



# Learning from BigData: Monitoring Room Rates by Destinations

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## CONTEXT

### Knowledge society

Information technology, New Metrics and Businesses Intelligence, provide a novel direction to support enterprise business and academic research in a new way.

Business Intelligence based on Internet is one of the most robust trends that has stimulated the growing interest in the field of strategic management and eScience (Teo and Choo, 2001; du Toit, 2003)

The new approaches provide an excellent tool to **anticipate** and estimate consumer habits on a **changing environment** (Shih et al., 2010).

## CONTEXT

### Knowledge society

Commitment is to provide insights in terms of knowledge creation and knowledge management in complex industries such as the hospitality field

- Public sector: support for policy making of the Administration, but not only (time-sensitive information modeling)
- Private sector: support business decision-making or tactical decisions (real time information modeling)

Different approaches might be needed when designing the research methods and the sources of data to be tackle

An enhanced understanding of the complex tourism market asks for multidimensional attribute structure research, multifaceted, **involving time and space**

## CYBER-PHYSICAL CONVERGENCE

The present time has been recognized as an **technology-mediated world**, with computing and communication entities interacting among themselves, as well as with users

## CONTEXT

### Knowledge society

In this technology-rich scenario, through out the multiple linked devices, information about the physical reality is seamlessly transferred into the cyber world

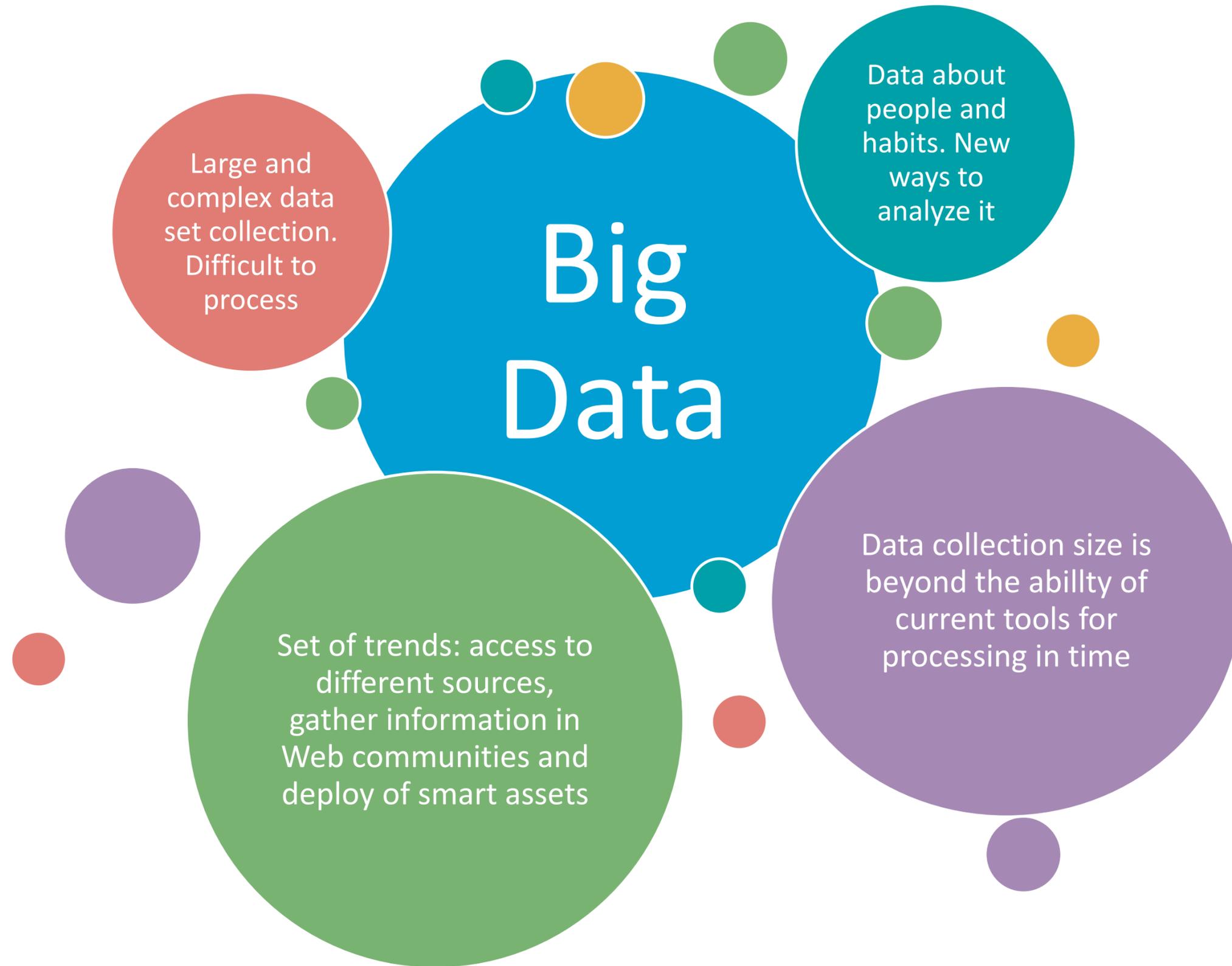
**It is not obvious how to transfer information and knowledge from the cyber world toward the physical one**

(Conti et al. 2011)

# CYBER-PHYSICAL CONVERGENCE

## Big Data

## Definition



# Big Data

## Big Data

## Scopes

Has

### *Features (5V)*

- Volume
- Velocity
- Variety
- Veracity
- Value

Oriented to

### *Computational Social Science*

- Human activity in digital footprint(Social Indicators)
- Collaborative process (Social Sc vs Computer Sc) : **Decision - making**

Applicability

### *Smart Destinations*

- New business models
- Beneficial for city systems (energy, transport, healthcare,..)
- Building of ICT platforms based on FI (Future Internet)

Should encourage the

### *Culture of data and Analysis*

- Privacy
- Access (*Open Data*)
- *OpenPDS (Personal Data Storage)* architectures
- What should analyze?, Why?

## NEW PARADIGM

The advance of internet and the new technology-mediated world, has significantly changed and even **transformed the structure of tourism value chain** and, in particular, the tourism distribution

## CONTEXT

### Knowledge society

It not only affects the choices available to the consumer, but also the business models and marketing strategies adopted by the various channel participants

## AIM OF THE PRESENTATION

1. describe the **capacities** of the developed hotel market **monitor** as a **novel research method**
2. assess the major structural changes and the complementarity of the methods in the **technological convergence**
1. understand the **role of ICT** in the **evolution** and **transformation** of **tourism information systems** and **knowledge management**

## BACKGROUND

Price competitiveness is an essential component in the overall tourism competitiveness of any tourism destination or industry.

## Price

- Countries and industries have developed price indicators.

## Digital Market

Price is one of the most important factor in decisions about whether, and where to market tourism products and services

Hotel price indexes are being developed like:

- Trivago HPI: most popular EU cities
- Expedia HPI: hotels.com, 18.000 global locations

## BACKGROUND

Price is one of the most effective variables that managers can manipulate to encourage or discourage demand in the short run (Aziz et al., 2011)

## Price

Online hotel reservation agencies like Booking.com cover most of the hotels and travellers use them surpassing other channels (Wong and Law, 2005; Magnini and Karande, 2011)

## Digital Market

- 46.2% of spanish tourists and 49.0% of foreigners use IDS when travelling to Spain (IET, 2011)

# BACKGROUND

Regional Information Systems

Micro vs. Macro



# BACKGROUND

Regional Information Systems

Micro vs. Macro



# TOURISM INTELLIGENCE

two pillars

Regional Information Systems

Micro vs. Macro

# BUSINESS INTELLIGENCE PLATFORM

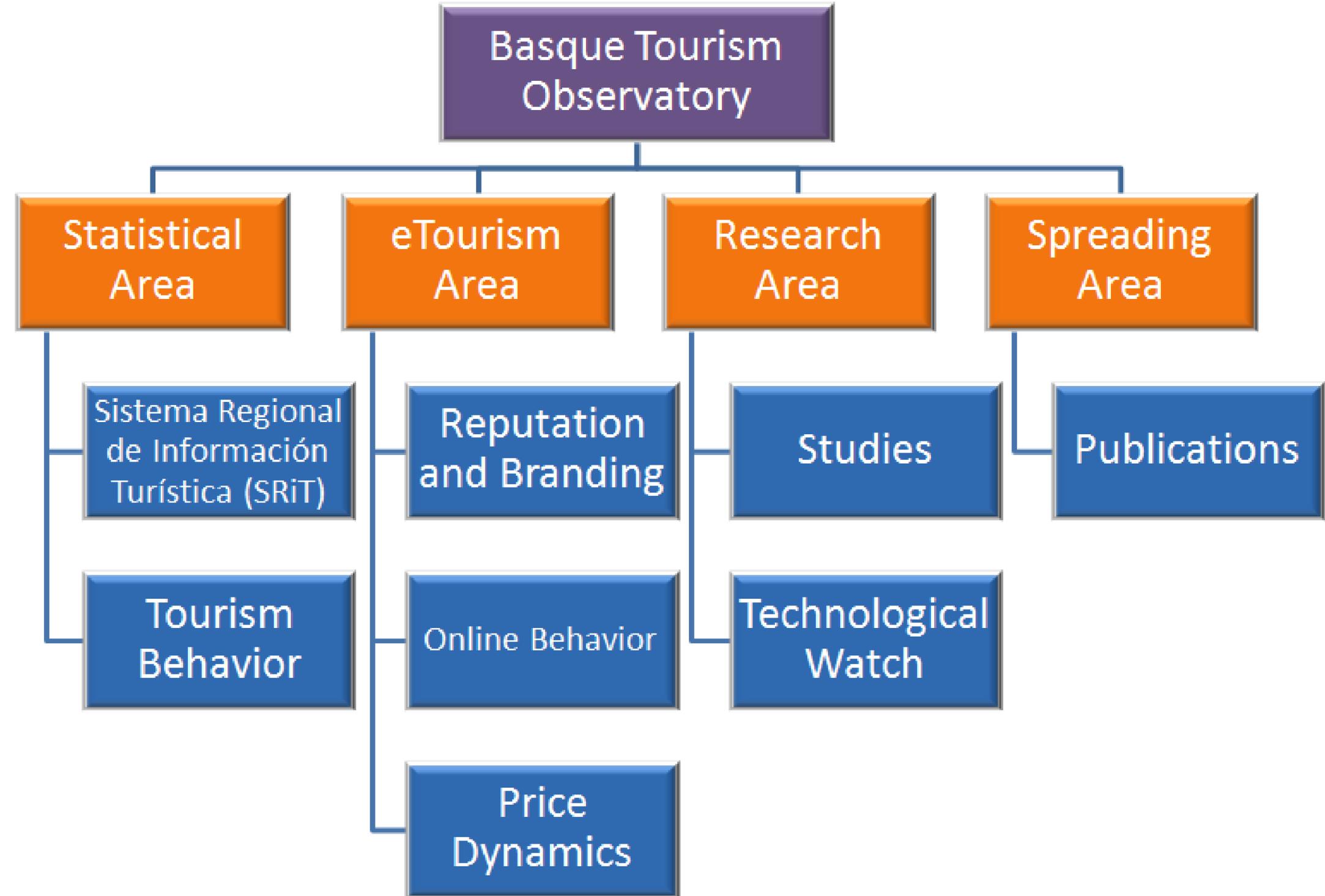
OPEN INNOVATION: CO-CREATION PLATFORM



# TOURISM INTELLIGENCE

## Regional Information Systems

## Micro vs. Macro



# TOURISM INTELLIGENCE

5 core units

Regional Information Systems

Micro vs. Macro



## OTE-BTO

OBSERVATORIO TURÍSTICO DE EUSKADI  
BASQUE TOURISM OBSERVATORY

# REGIONAL STATISTICAL SYSTEM

Visual Analytics /dashboards

Micro vs. Macro

**Último mes**

| 2013  |          | 2012    |           |
|-------|----------|---------|-----------|
| Abril |          | Abril   |           |
| Hotel |          | Hotel   |           |
| Real  | Objetivo | %       | Tendencia |
| 1,82  | 1,93     | -6,1 %  |           |
| 1,80  | 1,92     | -6,7 %  |           |
| 1,81  | 1,94     | -6,8 %  |           |
| 1,83  | 1,92     | -4,4 %  |           |
| 40,14 | 49,12    | -18,3 % |           |
| 31,93 | 43,09    | -25,9 % |           |
| 42,11 | 50,72    | -17,0 % |           |
| 39,92 | 48,58    | -17,8 % |           |

**Benchmarking de CCAA**

| CCAA               | Entradas  |
|--------------------|-----------|
| Andalucía          | 4.141.338 |
| Cataluña           | 4.091.578 |
| Canarias           | 3.458.903 |
| Madrid             | 2.913.851 |
| Valencia           | 2.119.252 |
| Castilla y León    | 1.128.233 |
| Islas Baleares     | 895.218   |
| Galicia            | 724.359   |
| Aragón             | 677.714   |
| Euskadi            | 648.442   |
| Castilla-La Mancha | 526.408   |
| Extremadura        | 361.628   |
| Murcia             | 331.795   |
| Asturias           | 316.275   |
| Navarra            | 237.476   |
| Cantabria          | 234.009   |
| La Rioja           | 151.135   |
| Ceuta y Melilla    | -35.631   |

**Mapa de entradas en Euskadi por CCAA (2013)**

**Distribución de entradas por CA**

**Análisis estacional**

**Index**

**Descripción**

Hoja de cálculo *interactiva* Permite *respuestas* a *preguntas concretas*

**Imagen**

Gráficos *interactivos* Diversos *indicadores* Diferentes orígenes (CCAA, Países *extranjeros*)

**1**

**2**

**3** Análisis de *oferta* y *ocupación* en Euskadi

- Informe con *tablas* y gráficos de *barras* integrados
- Análisis de las *plazas*, *habitaciones* y *grado de ocupación*

**4** Análisis *estacional*

- Gráfico *interactivo*
- Diversos *indicadores*
- Respecto a *estaciones concretas* (conjunto de meses)

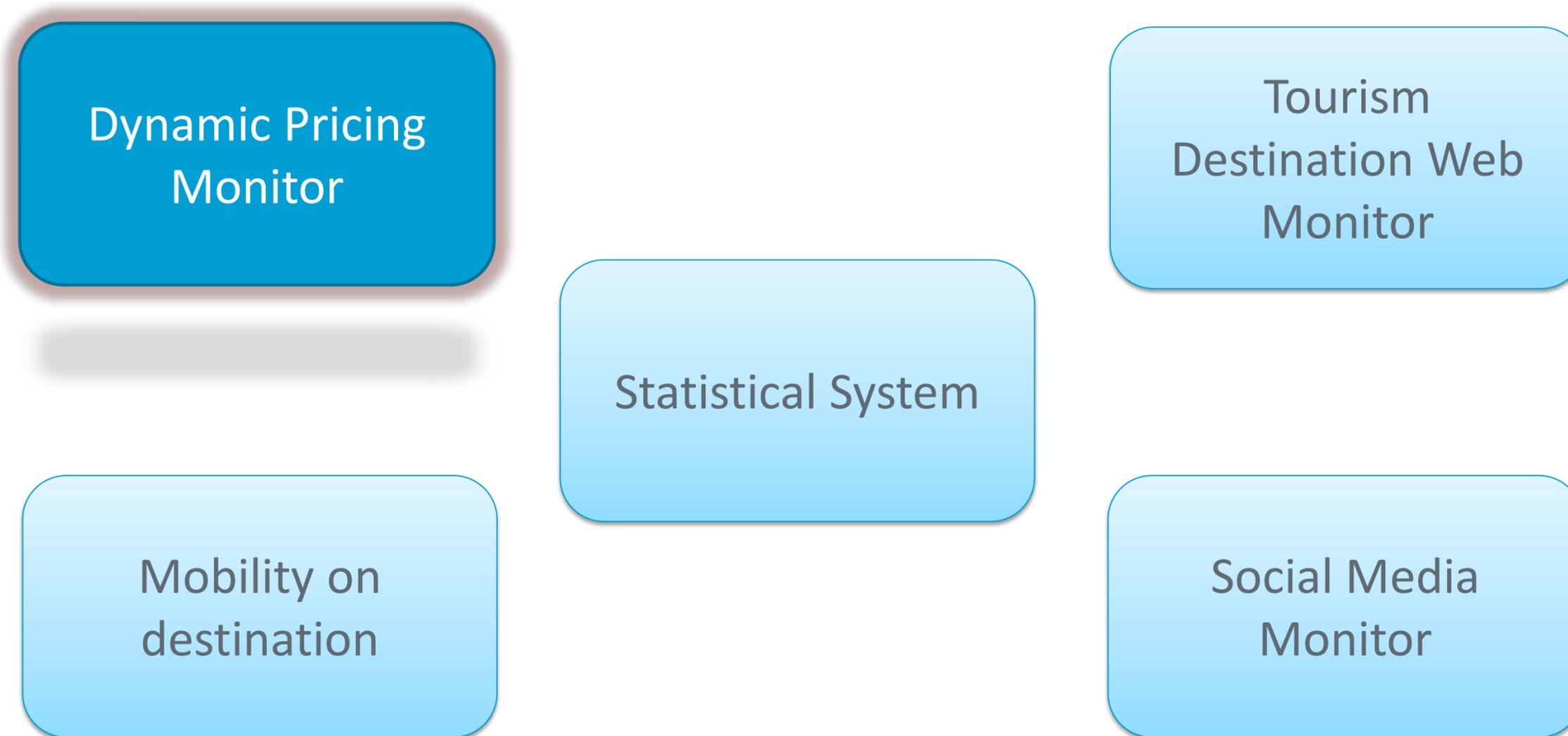
**Mapa de tipos de alojamiento**

Alojamiento  
 Boletín  
 Cuadro de Mandos (KPI)  
 Información Coyuntural  
 Evolución Histórica  
 Benchmarking de CCAA  
 Información de Análisis  
 Afluencia de Visitantes  
 Equipamientos culturales  
 Oficinas de Turismo  
 Tránsito de Viajeros  
 Aeropuertos  
 Puertos

# TOURISM INTELLIGENCE

5 core units

Regional Information Systems



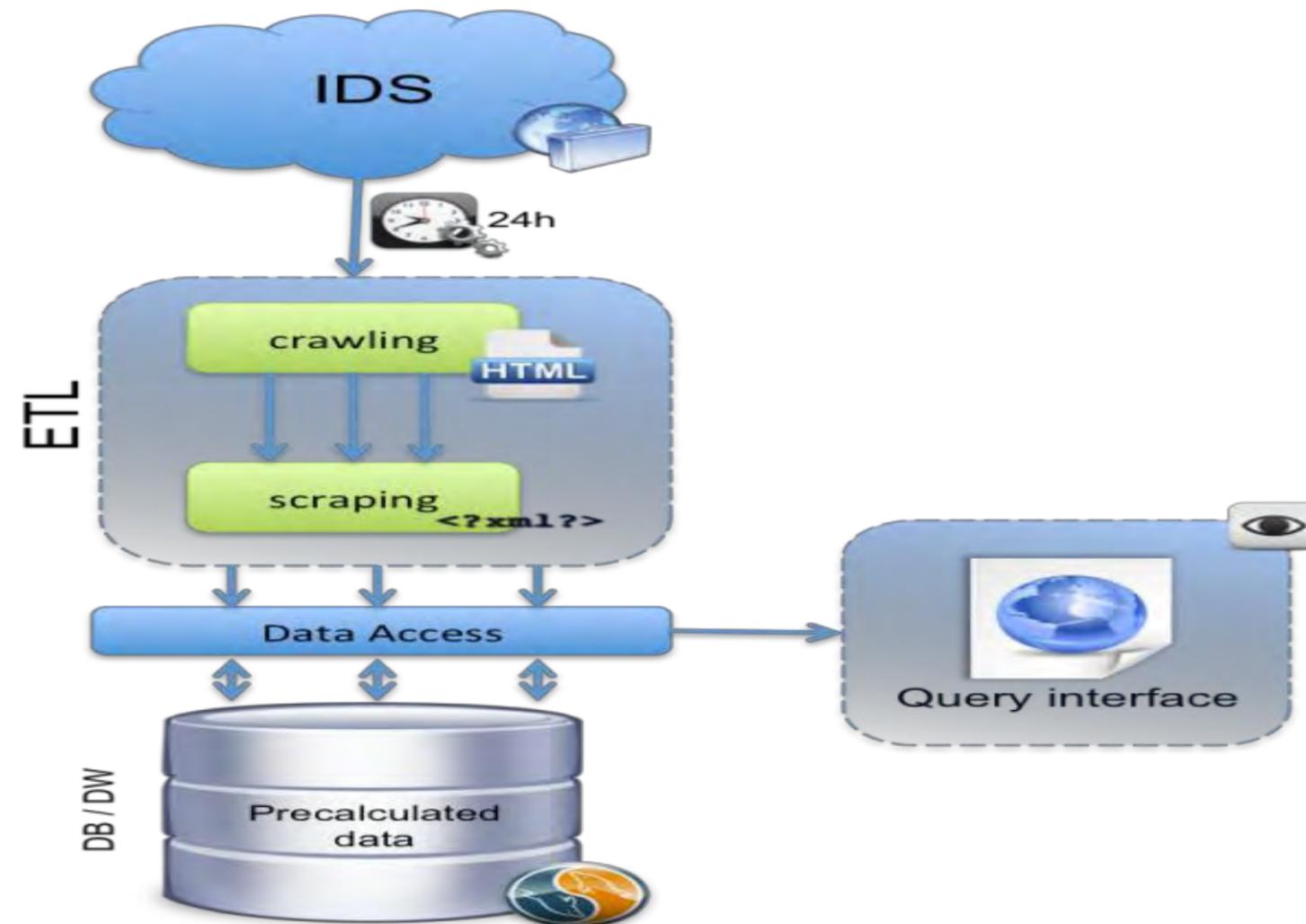
## OTE-BTO

OBSERVATORIO TURÍSTICO DE EUSKADI  
BASQUE TOURISM OBSERVATORY

# DYNAMIC PRICING MONITOR

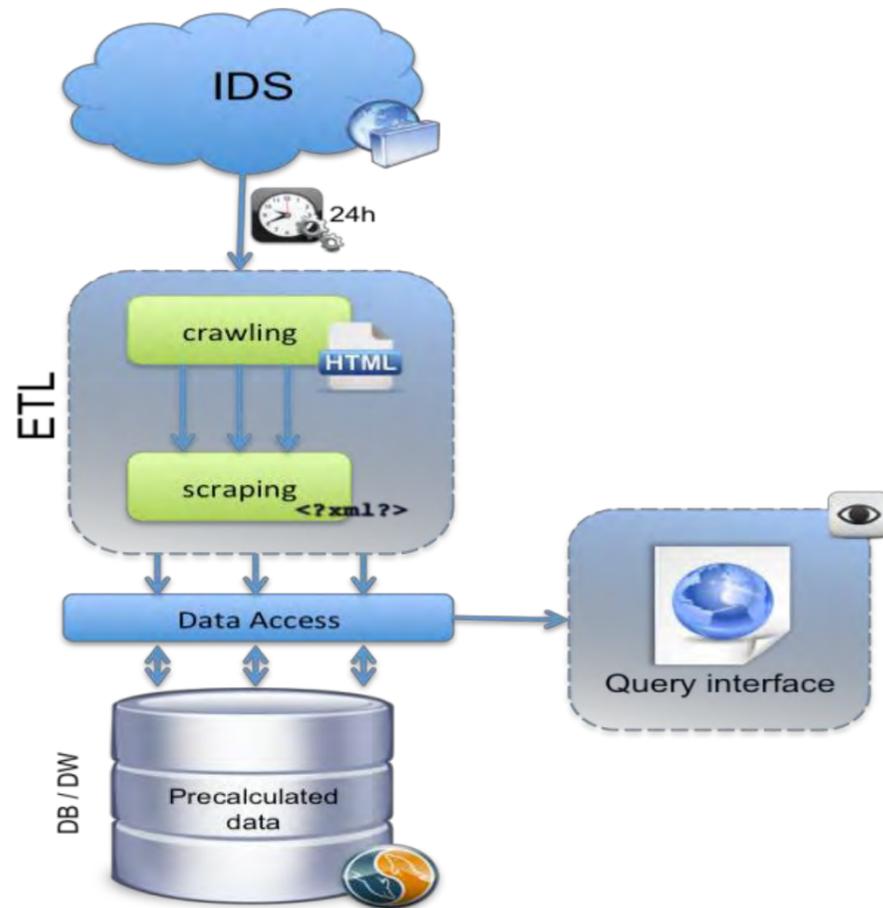
Dynamic Pricing Monitor gathers the price and availability information provided by online distribution channels (IDS)

It comprises a web crawler which uses screen scraping techniques in order to acquire prices and availability for twin bedded rooms on every available hotel for a given IDS, geographical and time scope



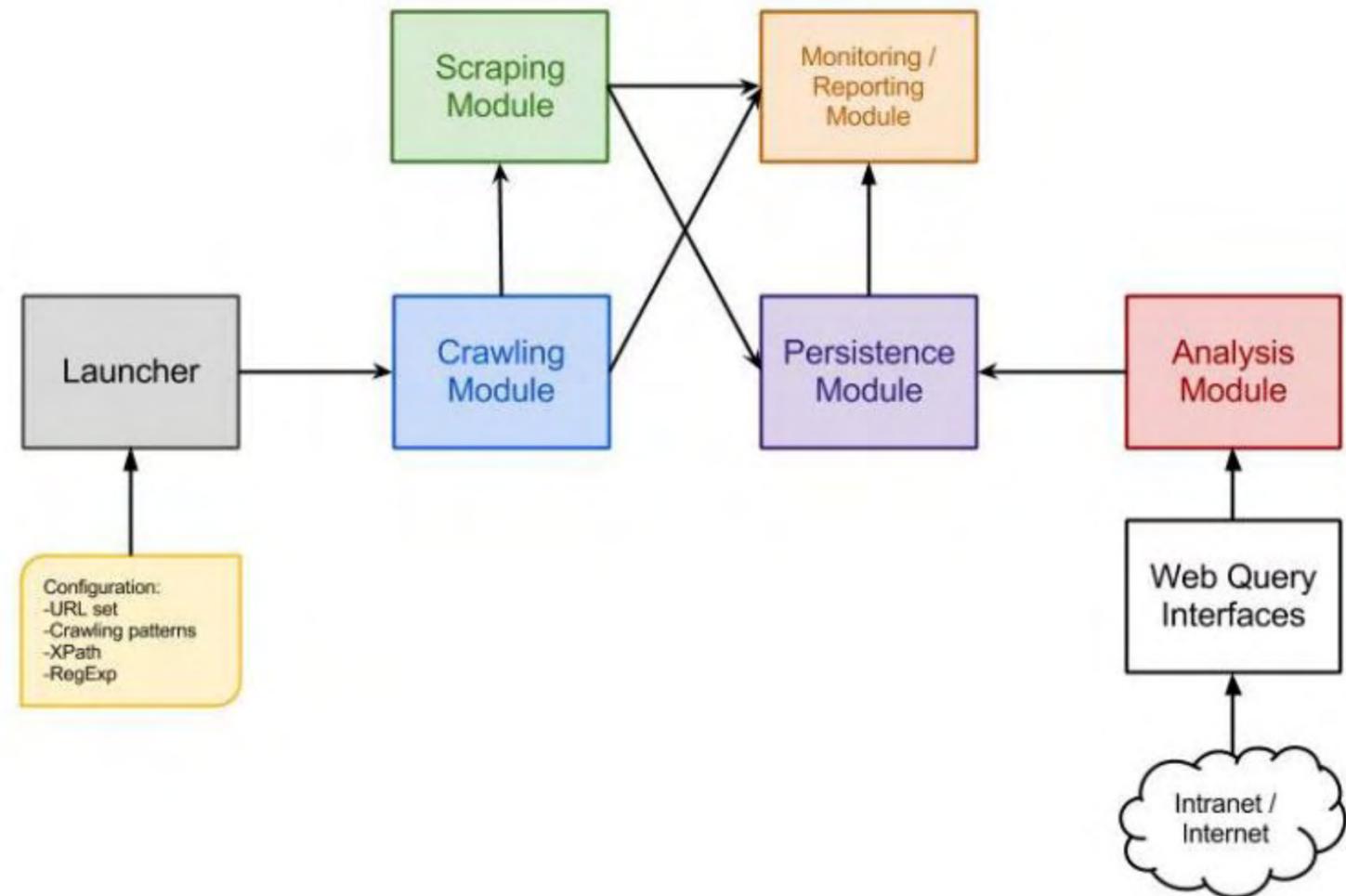
ETL  
Extraction  
Transformation  
Loading

# DYNAMIC PRICING MONITOR



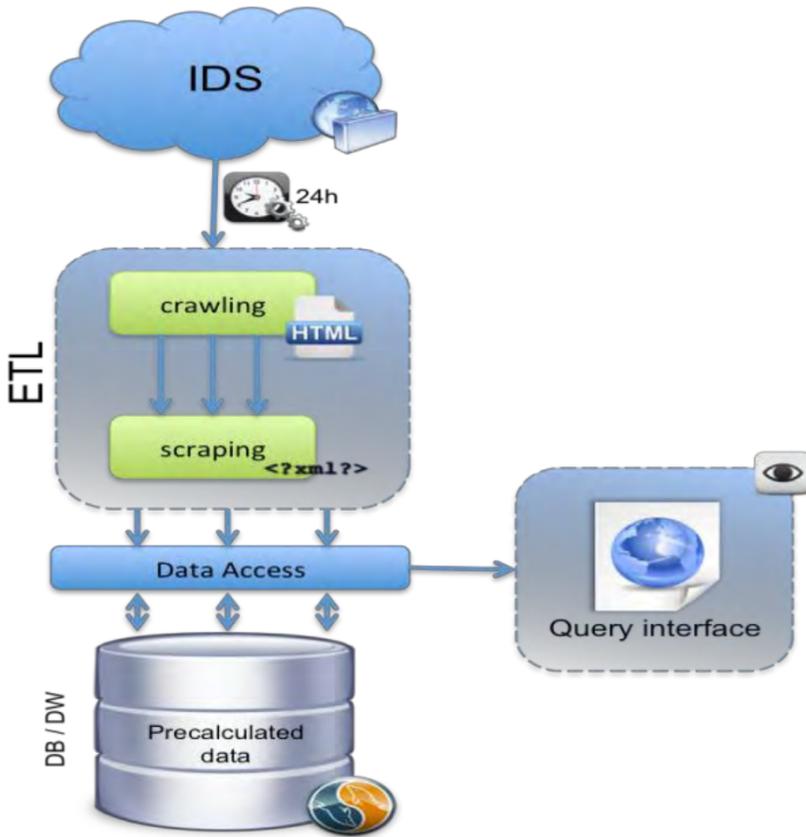
## Process

- Every 24 hours, data on accommodation prices are collected automatically
- The system asks for the price and availability of an overnight for the 1-28, 30, 45, 60 and 90 days -> Future price variation



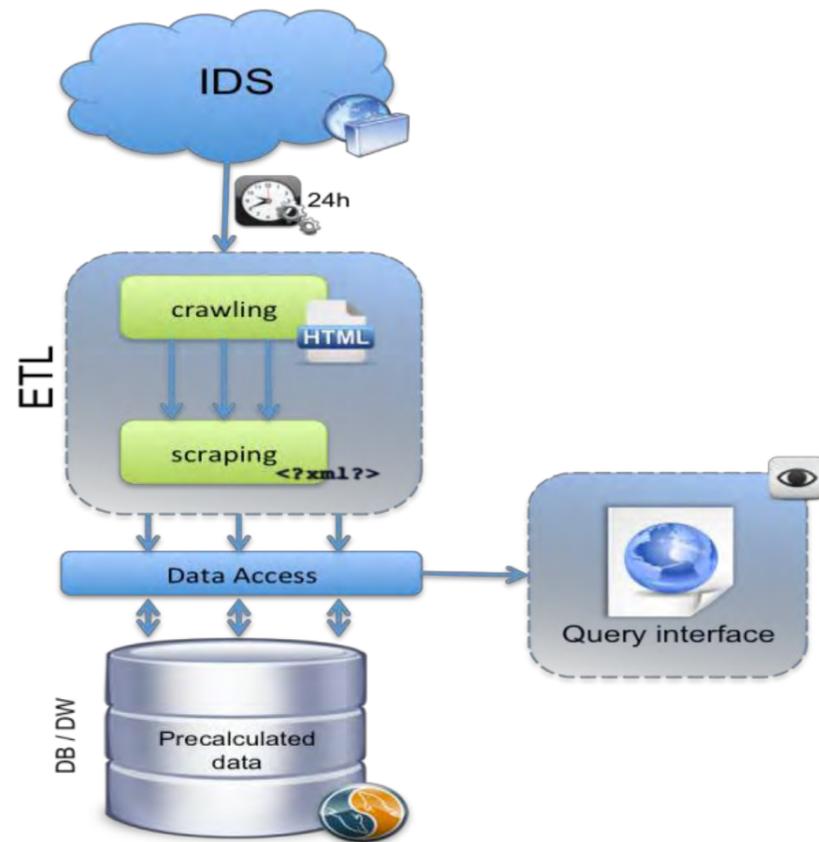
# DYNAMIC PRICING MONITOR

## Data volume



|   | Hotels | Records | Daily recs. | Hist. Series |
|---|--------|---------|-------------|--------------|
| Spain   | 11.569 | 140M    | 195K        | 5/2011       |
| France  | 13.784 | 135M    | 300K        | 10/2011      |
| Ireland   | 742    | 5M      | 18K         | 11/2012      |
| <i>Mediterranean Coastal Destination Sample</i> |        |         |             |              |
| Croacia   | 86     | 323K    | 2k          | 6/2013       |
| Egypt   | 33     | 123K    | 1K          |              |
| Greece  | 431    | 138K    | 10K         |              |
| Italy   | 1.105  | 2,5M    | 18K         |              |
| Morocco   | 217    | 812K    | 6k          |              |
| Portugal  | 163    | 141K    | 4k          |              |
| Tunisia   | 28     | 89k     | 1k          |              |
| Turkey  | 678    | 2,3M    | 16k         |              |

# DYNAMIC PRICING MONITOR



## It may address questions such as..

What is the average rate for 3 star hotels in Bilbao on a given day

Which European city showed the most economical room rates during Easter. Madrid, Paris or Rome?

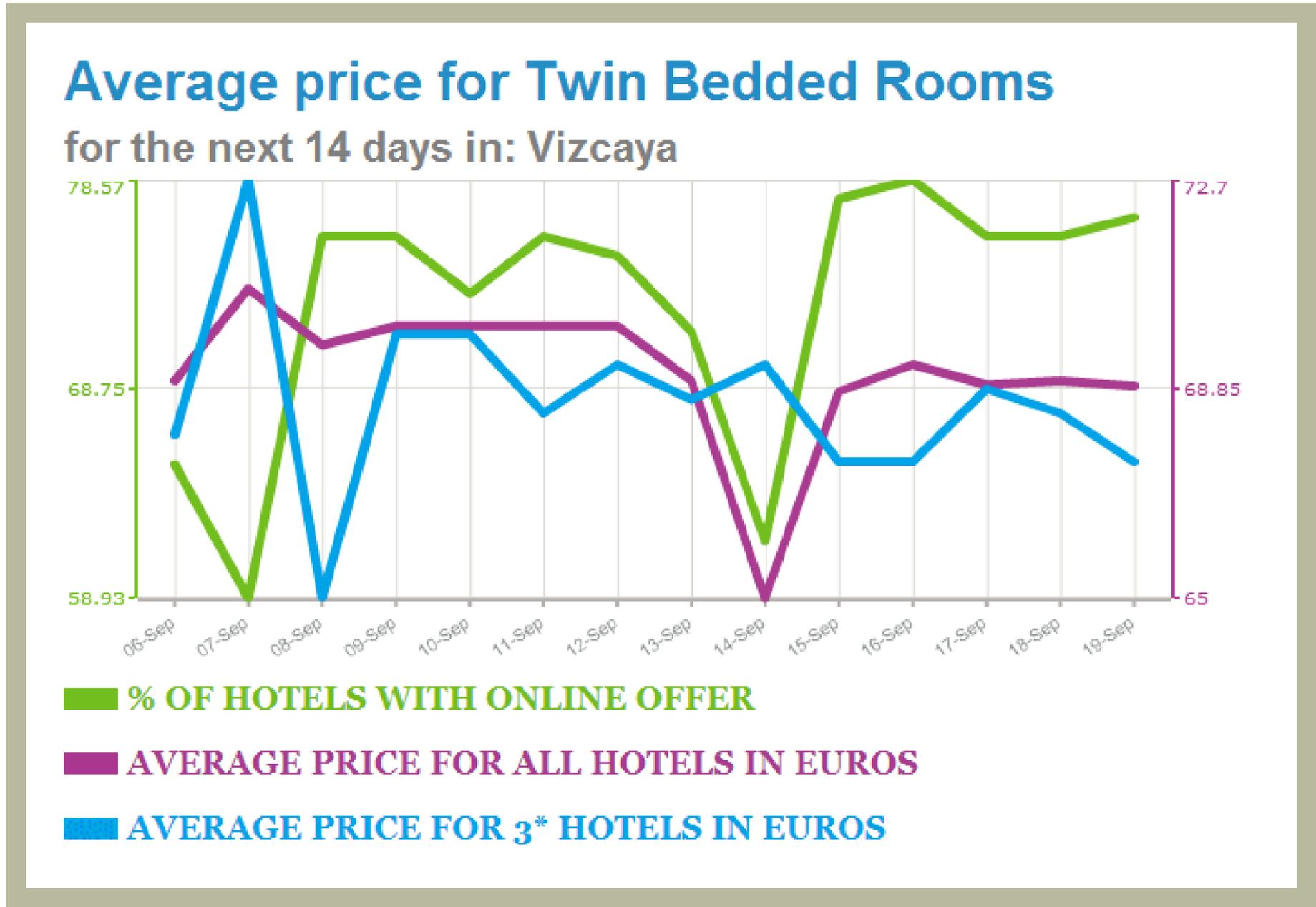
How many hotels (specific time and space) are in a given IDS channel ?

Which one is the optimal time to book a room for Christmas in Vienna ?

How does a big event affect hotel occupancy and room rate?

...

Forecast



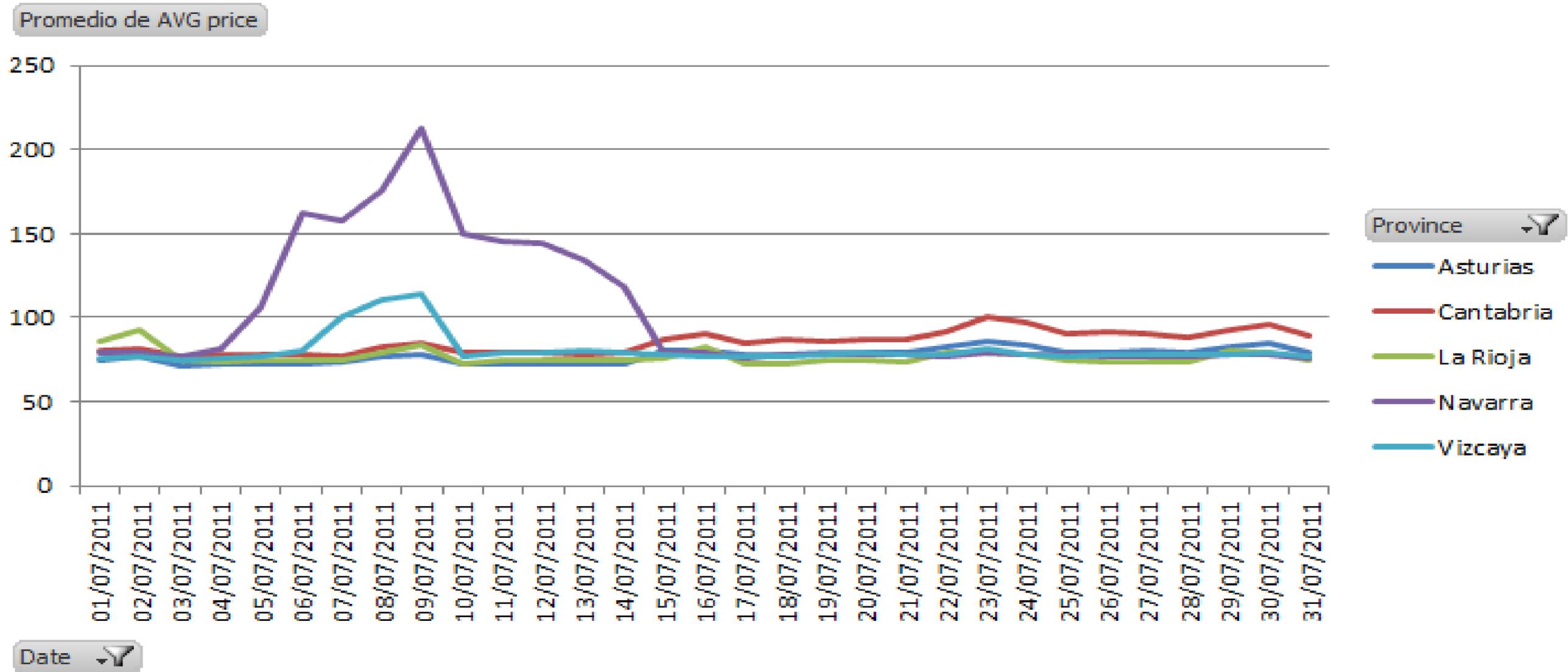
Price and occupancy on Biscay for the next 14 days

# Hotel Price variation in July.

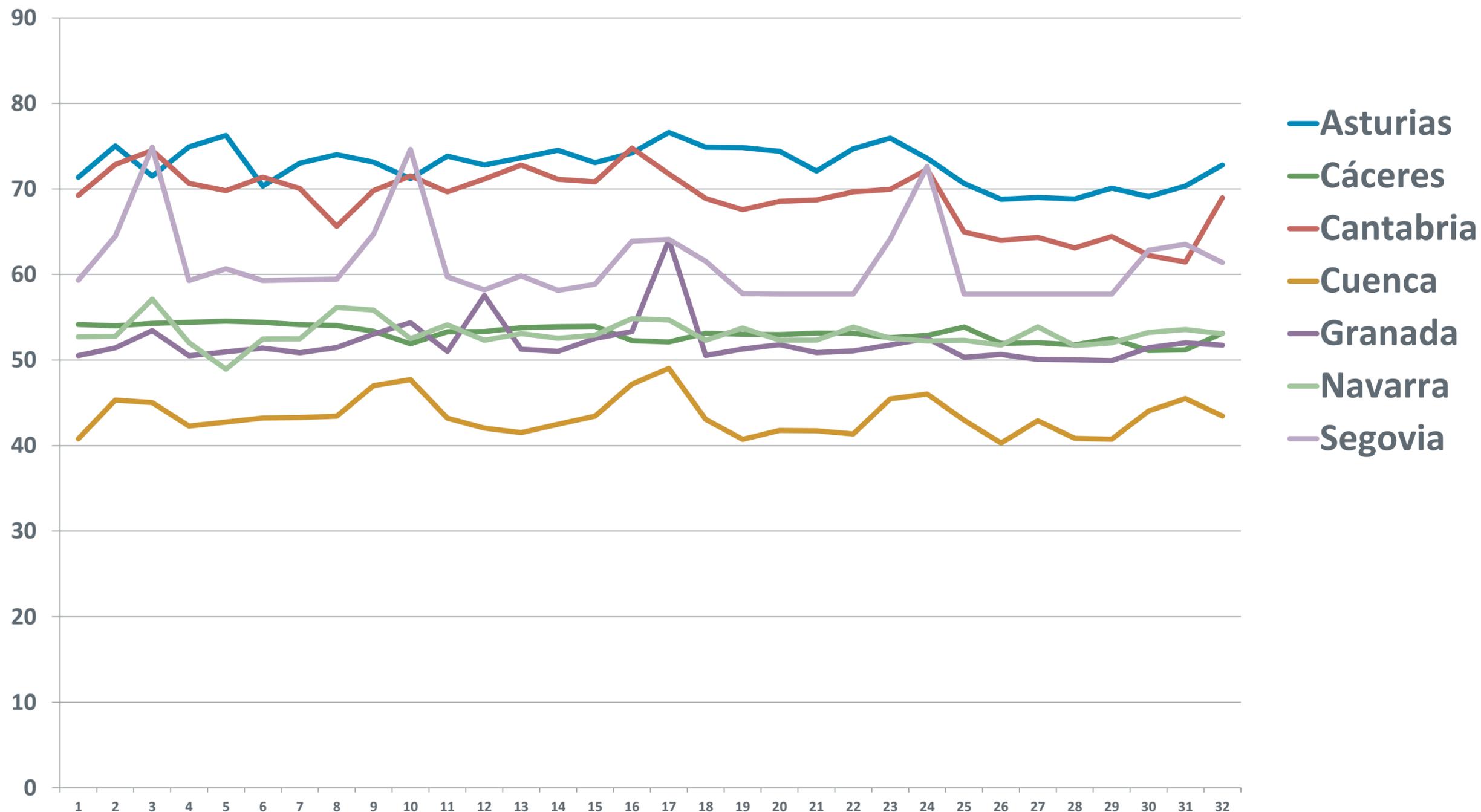
The impact of San Fermín in Navarre and surrounding regions

## IMPACT STUDIES

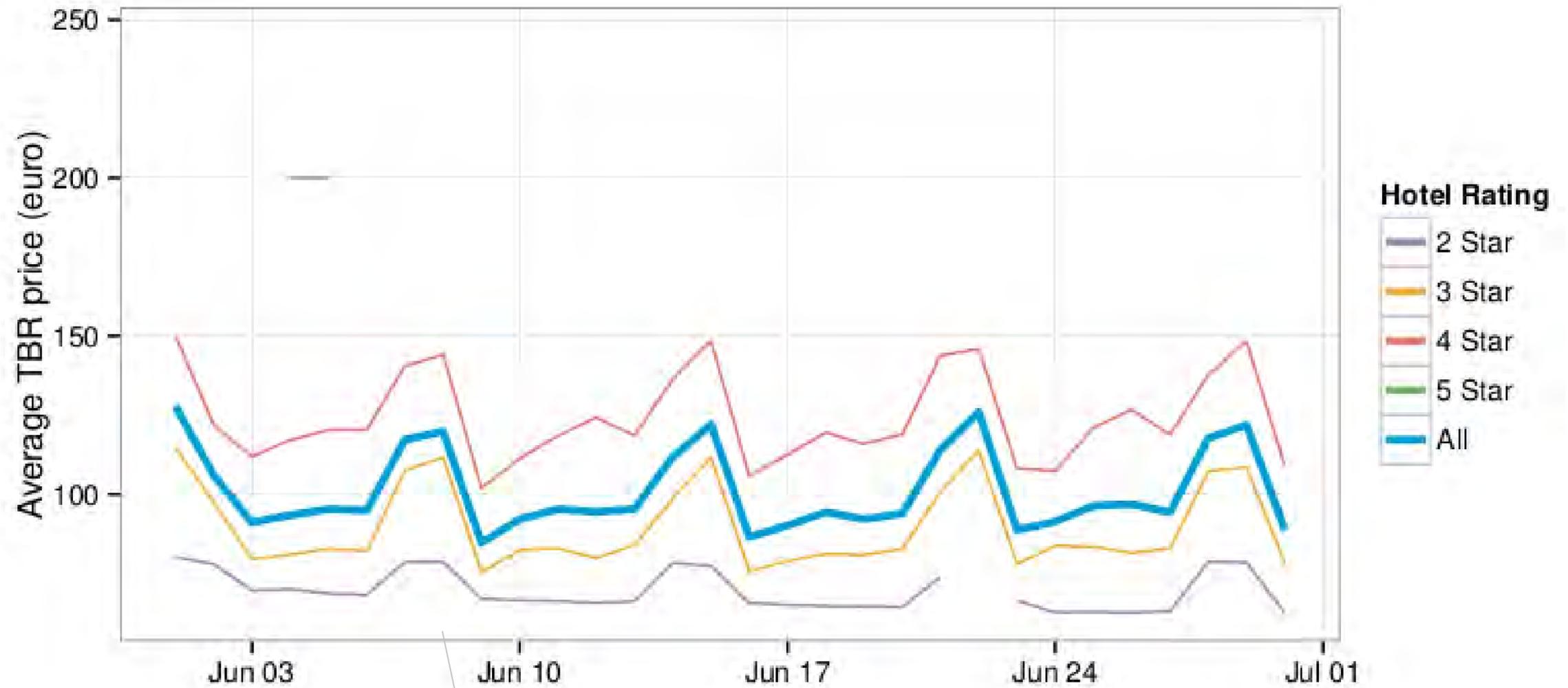
### Dynamic Pricing Monitor



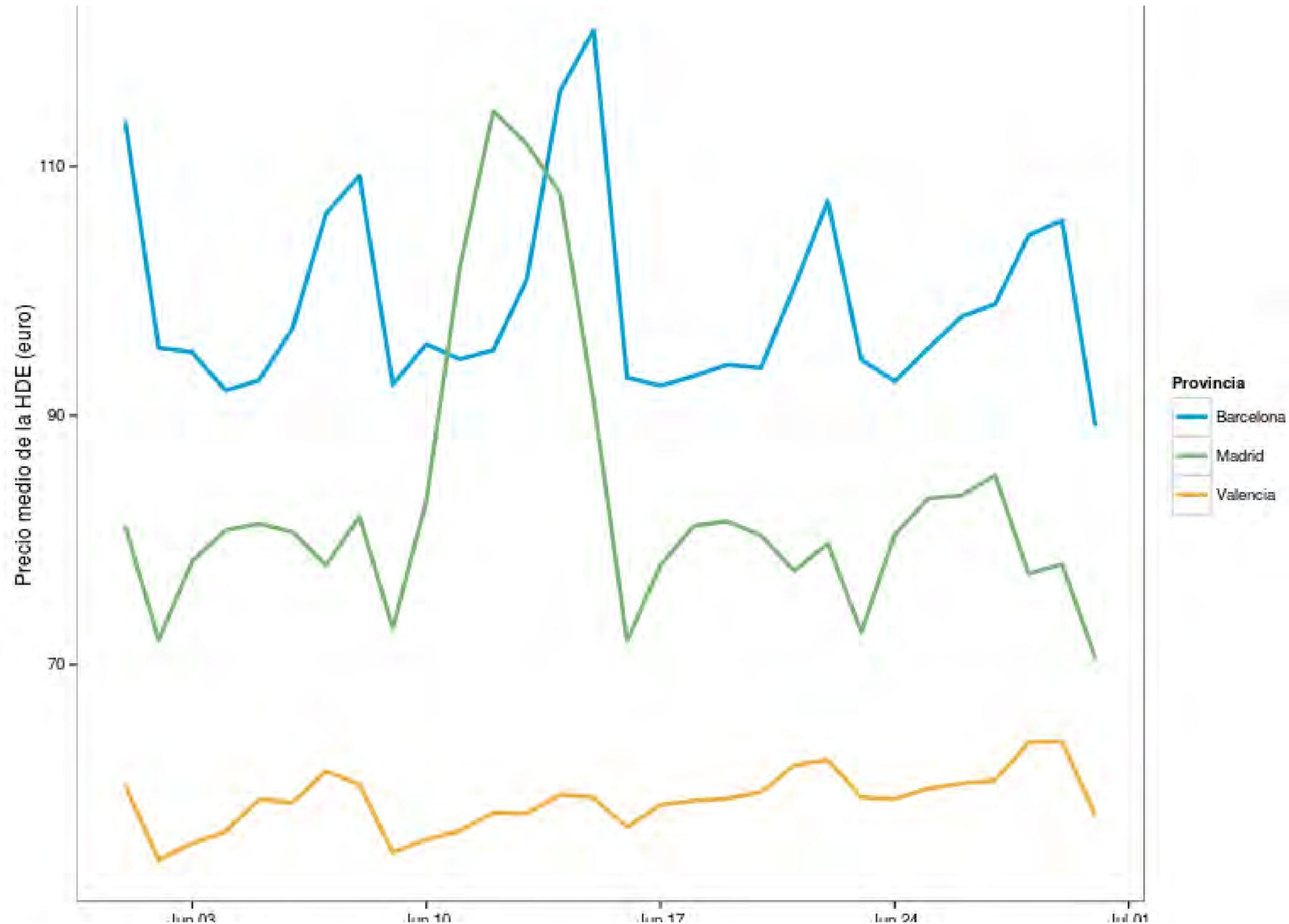
Rural accommodation: regions of Spain in August 2013



### Average Hotel prices in Galway in June 2013



Weekend effect

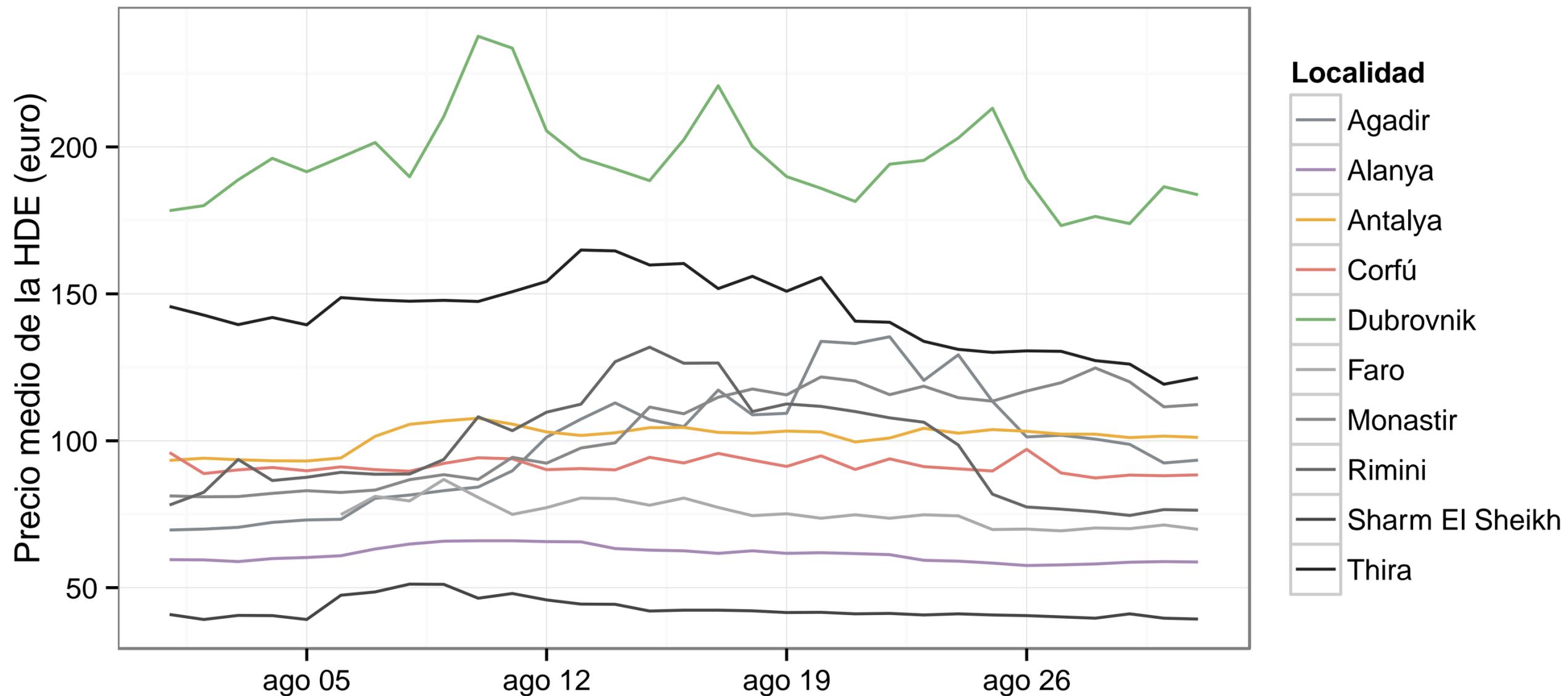


# Mediterranean coastal destinations August 2013

CITY  
BENCHMARK

any time  
framework

Dynamic Pricing  
Monitor

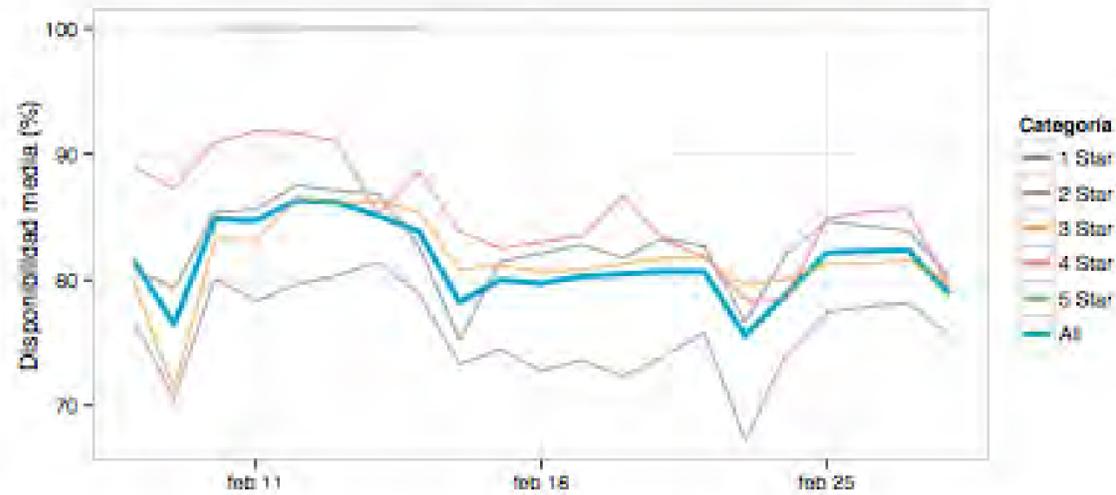
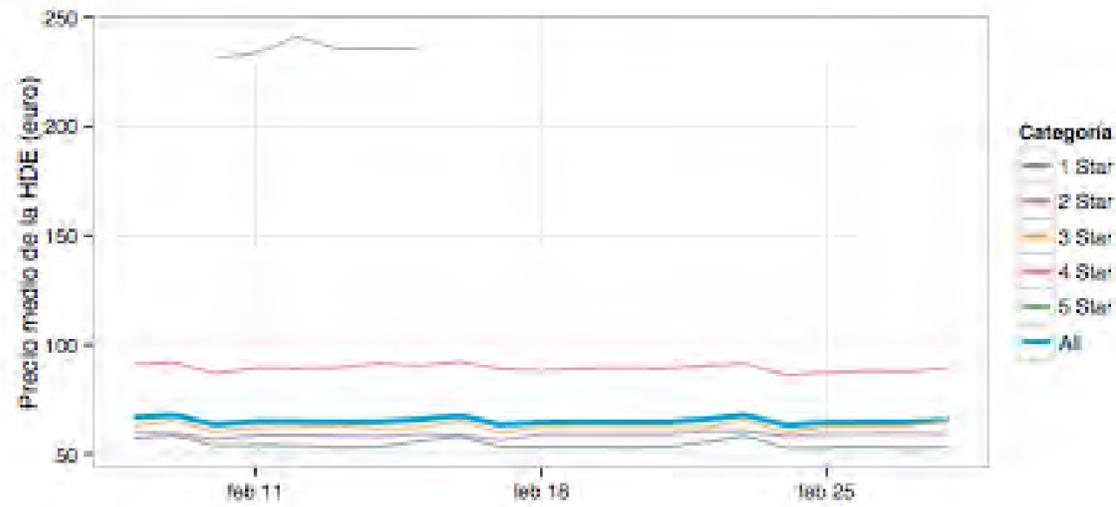


# INSIGHTS/ PRODUCTS

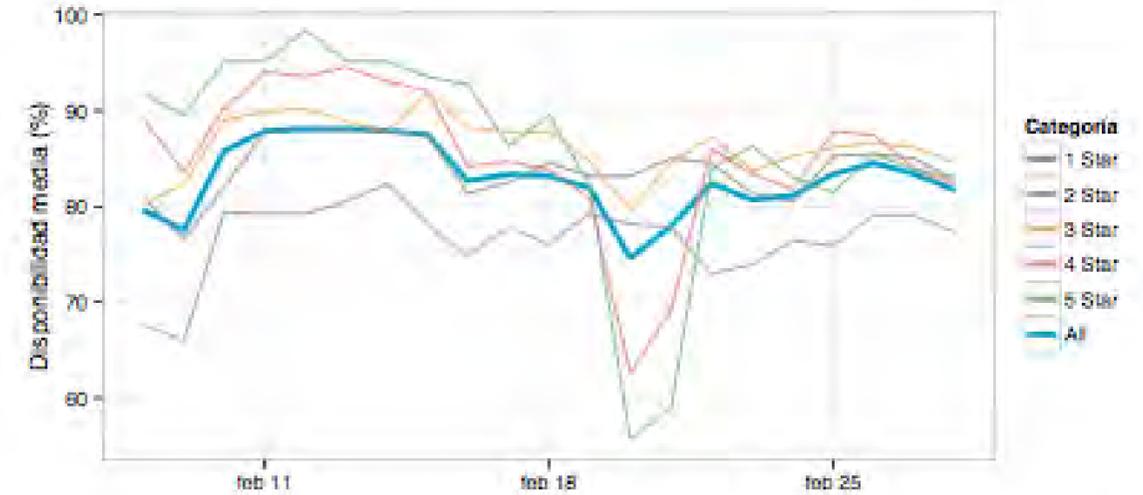
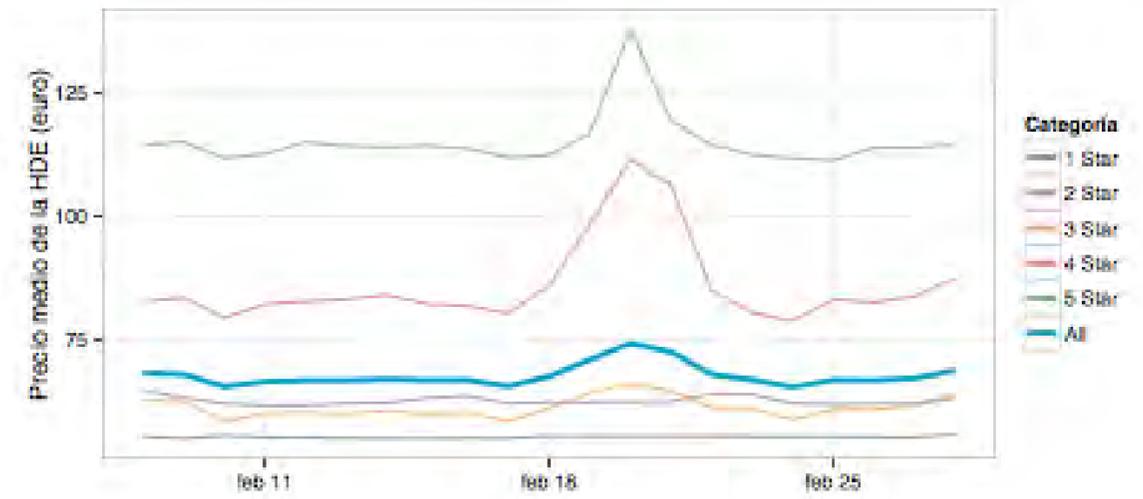
# BENCHMARK

# Dynamic Pricing Monitor

## Guipúzcoa



## Vizcaya



| Categoría | Días Laborables |        |        |           |       |        | Fin de semana |        |        |           |       |        |
|-----------|-----------------|--------|--------|-----------|-------|--------|---------------|--------|--------|-----------|-------|--------|
|           | Precio (€)      |        |        | disp. (%) |       |        | Precio (€)    |        |        | disp. (%) |       |        |
|           | feb             | ene    | diff.% | feb       | ene   | diff.% | feb           | ene    | diff.% | feb       | ene   | diff.% |
| 1 Star    | 53.34           | 53.01  | -0.62  | 83.72     | 74.64 | 12.16  | 57.14         | 56.49  | 1.15   | 79.59     | 69.61 | 14.34  |
| 2 Star    | 58.41           | 59.47  | -1.77  | 76.50     | 69.60 | 9.91   | 59.50         | 59.92  | -0.70  | 73.94     | 63.36 | 16.69  |
| 3 Star    | 61.91           | 61.51  | -0.67  | 82.11     | 77.95 | 5.34   | 63.49         | 62.92  | 0.91   | 80.36     | 75.60 | 6.30   |
| 4 Star    | 88.79           | 83.86  | 5.89   | 86.12     | 74.20 | 16.06  | 90.04         | 87.77  | 2.59   | 83.79     | 71.03 | 17.96  |
| 5 Star    | 232.03          | 232.00 | 0.01   | 88.39     | 97.19 | -9.06  | 236.80        | 232.13 | 2.01   | 89.11     | 84.68 | 5.24   |
| All       | 64.48           | 63.83  | 1.02   | 82.08     | 74.33 | 10.44  | 66.52         | 66.12  | 0.75   | 79.37     | 69.96 | 13.46  |

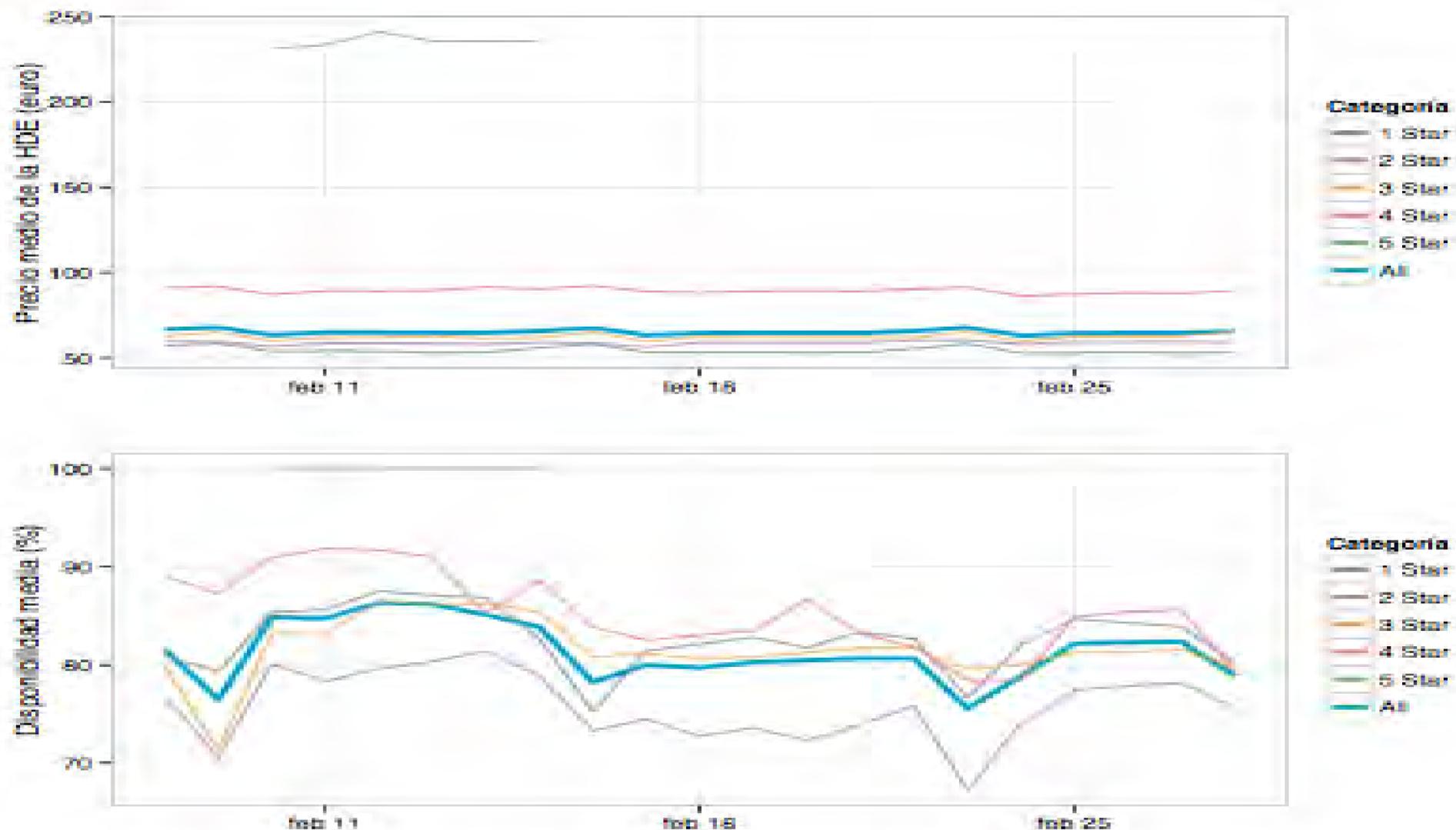
| Categoría | Días Laborables |        |        |           |       |        | Fin de semana |        |        |           |       |        |
|-----------|-----------------|--------|--------|-----------|-------|--------|---------------|--------|--------|-----------|-------|--------|
|           | Precio (€)      |        |        | disp. (%) |       |        | Precio (€)    |        |        | disp. (%) |       |        |
|           | feb             | ene    | diff.% | feb       | ene   | diff.% | feb           | ene    | diff.% | feb       | ene   | diff.% |
| 1 Star    | 55.37           | 57.03  | -2.92  | 84.54     | 83.85 | 0.82   | 55.27         | 57.09  | -3.19  | 82.75     | 80.99 | 2.17   |
| 2 Star    | 62.17           | 58.33  | 6.58   | 77.88     | 63.02 | 23.58  | 63.83         | 59.80  | 6.75   | 72.30     | 63.11 | 14.56  |
| 3 Star    | 61.00           | 61.63  | -1.02  | 86.92     | 85.60 | 1.55   | 60.82         | 61.30  | -0.77  | 86.57     | 84.22 | 2.79   |
| 4 Star    | 85.57           | 78.96  | 8.38   | 86.13     | 85.15 | 1.15   | 81.92         | 77.73  | 5.39   | 87.18     | 82.32 | 5.90   |
| 5 Star    | 115.40          | 113.87 | 1.35   | 87.22     | 89.55 | -2.61  | 114.02        | 113.58 | 0.39   | 90.93     | 93.15 | -2.38  |
| All       | 67.55           | 65.90  | 2.50   | 83.87     | 79.20 | 5.89   | 67.23         | 65.88  | 2.04   | 82.38     | 77.88 | 5.78   |

# INSIGHTS/ PRODUCTS

## Price/channel

## Dynamic Pricing Monitor

### Guipúzcoa

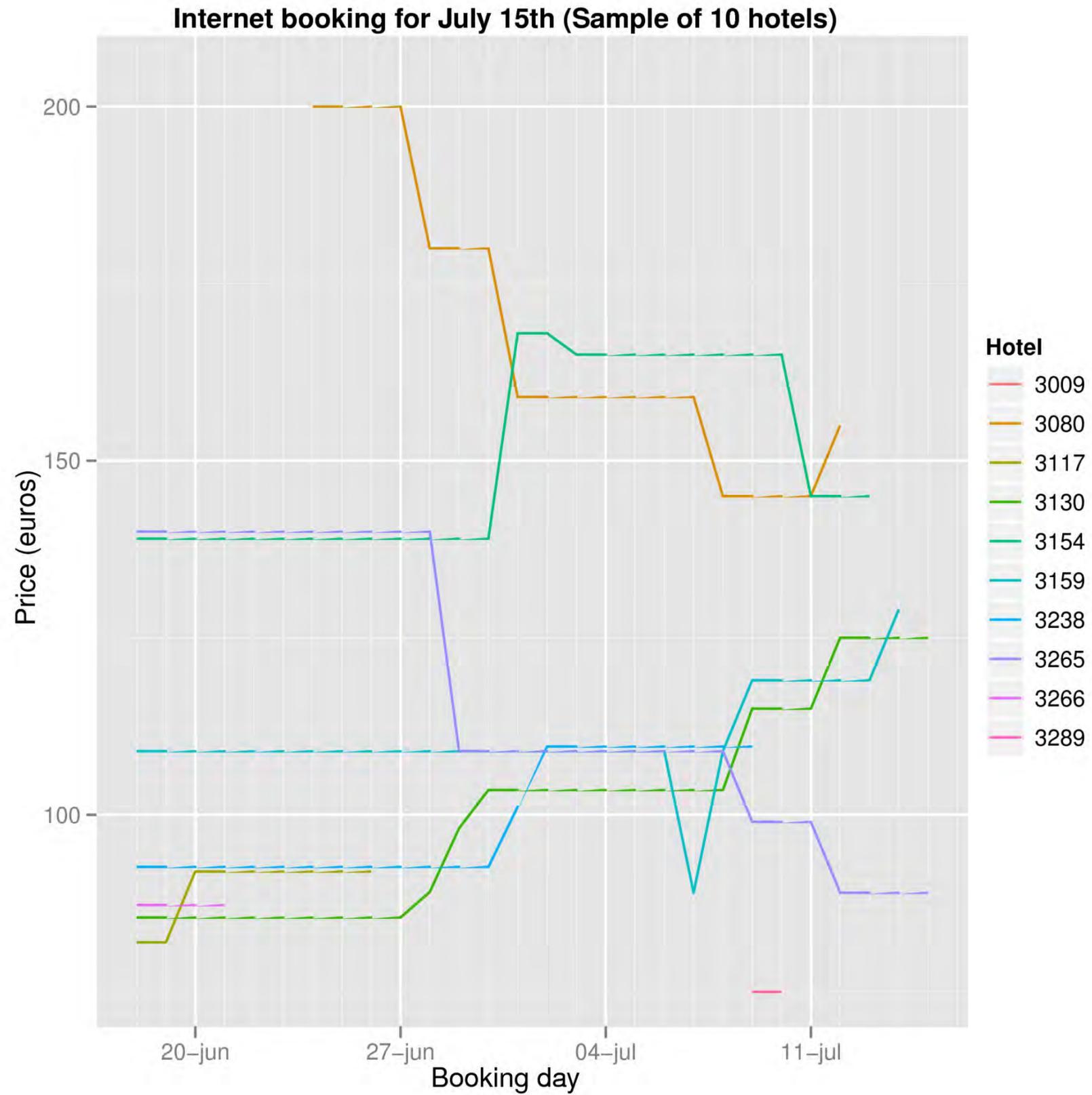


| Categoría | Días Laborables |        |        |           |       |        | Fin de semana |        |        |           |       |        |
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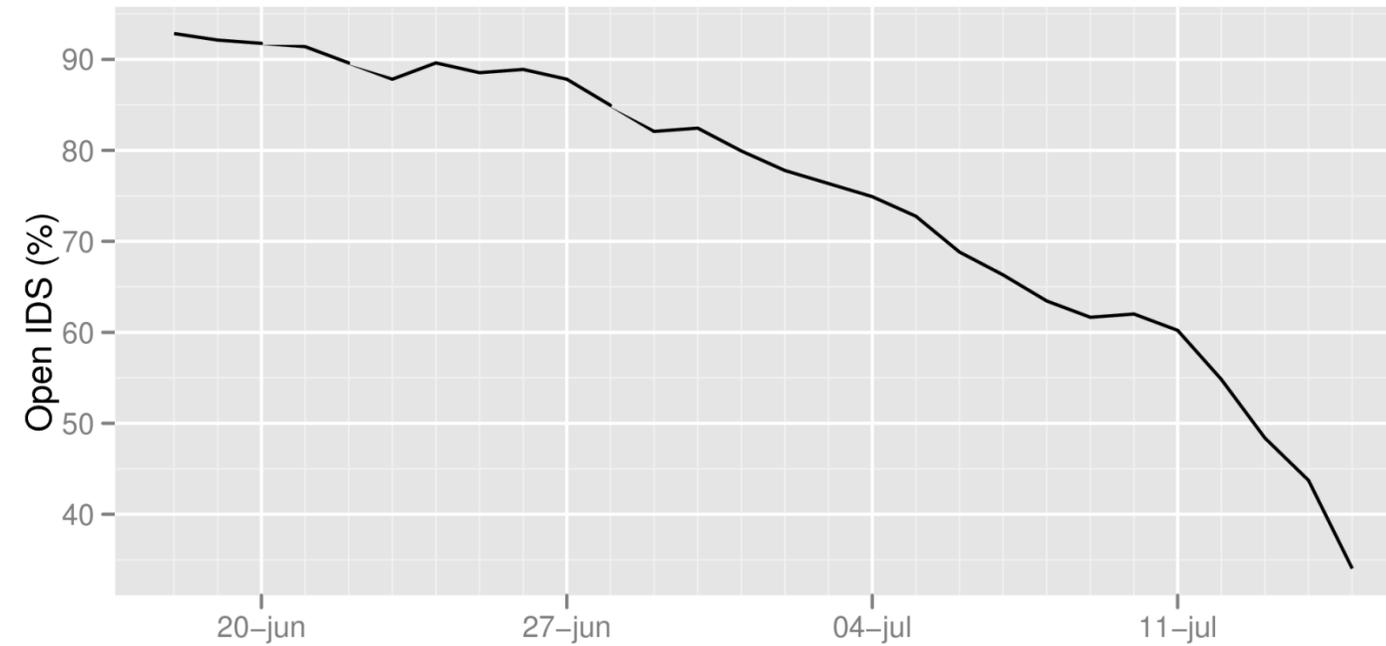
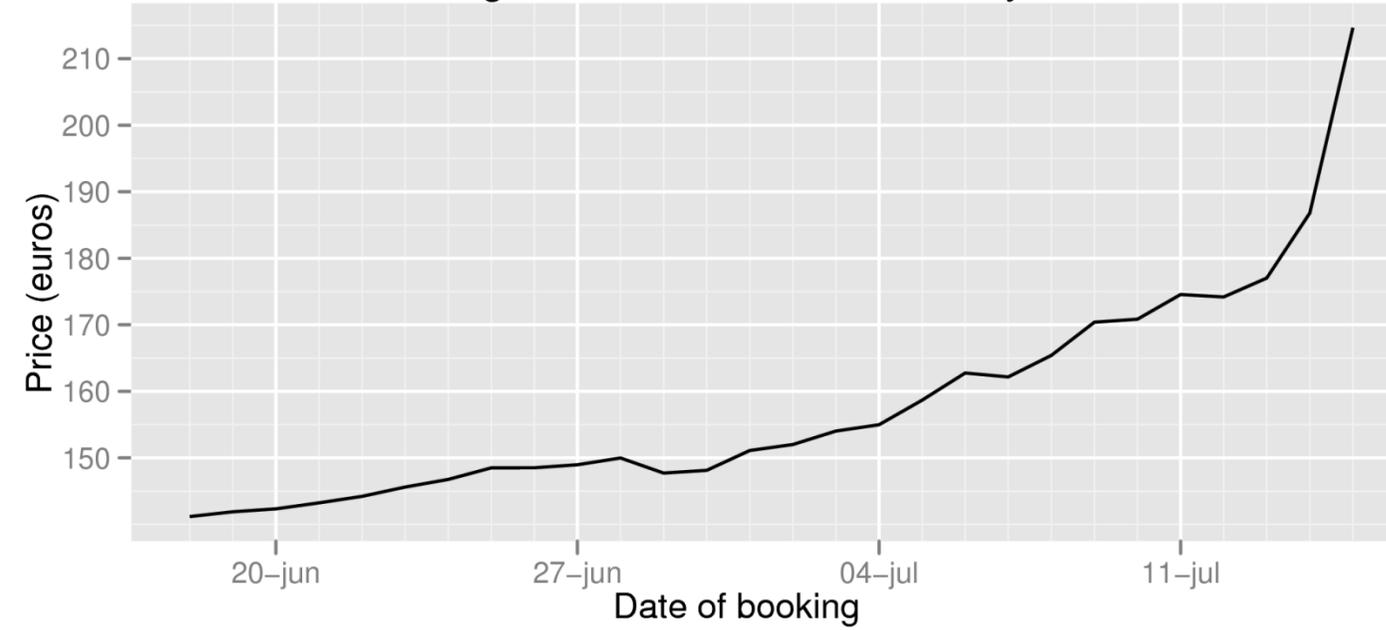
## Price/channel

## Dynamic Pricing Monitor



# Opening and Closing of the channel

Booking a room in Barcelona for July 15th



## PRICE INDEX

### Complementary approach

### National Bureau of Statistics

### Dynamic Price Monitor

- We carried out a study to understand whether the online price is a good approximation to official ADR, provides by official statistics
- A regional study was conducted from 2011 to July of 2012, showing the monthly ADR published by INE with the average price got by the dynamic pricing monitor.

## PRICE INDEX

### Complementary approach

### National Bureau of Statistics

### Dynamic Price Monitor

- The INE has built two indicators on the Profitability of the Hotel Sector: The **ADR** (Average Daily Rate) and the **RevPAR** (Revenue per Available Room)
- The INE collects on a monthly basis information relating to prices for a **double room with a bathroom**. This information is requested in the **Hotel Occupancy Survey** questionnaire (HOS)
- Since 2008 the questionnaire has been amended distinguishing between **different types of customer and sales channels**: traditional and online tour operators and travel agencies, enterprises, groups, hotel or chain websites

## PRICE INDEX

### Complementary approach

### National Bureau of Statistics

### Dynamic Price Monitor

HOS information is used for calculating the HPI (Hotel Price Index)

The HOS comprises three different scopes:

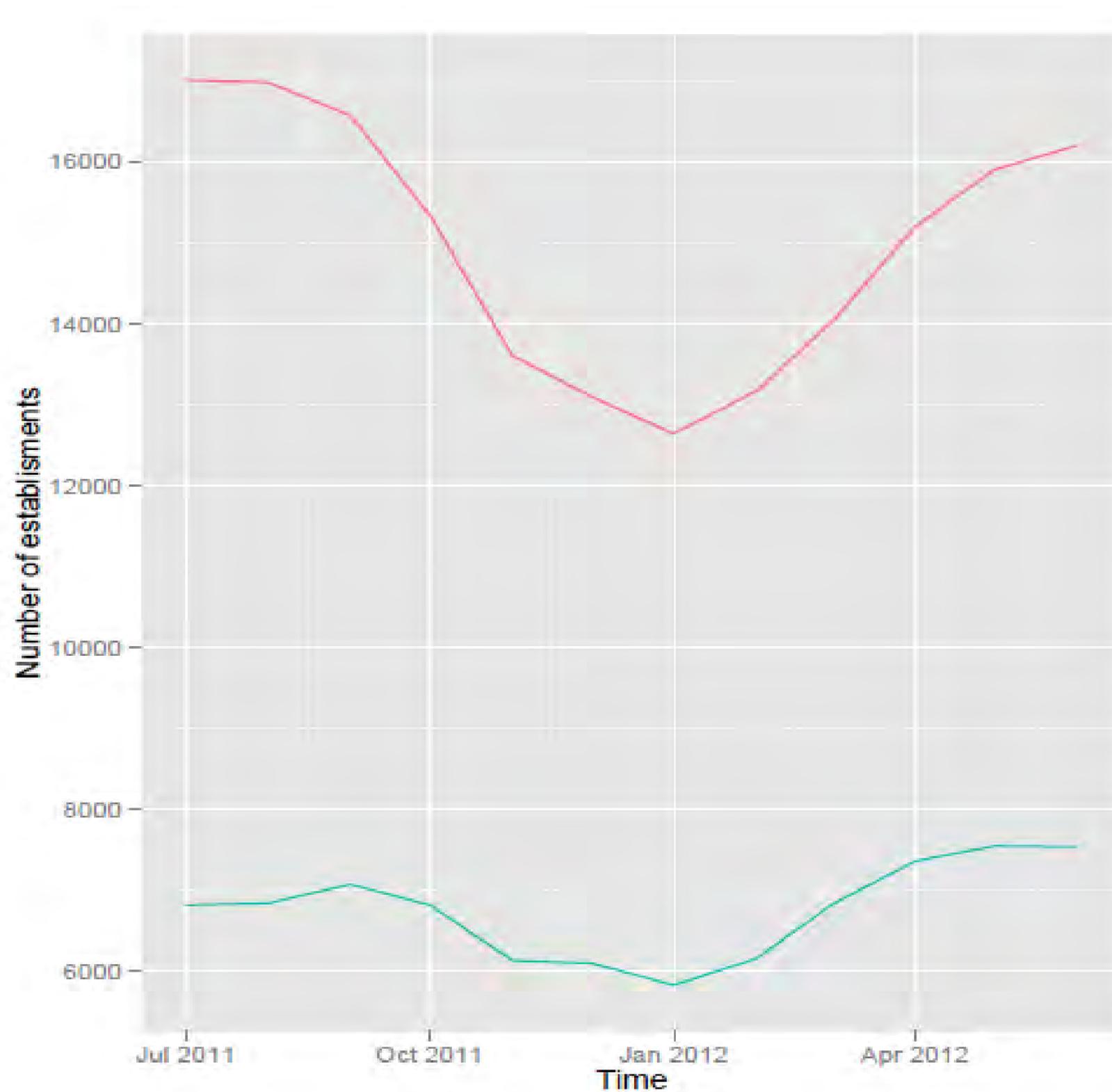
- **Time scope.** The HOS is **monthly** and the estimated data refers to the activity by each hotel establishment during the month corresponding to the reference period. Requested data refers to **seven consecutive days**, such that establishments in the sample are distributed throughout the month
- **Population scope.** All the establishments in their modalities of hotel, parador, hotel-apartment, aparthotel and motel with the categories of five, four, three, two and one stars
- **Geographical scope.** The scope of the survey encompasses the entire country

## PRICE INDEX

Complementary approach

National Bureau of Statistics

Dynamic Price Monitor



The survey carried by the INE covers: about **13.000** lodging establishments

The number of **hotels** that offer their services through IDS is about **7.000**

## PRICE INDEX

Complementary approach

National Bureau of Statistics

Dynamic Price Monitor

| Month  | IDS   | NSI   | Δ%   |
|--------|-------|-------|------|
| jul-11 | 76,67 | 81,32 | -6%  |
| ago-11 | 79,98 | 88,24 | -10% |
| sep-11 | 69,18 | 75,82 | -10% |
| oct-11 | 64,66 | 72,25 | -12% |
| nov-11 | 60,83 | 74,52 | -23% |
| dic-12 | 60,87 | 74,84 | -23% |
| ene-12 | 58,75 | 73,76 | -26% |
| feb-12 | 59,43 | 74,09 | -25% |
| mar-12 | 60,10 | 72,25 | -20% |
| abr-12 | 63,37 | 73,55 | -16% |
| may-12 | 61,69 | 69,66 | -13% |
| jun-12 | 64,20 | 73,87 | -15% |

Percent difference to national level

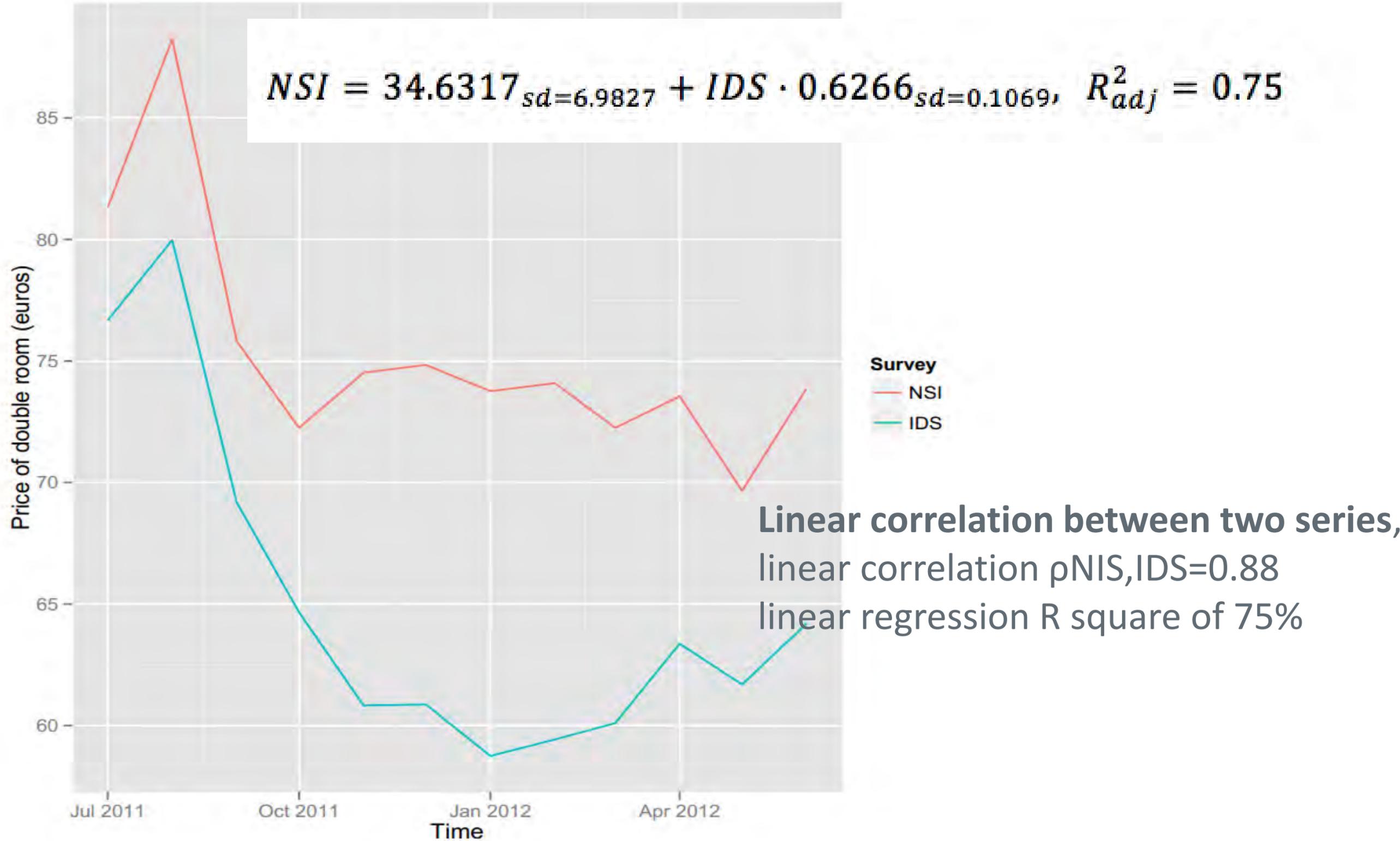
The absolute difference in euros varies from **5€** in July to **15€** in January

# PRICE INDEX

Complementary approach

National Bureau of Statistics

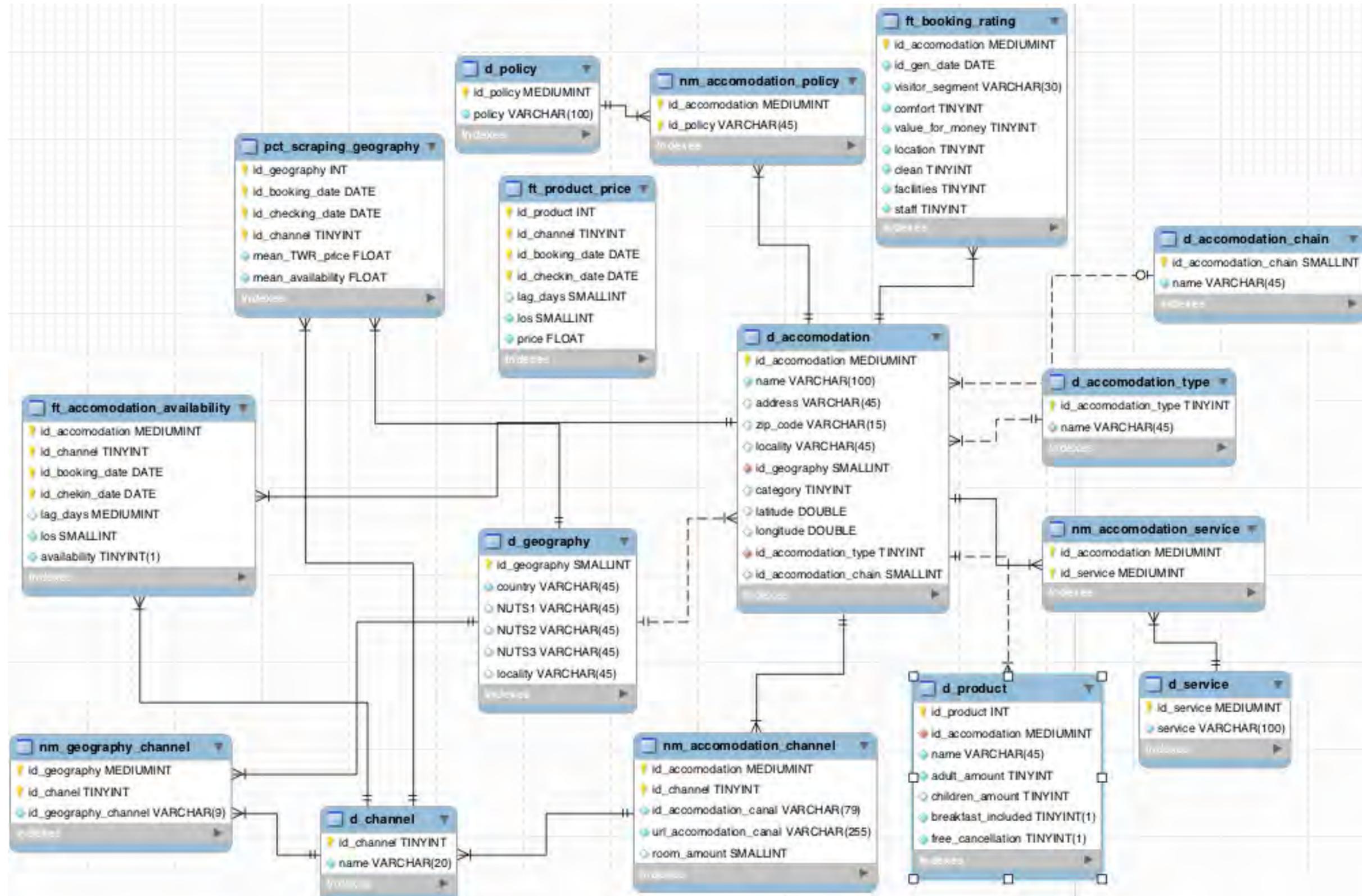
Dynamic Price Monitor



# WHAT'S NEXT

## Enriched Hotel DPM\_Hotel +

1. Accommodation
2. Policy
3. Service
4. Product
5. Rating
6. Prices



## WHAT'S NEXT

Do closely located hotels react to price changes among each other?

## Enriched Hotel DPM\_Hotel +

What are the attributes/features that add higher value to the hotel room prices?

...

## SUMMING UP

Despite the progress in official statistics there are limits and constraints in traditional methodologies

The generation of primary data is a costly process, starting from the data gathering process based on offer side surveys and ending in the data processing where the elevation techniques from sample to universe are the cornerstone of the Statistical Offices

Gathering information from different IDS, a representative sample of hotels and prices can be collected with low cost in terms of time and economical resources providing future daily prices

## SUMMING UP

Based on observed data, the prices offered by leading European IDS is a good predictor for the estimation of ADR with a percentage difference in price at around 10%

**This DPM allows us to have real-time data (at least one month before the official statistics) at any time and space aggregation level. This allows for a benchmarking among cities, regions, countries, days, weeks ...**

## SUMMING UP

Big data offers significant benefits for all travellers and companies

- Better decision support
- New products and services
- Better customer relationships
- Cheaper, faster data processing

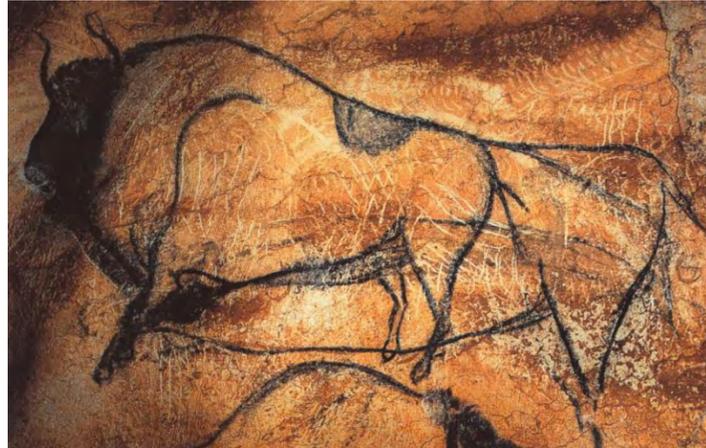
Challenges need to be overcome:

- Creating an integrated data source
- Working in a hybrid technological environment
- Overcoming the data skills shortage
- Maintaining competitive advantage

## NEW PARADIGM

We are in the process of understanding

KNOWLEDGE CREATION AND KNOWLEDGE MANAGEMENT





# Danke Schön

Eskerrik asko  
Thank you

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