tourism 4.0
for the Black Sea

With the contribution of the European Maritime and Fisheries Fund of the European Union

'Tourism 4.0 for the Black Sea - data analysis for sustainable tourism development strategies'

High Level Forum - Tourism, Digitalisation and Sustainable development for the Black Sea

18/11/2021 | 9:00 – 13:00 CET | Ljubljana, Slovenia - Hybrid event

Co-creating tourism for the future with data analytics

ARCTUR

hcl Management

aRo accessibleRomania by SanoTouring

TOURISM INSTITUTE

Universitatea „Ovidius" din Constanța

tourism 4.0 for the Black Sea

With the contribution of the European Maritime and Fisheries Fund of the European Union

Tourism 4.0 for the Black Sea – project presentation

Urška Starc Peceny, PhD
CIO, project lead and lead of Tourism 4.0 department, Arctur

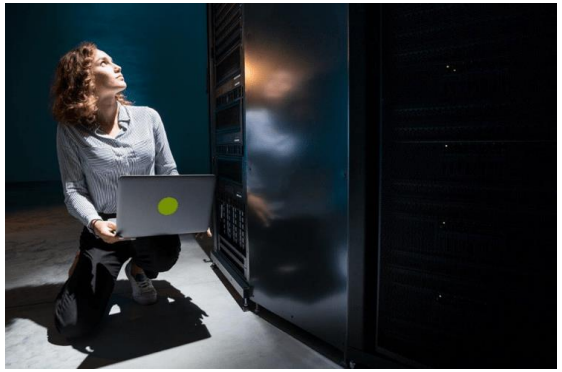
Co-creating tourism for the future with data analytics

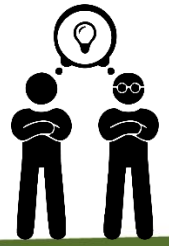
ARCTUR · hcl Management · aRo accessibleRomania by SanoTouring · Tourism Institute · Agrikopa Одеса Україна · Universitatea „Ovidius" din Constanța

Arctur

where creativity meets experience. Since 1992.

- 29+ years of experience
- Hi-Tech innovation driven culture
- the largest private-owned HPC provider in CEE
- international network of research and business partners
- yearly investments in R&D exceeding 30%
- private incubator; design/art thinking approach





With the contribution of the European Maritime and Fisheries Fund of the European Union

Industry 4.0

Key enabling technologies

High Performance Computing

Internet of Things

Big Data Analytics

3D Scanning and printing

Augmented Reality

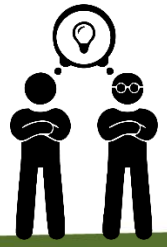
Blockchain

Simulations

Virtual Reality

Aditive Manufacturing

Artificial Intelligence



With the contribution of the European Maritime and Fisheries Fund of the European Union

R&D into tourism

TRL1	TRL2	TRL3	TRL4	TRL5	TRL6	TRL7	TRL8	TRL9
research				prototyping		production dev.		demonstration, sale

Tourism 4.0 TRL3-6
2018 - 2021, Budget: 2,3 M EUR

Demo Pilot Tourism 4.0
2019 - 2022, Budget: 10,9 M EUR

Tourism 4.0 for the Black Sea
2019 - 2021, Budget: 720 K EUR

Amazing AoE
2020 - 2022, Budget: 2,4 M EUR

Weave
2021 - 2022, Budget: 1,3 M EUR

DICH projects
2020 - 2022, Budget: 1,5 M EUR

Insites
2020 - 2022, Budget: 300 K EUR

TRL = Technology Readiness Level

With the contribution of the European Maritime and Fisheries Fund of the European Union

Tourism 4.0
For the Black Sea

Co-creating tourism for the future with data analytics

Duration: 2019 - 2021
Budget: 720 K EUR

Co-financed by European Maritime and Fisheries Fund of the European Union

Consortium:

ARCTUR

ტურიზმის ინსტიტუტი
TOURISM INSTITUTE

aRo accessible Romania
by SanoTouring

AGRICOLA ODESSA UKRAINE

Universitatea „Ovidius" din Constanța

hcl Management

With the contribution of the European Maritime and Fisheries Fund of the European Union

Consortium

Arctur, Slovenia
Hi-tech company, HPC provider and Tourism 4.0 initiator

NGO Agricola, Ukraine
NGO promoting sustainable development

Tourism Institute, Georgia
Think tank for sustainable tourism development

Ovidius University of Constanta, Romania
Black Sea coastline expert

Marketing Development, Romania
Tourism service provider specialized in accessible travel

HCL, Greece
International development consultancy

With the contribution of the European Maritime and Fisheries Fund of the European Union

About the T4BS Project

General objective and aims

- Foster the commercialization of High Performance Data Analytics (HPDA) tools in tourism
- Demonstrate to regional stakeholders the benefits of Big Data Analytics
- Test a set of concrete (Blue) Tourism 4.0 HPDA services in the Black Sea region
- Stimulate (policy) dialogue on Tourism 4.0 potentials with regional and EU stakeholders

With the contribution of the European Maritime and Fisheries Fund of the European Union

About the T4BS Project

Key activities

1. Development and testing of **Tourism Impact Model (TIM)** at pilot tourism destinations in Romania, Ukraine and Georgia
2. **Big Data Analytics:** acquiring data from global platforms and performing analysis
3. **Demonstration to regional stakeholders** at 3 rounds of workshops:
   - Results of TIM testing
   - Potential for Big Data Analytics
4. **Capitalisation and commercialisation** of TIM and Big Data Analytics

With the contribution of the European Maritime and Fisheries Fund of the European Union

About the T4BS Project

Key results

1. **TIM**

- *Data availability:* difficulties in obtaining the data, especially from public institutions
- *Data reliability:* poor accuracy of existing data using TIM's Data accuracy methodology

2. **Big data Analytics:**

- big data sources are still too aggregated or inaccessible to offer a strong source of analysis at the destination level

3. **Lack of experience and knowledge of local stakeholders** of the proper data use and management
4. **Lack of robust assessment of tourism impact** weakens sectoral policies

With the contribution of the European Maritime and Fisheries Fund of the European Union

changing the perception of tourism

> Tourism can only be sustainable, when it improves quality of life of the local community.

> Providing competent and quick response of local governments with the use of Big Data.

With the contribution of the European Maritime and Fisheries Fund of the European Union

Next Steps

“T4BS DECLARATION for supporting a stronger Tourism 4.0 approach across the Black Sea:

- based on the results and lessons learned in the project
- in line with the Common Maritime Agenda (CMA)

Key follow up actions:

- Promoting a greater and more effective *digitalisation of tourism*
- Establishing permanent mechanisms for the *systematic collecting of data*
- Promoting access to and usage of *advanced data sources* (eg. space data)
- Promoting the use of advanced technologies and tools for the needs of *holistic management of tourism*
- Encouraging activities and projects that include at the forefront and among performance indicators *cooperation between stakeholders*

With the contribution of the European Maritime and Fisheries Fund of the European Union

tourism 4.0 for the Black Sea

With the contribution of the European Maritime and Fisheries Fund of the European Union

Tourism 4.0 for the Black Sea – TIM

Hrvoje Ratkajec, PhD
R&D Project Manager, Arctur

Co-creating tourism for the future with data analytics

ARCTUR · hcl Management · aRo accessibleRomania by SanoTouring · Tourism Institute · Агрікола Одеса Україна · Universitatea Ovidius din Constanța

Tourism Impact Model

Measuring tourism impact

TIS TOURISM INNOVATION SUMMIT

The best innovation in AI and Data Analytics Award 2020

Gospodarska zbornica Slovenije
Chamber of Commerce and Industry of Slovenia

Golden plaquette for best innovation of North Primorska 2020

TIM is a tool using **real data** to create an **objective picture of the impact of tourism** in a certain micro-location.

300+ indicators

positive and negative effects of tourism

different societal aspects

By modelling the impact using different scenarios, TIM acts also as a **digital twin of tourist destination** and allows **data driven strategic planning**

With the contribution of the European Maritime and Fisheries Fund of the European Union

True impact of tourism

TIM brings **real data in the perception of the impact of tourism** to sharpen the real picture for everyone and allow data driven strategic planning.

With the contribution of the European Maritime and Fisheries Fund of the European Union

The benefits for a destination

TOURISM IMPACT MODEL by tourism 4.0

- Built-in **transparency** and **inclusion of local inhabitants** in strategic planning.
- **Supervised collecting of data** from various sources and their **transformation into valuable information**.
- **Real picture** of the whole spectrum of positive and negative impacts of tourism **based on real data**.
- Complex concepts made simple and understandable through **visualisation of results and sets of recommendations for improvements**.
- Dynamic real data simulations of possible scenarios for quick and **competent response in all situations**.

With the contribution of the European Maritime and Fisheries Fund of the European Union

SDGs

(Sustainable Development Goals)

- 17 goals
- 169 targets
- 244 indicators (232 non repeating indicators)

*https://unstats.un.org/sdgs/indicators/database/

With the contribution of the European Maritime and Fisheries Fund of the European Union

How it works

Definition of the most appropriate geographical Micro-location

Mapping the data sources

Completing the questionnaire and launching the Automated Assessment Tool

Automatic report generation

Validation of the results and detailed recommendations by experts (optional)

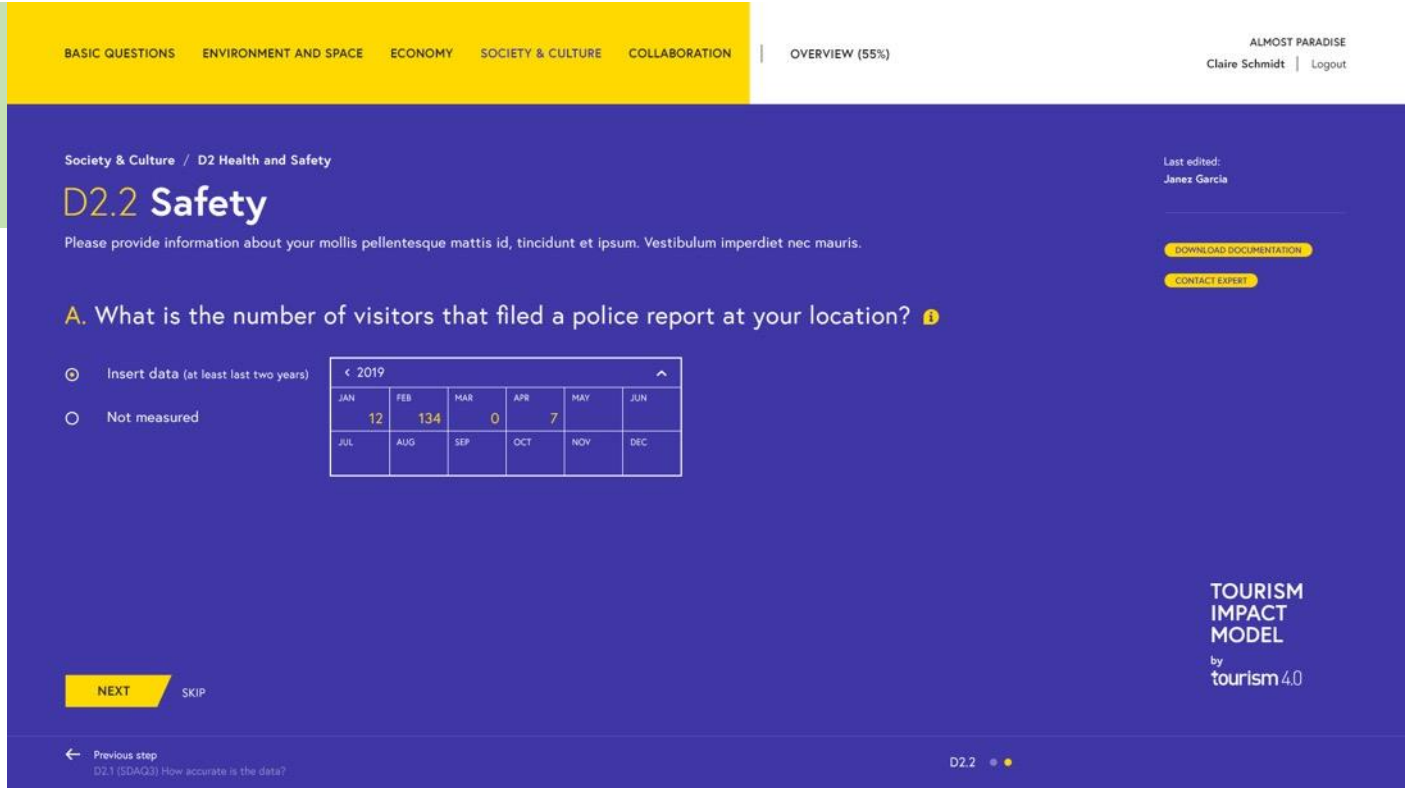
With the contribution of the European Maritime and Fisheries Fund of the European Union

Questionnaire

TOURISM IMPACT MODEL by tourism 4.0

300+ indicators used
(Impact and Collaboration)

- 5 groups
- 23 categories
- 67 question sets
- 138 SDAQ question sets
- Min 2000 up to 100.000 data inputs

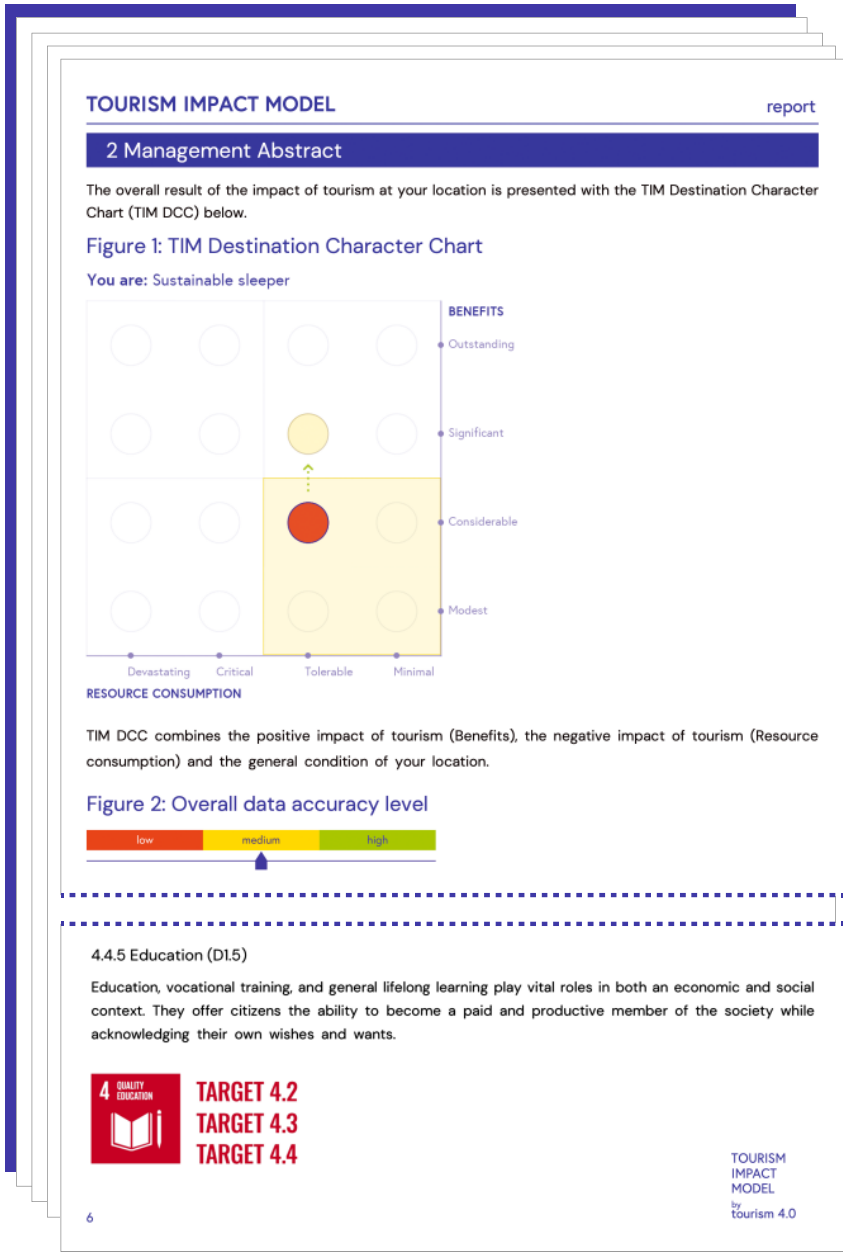


With the contribution of the European Maritime and Fisheries Fund of the European Union

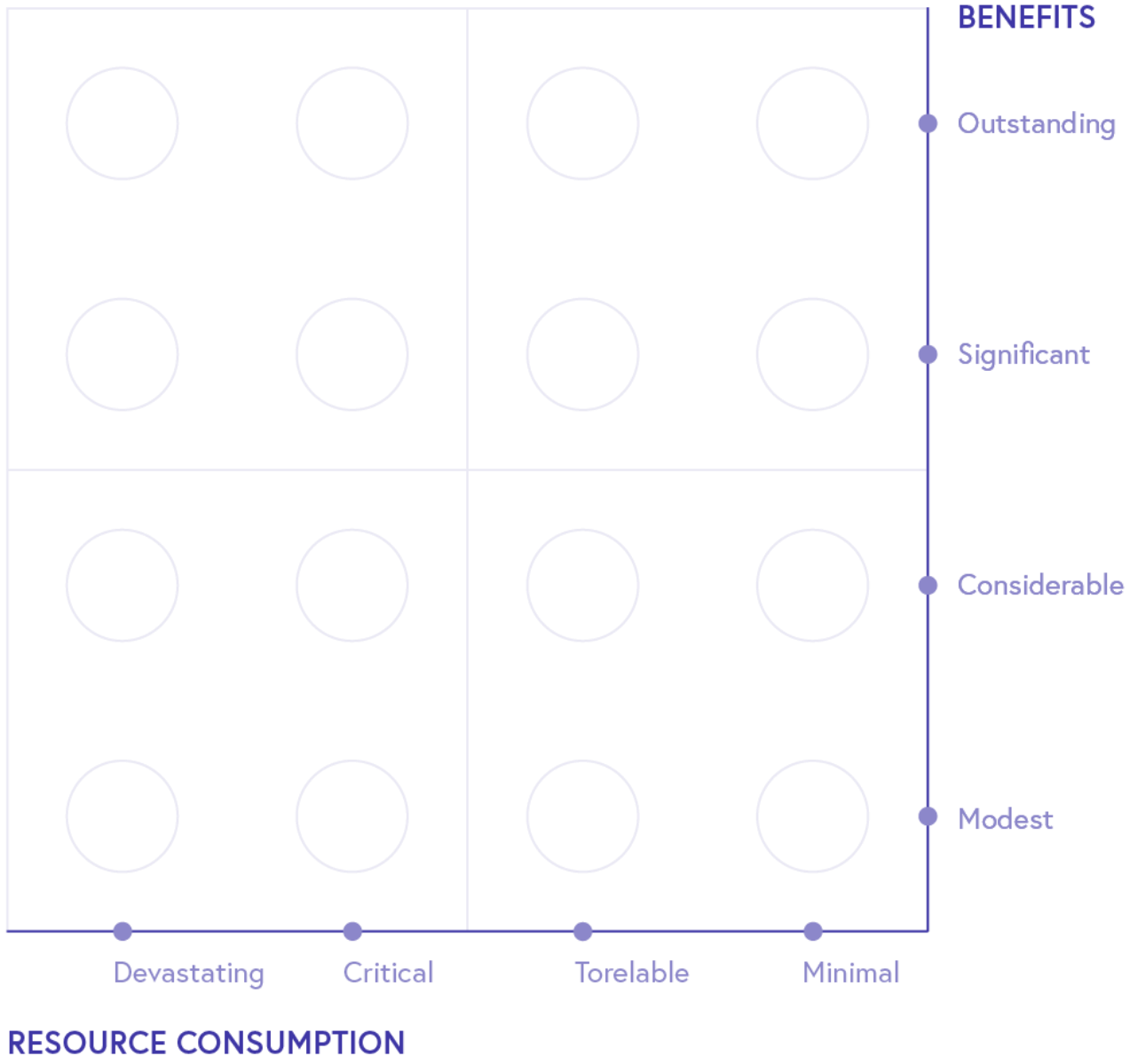
Report

300+ indicators used
(Impact and Collaboration)

- 5 groups
- 23 categories
- 67 question sets
- 138 SDAQ question sets
- Min 2000 up to 100.000 data inputs



With the contribution of the European Maritime and Fisheries Fund of the European Union



Destination Character Chart™

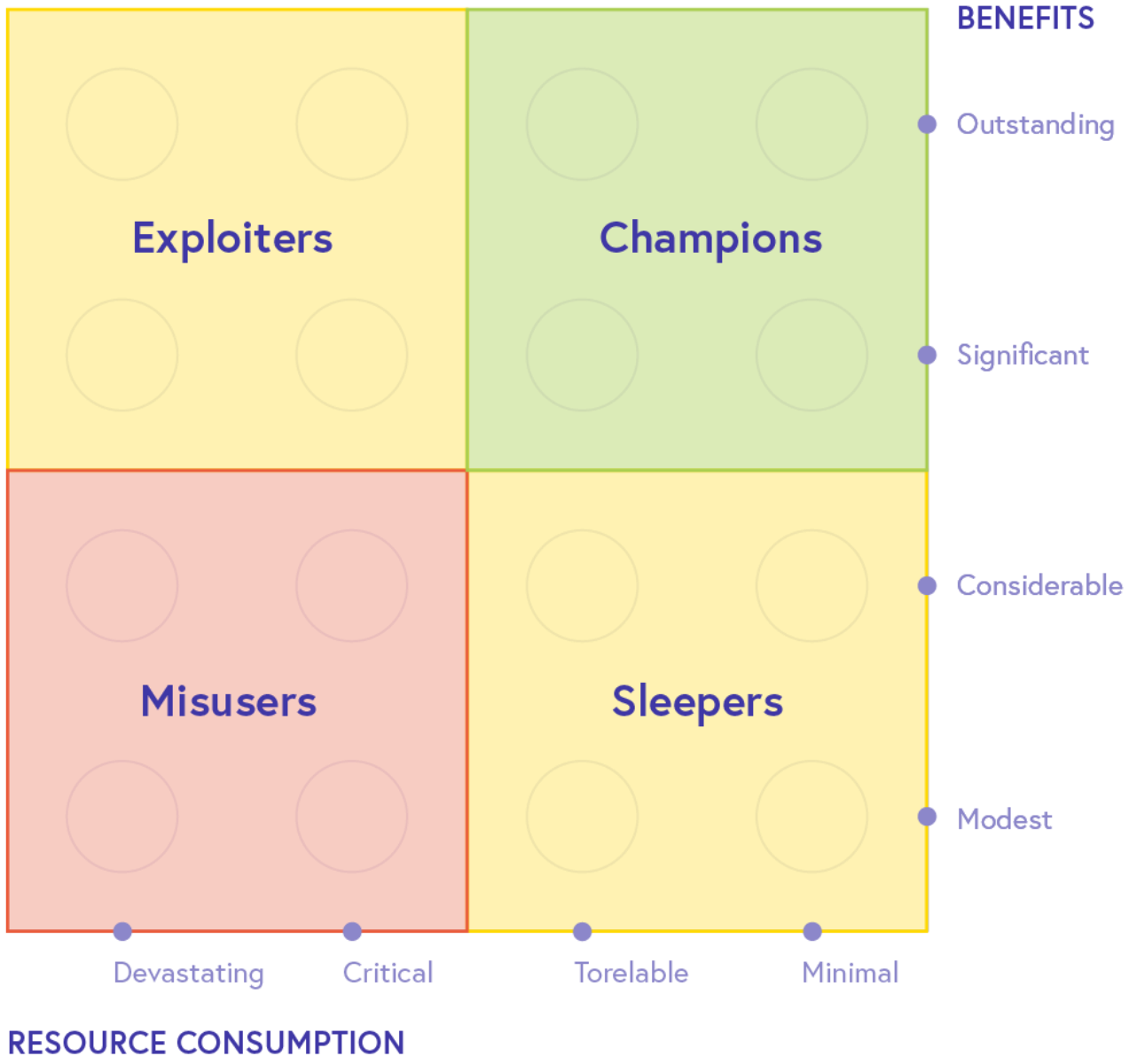
Y – Benefits

X – Resource consumption

16 (4x4) possible positions.

TOURISM IMPACT MODEL
by tourism 4.0

With the contribution of the European Maritime and Fisheries Fund of the European Union



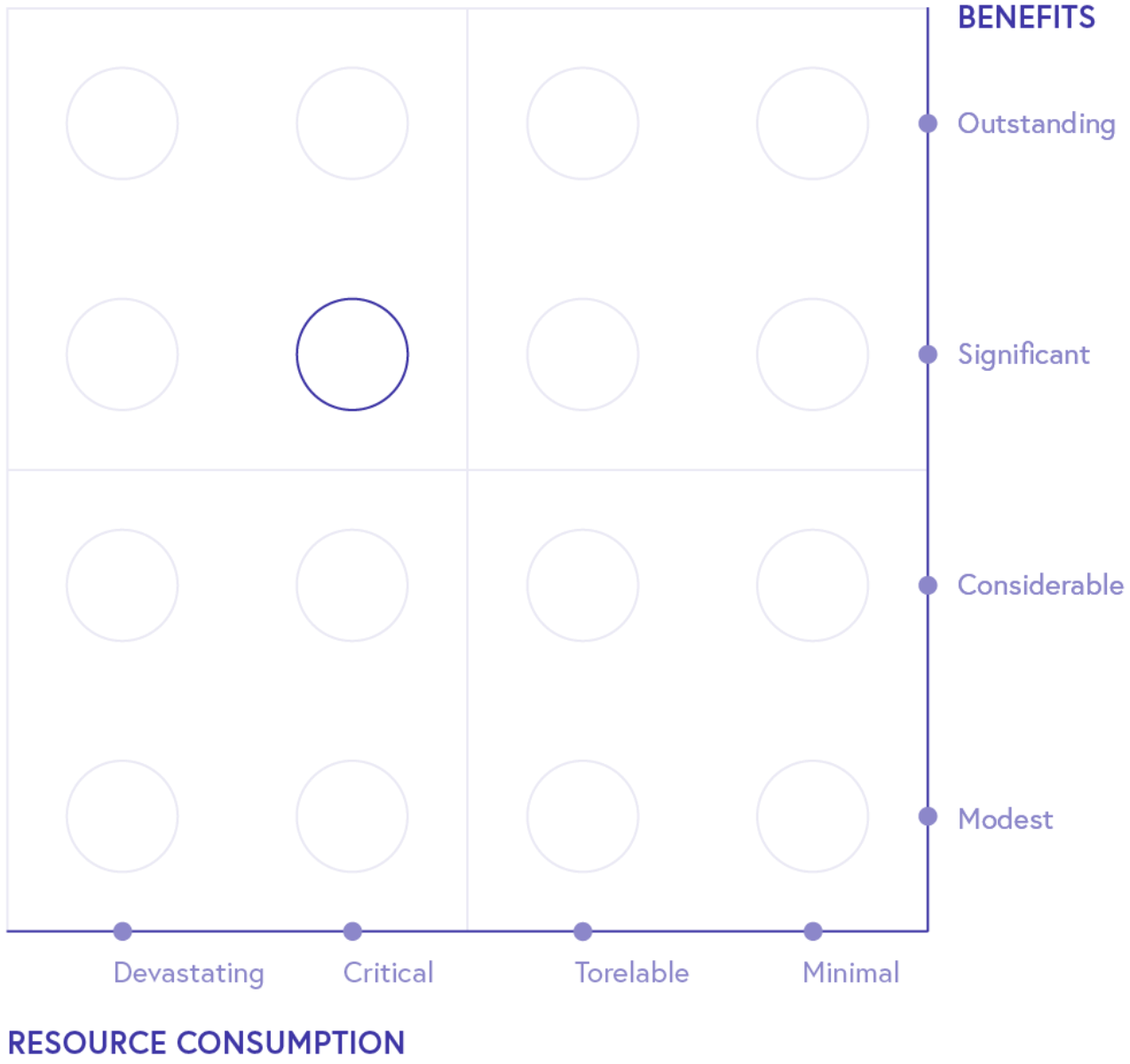
Destination Character Chart™

4 groups of primary characters

4 positions for each

TOURISM IMPACT MODEL
by tourism 4.0

With the contribution of the European Maritime and Fisheries Fund of the European Union



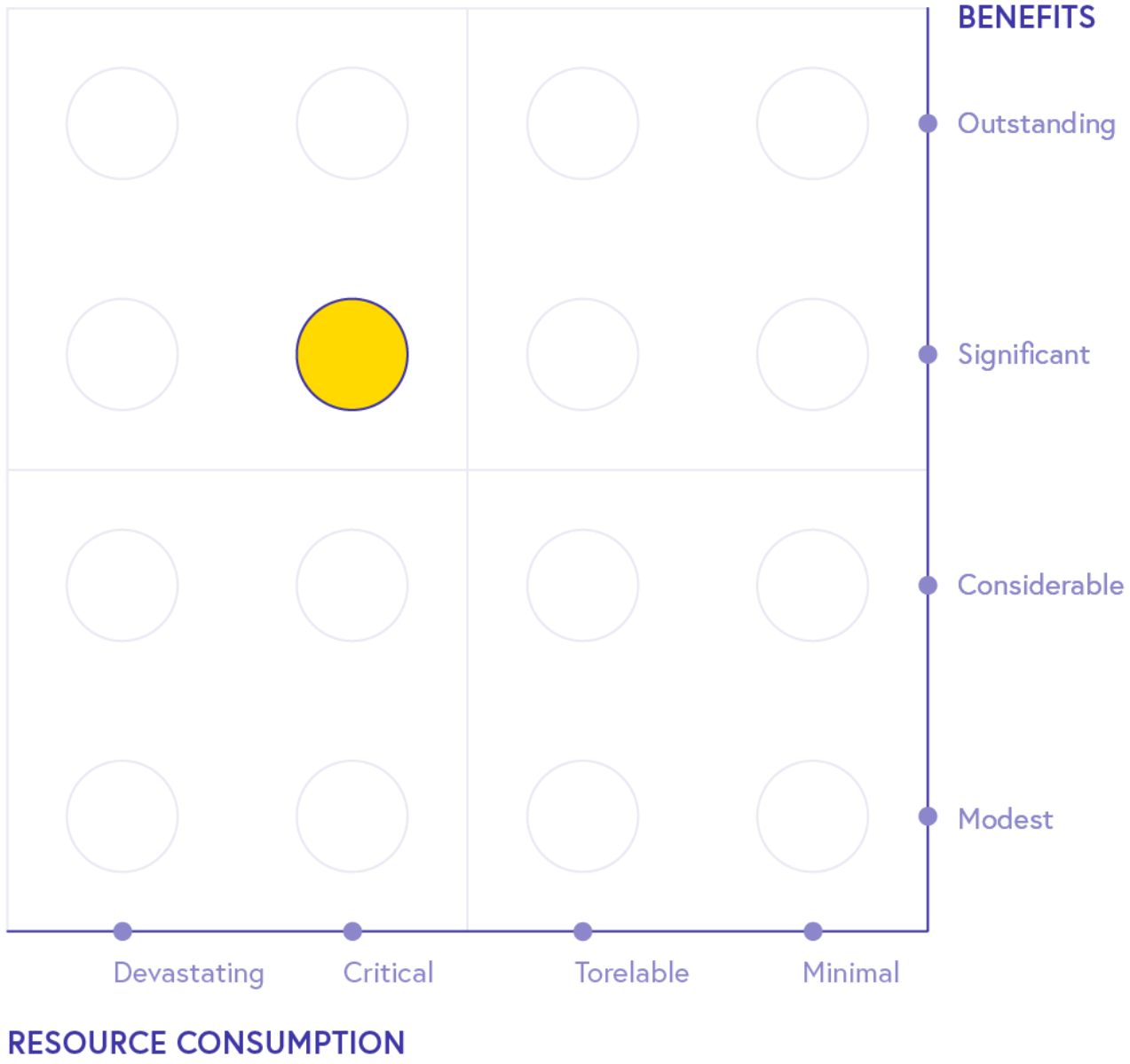
Destination Character Chart™

Destination is placed in one of

16 positions

TOURISM IMPACT MODEL
by tourism 4.0

With the contribution of the European Maritime and Fisheries Fund of the European Union



Destination Character Chart™

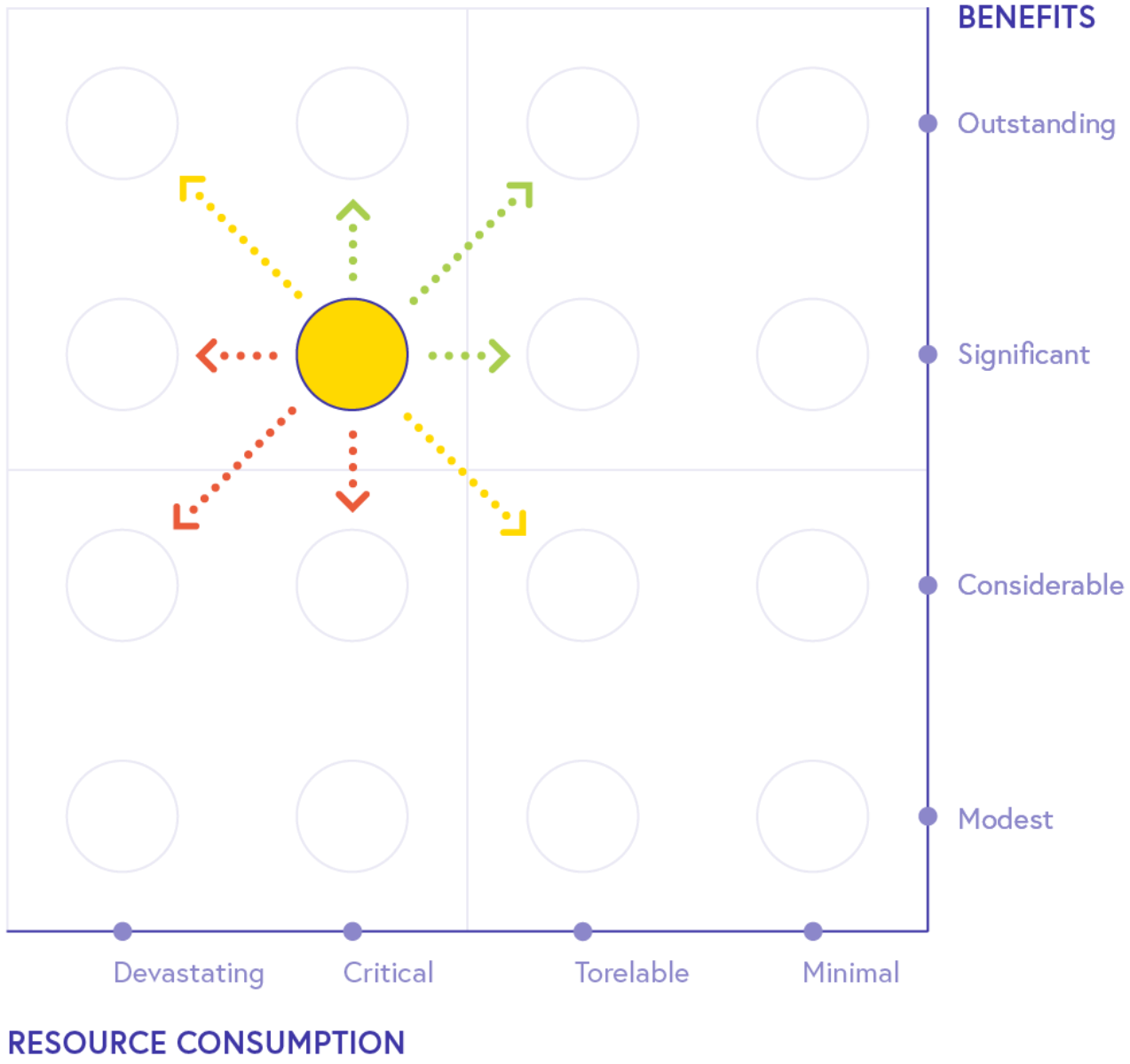
Colour of the circle presents the general condition of the destination

red – poor,

yellow – mediocre,

green – great.

TOURISM IMPACT MODEL
by tourism 4.0
With the contribution of the European Maritime and Fisheries Fund of the European Union



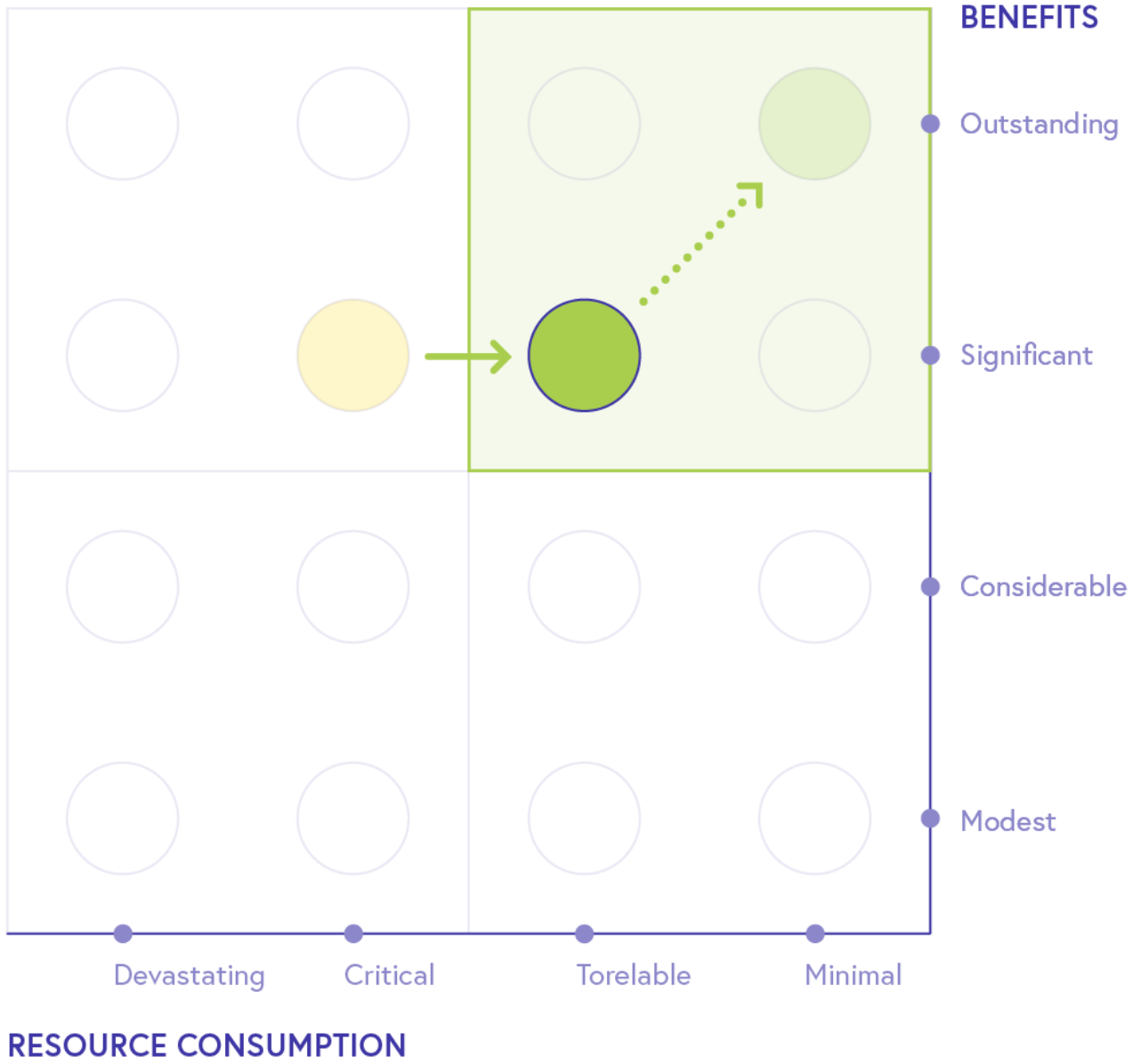
Destination Character Chart™

Possible directions of the trend vectors

TOURISM IMPACT MODEL
by tourism 4.0

With the contribution of the European Maritime and Fisheries Fund of the European Union

You are: **Sustainable champion**



Destination Character Chart™

Final result – Destination character

TOURISM IMPACT MODEL
by tourism 4.0

With the contribution of the European Maritime and Fisheries Fund of the European Union

TIM development

TIM prototype was tested at 6 pilot tourism destinations: 2 in Romania, 2 in Ukraine and 2 in Georgia

Specifics of the pilot destinations:

- *2 destinations in the Danube delta*: S. Gheorghe – RO and Vylkove – UA
- *Different size destinations:* big cities – Odessa (UA) and Constanta (RO), one region and a tourism destination within region (Adjara and Batumi – GE)

With the contribution of the European Maritime and Fisheries Fund of the European Union

TIM development

Development (2019-2021):

- Arctur and key feedback from project partners
- Technical and content improvements to TIM

Demonstration (2020-2021):

- *2nd cycle of workshop with local stakeholders (2020):* TIM features and usage; basis for improvements
- *3rd cycle of workshop with local stakeholders (2021):* TIM results, lessons learned and challenges

With the contribution of the European Maritime and Fisheries Fund of the European Union

TIM results

TOURISM IMPACT MODEL by tourism 4.0

Data challenges:

- Quite a lot of missing data
- Generally low accuracy of collected data (a lot of expert estimations)

TIM Data accuracy report

TOURISM IMPACT MODEL report

2 DATA ACCURACY overview

The general accuracy level which displays the combined score for the entire TIM report/TIM questionnaire.

Overall data accuracy level

low medium high

Please note that SDAQ questions can cover one or multiple "topic" questions in the TIM questionnaire. To help you identify these "topic" questions, we have marked them in brackets (ie. A1.1e, A1.1f-A1.1i).

A) Basic

The basic accuracy level displays the score for all basic questions about the location.

Basic questions data accuracy level

low medium high

A1.1e) Number of residents

- **Source** of the data: Third party source: State Statistical Service, http://www.ukrstat.gov.ua/
- **Frequency** of data collection: Once per year
- **Accuracy** of data: Data is not accurate

A1.1f - A1.1i) Number tourism service providers, types and scale of tourism

- **Source** of the data: Own analogue source
- **Frequency** of data collection: Once per year
- **Accuracy** of data: Data is not accurate

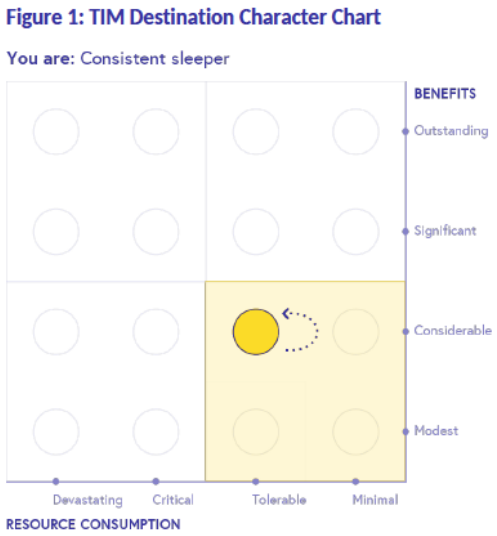
A1.1l - A1.1m) Number of one-day visitors and number of overnight stays

- **Source** of the data: Expert estimation
- **Frequency** of data collection: Several times per year
- **Accuracy** of data: Data is not accurate

With the contribution of the European Maritime and Fisheries Fund of the European Union

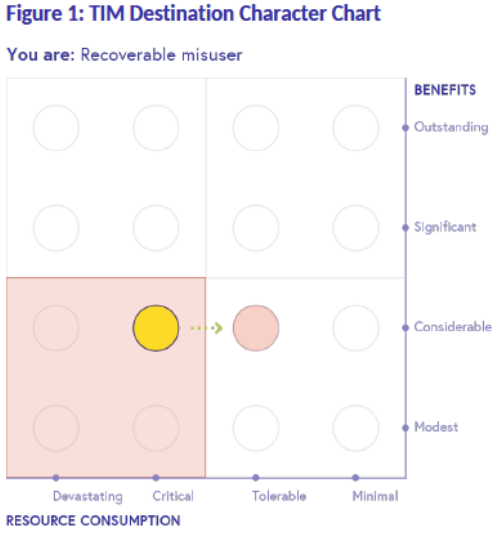
TIM results

Sfantu Gheorghe (RO)



Data accuracy

Batumi (GE)



Data accuracy

- *All destination have a dominant Slepeer character* - small benefits from tourism but also small negative impact of tourism

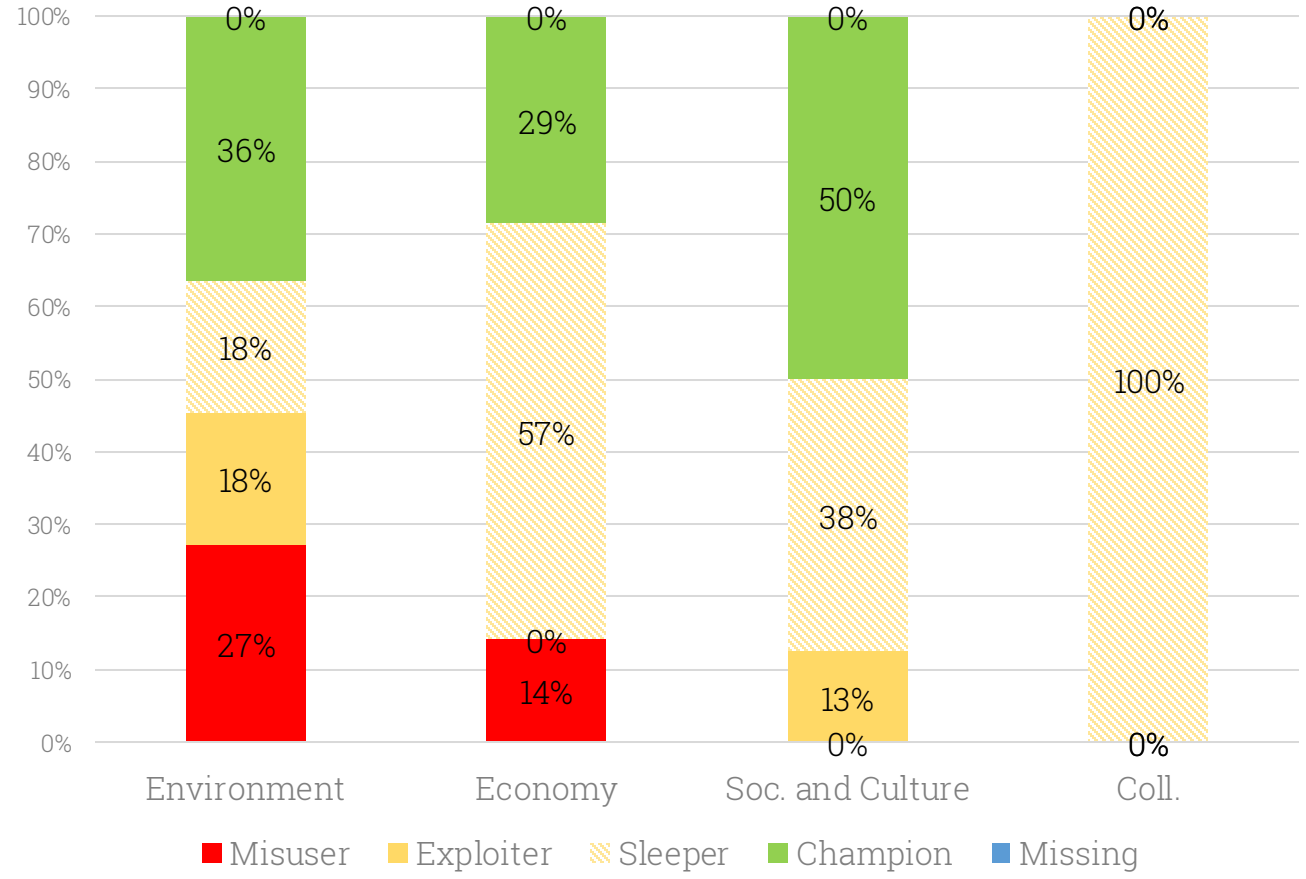
- *Big destinations* (Odesa – UA, Batumi – GE, Constanta – RO) show *more negative impacts of tourism* (Misuser and Exploiter character)

With the contribution of the European Maritime and Fisheries Fund of the European Union

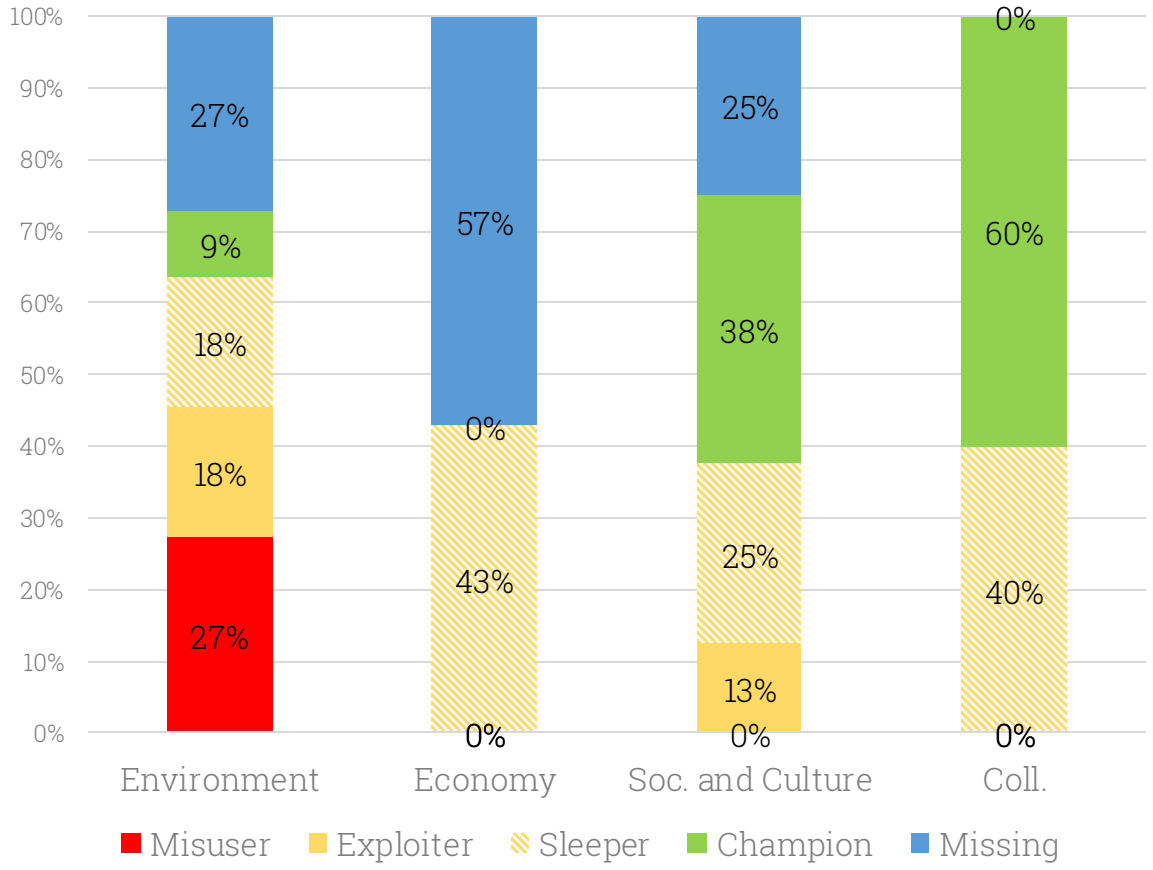
TOURISM IMPACT MODEL by tourism 4.0

TIM results

BATUMI TIM RESULTS



ODESSA TIM RESULTS



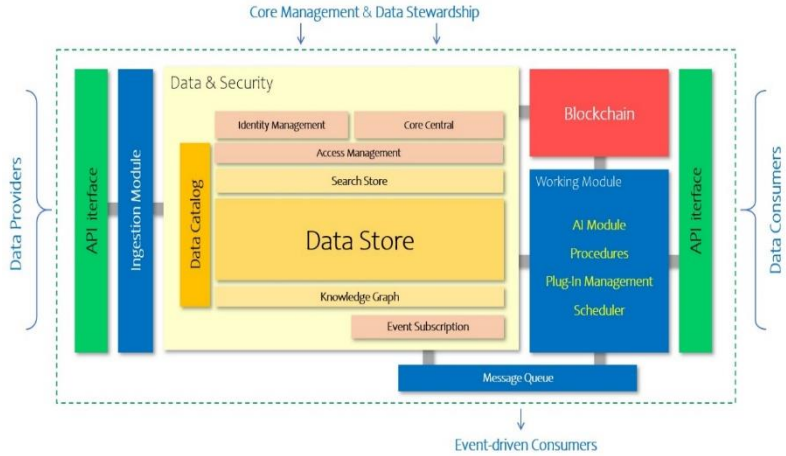
With the contribution of the European Maritime and Fisheries Fund of the European Union

How to improve TIM results

PRIORITY ON SOLVING DATA CHALLENGES

1. **Self-assessment of Data readiness for TIM:**
- Using TIM technology (AAT), already in development
- Readiness tools works in connection with TIM Data accuracy report

2. **Big Data and automatic data collection through T4.0 Core:**
- Aggregated data feed and validate TIM data
- Better understanding; reduced work for the user
- Digital / real time data collection using APIs and Data catalogue of T4.0 Core



Picture of T4.0 Core. Author: Arctur d.o.o.

BETTER DATA MANAGEMENT AND TOURISM DECISIONS

- Performed self-assessment and improved data accessibility
- Action plans to improve data usability and TIM results
- Implementation of tourism strategies, marketing, sales

With the contribution of the European Maritime and Fisheries Fund of the European Union

First hand experience with TIM

TOURISM IMPACT MODEL by tourism 4.0

Tinatin Zoidze
Head of Department of Tourism and Resorts of Adjara AR, Georgia

With the contribution of the European Maritime and Fisheries Fund of the European Union

tourism 4.0 for the Black Sea

With the contribution of the European Maritime and Fisheries Fund of the European Union

Tourism 4.0 for the Black Sea – Big Data Analytics

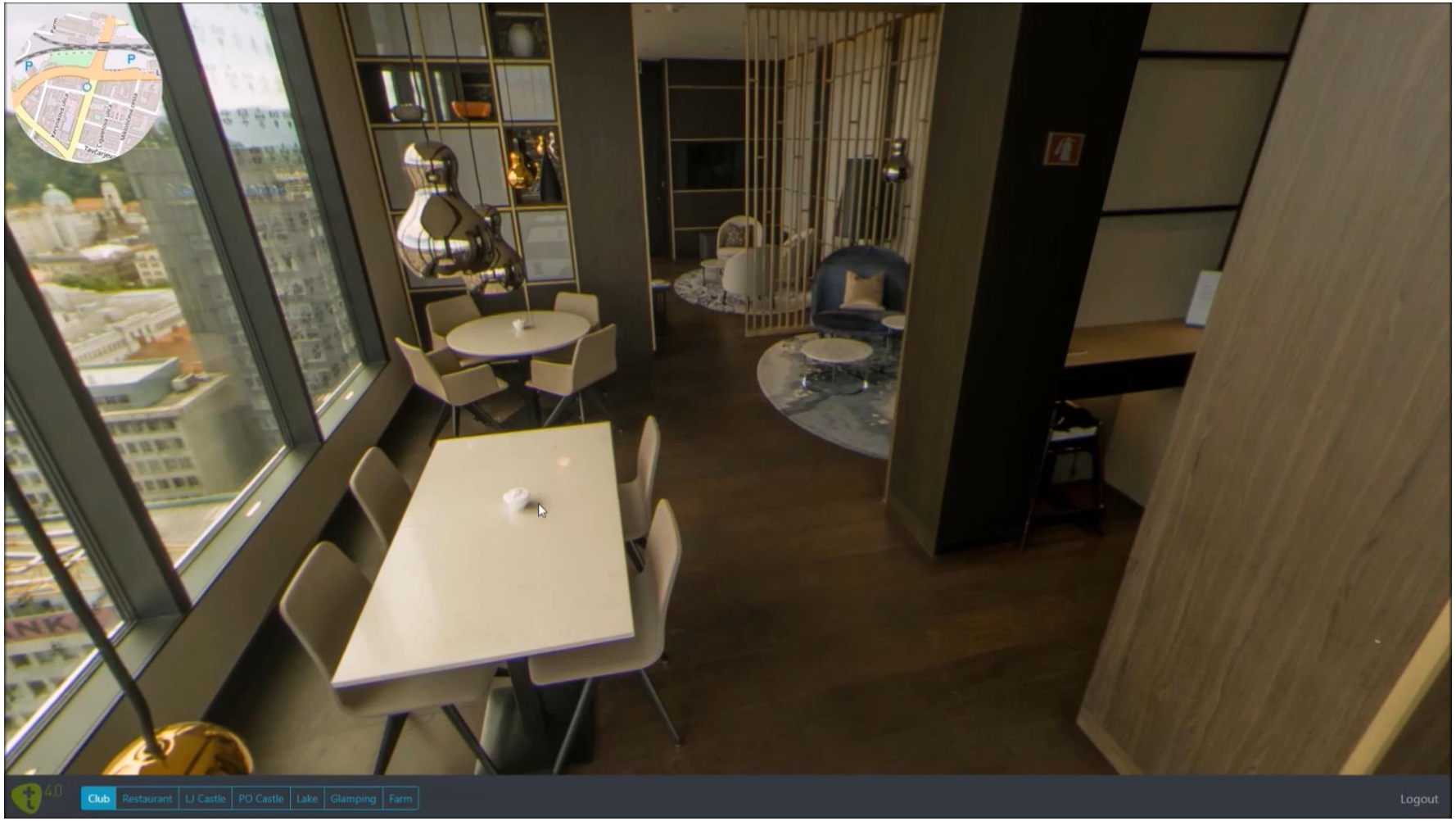
Samo Eržen, *Research Engineer, Arctur*

ARCTUR · hcl Management · aRo accessibleRomania by SanoTouring · Tourism Institute · Agrikola Одеса Україна · Universitatea „Ovidius” din Constanța

TOURISM IMPACT MODEL
by tourism 4.0

A look into the future

Enriched tourism experience through data



With the contribution of the European Maritime and Fisheries Fund of the European Union

A look into the future

- T4BS achievements are a pilot for a future work on digitalisation of tourism in the Black Sea
- Potentials for a more holistic picture of tourism through good cases of data sharing

With the contribution of the European Maritime and Fisheries Fund of the European Union