ENHANCING TOURISM ANALYTICS THROUGH MOBILE NETWORK DATA: A CASE STUDY OF VENICE AND THE VENETO COAST

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FASTWEB + vodafone

MOBILE ANALYTICS

MOBILE TELCO DATA

Big data analysis suite based on Vodafone Italia network

300k network cells
98% of Italy

>20 million customers in Italy

Privacy by design: aggregated & anonymized data

1/3 Italian customers

40% of foreign users roaming-in

Collective behaviour of homogeneous groups

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MOBILE ANALYTICS

KEY METRICS

Location and footfall

Unique visitors and total visitors within an area and by time slot

Temporal and spatial comparison

Possibility to compare the various indicators in several periods or on several areas

Insights

Digital Grade, Spending Power, Dwell time, Frequency of Visit, Distance Traveled

Socio-demographic

Gender, age, origin (nationality for foreigners, municipality and zip code for Italians), place of work

Profiles

Inhabitants, Tourists, Habituals, Visitors

Origin – Destination Matrix

Tracking the users from the point of origin to the destination with information on the means of transport

References

(BD4T) Methodologies for the integrated interpretation of Big Data to favour a holistic understanding of touristic phenomena.

Spoke 6
Ca' Foscari University of Venice
iNEST
Tourism, culture and creative industries

Motion Analytica

innovactors

GOAL:

Use telco & spending Big Data to enrich tourism statistics and go beyond limits of official data

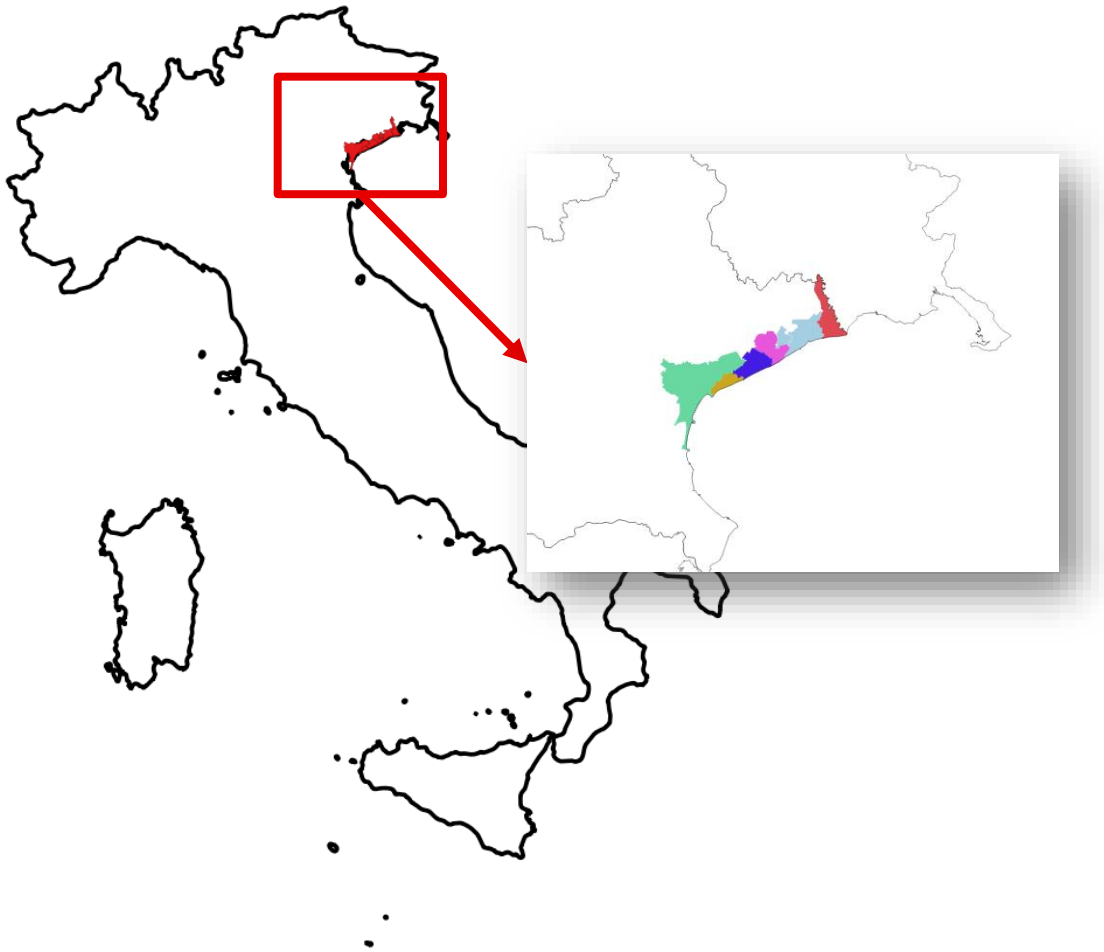
INNOVATION:

- Higher granularity & faster results
- New tourist definitions based on real visitation behavior
- Integrated methodology combining telco, official stats, and spending data

SCOPE:

Analysis on Venice and Veneto's coast main destinations

MNO BIG DATA PROJECT



Target Area:

- Venice with sub-zones: Cannaregio, San Marco, Lido, Murano
- Seaside destinations: Cavallino Treporti, Jesolo, Eraclea, Caorle, Bibione

Target period:

- Years 2023 and 2024

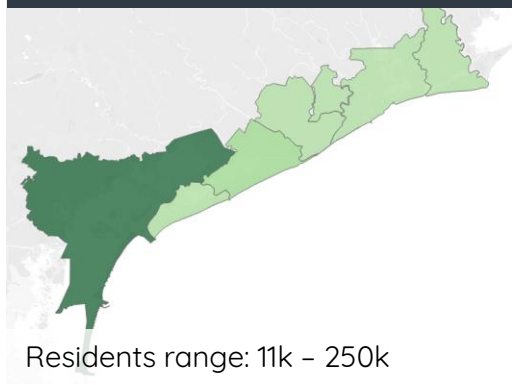
Objective:

Understanding tourism dynamics in Venice and Veneto coast:

- Get high frequency (daily) data and insights
- Understand tourists' behavior at sub-municipal level
- Analyze city users' "identikit" and behavior (same-day visitors, workers, habitual visitors)

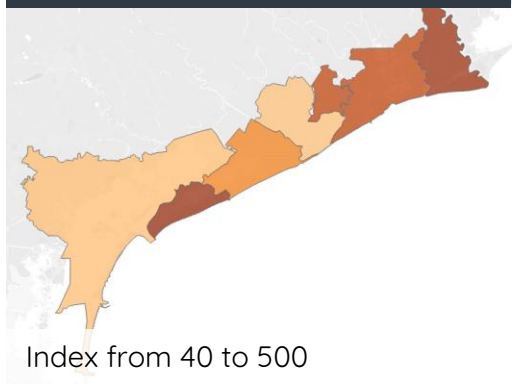
VENICE AND THE VENETO COAST: AN OVERTOURISM PHENOMENA?

RESIDENTS



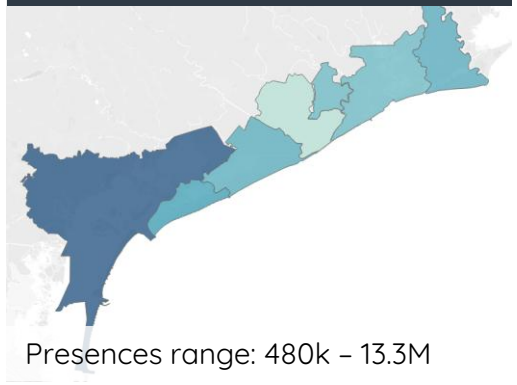
Residents range: 11k – 250k

"OVERTOURISM"



Index from 40 to 500

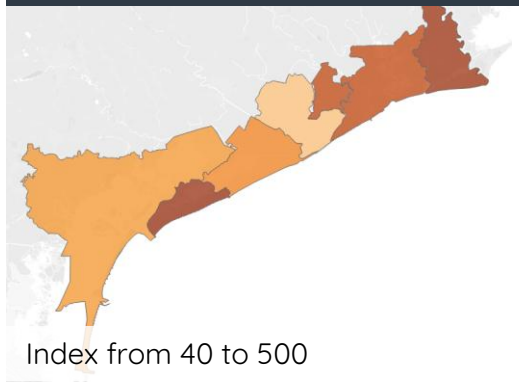
PRESENCE



Presences range: 480k – 13.3M

Data source: ISTAT 2024

"OVERTOURISM" *



Index from 40 to 500

*w/o "Terraferma" residents

CONTEXT:

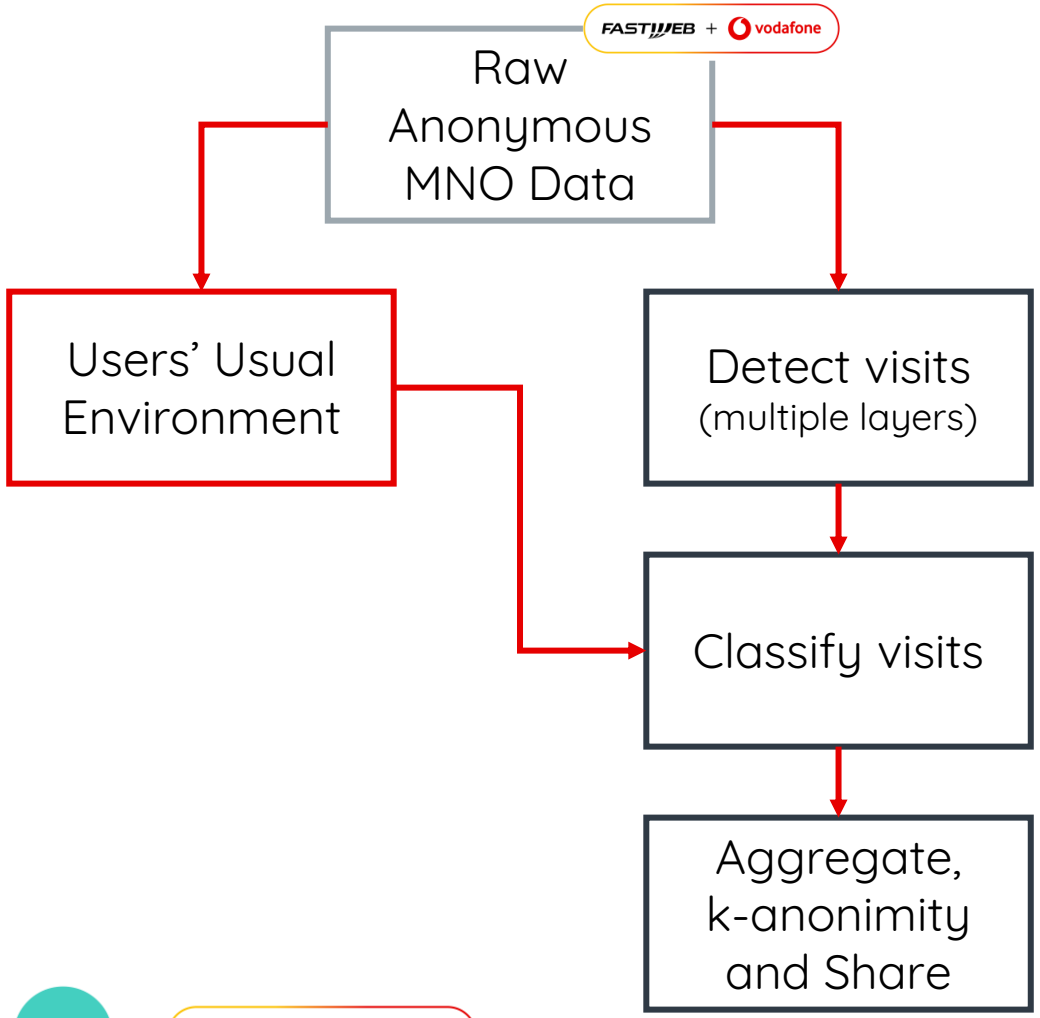
- Venice & Veneto coast are overtouristic areas: they attract more visitors than infrastructure can sustain
- Measuring overtourism is crucial for informed policies
- Index definition:

$$Tourism\ Index = \frac{Tourist\ presence}{Residents}$$

LIMITS OF OFFICIAL STATISTICS

1. Limited granularity
2. Require time to collect & validate
3. Little coverage of same-day visitors

MNO BIG DATA PROJECT: UNDER THE HOOD



Vodafone Italy collects **network logs** (originally for quality analysis).

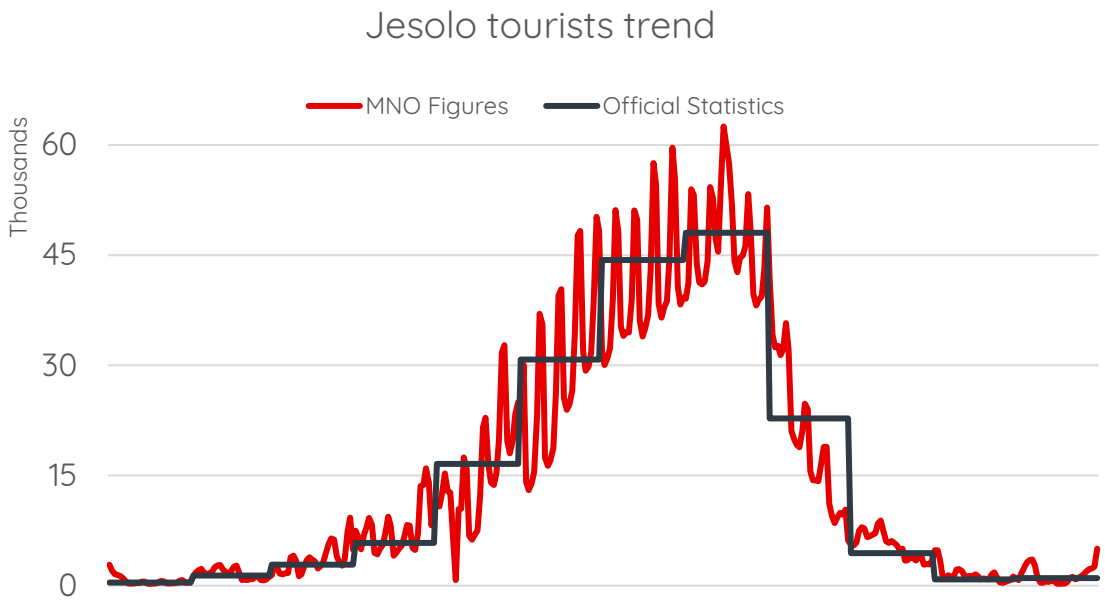
These data **can provide insights on people** behaviour, if processed accordingly:

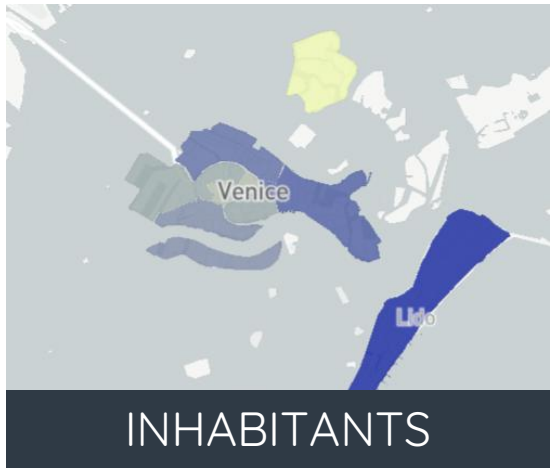
1. We **pre-process** data → **users' characteristics** (i.e. Usual Environment).
2. We detect **visits** in target area (i.e. Venice's Sestrieri).
3. By matching visits & characteristics we classify: **inhabitants, usual visitors, tourists, same day visitors**.
4. Data are then aggregated and fully anonymized before sharing.

WHAT CAN MNO BIG DATA PROVIDE?

MNO Big Data can provide:

- Spatially detailed analytics (i.e. sub-municipal)
- Time detailed analytics (up to minute level)
- Monitor and compare different users' groups





Data sources: Vodafone Analytics, ISTAT 2024

DRILLING DOWN OVER OVERTOURISM TIME VARIABILITY

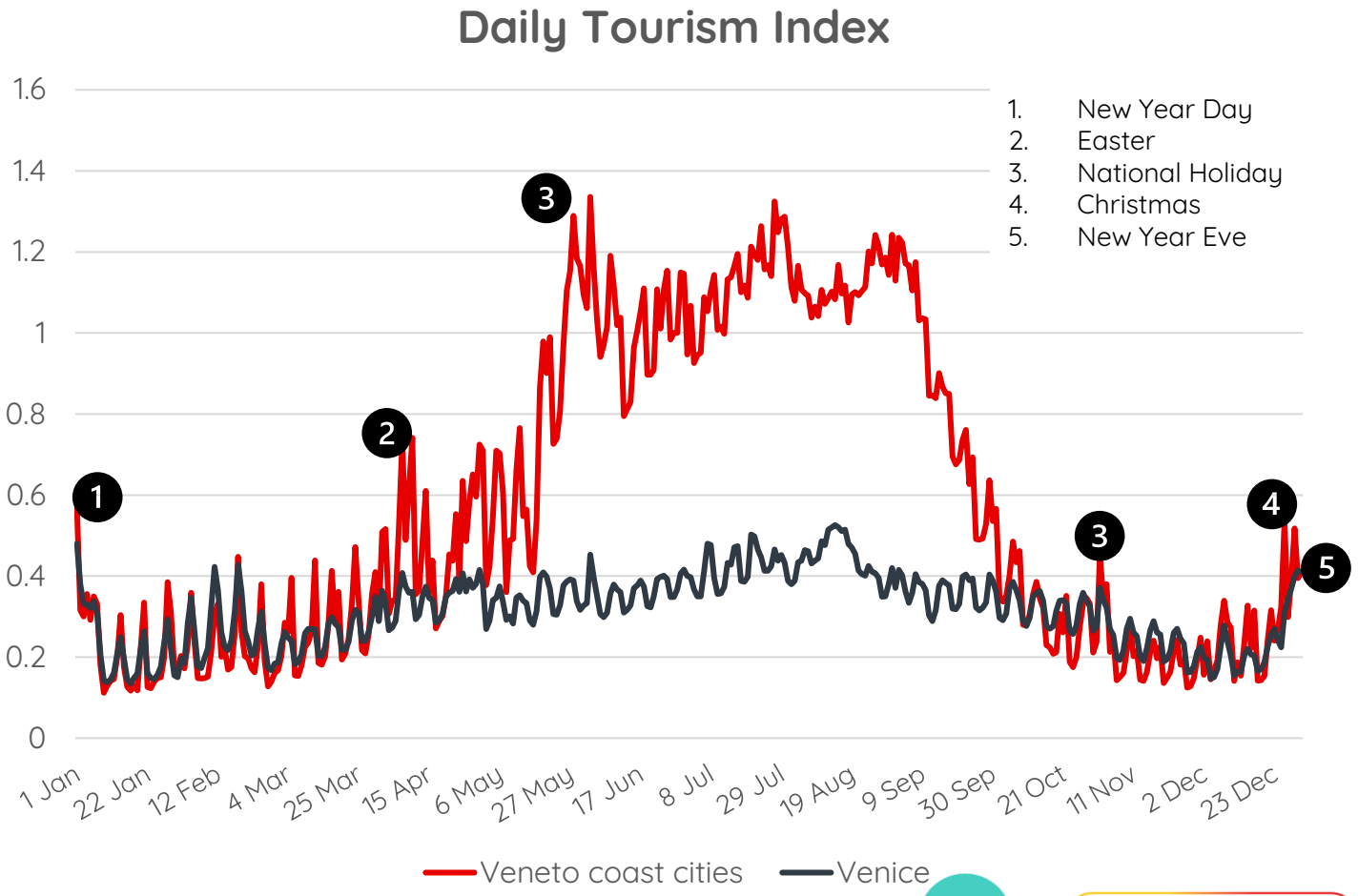
$$Tourism\ Index_d = \frac{T_d + S_d}{I_d + W_d + H_d} \ (*)$$

KEY TAKEOUTS:

- In summer, visitors weigh more on coast cities than Venice
- Visitors weight is greater on Weekends amplify visitor presence
- Holidays further increase preassure

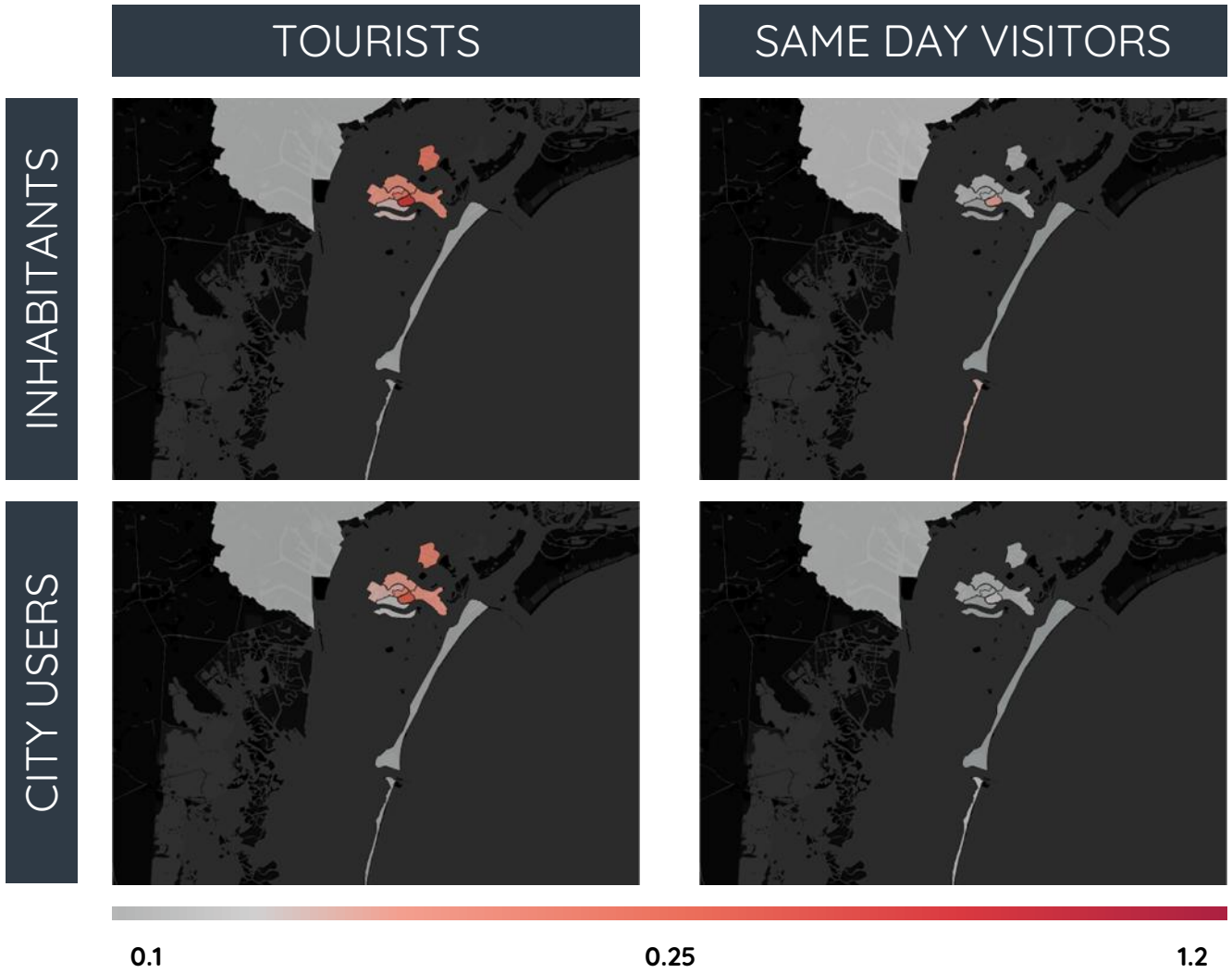
(*) on day **d**
TI: tourism index
T: number of tourists
S: number of same day visitors

I: number of inhabitants
W: number of workers
H: number of habitual visitors



Data sources: Vodafone Analytics

TOURISTS VS SAME DAY VISITORS

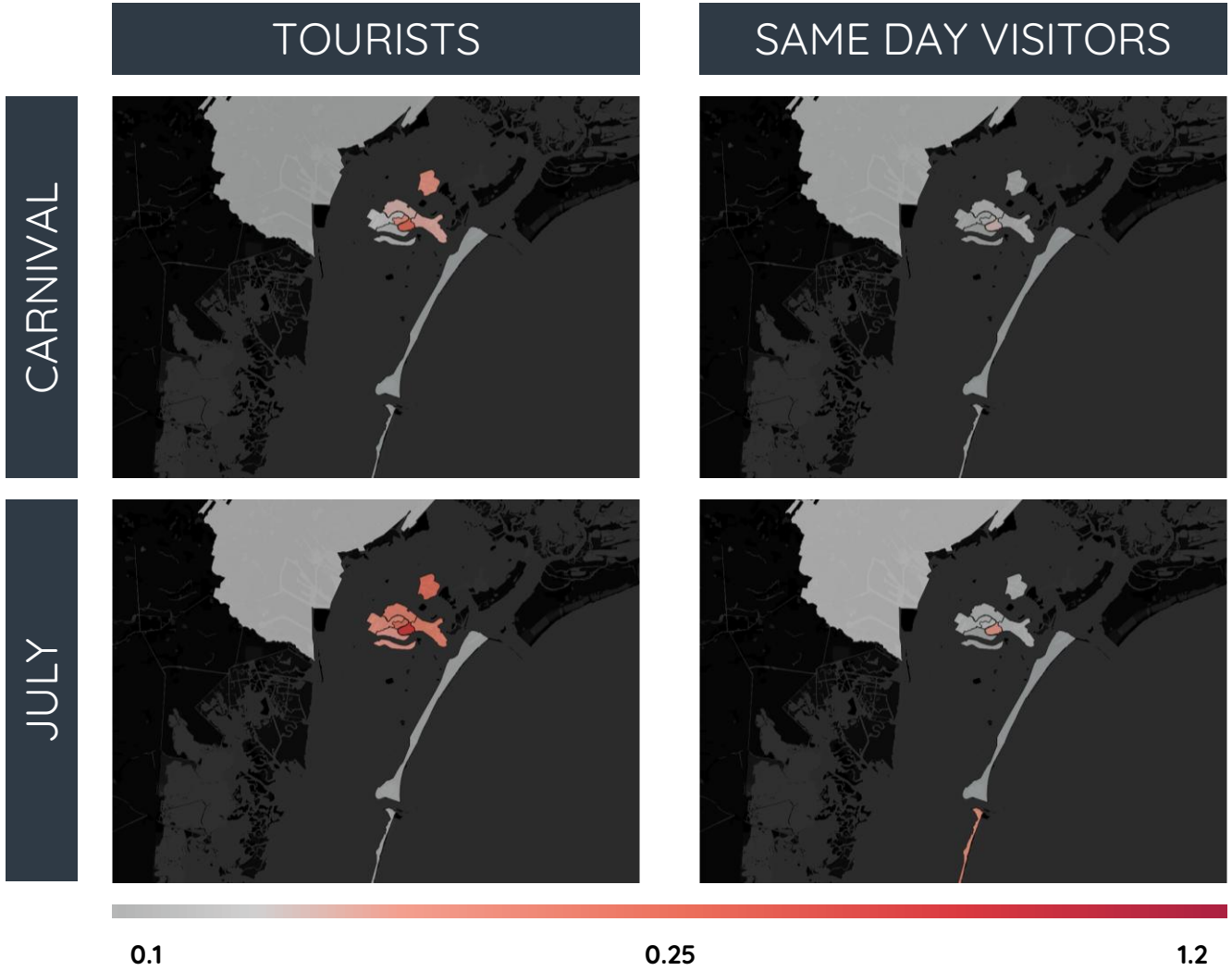


Data sources: Vodafone Analytics

Comparing same-day visitors and tourists, with/without usual visitors:

1. Same-day visitors increase the pressure on main touristic areas
2. Considering usual visitors and inhabitants lowers the overall index, but highlights the concentration of tourists in a few hotspots

TOURISTS VS SAME DAY VISITORS



Comparing same-day visitors and tourists (with usual visitors):

1. Tourists are more concentrated in carnival, they are more distributed in summer
2. Same-day visitors are clustered in “Sestriere di San Marco”, they explore “Pellestrina” in summer

Data sources: Vodafone Analytics

CONCLUSIONS

MNO BIG DATA PROS:

- They can provide fine-grained statistics:
  - High Time Resolution (i.e. daily data)
  - High Space Resolution (i.e. sub-municipal level)
- They can be used to investigate ad-hoc or unknown phenomena (i.e. custom definitions, same day visitors)
- Their results can be reproducible and timely

MNO BIG DATA CONS:

- Their figures may differ from official statistics
- Sometimes providing formal definitions may not be straightforward
- Some data knowledge and domain knowledge are required to make them actionable

ACKNOWLEDGEMENTS

Motion Analytica

VENETIARVM VNIVERSITAS
IN DOMO FOSCARI

Istat

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Spoke 6
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Insights from people & things in motion