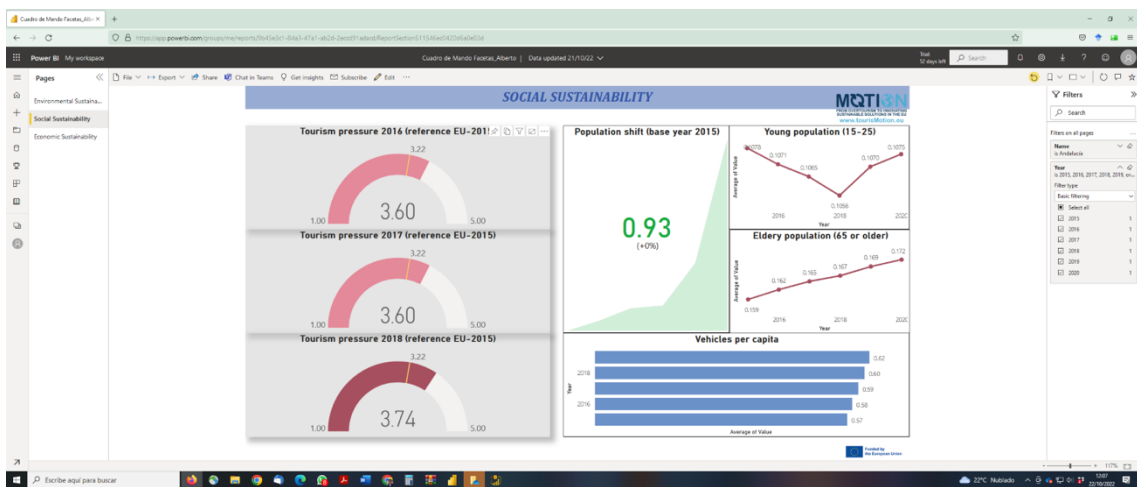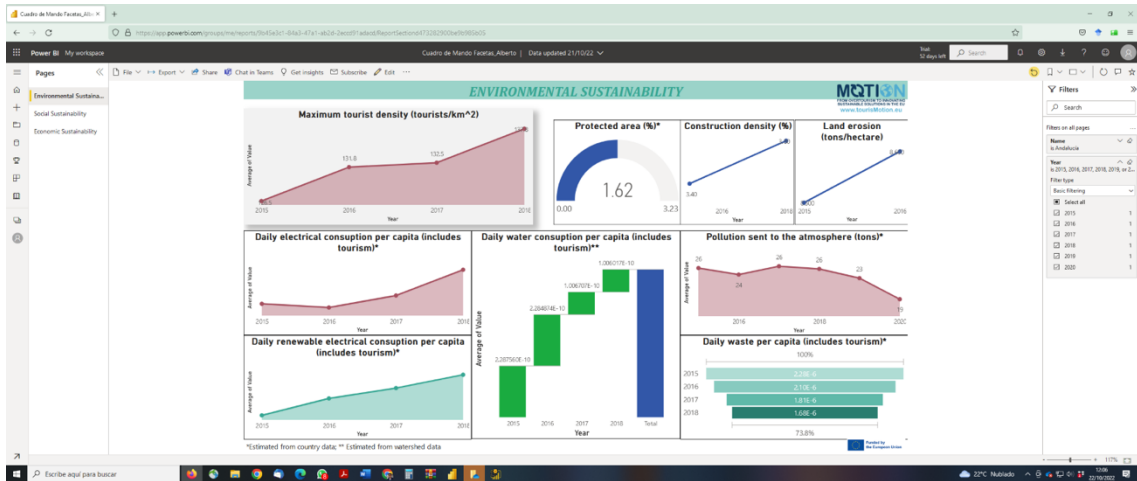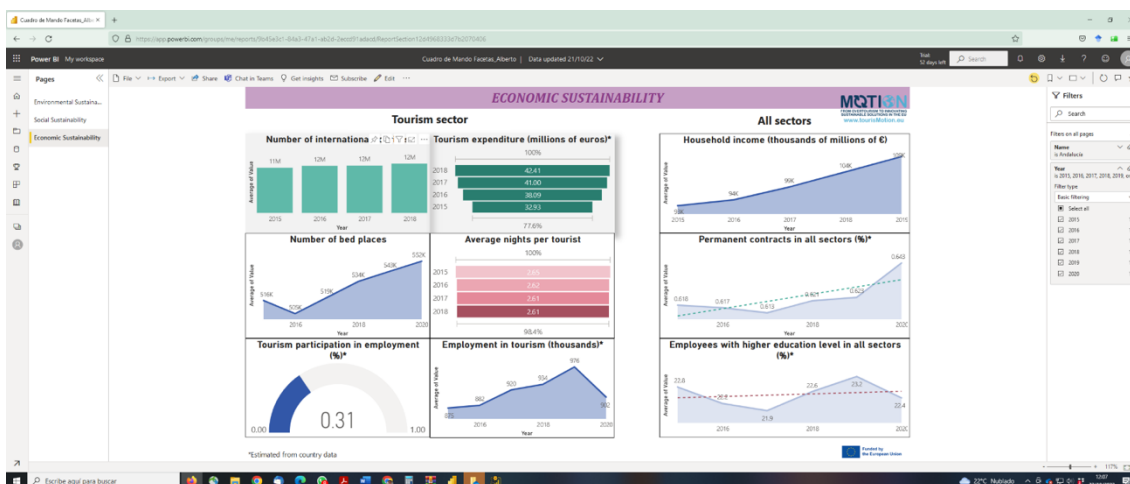# Scenarios tool for The Motion Model for Sustainable Business (MMSB)

Screenshots from the MOTION tool for sustainability evaluation

How to measure destination sustainability?

Regarding specific indicators on sustainability, most authors consider the environmental, social and economic dimensions the three pillars that construct the sustainability of destinations. Paying attention to these dimensions implies achieving economic viability with tourism activity, the conservation of destination resources and the well-being of destination participants (Blancas et al., 2016). Each of these dimensions can be specified for a destination in a set of objective indicators, distributed in different sources of information.

There are extensive guidelines established by international institutions that serve as a guide for the definition of a system of indicators about sustainability of the destinations (WTO 1993, 1996, 2004; United Nations Commission for Sustainable Development 2001; United Nations Environment Program 2007; OECD 2002, 2005, 2008; European Commission 2003, 2007, 2010). Based on previous international guidelines and other works in the field Blancas et al., 2016;Cucculelli and Goffi, 2016;Mikulic et al., 2015;Pérez et al., 2017;Rio and Nunes, 2012;Tanguay 2010;Tanguay 2013) in this project we define a system of indicators with scientific validity that provide key information to manage sustainable tourism in any tourism destination. The choice of indicators will be made using criteria such as usability of the information, frequency of use, relevance, conceptual coverage, temporality, comprehensibility, representativeness and availability of statistical information (Nardo et al. 2005a, b; Blancas et al. 2015; Blancas et al. 2016). Regarding this last criteria, a panel of key indicators has been defined that can be quantified directly from official statistical sources, without requiring additional information obtained through fieldwork. A fully operational tool has been

defined that can be updated on a regular basis and is available to the different agents in the sector.

As for the statistical sources that support the quantification of the system, we have chosen to use indicators published in Eurostat, since it has a number of advantages over other alternatives:

1.   It presents data for the entire EU territory at different levels of disaggregation.

2.   Data is obtained in a standardized way for all territories.

3.   It is updated periodically.

4.   The indicators are aligned with the development strategies approved by the European Commission.

Taking into account the different indicators proposed and collected by literature, the following phases are developed for the selection of the final set of Key Performance Indicators (KPIs) that will integrate the dashboard on sustainability in EU territories:

1.   An initial set of KPIs is created, consisting of 20 indicators for the environmental dimension, 34 for the economic dimension and 14 for the social dimension.

2.   A filtering is performed based on the availability of these indicators in Eurostat, which reduces the KPIs per dimension: 16 for environmental, 17 for economic and 9 for social.

3.   An expert panel of MOTION project partners is consulted to identify the main KPIs in order to have an operational tool. This leaves the final base of indicators at 9 KPIs in the environmental dimension, 8 in the economic dimension and 5 in the social dimension.

The KPIs, their formulation and a commentary on their interpretation within the framework of tourism destination sustainability are detailed below (tables 2.1, 2.2 and 2.3).

Table 2.1 KPIs of the dashboard about environmental sustainable destinations in the EU

Theoretical indicator	Interpretation Guide	Formulation
Tourists per area (tourism density)	The measurement of the pressure exerted on the systems can be an indicator of potential and suffered damages. Measuring the intensity of tourism can be useful to study the pressure level the natural environment is under.	Number of tourists received on a year/region surface
Percentage of the region surface deemed as protected nature zone.	This indicator assesses the efforts made to protect natural variety of the area (fauna, plants, unique ecosystems, . . .) and to guarantee its public use through activities that do not endanger natural resources.	Direct data from Eurostat
Construction density per unity of surface	These indicators assess the visual impact of the facilities and infrastructures in the surrounding of a region. The buildings and any other facilities must be integrated within the landscape and environment. Efforts to preserve or enhance the natural environment are evaluated, as well as strategies to prevent erosion.	Built plots (m^2))/(All plots(m^2))
Total surface in a state of erosion		Elevated erosion + Very elevated erosion
Energy consumption per person and day	These indicators are useful for observing trends in energy consumption, while they also allow the destination to monitor performance. Reducing the amount of energy used in tourism is a good indicator of sustainability since it generates important environmental benefits (such as the preservation of natural resources or a drop in the pollution levels). In addition, destinations that use renewable energy are deemed as more sustainable.	Electricity consumption / (Population×(365−30)/365 +Overnight stays/365)
Energy consumption produced by renewable resources per person and day		Renewable energy consumption / (Population×(365−30)/365 +Overnight stays/365)
Total daily volume of water consumed	This indicator is useful for the need to manage the demand and supply of water. It can be key to measure the capacity to receive tourism in destinations with a lack of water, while it also serves as a warning on the possible overexploitation of the supply system.	Average daily water consumption/ (Population×(365−30)/365 +Overnight stays/365)
Total volume of waste produce in the region per person and day	The amount of waste must be reduced as it is a risk to the environment and damages the image of the destination. It is also useful to see the trend in the production of solid waste and to monitor the destination so that appropriate measures can be taken.	Total Municipal Waste / (Population×(365−30)/365 +Overnight stays/365)
Atmospheric pollution levels	Lower levels of air pollution reduce the negative effects on cultural heritage (acid rain on historical monuments) and natural (damage to species and impact on ecosystems).	Total Pollution / (Population×(365−30)/365 +Overnight stays/365)

Table 2.2 KPIs of the dashboard about economic sustainable destinations in the EU

Theoretical indicator	Interpretation Guide	Formulation
Direct effect in tourism sector		

Number of tourists received	The high demand, the average stay and the tourist expenditure are indicative of great economic benefits. These indicators allow us to monitor the increase/decrease in tourist expenditure, the contribution to the GPD and to the income of the community. With these, it is possible to decide if the community should encourage local or foreign tourism and how to do it, or if, on the contrary, it should stop development.	Direct data from Eurostat
Average stay		Annual overnight stays/Total number of tourists
Tourist expenditure		Direct data from Eurostat
Regulated accommodation places offered	This indicator shows the provision of regulated accommodation services that are available to the demand. The total number of places available must be quantified by adding the places available in each type of tourist accommodation.	Direct data from Eurostat
Percentage of employees in the tourist sector compared to all the employment	This indicator shows the employment generated in the tourism sector directly through the activity recorded in regulated tourist accommodation activities. A tourist destination can have many of the ingredients for success: interesting tourist attractions, great weather, five-star accommodations, and great services. However, if qualified employees are not available to provide the services and operate the facilities, tourism will not be sustainable in that destination.	(Total contracts in the tourism sector/Total contracts)x100
Indirect effect in all sectors		
Average net income declared per inhabitant	This indicator provides an indirect measure on the contribution of tourism to the local economy. It tries to control whether the improvements in the amount of tourist activity are reflected in the average income levels per inhabitant in the area.	Direct data from Eurostat
Percentage of permanent contracts registered compared to the total	These indicators are used to evaluate the quality of the employment in the area by analyzing its duration and the levels of education and/or qualification of the employees hired.	(Total permanent contracts) / (Total contracts)×100
Percentage of contracts registered for employees with higher education		(Registered contracts of employees with higher education) / (Total contracts)×100

Table 2.3 KPIs of the dashboard about social sustainable destinations in the EU

Theoretical indicator	Interpretation Guide	Formulation
Tourist population per local resident (tourism pressure)	This indicator evaluates and establishes limits regarding the number of tourists that the local community can welcome without a negative impact.	Tourism received in a year / Total population of the region
Population variation	Tourism growth can cause a considerable change in the number and composition of residents: the oldest ones leave due to the excessive transformation of their community or city	(Most recent year population) / (Reference year population) ×100−100

| Percentage of young population	and new ones fill the jobs and take advantage of the opportunities tourism offers. A touristic destination is deemed more sustainable when it tends to maintain the amount of resident population and there is a balanced population structure. The changes in structure registered must be linked with tourist development in order to assess (even qualitatively) its influence on population changes.	(Population between 15 and 24 years of age/Total population of the region)x100
Percentage of elderly population		(Population over 64 years of age/Total population of the region)×100
Amount of passenger transport vehicles	This indicator seeks to evaluate the benefits in terms of improvements in the provision of transportation services as a result of tourism activity in the area.	(Total amount of buses/Total population of the region)*1000

EU destination sustainability dashboard

Dashboards have become an increasingly useful tool to manage all kinds of information and visually aid decision making in all fields. This includes sustainable tourism (Balletto et al. 2020). To achieve this they need to gather information from several sources (Mariani at al. 2018) that require access to such information through APIs, downloading data files or web crawlers that search for information within web pages or social networks (Nave et al. 2018, Soualah-Alila at al. 2018). The information needs to be federated and annotated with the same semantics in a database. Subsequently, the information in the database is analyzed with different parameters and visualized in interactive graphs and tables.

Once the fundamental key indicators and their information sources have been defined, we collected necessary data through Eurostat's APIs. Subsequently, through common semantics, all the information will be integrated automatically into a database. The data will be analyzed and visualized in a destination sustainability dashboard with different dimensions.

Regarding the platform used to implement the dashboard, analytics, business intelligence, data science and artificial intelligence platforms have evolved enormously (Kronz et al., 2022). This rapid development has meant that providers are constantly improving the advanced analytics capabilities of their platforms, while making sure they are manageable for users. Most customers are opting to acquire such tools in the cloud, given their need for scalability and performance in the face of complex analysis and volume of data processed (Kronz et al., 2022). Due to the importance of this sector and its growth rate, many providers are

currently offering analytics and business intelligence applications as observed in the Gartner report (2022). Using the Magic Quadrant methodology of this consulting firm, the upper right quadrant identifies the market leaders in this type of solutions, highlighting Microsoft with its Power BI tool, Salesforce with Tableau and Qlik with its Qlik Sense platform (Figure 2.2).

Figure 2.2 Gartner Magic Quadrant showing the leading business intelligence and analytics solutions.
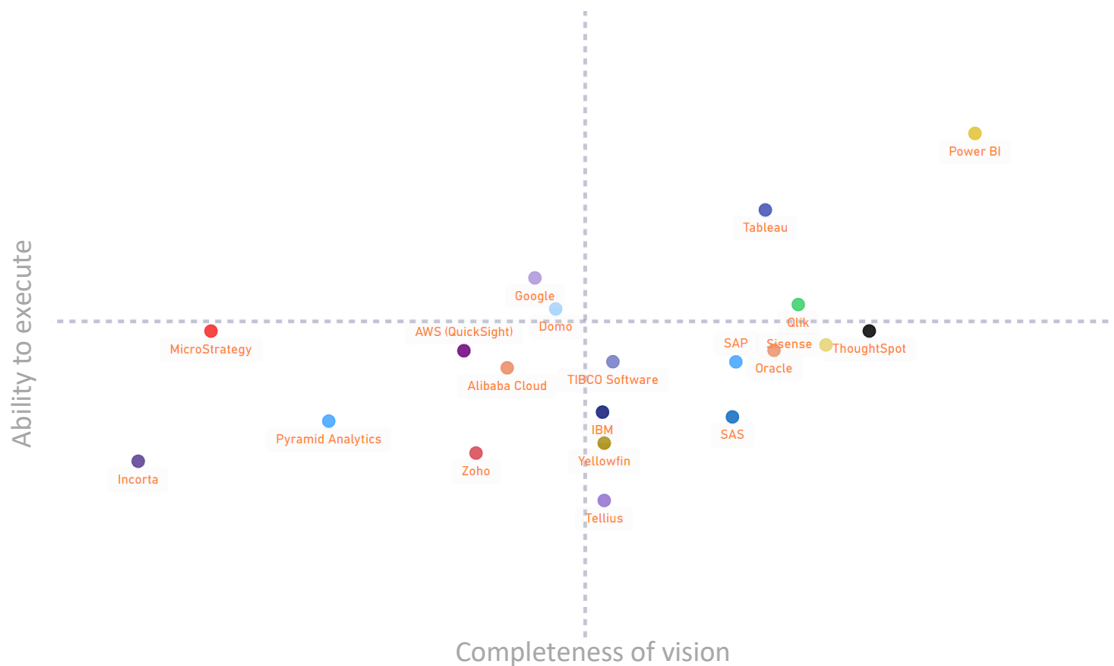
Source: Gartner (2022)

After the analysis, it seemed necessary to make a decision on which of them was the most appropriate for the development of this work. The one that Gartner ranks as the best in ability to execute and completeness of vision is Power BI, that is the selected platform for the dashboar. As an additional advantage, the integration of Power BI with Microsoft is useful to make it accessible for different publics.