the index calculation are updated annually, while others are updated every two, three, or five years.[5] The intermittent updating of these indicators is due to the fact that they refer to phenomena that change not significantly over time, so an annual update of this data is not considered worthwhile. The majority of the indicators have as the reference year 2021 or 2022 (these are the indicators with an annual update), while only for data that do not present an annual update, we took a previous year (Appendix – Table A1). Considering that, we assume the reference year of the composite index is 2022.

The selection of the indicators was made taking into consideration i) the theoretical framework of the composite index, ii) the data already used by the WEF for the construction of the TTCI, and iii) the data availability in Italy at the regional level.[6]

After a preliminary descriptive analysis of the individual indicators, we constructed the composite index on the regional touristic development of the Italian regions. Figure 2 shows the map of Italy, where regions are filled with colour based on the composite index values (Appendix – Table A2); as shown in the legend, the darker green areas (Lombardy, Tuscany and Veneto) are those regions showing the highest values of the composite index and, therefore, present advantages in terms of travel and tourism industry. On the other hand, the darker orange areas (Calabria, Molise and Campania) are the regions with the lowest level of endowments.

Overall, it can be observed that there is not a lot of variability among regions since between the worst performers (Calabria) and the best performer (Veneto), the difference in terms of the value of the composite index is less than 10 (93.98 and 102.82, respectively).[7] Another interesting aspect of the map is the value of the composite index, which strictly reflects the classical geographical categorization

[4] The cross-section nature of this study does not allow direct temporal comparisons, since it was agreed to not work with time series, due to the static nature of the measured dimensions. In fact, on the indicators collected for the construction of the composite, we observed very little changes over time, so we decided to work with the latest year available for each indicator. However, as future improvements of this study, the analysis could be re-implemented after a period of time (5 years, for instance), to assess if variations in ranks occur.

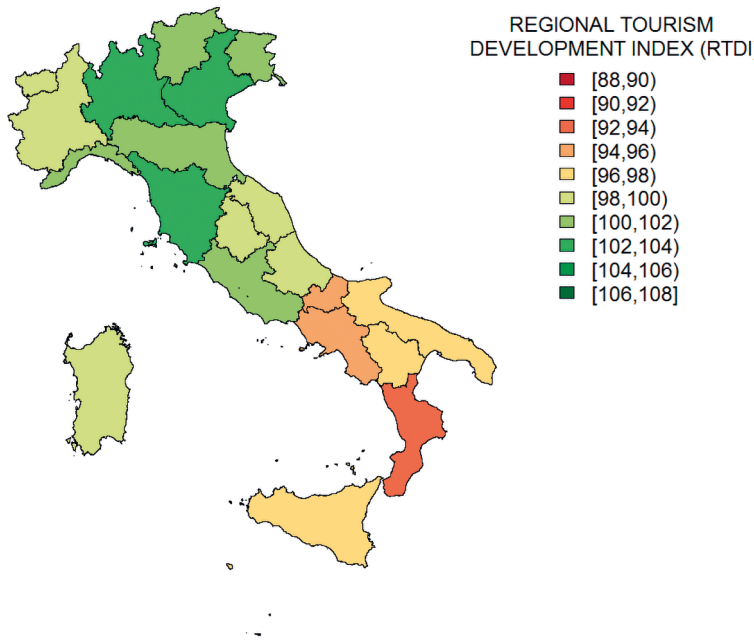
[5] For instance, the forest area index (FAO) is updated every 5 years, so at the time of this study the latest data available referred to 2020.

[6] The availability of regional data could represent a limitation for the analysis, since many indicators are only produced at national level. On one side, calculating a regional index allows a better understanding of the internal differences in a Country; on the other side, the selection of the indicators is limited to those that are disaggregated by region, reducing the set of information available for the analysis.

[7] In terms of variability of the composite, the coefficient of variation calculated on the regional distribution of the RTDI is equal to 2.5%. This measure of variability was also calculated on the 13 pillars and on the four sub-indexes, to assess which domains present the highest level of heterogeneity at territorial level. Considering the 13 pillars, the domains that show significant disparities at regional level are pillar A4 (*Human resources and labour market*), pillar A5 (*ICT readiness*), pillar A6 (*Prioritization of Travel and Tourism*) and pillar C9 (*Air Transport Infrastructure*), having a coefficient of variation of around 8%. Considering the four sub-indexes, the dimension presenting the highest variability at territorial level is the one that captures the general conditions necessary for operating in a region (*Enabling environment*), having a coefficient of variation equal to 5.4%, while for the dimension D (*Natural and Cultural Resources*) the regional variability is the lowest ($CV = 2.4\%$).

of the Italian regions. In fact, all the regions coloured orange are in the south of Italy, while all the regions with a higher score on the composite index are in the middle and in the north of Italy. This evidence strictly reflects an existing gap between the macro areas of Italy, both from economic and social points of view. The results of this analysis confirm that also in terms of tourism attractiveness there is a clear gap between these areas, which cannot be solely explained by the higher or lower presence of some touristic endowments in a specific area. For example, the southern regions have many artistic and natural resources. Considering the UNESCO heritage (unique, not shared), Sicily is the region with the highest number (7), along with Tuscany; Campania has 5, more than Lombardy (4). This evidence might suggest that it is not only the "natural" endowment of a territory that makes the difference in terms of attractiveness (museums, archaeological finds, landscapes, etc.) but also the services and infrastructures offered to tourists.

Figure 2 Regional Tourism Development Index (RTDI)



Source: Own elaboration

Going into detail, there are many different factors that could explain the gaps among the different Italian regions. A way to better understand the drivers of the inequalities is to look at the different characteristics of these areas within the four sub-indexes composing the final composite index (Figure 3).

Figure 3 shows the map of Italy where the regions are coloured considering the characteristics of the four sub-dimensions of destination development. Concerning dimensions A and C (*Enabling environment* and *Infrastructure*), it is possible to observe the presence of more variability among Italian regions[8] since the distances between the worst and the best performers in these two dimensions are much higher than the ranges observed in the composite indexes calculated for dimensions B and D (*T&T policy and enabling conditions* and *Natural and cultural resources*).

[8] See the Appendix.

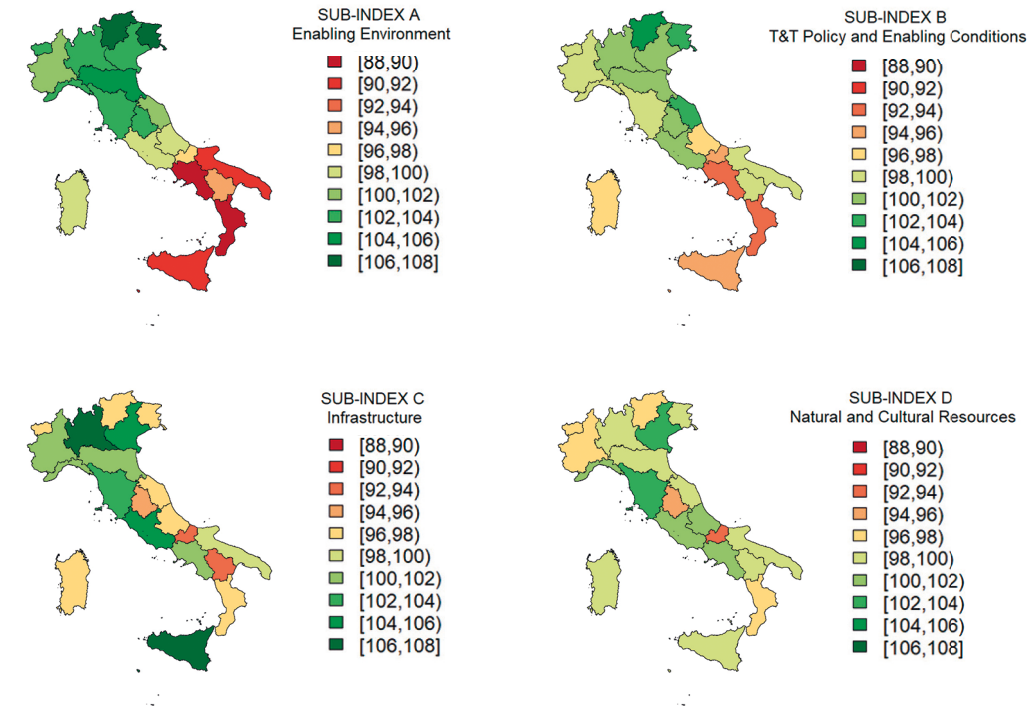
Concerning dimension A – *Enabling environment* – the map shows, again, a strong disparity between the North and the South in terms of endowments. The composite index shows that the Campania and Calabria regions are the least endowed, while Trentino-South Tyrol and Friuli-Venezia Giulia regions are the most ones in this area.

Concerning the second dimension – *T&T policy and enabling conditions* – the map shows a lower level of variability among regions in comparison to the previous sub-index. In fact, the composite index for the sub-index B ranges between 93 and 105. Again, there is a polarization of the scores of the composite index reflecting the disparities among the South and the North. In fact, the most endowed region (Trentino-South Tyrol region) is located in the northern area, while the least are almost all located in the South. As previously mentioned, Trentino-South Tyrol is, also in the case of *T&T policy and enabling conditions* dimensions, the region that scores highest, followed by Friuli-Venezia Giulia and Marche. On the other hand, the least developed are, as it was for the sub-index A, Calabria and Campania, followed by Sicily and Molise.

Moving to the third sub-index, *Infrastructure*, the figure shows a complete change in the regions' ranking compared to the previous sub-indexes. In fact, most endowed regions are located in both the North and the South, but the same occurs with least endowed regions. The regions showing the highest scores for this dimension are Sicily and Lombardy, followed by the Lazio and Veneto regions. Looking at the worst performers, the regions that score lowest are Molise and Basilicata, followed by the Umbria region.

The fourth sub-index (*Natural and Cultural Resources*) calculated for the Italian regions shows a lower variability among territories – in comparison with the previous sub-index, since the composite index ranges from 93 to 104. The least endowed region is Molise, while the most endowed are Tuscany and Veneto.

Figure 3 Sub-indexes of regional touristic development



Source: Own elaboration

In terms of association between the RTDI and the four sub-indexes, while a high correlation occurs between RTDI and sub-index A (*Enabling environment*) and sub-index B (*T&T policy and enabling conditions*), we observed a weaker correlation between the RTDI and the sub-index C (*Infrastructure*) and sub-index D (*Natural and cultural resources*). These results show that, while for general conditions necessary for operating and policies or strategic aspects that impact the T&T industry, the relationship with the total potential attractiveness is linear (highest the level of these services/conditions, higher the level of the total potential attractiveness of the region), in terms of infrastructure and/or natural/cultural resources, this link is not symmetric, meaning that those regions performing better on this two dimension, are not automatically those with the highest scores in terms of total potential attractiveness.

We then replicated the calculation of the RTDI using the original TTCI index methodology (normalization and aggregation) in order to compare the results, observe and rank the regions for both the indexes and see if and how the new methodology affects the ranking obtained. The correlation between the two indexes is very high (*Pearson correlation coefficient* = 0.99), consisting of few differences in terms of shifts in rankings. In particular, the bottom parts of the two rankings are equivalent, while the shifts observed are exclusively in the top positions of the rankings. Differently from the RTDI calculated with the new methodology, the other index shows in the second position the Lombardy region (third position for the RTDI), while the third best performer is the Trentino-Alto Adige region (seventh position for the RTDI). Even if there are no significant changes from one ranking to another, there are two important factors that make the RTDI easier to interpret. The first point regards the range of the index: the RTDI has a range of almost 9 points, while the other index has a range of 1.3, which does not allow us to clearly observe the distances between regions. The second issue regards the "reference" score. The MPI methodology is based on a range of 70–130, where 100 represents the average value, so then it is possible to compare each score of the index to see if that region is above or below the average. The TCCI methodology does not allow for this type of assessment, so by looking at the ranking, it is only possible to identify the best and the worst performers.

After the calculation of the RTDI, we implemented an influence analysis in order to identify the sub-indexes that mostly determined the differences among regions. Then, we calculated the arithmetic mean of absolute rank differences: the sub-index with the lowest mean value represents the dimension that less influences the composite, and then that less determines differences among regions.

The influence analysis revealed that, overall, the first dimension – *Enabling environment* – mostly contributed to regional differences in tourism development, determining an average shift in the ranking of 2.1 (Table 1). On the other hand, *Natural and cultural resources* dimension (sub-index D) has no substantial impact on regional disparities since the average shift in ranking is equal to 1.5, indicating that this dimension has less influence on the composite index.

Table 1 Results of the influence analysis

Sub-index	Influence (average shift in the ranking)
A – *Enabling environment*	2.1
B – *T&T policy and enabling conditions*	1.6
C – *Infrastructure*	1.9
D – *Natural and cultural resources*	1.5

Source: Own elaboration

In the last step of this analysis, we related the composite index to some outcome indicators in order to identify the regions associated with the highest performances in tourism. There are several studies that correlate the development of the destination touristic industry with outcome indicators – such as for example, tourist satisfaction, competitiveness, tourist arrivals, and economic indicators from

the Tourism Satellite Account (Hanafiah and Zulkifly, 2019). In particular, in this analysis, we compared the RTDI with four performance indicators: accommodation and food service sector value added, tourist arrivals, overnight stays in tourist accommodations and tourism expenditure. The objective is to understand, in the case of Italy, if a higher development of the destination is connected to a stronger effective capacity to attract tourists and generate additional value.

Due to the high correlation between the four performance indicators,[9] we implemented a Principal Component Analysis, keeping the first component as a synthesis of the four original dimensions.[10] We regarded the first component as a proxy of the destination competitiveness and we analysed the correlation between this component and the Regional Tourism Development Index, in order to assess for the 20 Italian regions the correspondence between their potential attractiveness and their results in the touristic sector.

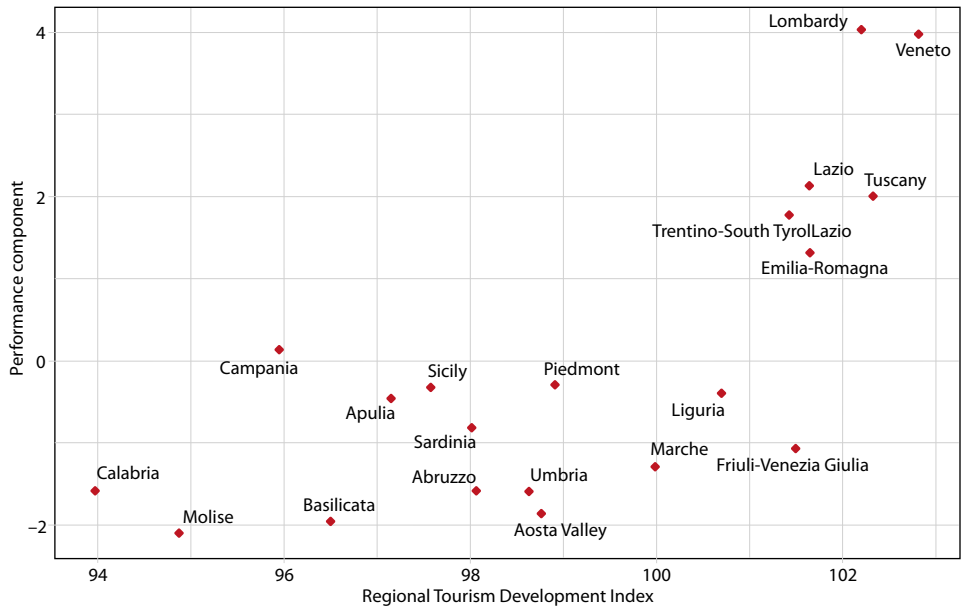
The results are shown in the scatterplot (Figure 4). The scatterplot displays the link between the first component of the PCA and the RTDI. As clearly visible in the graph, between these two dimensions, there is a high positive correlation (*Pearson correlation coefficient* = 0.73), meaning that those destinations that are more advanced and developed in terms of infrastructures, business environment and natural/cultural resources, are also (on average) more likely to attract tourists, and then more competitive. It is important to note from the scatterplot that there are also Italian regions for which this relationship is not fully assumed. For instance, looking at Friuli-Venezia Giulia, we notice that even if the value of the composite index is relatively high, the value of the performance component is not as high as expected. A similar trend is observed for other destinations, such as Marche and Liguria. Therefore, these destinations show a failure in their resource deployment because the market performance is not fully achieved. This result draws attention to the fact that it is not sufficient for destinations to have a comparative advantage: in fact, territories have to put in place policies and specific interventions in order to concretely attract tourists. The potential of these regions, in terms of their capacity to attract tourists, is definitely very high, and should be better exploited through targeted interventions and systematic public policies. The opposite situation is observed for the Campania region. In this case, even if the score for the RTDI is low, showing difficulty for the region to have a comparative advantage in terms of resources available, the market performance is relatively high. This example brings to the attention that even if the availability of resources is a driver of competitiveness, there are some cases in which other unobserved factors play a crucial role.

A more in-depth analysis allows us to better understand the relationship between the destinations' market performances and the four sub-components of the composite index. In fact, as the performance component and the RTDI are significantly correlated, the third sub-dimension of the index – *Infrastructure* – is also highly correlated with the performance measure (*Pearson correlation coefficient* = 0.78). For the other three sub-dimensions, the positive association between input and outcome is much less strong. In fact, the second and the fourth sub-dimensions – *T&T Policy and Enabling Conditions* and *Natural and Cultural Resources* – show a moderate correlation (*Pearson correlation coefficient* = 0.43 and 0.53, respectively), while the first sub-dimension – *Enabling Environment* – is not significantly associated with the performance synthetic factor (*Pearson correlation coefficient* = 0.29). From these results, we deduce that, in the Italian context, the availability of high-quality physical infrastructure and tourism services is the main driver of destination competitiveness, followed by the natural and cultural resources – i.e., *reasons to travel*. Except for Trentino-South Tyrol, where high market performances are associated with a relatively low infrastructure development, none of the destinations showing a competitive advantage in terms of performance has, at the same time, a low score for this sub-index.

[9] Pearson correlation coefficients range between 0.79 (added value and overnight stays indicators) and 0.98 (arrivals and overnight stays indicators).

[10] The variance explained by the first factor of the Principal Component Analysis is equal to 90.9%.

Figure 4 Scatterplot of the RTDI and the performance component



Source: Own elaboration

CONCLUSIONS

Italy, people of poets, artists, heroes, saints, thinkers, scientists, navigators and transmigrators. Certainly, each of Italy's epochs left a tangible mark from an artistic (and not only) point of view.

In some periods, Italy has been one of the greatest centres of political, cultural and civil development. It is not by chance that Italy is one of the most visited countries in the world. It follows that Italy must also consider tourism as a fundamental engine of its economy. Italy is also well-known for having strong internal variability from an economic and social point of view. These conspicuous differences, rooted in the country's history, have attracted the attention of social, economic and political scientists (e.g. Banfield, 1958; Putnam et al., 1993; Solivetti, 2020). Italy is said to be the country of municipalities: many, small and dissimilar. In a nutshell, the North is more developed than the South: could internal differences also be visible in the tourism sector? Our research questions are focused, on the one hand, on interpreting these internal differences through the analysis of tourism attractiveness and, on the other, on finding a synthetic measure for quantifying it from a statistical point of view.

We adopted the theoretical framework of the TTCI, because we considered it appropriate for the case of the Italian regions. The MPI has been calculated because it provides greater guarantees from a mathematical point of view. The new composite index, the Regional Tourism Development Index (RTDI), provides interesting results on the Italian regions, and it can be used as an analysis tool to understand the territorial features and plan intervention policies.

The territorial differences along the "boot" are those of Italy's historical problems: it is said that Italy is a country with two speeds. Certainly, those who live in the North have better resources than those who live in the South, from many points of view. Tourism is not an exception. The tourist competitiveness of a region does not depend only on the artistic or natural beauties it possesses; some tourist sites in the South have equal or greater value than some in the North. So why does the RTDI show Italy split in two?

The analyses presented in the paper show that regional tourism development depends on the territorial context, that is, the social and economic development capacity of an area. The territorial context depends on the infrastructural endowment, citizens' education, services offered, crime rate, civic sense, social capital, politics, local administration and much more. To this end, the TTCI and the proposed composite index are measures of determinants – meaning, potential conditions of competitiveness of territory – and not performance-based indicators. Four performance indicators have been compared to the RTDI in order to assess if a higher level of potential touristic attractiveness of a region is linked to higher tourism competitiveness. The results showed that, on average, this association is confirmed since the correlation between the RTDI and tourism performance is close. However, as we showed in the previous paragraph, there are some specific cases where a high level of potential attractiveness is associated with bad performances in terms of capacity to attract tourists (see, for example, Marche, Liguria and Friuli-Venezia Giulia regions). These results clear the way to a further discussion on how to improve the destinations' competitiveness.

The results of the RTDI, from this point of view, are very clear: the most beautiful tourist sites in the world, if not included within an adequate territorial context, could be unable to attract tourists. It could be called the "hidden city paradox". Suppose that an ancient city is brought to light again after thousands of years, and this discovery is such an extraordinary event that it attracts interest from all over the world. However, if this wonderful city is not reachable by any means of transport, if the place is not equipped with adequate accommodation facilities, if safety and public order are not respected, and if the local government does not understand the importance of this discovery, then digging the city up would not generate significant advantages as to tourism.

The RTDI seems to well represent tourism potential attractiveness by showing the strengths and weaknesses of the regions. There are regions that are not competitive – e.g., Basilicata, Calabria, Molise – because they do not have an offer comparable with other areas of the country from an artistic point of view. Nevertheless, Campania too shows a low level of development, but it is attractive for tourists since the score of the performance component is relatively high. Lazio, Tuscany and Veneto have a high level of competitiveness because the cities of Rome, Florence and Venice guarantee high performances. Lombardy is the engine of Italy, as Milan is the Country's business capital, and some of Lombardy's provincial capitals are among the most developed areas in Europe from many points of view. Friuli-Venezia-Giulia, Liguria and Marche have a good level of touristic development, but they need to further exploit marketing tools in order to better propose their wonders. Trentino-South Tyrol, over the years, has assumed the role of the world capital of the mountains, thanks to the extraordinary Dolomites inserted in a territorial context of absolute efficiency. Abruzzo, Piedmont, Apulia, Sardinia and Aosta Valley have some excellent endowments, but their level of total potential attractiveness is lower than the national average: the composite indices of the sub-dimensions suggest that these regions need large investments to develop the different components of the territorial context.

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References

BANFIELD, E. C. (1958). *The Moral Basis of a Backward Society*. The Free Press: Glencoe Ill.

BOLEY, B. B., PERDUE, R. R. (2012). Destination management, competitiveness, and quality-of-life: A review of literature and research agenda. In: UYSAL, M., PERDUE, R. R., SIRGY, M. J. (eds.) *Handbook of tourism and quality-of-life research*, Dordrecht: Springer, pp. 515–528.

CRACOLICI, M. F., NIJKAMP, P. (2009). The attractiveness and competitiveness of tourist destinations: a study of Southern Italian regions [online]. *Tourism managem*ent, 30(3): 336–344. <https://doi.org/10.1016/j.tourman.2008.07.006>.
CROES, R., KUBICKOVA, M. (2013). From potential to ability to compete: Towards a performance-based tourism competitiveness index [online]. *Journal of Destination Marketing & Management*, 2(3): 146–154. <https://doi.org/10.1016/j.jdmm.2013.07.002>.
CROUCH, G. I. (2011). Destination competitiveness: An analysis of determinant attributes [online]. *Journal of travel research*, 50(1): 27–45. <https://doi.org/10.1177/0047287510362776>.
DE MURO, P., MAZZIOTTA, M., PARETO, A. (2011). Composite Indices of Development and Poverty: an Application to MDGs. *Social Indicators Research*, 104: 1–18.
DIAMANTOPOULOS, A., RIEFLER, P., ROTH, K. P. (2008). Advancing formative measurement models [online]. *Journal of Business Research*, 61: 1203–1218. <https://doi.org/10.1016/j.jbusres. 2008.01.009>.
DWYER, L., KIM, C. (2003). Destination competitiveness: Determinants and indicators [online]. *Current Issues in Tourism*, 6(5): 369–414. <https://doi.org/10.1080/13683500308667962>.
DWYER, L. (2022). Destination competitiveness and resident well-being [online]. *Tourism Management Perspectives*, 43: 100996. <https://doi.org/10.1016/j.tmp.2022.100996>.
FERNÁNDEZ, J. A. S., AZEVEDO, P. S., MARTÍN, J. M. M., MARTÍN, J. A. R. (2020). Determinants of tourism destination competitiveness in the countries most visited by international tourists: Proposal of a synthetic index [online]. *Tourism Management Perspectives*, 33: 100582. <https://doi.org/10.1016/j.tmp.2019.100582>.
FUSCO, E. (2023). Potential improvements approach in composite indicators construction: the Multi-directional Benefit of the Doubt model [online]. *Socio-Economic Planning Sciences*, 85: 101447. <https://doi.org/10.1016/j.seps.2022.101447>.
GOFFI, G., CUCCULELLI, M. (2019). Explaining tourism competitiveness in small and medium destinations: the Italian case [online]. *Current Issues in Tourism*, 22(17): 2109–2139. <https://doi.org/10.1080/13683500.2017.1421620>.
GÓMEZ-VEGA, M., PICAZO-TADEO, A. J. (2019). Ranking world tourist destinations with a composite indicator of competitiveness: To weigh or not to weigh? [online]. *Tourism Management*, 72: 281–291. <https://doi.org/10.1016/j.tourman.2018.11.006>.
GOOROOCHURN, N., SUGIYARTO, G. (2005). Competitiveness indicators in the travel and tourism industry [online]. *Tourism Economics*, 11(1): 25–43. <https://doi.org/10.5367/0000000053297130Z>.
GRASSINI, L., MAGRINI, A., CONTI, E. (2023). Formative-reflective scheme for the assessment of tourism destination competitiveness: an analysis of Italian municipalities. *Quality & Quantity*, 57(4): 3523–3548.
HANAFIAH, M. H., HEMDI, M. A., AHMAD, I. (2016). Tourism destination competitiveness: Towards a performance-based approach [online]. *Tourism Economics*, 22(3): 629–636. <https://doi.org/10.5367/te.2014.0446>.
HANAFIAH, M. H., ZULKIFLY, M. I. (2019). Tourism destination competitiveness and tourism performance: A secondary data approach. *Competitiveness Review: an International Business Journal*, 29(5): 592–621.
HEATH, E. (2003). Towards a model to enhance destination competitiveness: a southern African perspective. *Journal of Hospitality & Tourism Research*, 10(2): 124–141.
JIMÉNEZ-FERNÁNDEZ, E., SÁNCHEZ, A., ORTEGA-PÉREZ, M. (2022). Dealing with weighting scheme in composite indicators: an unsupervised distance-machine learning proposal for quantitative data [online]. *Socio-Economic Planning Sciences*, 83: 101339. <https://doi.org/10.1016/j.seps.2022.101339>.
KUNST, I., IVANDIĆ, N. (2021). The viability of the travel and tourism competitiveness index as a reliable measure of destination competitiveness: the case of the Mediterranean region [online]. *European Journal of Tourism Research*, 27: 2704–2704. <https://doi.org/10.54055/ejtr.v27i.2124>.
LAFUENTE, E., ARAYA, M., LEIVA, J. C. (2022). Assessment of local competitiveness: a composite indicator analysis of Costa Rican counties using the 'Benefit of the Doubt' model [online]. *Socio-Economic Planning Sciences*, 81: 100864. <https://doi.org/10.1016/j.seps.2020.100864>.
MAZANEC, J. A., RING, A. (2011). Tourism destination competitiveness: second thoughts on the World Economic Forum reports [online]. *Tourism Economics*, 17(4): 725–751. <https://doi.org/10.5367/te.2011.0065>.
MAZZIOTTA, C., MAZZIOTTA, M., PARETO, A., VIDOLI, F. (2010). La Sintesi di Indicatori Territoriali di Dotazione Infrastrutturale: Metodi di Costruzione e Procedure di Ponderazione a Confronto. *Review of Economics and Statistics for Regional Studies*, 1: 7–33.
MAZZIOTTA, M., PARETO, A. (2016). On a generalized non-compensatory composite index for measuring socio-economic phenomena [online]. *Social indicators research*, 127: 983–1003. <https://doi.org/10.1007/s11205-015-0998-2>.
MENDOLA, D., VOLO, S. (2017). Building composite indicators in tourism studies: Measurements and applications in tourism destination competitiveness [online]. *Tourism Management*, 59: 541–553. <https://doi.org/10.1016/j.tourman.2016.08.011>.
NOVAIS, M. A., RUHANEN, L., ARCODIA, C. (2018). Destination competitiveness: a phenomenographic study [online]. *Tourism management*, 64: 324–334. <https://doi.org/10.1016/j.tourman. 2017.08.014>.
OECD. (2008). *Handbook on Constructing Composite Indicators. Methodology and user guide*. Paris: OECD Publications.
PATRIZI, A., CELARDO, L. (2021). New travel habits of university students in relation to COVID-19. *Rivista Italiana di Economia Demografia e Statistica*, 75(2): 109–120.
PORTER, M. E. (1990). The competitive advantage of nations. *Harvard business review*, 68(2): 73–93.

PULIDO–FERNÁNDEZ, J. I., RODRÍGUEZ–DÍAZ, B. (2016). Reinterpreting the World Economic Forum's global tourism competitiveness index [online]. *Tourism Management Perspectives*, 20: 131–140. <https://doi.org/10.1016/j.tmp.2016.08.001>.
PUTNAM, R. D., LEONARDI, R., NANETTI, R. (1993). *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton N.J.: Princeton University Press.
RITCHIE, J. R. B., CROUCH, G. (1993). *Competitiveness in international tourism: a framework for understanding and analysis*. Proceedings of the 43rd congress of association internationale d'experts scientifique de tourisme, San Carlos de Bariloche, Argentina, October, pp. 17–23.
RITCHIE, J. B., CROUCH, G. I. (2003). *The competitive destination: a sustainable tourism perspective*. CABI Publishing.
RODRÍGUEZ-DÍAZ, B., PULIDO-FERNÁNDEZ, J. I. (2021). Analysis of the Worth of the Weights in a new Travel and Tourism Competitiveness Index [online]. *Journal of Travel Research*, 60(2): 267–280. <https://doi.org/10.1177/0047287519899982>.
SAISANA, M., TARANTOLA, S. (2002). *State-of-the-art report on current methodologies and practices for composite indicator development*. European Commission-JRC, EUR 20408 EN, Ispra.
SOLIVETTI, L. M. (2020). Political partisanship versus turnout in Italy's 2016 referendum. *Quality & Quantity*, 54(3): 709–734.
TANG, J. C., ROCHANANOND, N. (1990). Attractiveness as a tourist destination: a comparative study of Thailand and selected countries [online]. *Socio-Economic Planning Sciences*, 24(3): 229–236. <https://doi.org/10.1016/0038-0121(90)90005-R>.
UNWTO. (2020). *World Tourism Barometer* [online]. Vol. 18, No. 1. <https://www.e-unwto.org/doi/epdf/10.18111/wtobarometereng.2020.18.1.1>.
UYAR, A., KUZEY, C., KOSEOGLU, M. A., KARAMAN, A. S. (2023). Travel and tourism competitiveness index and the tourism sector development [online]. *Tourism Economics*, 29(4): 1005–1031. <https://doi.org/10.1177/13548166221080357>.
WEF. (2022). *Travel & Tourism Development Index 2021. Rebuilding for a Sustainable and Resilient Future* [online]. <https://www3.weforum.org/docs/WEF_Travel_Tourism_Development_ 2021.pdf>.
WTTC. (2020). *Travel & Tourism Economic Impact 2019 – World* [online]. <https://wttc.org/research/economic-impact>.
WU, W. W., LAN, L. W., LEE, Y. T. (2012). Critiquing the World Economic Forum's concept of destination competitiveness: a further analysis. *Tourism Management Perspectives*, 4: 198–206. <https://doi.org/10.1016/j.tmp.2012.08.008>
ZEHRER, A., SMERAL, E., HALLMANN, K. (2017). Destination competitiveness – a comparison of subjective and objective indicators for winter sports areas [online]. *Journal of Travel Research*, 56(1): 55–66. <https://doi.org/10.1177/0047287515625129>.

APPENDIX

Table A1 Individual indicators, by pillar, sub-index, reference year and data source

ENABLING ENVIRONMENT (A)		
Business innovation, competitiveness and creativity (A1)	Enterprises net entry rate (A1.1)	ISTAT – Infocamere Movimprese (2021)
	Patent applications (A1.2)	Ocse – Database Regpat (2019)
	Innovative enterprises (A1.3)	ISTAT – Cis (2021)
	Enterprises with web site (A1.4)	ISTAT (2022)
	Labour productivity of tourism activities (A1.5)	ISTAT (2019)
	Employed persons in creative industries (A1.6)	ISTAT (2021)
Safety and security (A2)	Pickpocketing (A2.1)	Ministry of Home Affair (2022)
	Robbery (A2.2)	Ministry of Home Affair (2022)
	Corruption (A2.3)	ISTAT (2016)
Health (A3)	Hospital beds (A3.1)	Ministry of Health (2019)
	Physicians (A3.2)	IQVIA ITALIA (2020)
	Nurses and midwives (A3.3)	Co.Ge.A.P.S. (2020)
Human resources and labour market (A4)	Tertiary education (A4.1)	ISTAT (2022)
	NEET (A4.2)	ISTAT (2022)
	Lifelong learning (A4.3)	ISTAT (2022)
	Hourly earnings (A4.4)	ISTAT (2021)
	Gender employment gap (A4.5)	ISTAT (2021)
ICT readiness (A5)	Electric power distribution (A5.1)	ISTAT – Arera (2020)
	Digital skills (A5.2)	ISTAT (2020)
	Broadband connection (A5.3)	ISTAT (2022)

Table A1 continuation

T&T POLICY AND ENABLING CONDITIONS (B)		
Prioritization of travel and tourism (B6)	Final consumption expenditure – recreation, culture and religion (B6.1)	ISTAT (2019)
	Destination appeal (B6.2)	Demoskopika (2020)
Price competitiveness (B7)	Consumer prices (B7.1)	ISTAT (2021)
	Energy consumer prices (B7.2)	ISTAT (2021)
	Transport consumer prices (B7.3)	ISTAT (2021)
	Accommodation consumer prices (B7.4)	ISTAT (2021)
	Fuel price (B7.5)	Ministry of Economic Development (2021)
Environmental sustainability (B8)	Urban sewage treatment (B8.1)	ISTAT (2020)
	PM10 (B8.2)	ISPRA (2021)
	Separate collection of municipal waste (B8.3)	ISTAT (2021)
	Renewable energy (B8.4)	TERNA (2020)
	Illegal building rate (B8.5)	CRESME (2021)
	Environmental certification (B8.6)	ISTAT (2021)
	Forest area index (B8.7)	FAO (2020)
INFRASTRUCTURE (C)		
Air transport infrastructure (C9)	Airports (C9.1)	ENAC (2022)
	Passenger traffic (C9.2)	Assaeroporti (2019)
Ground and port infrastructure (C10)	Road density (C10.1)	Ministry of Infrastructure and Transport (2014)
	Highway density (C10.2)	ANAS (2014)
	Railway (C10.3)	Ministry of Infrastructure and Transport (2018)
	Seaports (C10.4)	Porti D'Italia (2022)
Tourist service infrastructure (C11)	Hotel rooms (C11.1)	ISTAT (2022)
	Collective accommodation establishments (C11.2)	ISTAT (2022)
	Quality of tourism infrastructure (C11.3)	Demoskopika (2020)
	ATM (C11.4)	Banca D'Italia (2021)
	Seat-Km of public transport networks (C11.5)	ISTAT (2021)
NATURAL AND CULTURAL RESOURCES (D)		
Natural resources (D12)	Urban green areas (D12.1)	ISTAT (2021)
	Protected natural areas (D12.2)	Ministry of Environment (2021)
	Marine areas (D12.3)	Ministry of Environment (2022)
	Coastal bathing waters (D12.4)	Ministry of Health (2019)
Cultural resources and tourist attractions (D13)	Museums and similar institutions (D13.1)	ISTAT (2022)
	Entertainments (D13.2)	SIAE (2021)
	Sports stadiums (D13.3)	Our elaboration (2022)
	UNESCO World Heritage cultural sites (D13.4)	UNESCO (2022)
	Ski resorts (D13.5)	Our elaboration (2022)

Note: Data refer to the latest available year in time series in October 2023.
Source: Own elaboration

Table A2 Values of the composite indexes, by region

Italian regions	Sub-index A: Enabling environment	Sub-index B: T&T policy and enabling conditions	Sub-index C: Infrastructure	Sub-index D: Natural and cultural resources	Regional Tourism Development Index (RTDI)
Veneto	102.69	101.35	105.27	102.03	102.82
Tuscany	102.16	99.95	103.37	103.82	102.3
Lombardy	102.88	100.79	106.32	99.06	102.19
Emilia-Romagna	104.74	101.48	101.24	99.3	101.65
Lazio	98.23	101.11	105.64	101.87	101.64
Friuli-Venezia Giulia	107.32	102.02	97.93	99.15	101.48
Trentino-South Tyrol	106.44	105.14	96.87	97.9	101.41
Liguria	102.32	98.89	101.32	100.3	100.69
Marche	101.38	102.75	96.36	99.63	99.97
Piedmont	100.13	98.34	100.06	97.12	98.9
Aosta Valley	103.28	99.02	96.97	96.08	98.76
Umbria	103.64	101.57	94.81	95.13	98.63
Abruzzo	98.34	96.46	96.64	100.96	98.06
Sardinia	99.66	97.51	96.46	98.51	98.02
Sicily	90.32	95.26	106.32	99.78	97.56
Apulia	91.85	99.3	98.13	99.73	97.15
Basilicata	95.33	98.24	92.84	99.88	96.5
Campania	88.71	93.67	100.78	101.8	95.94
Molise	97.16	95.98	93.02	93.44	94.87
Calabria	88.85	93.18	97.97	96.43	93.98
Coefficient of variation	5.40%	3%	4%	2.40%	2.50%

Source: Own elaboration