From vulnerability to resilience:
New (big) data and methods to characterize tourism in European regions

Filipe BATISTA
European Commission, Joint Research Centre, Territorial Development unit

Science Meets Regions event on “Coastal and Maritime Tourism & Sustainable Growth”
Pori, Finland
26 September 2019
The JRC at a glance

- European Commission's science and knowledge service.
- Supports EU policies with independent scientific evidence.
- 3000 staff (3/4 research staff)
- Headquarters in Brussels + research facilities in 5 Member States
- +1400 scientific publications yearly
The Knowledge Centre for Territorial Policies

- Part of a wider European Commission strategy on “Knowledge 4 Policy” aiming at improving communication and interaction between science and policy.
- The KCTP aims at supporting territorial (urban & regional) development policies by promoting better holistic knowledge management and dissemination.

**Key components:**
- Knowledge base (data, indicators)
- Analytical and modelling capacity
- Community of Practice on Cities (CoP-Cities)
- Field studies (City-labs)
- Urban Data Platform

http://ec.europa.eu/knowledge4policy/territorial
Tourism – key characteristics

**Important economic sector in Europe**

- Travel and tourism sector contributed with **9.7%** to the EU GDP and Employment in 2018 (direct, indirect, induced contributions) (source: World Travel and Tourism Council).

**Strong spatial dimension**

- Tourism sector is not evenly distributed across countries and regions owing to geographic, cultural and socio-economic features and characteristics.
- Important regional and local impacts.

**Strong temporal dimension**

- Tourism is affected by seasonality (uneven tourism demand across seasons) due to climate patterns, holiday calendar, events.
Spatiotemporal patterns of tourism

Objectives of the study

- Systematically assess the spatial and temporal patterns of tourism in Europe (EU28) at high resolution;
- Obtain new insights regarding spatial patterns of tourism in Europe regionally.

Materials & Methods

- Emerging sources of big geospatial data (i.e. online booking platforms);
- Official statistics (Eurostat, NSIs);
- GIS & data fusion.
Workflow

Nights-spent, annual, NUTS2 (Eurostat)

Temporal disaggregation

Nights-spent, NUTS3, monthly

Online booking platforms data, point-based

Processing

Room density, pixel (100m)

Nights-spent or arrivals, NUTS2/3, quarterly/monthly (NSIs)

Spatial disaggregation

Tourists, pixel (100m), monthly
Tourism capacity

Data sources

✓ Booking.com

Location of touristic accommodation establishments and their capacity (no. of rooms) for Europe (0.53M records).

✓ TripAdvisor.com

Location of tourist accommodation establishments, restaurants (and bars, pubs, etc.) and attractions (e.g. museums, parks, sightseeing spots).

No. of reviews, seasonal breakdown, costumer rating for each location (1.2M records).
Nights-spent, annual, NUTS2 (Eurostat)

Temporal disaggregation

Nights-spent, NUTS3, monthly

Online booking platforms data, point-based → Processing → Room density, pixel (100m)

Nights-spent or arrivals, NUTS2/3, quarterly/monthly (NSIs)

Spatial disaggregation

Tourists, pixel (100m), monthly
Workflow

Nights-spent, annual, NUTS2 (Eurostat)

Temporal disaggregation

Nights-spent, NUTS3, monthly

Spatial disaggregation

Tourists, pixel (100m), monthly

Online booking platforms data, point-based

Processing

Room density, pixel (100m)

Nights-spent or arrivals, NUTS2/3, quarterly/monthly (NSIs)

Processing Room density, pixel (100m)
Results

Average daily presence of tourists in April
Results – different spatial patterns

a) London
b) Paris
c) Rimini
d) Santorini
e) Venice

Average daily
no. of tourists / ha

0 2 4 km

<= 0
1 - 2
3 - 5
6 - 10
11 - 50
51 - 100
101 - 150
151 - 300
> 300
Results – seasonal fluctuations

Monthly tourism density in Croatia
Results – seasonal fluctuations
Tourism density

August

Busiest month of the year (on average).

Main hotspots:

- Coastal areas
- Islands
- The Alps
- Cities
Tourism density

**November**

One of the quietest months of the year (on average).

Main hotspots:

- Spanish coastal areas and islands remain comparatively popular.
Tourism popularity

Many areas are popular year-round.

- Central Europe (high population and firm density, business destinations)
- Cities, the Alps and some coastal areas.

Overall low tourism density and low popularity:

- Eastern Europe
- Northern Europe

Sparse locations in Ireland, Scandinavia and Eastern Europe become relatively popular in Autumn and Winter.
Tourism seasonality

Seasonality is a result of uneven temporal demand for tourism. Driven by climate conditions, holiday calendar, events.

Regions mostly affected by seasonality:
- Coastal
- Islands
- Mediterranean basin

Cities are less affected by seasonality.

Seasonality determines fluctuation of revenues, employment, under/over utilization of infrastructure, services and resources.
Tourism seasonality

Intra-regional variation

The province of Barcelona shows very distinct patterns of seasonality between the city and the nearby coastal areas (just a few kilometers apart).

Fine-scale estimates based on time-tagged customer reviews of tourist accommodation establishments.
Tourism intensity

Relates the number of inbound tourists with size of regional population.

May indicate economic dependence of a region on the tourism sector and/or pressure on local resources and services.

Typically, **cities score low**, despite being major touristic hotspots.

**Higher intensity** in islands and some mountainous and coastal regions.

Territories with low tourism demand may still score high intensity (e.g. Northern Scandinavia).
Tourism vulnerability

Susceptibility of a region to be affected in case of shocks in the tourism sector (e.g. economic crises, terrorism, transport or environmental disruptions).

Combines tourism seasonality with tourism intensity.

Other factors may affect actual vulnerability.
Regions scoring high in both seasonality and intensity are deemed more vulnerable. Countries like Italy, Austria, Denmark have a large share of regions scoring high vulnerability.

To become more resilient, vulnerable countries/regions may consider:

- Diversifying tourist supply throughout the year;
- Attract tourists from multiple origins;
- Promote other viable sectors.
Tourism, new platforms and housing pressure

AirBnB listings (year 2018) have a **lower average price** than more traditional accommodation options (e.g. hotels). This makes it a **competitive alternative**.

AirBnB generates up to 2.2 times more gross income than long term rental. The **competitive advantage over hotels, combined with higher rental profits, may be contributing to shortage of housing for long term rentals**. This is especially relevant in touristic destinations.
1. Tourism management policies must underpin sound data and knowledge.

2. Combining emerging sources of geospatial data with official statistics improves our knowledge regarding tourism at regional and local levels:

- Territories can be characterized and compared according to their tourism intensity and tourism concentration (spatial and temporal), at multiple scales;
- Helps detect emerging tourist destinations, as well as hotspots of potential environmental and/or social stress;
- Can be used to monitor and manage accommodation supply levels.
3. Issues regarding emerging sources of big data cannot be ignored:
   - (un)Sustained data production and/or access (technical / legal barriers);
   - Quality (e.g. consistency, completeness, accuracy) cannot be guaranteed (and sometimes not assessed).

4. Way forward
   - Institutional agreements / partnerships with private operators to streamline data exchange.
Thank you

Filipe Batista

filipe.batista@ec.europa.eu