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OBIS
Final Conference

Prague - 21 June 2011

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Ajuntament de Barcelona

Agenda

- »Introduction
- »Studies
- »Communication
- »Redistribution
- »Conclusions

BICING NOW

»This service began operations four years ago and now has already obtained a user base of **120.000**.

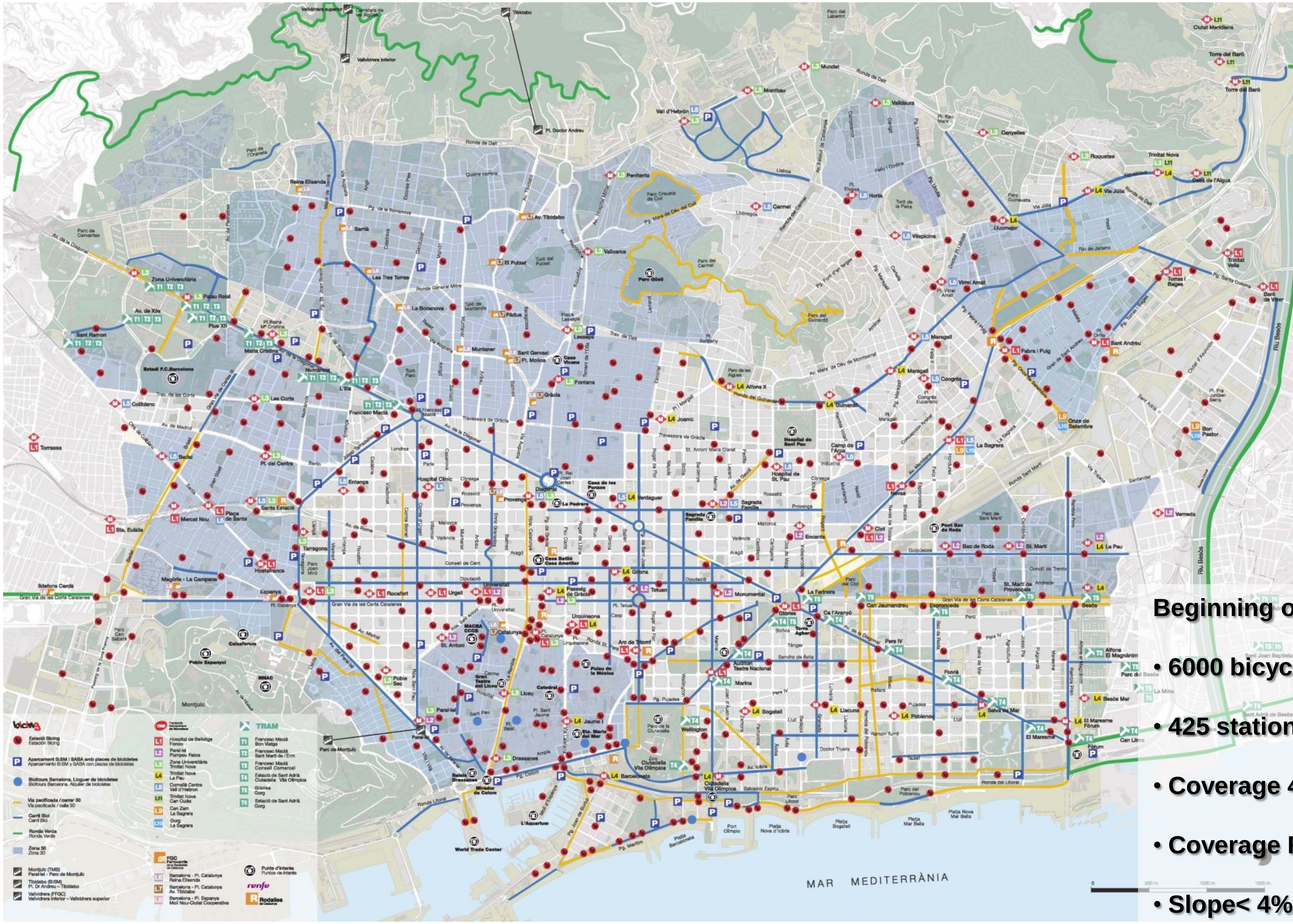
»There are currently about **425 stations** (11.000 slots) with a total of **6.000 bikes**.

»An estimated **10% of adults** residents in Barcelona are already system users.

»During the summer, users perform an average use of **6-7 times** a day per bike with a total of **40.000 trips**.

»The average mileage per trip is about **3 km** (20 km per bike and day).

STATIONS MAP



Beginning on March 2007

- **6000 bicycles**
- **425 stations**
- **Coverage 49 km²**
- **Coverage Range 197 m**
- **Slope< 4%**

BICYCLE BEFORE BICING

The bicycle in public transport

- Inefficient use of the bicycle.
- No rotation.
- A lot of public space required.
- Uncomfortable intermodality.

or

Public transport by bicycle

- Increases the efficiency of the bicycle.
- High rotation.
- Need for less public space.
- Comfortable, accessible intermodality.

BICING BEFORE OBIS PROJECT

September 2008:

- 165.000 season ticket holders
- 6.000 bicycles in service
- 376 stations.

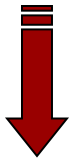
- Total no. uses: **12 million uses**
- Average usage data: **6-7 uses/day and bicycle**
- Average daily uses: **40,000 – 45,000 uses/day**
- **300 new subscribers/day**

BICING BEFORE OBIS PROJECT

September 2008:

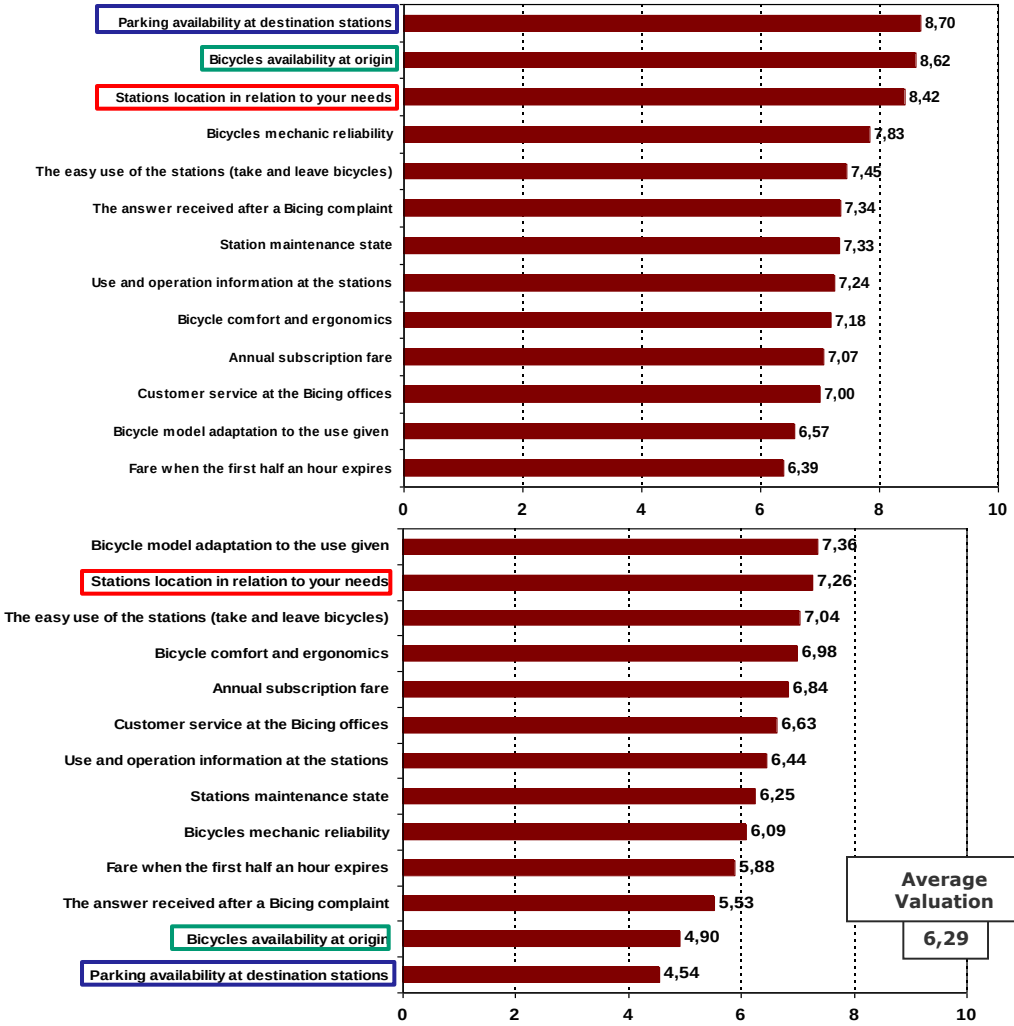
PROBLEMS TO BE SOLVED!!

- Communication with users
- Service level
- Bicycle distribution



Costumer satisfaction decreasing

User satisfaction: Importance and Evaluation



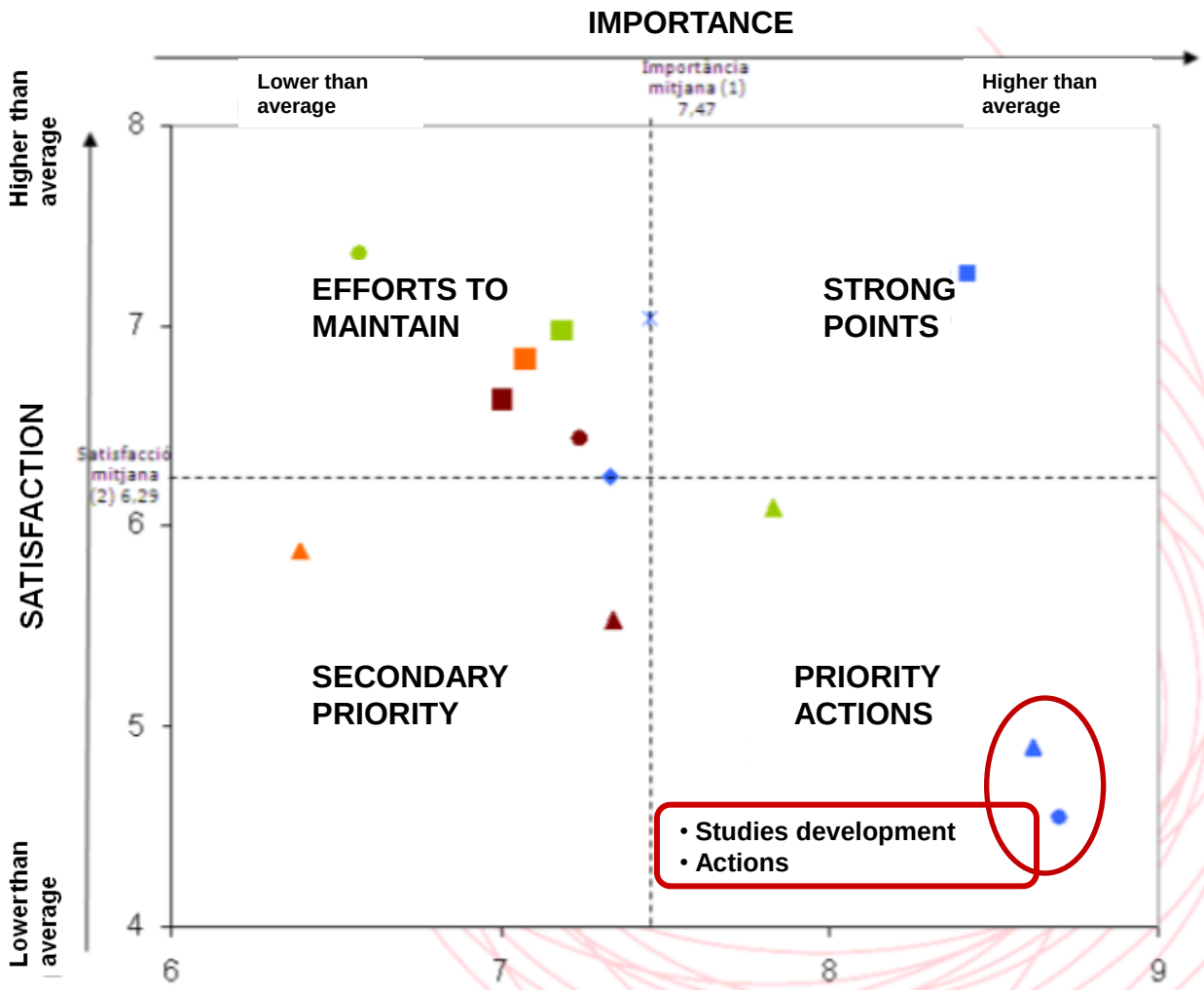
Stations location (needs coverage) have a **high valuation**

The two points considered the most important (availability) are less valuated

Studies for improve:

- System **compensation** (Bicycles / Anchorages≈2)
- **Distribution logistics**

EVALUATION OF SERVICES PROVIDED



Improvement priority matrix

- Stations locations in relation to your needs
- Bicycles availability at origin
- Parking availability at destination stations
- Stations maintenance state
- The easy use of the stations (take and leave bicycles)
- Bicycle comfort and ergonomics
- Bicycles mechanic reliability
- Bicycle model adaptation to the use given
- Annual subscription fare
- Fare when the first half an hour expires
- Customer service at the Bicing offices
- The answer received after a Bicing complaint
- Use and operation information at the stations

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STUDIES EXECUTION

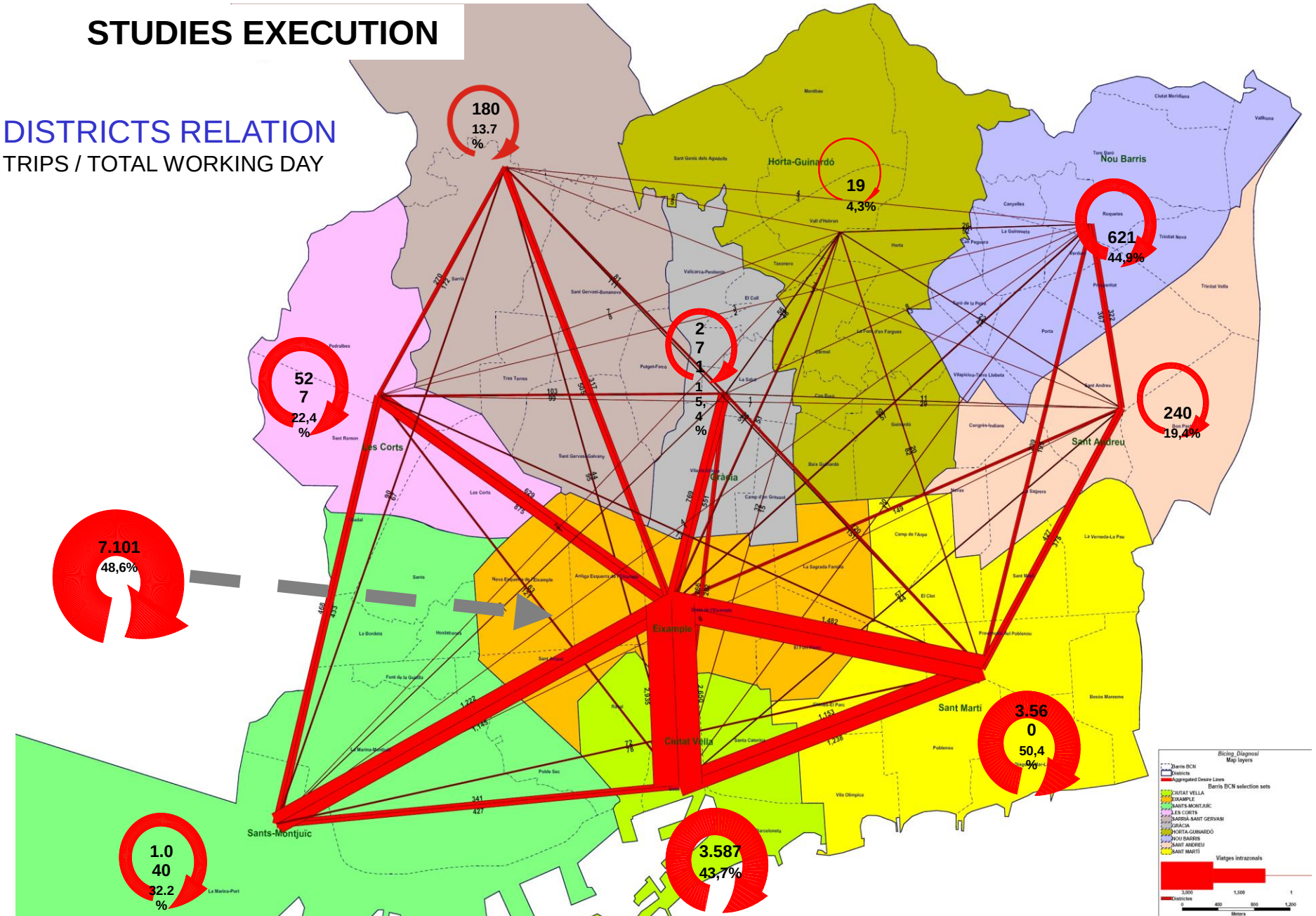
- Studies about **mobility**:
  - **Demand analysis**:
    - Origin/destination matrix
    - Schedule distribution
    - Stations imbalance
  - **Supply analysis:**
    - Territorial coverage
    - Agility of the system
  - **Search of alternatives for demand management**, and improve/adapt the supply

- Studies about **operative optimization**:
  - **Analysis: problems detection**
  - **System resizing**
    - Stations, anchorages, bicycles, redistribution systems, etc.

STUDIES EXECUTION

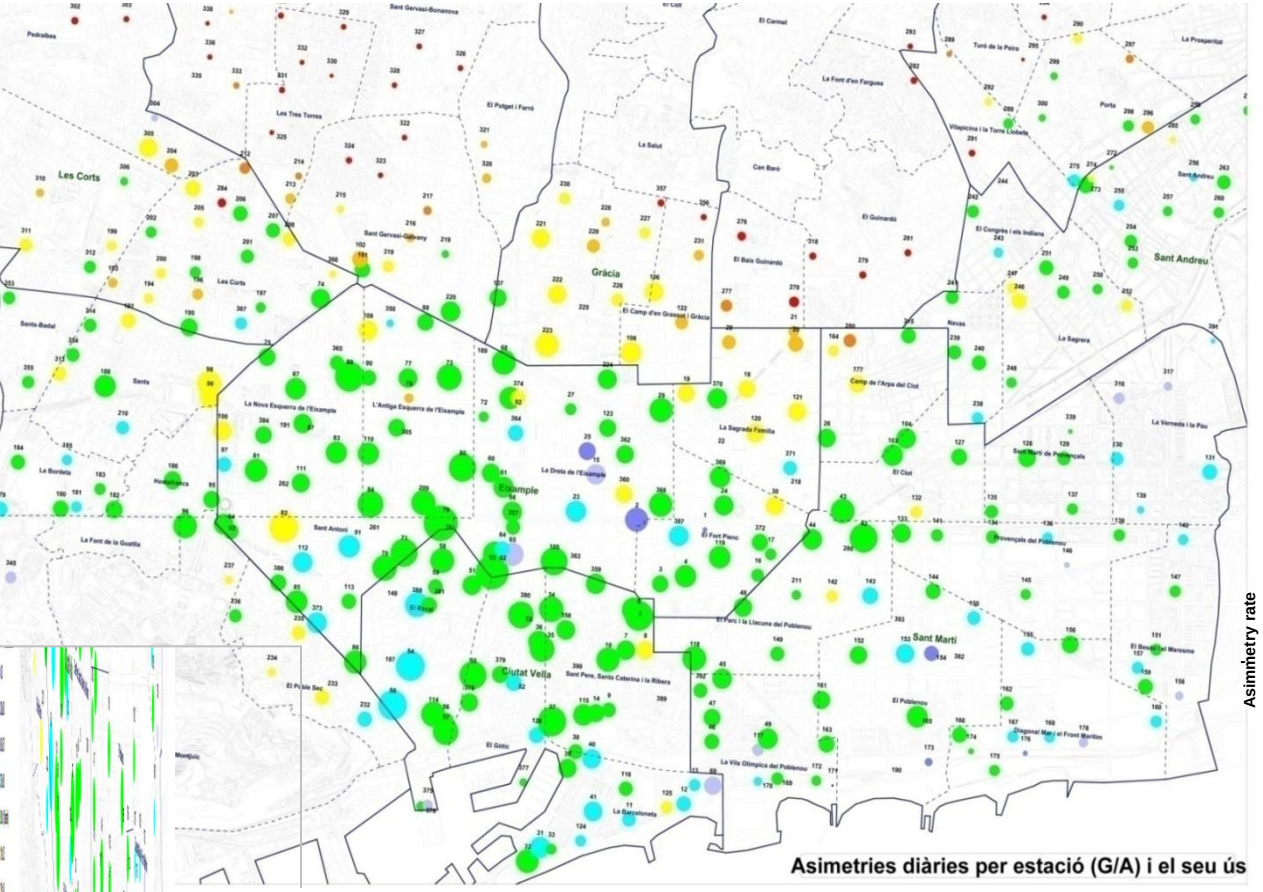
DISTRICTS RELATION

TRIPS / TOTAL WORKING DAY



STUDIES EXECUTION

DAILY ASYMMETRY PER STATION DURING A WORKING DAY



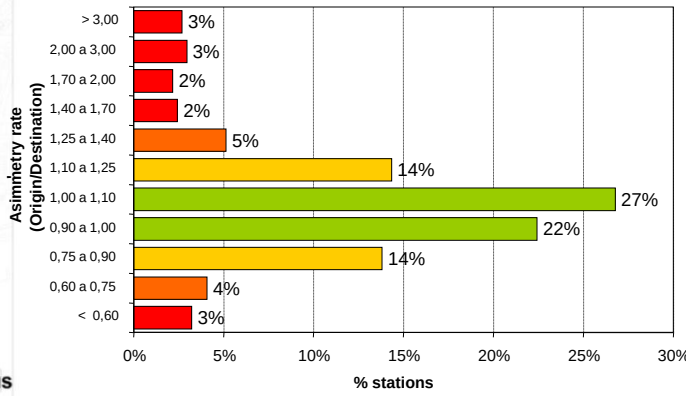
Each circle diameter indicate the volume of generated trips, whereas the colour represent the α value.

Asymmetry (α) is represented as the relation between generated trips (G) and attracted trips (A):

$$\alpha = G / A$$

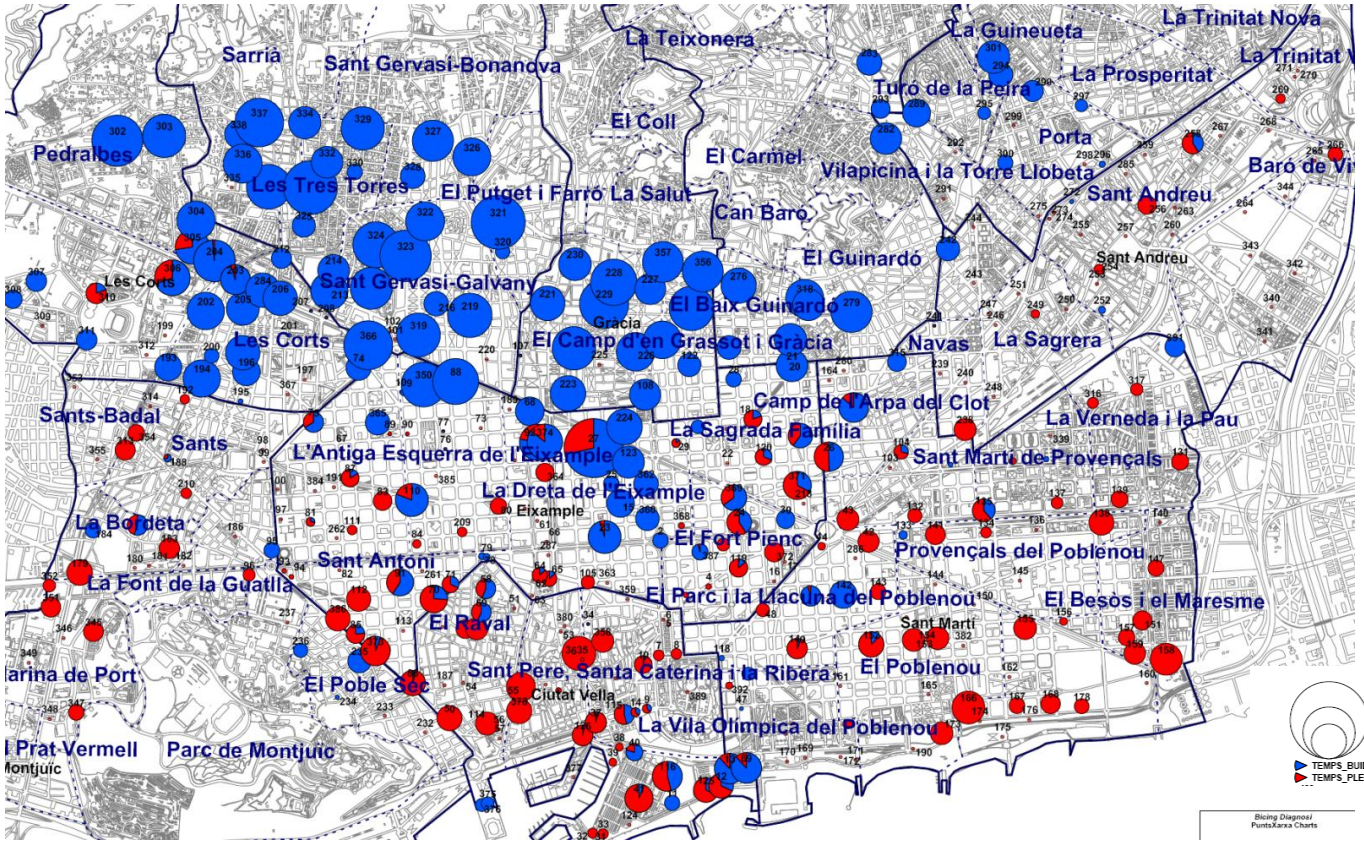
49% of stations have a balanced asymmetric rate.

STATIONS CLASSIFICATION BY ASYMMETRY LEVEL



STUDIES EXECUTION

Blue circles represents the empty stations during the day, the red ones represents the completely full stations and its diameter represents the number of hours that have been full.

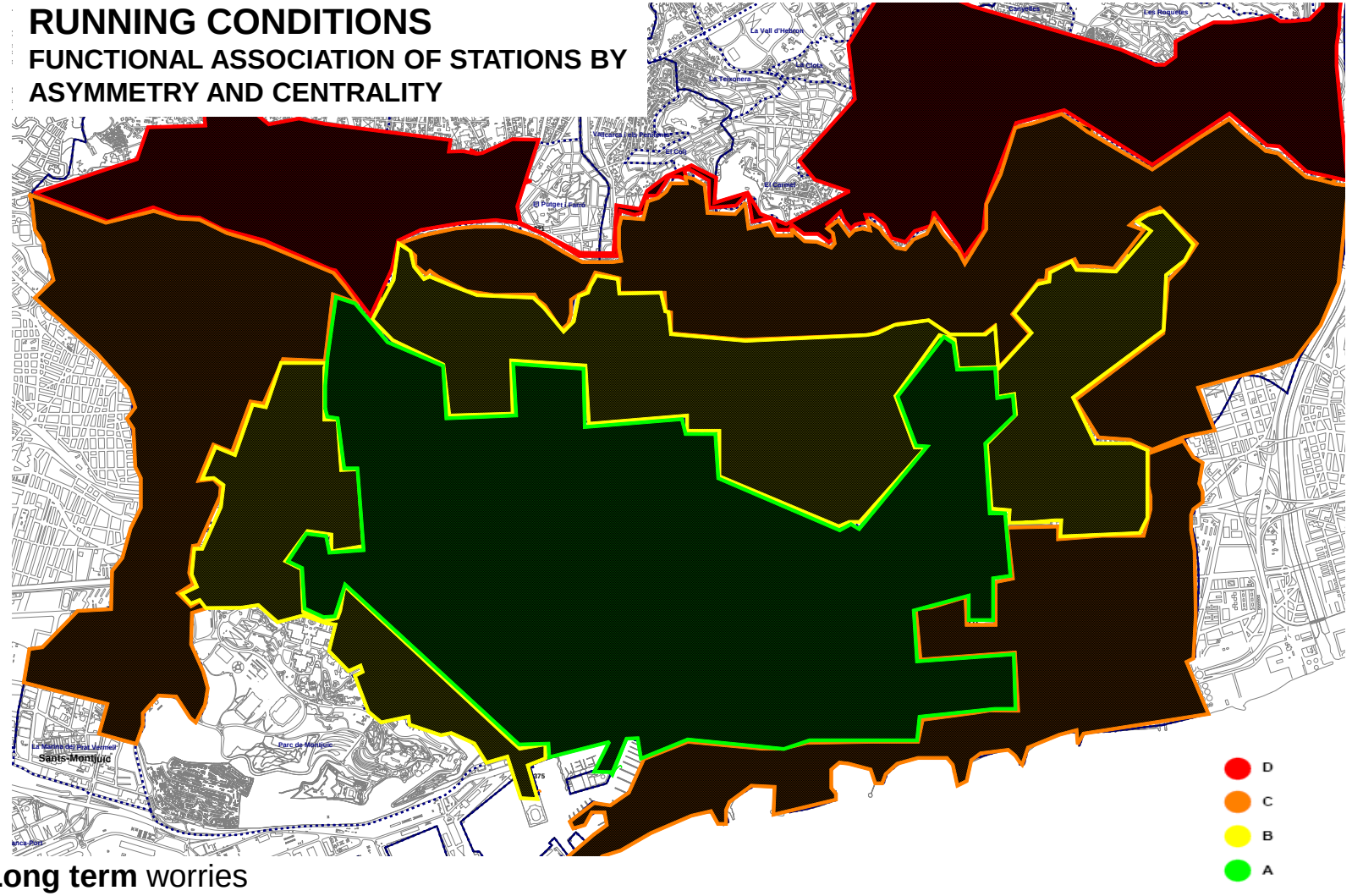


STATIONS OCCUPATION.
WORKING DAY

STUDIES EXECUTION

RUNNING CONDITIONS

FUNCTIONAL ASSOCIATION OF STATIONS BY ASYMMETRY AND CENTRALITY



- **Long term** worries
  - When serving latent demand, provoke higher imbalances
  - Will be necessary a **compromise between the served demand level by zones and time slot, and the system costs**.

IMPROVEMENT MEASURES

Improvement proposal:

Most saturated and/or unbalanced zones boost:

- **Short term** measures
  - Suggest to Clear Channel a **replacement route reorganization** by zones, to give an homogeneous service to unattended zones with minimum costs
  - **Densification of clusters** (groups of stations) at zones where the storage capacity is insufficient, extending the current stations when is possible or opening new stations near to the existing ones
  - At new programmed stations (i.e. Sants), preferably stations with 60 slots (2x30)

DONE!!

CL027	PLAÇA CATALUNYA
CL029	BARCELONETA
CL030	HOSPITAL DEL MAR
CL032	VILA OLÍMPICA
CL034	UPF

- **Long term** measures
  - Periodic revision of the zonification at clusters and the stock planning, and the van assignment by day type, as the demand increase
  - Use of a station stock control tool, for visits reassignment

IMPROVEMENT MEASURES

Improvement proposal:

- **Solve of redistribution problems:**
  - Access problems to some stations
  - Action protocol
    - Security improvement
    - Minimize the traffic affectation

- **Revision of the service levels requirements (contract conditions).**

- **Improve on demand management:**
  - Incentive for customers → Auto-balance of the system
  - Communication with users → More information => better choices!!

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I-BICING

Mobile System Information

New Users Needs

- With the service creation, new real time information is demanded by the users.
- Mobile channel it's good positioned to resolve these new necessities.

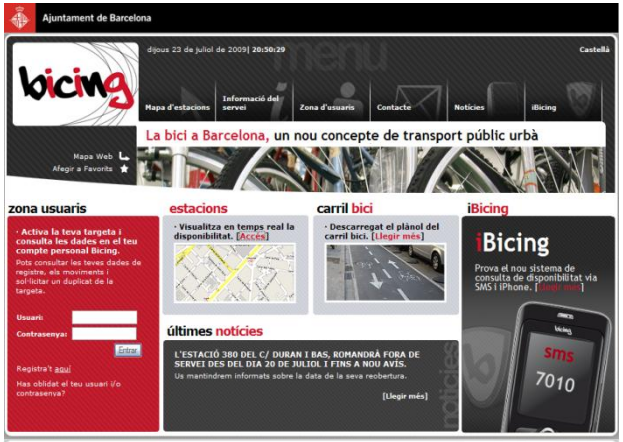
Station Location
Availability
Where to park
Bike lanes
Report Incidences

MULTICHANNEL STRATEGY

AVALIABLE NOW!!

On Site

On Line



Mobile Apps

SMS

DOWNLOAD CHANNELS

I-PHONE

» 20% Smartphone Spain's market share.
» Mobile Internet services heavy users.
» Geopositioning.
» Free publication in the Apple App Store.
» Fast download and easy install.
» Nowadays, average of 300 weekly downloads.

SYMBIAN

» 53% Worldwide Mobile market share.
» Not native mobile internet users.
» Usually without Geopositioning.
» Download by sending a SMS.
» Fast download and easy install.
» Nowadays, average of 25 weekly downloads.

CONCLUSIONS

»Our experience has been good at this moment, and the **users are showing a great acceptation**. We have achieve the mobile access to the service information, so we have improved customer satisfaction.

»In this moment it's not clear the **decision between different mobile strategies** because the market is really segmented: mobile portal, native application, sms… each one has good and bad things, but we have to keep trying to get experience and knowledge.

»The **Smartphones segment it's a potential target** because they are heavy users of mobile internet services. We see it as an opportunity to do things that were impossible before.

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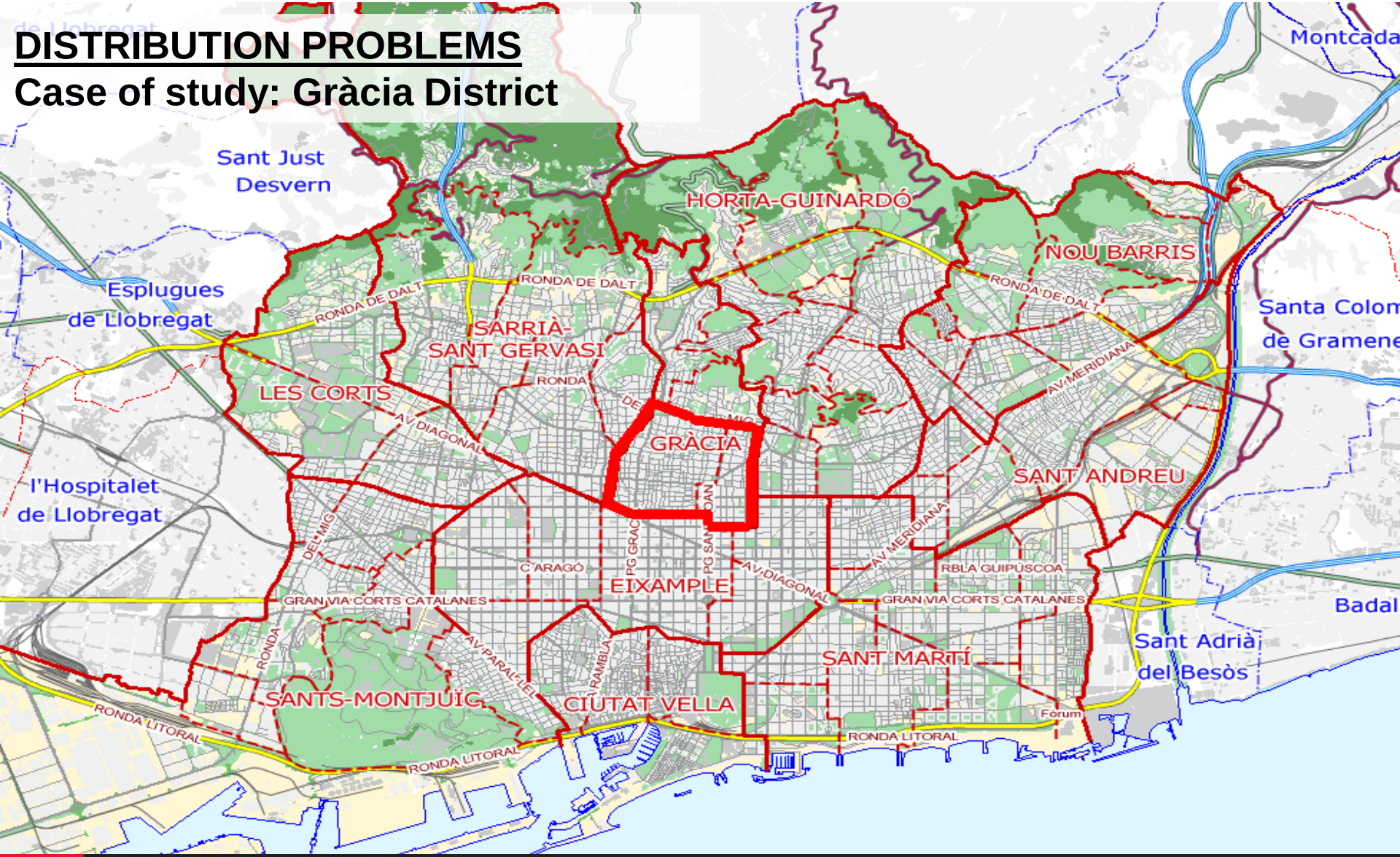
DISTRIBUTION PROBLEMS

Case of study: Gràcia District



GRACIA DISTRICT PROBLEMS

- **High demand:**

  Subscribers of Gràcia 12.000 (10%).

- **Low offer:**

  Few stations 12: 350 Slots (3´2%).

District with great use of bikes

GRÀCIA DISTRICT PROBLEMS

- **High demand:**

  Subscribers of Gràcia 12.000 (10%).

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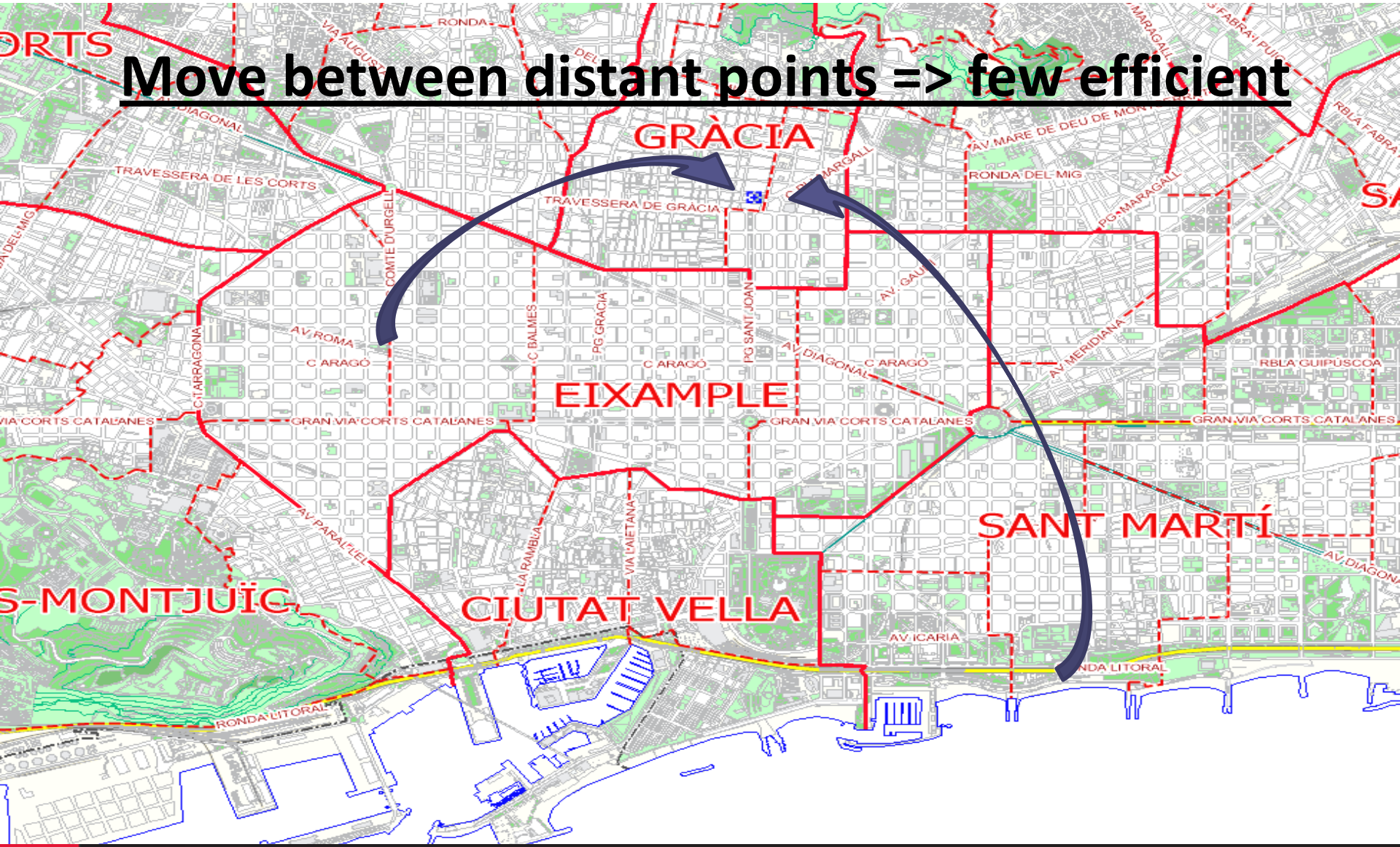
District with great use of bikes

DISTRIBUTION PROBLEMS

Narrow streets : access with wagon without trailer:

- Faster to load and move
- Capacity for only 15 bikes (30 with the trailer)

Move between distant points => few efficient



CONTRIBUTION OF BICYCLES

Before of the improvements:

- Night transfer of bicycles (since 0h to 5h).
  - *When the service is closed.*
  - Start in the morning with 160 bicycles (45% capacity in Gràcia stations).
- Daytime transfer of bicycles (since 5h to 24h).
  - *When the service is working.*
  - Programmed bikes distribution → GENERAL CRITERIONS:
    - From the stations that have been more time full, to the stations that have been more time empty.
    - Criterions of proximity (optimizing travels).
    - Move 180 bicycles every working shift (8h) to the quarter.
  - Not programmed bikes distribution.
    - Problems detection.
    - Solutions at real time.

SOLUTIONS PROPOSAL

- **Solutions:**
  - First time in the morning, from 160 to 280 bicycles (80% of the capacity in the Gràcia stations).
  - Creation of Hub-station in the district (Joanic Square station).
  - Transfer to Hub with trailer-wagon (30 bicycles).
  - Transfer from closer stations (for example, from Catalunya Square).
  - Distribution from Joanic Square to the rest of the quarter stations with simple wagon (15 bicycles).
  - Using *Hub & Spoke* system we can pass from 180 bikes per shift to 310-320 bikes.


GRÀCIA
EIXAMPLE
Sant Gervasi Galvany
VIA AUGUSTA
TRAVESSERA DE GRACIA
C. BALMES
AV. DIAGONAL
PG. SANT JOAN
la Vila de Gràcia
el Camp d'en Grassot i Gràcia Nova
C. PI I MARGALL
el Baix Guinardó
ONDA DEL MIG
el Guinardó
AV. GAUDI
la Sagrada Família
el Camp de l'Arpa del Clot
l'Antiga Esquerra de l'Eixample
C. COMTE D'URGELL
C. ARAGÓ
PG. GRACIA
GRAN VIA CORTS CATALANES
AV. MERIDIANA
PL. GLORIES CATALANES
el Fort Pienc
el Parc i la Llacuna del Poblenou
PG. SANT JOAN
AV. DIAGONAL

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END CONCLUSIONS

- »We started the system without experience:
  - »Difficulties with dimensioning, logistics, material, etc.
  - »Increasing of costs.

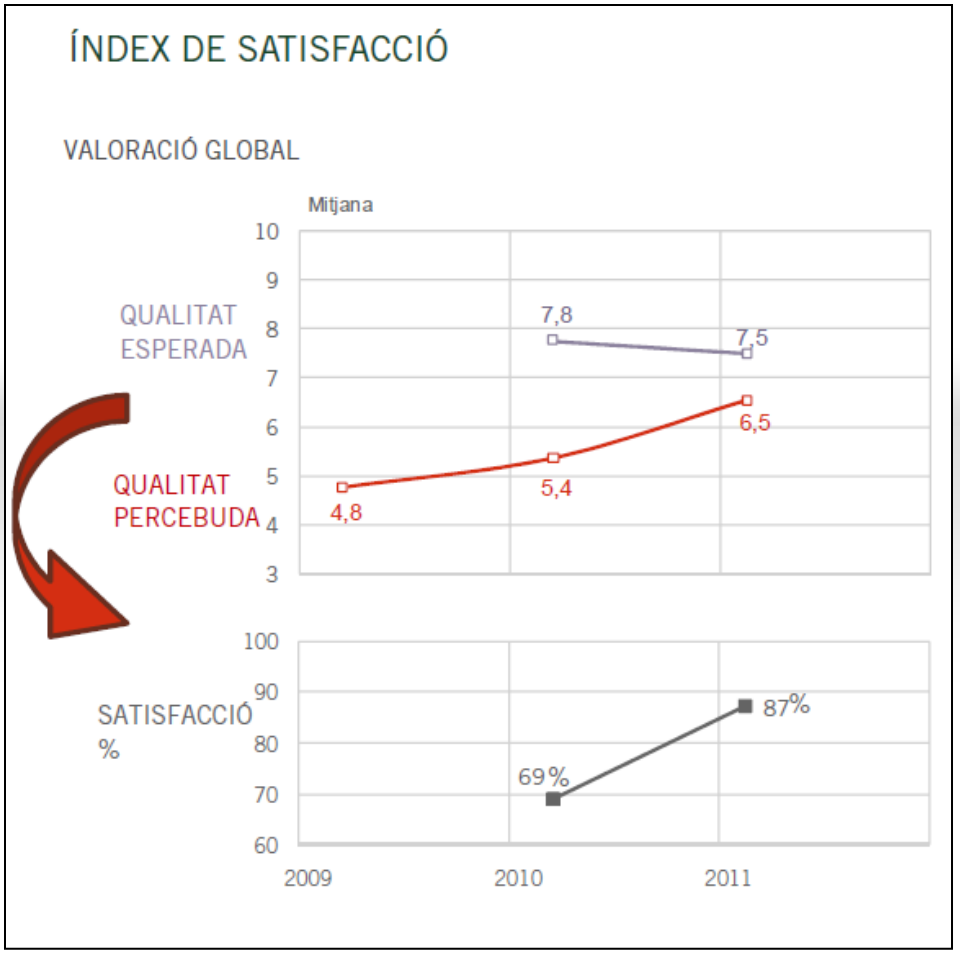
- »Participation in OBIS:
  - »Knowledge and experience.
  - »Redactions of **studies about the system**.

- »Measures (suggested in the studies):
  - »Densification and redimensioning: **50 new bigger stations**.
  - »Management of demand (communication): **i-bicing**.
  - »Solving redistribution problems: ***hub & spoke* in Gràcia**.

END CONCLUSIONS

»The **users satisfaction has increased** from 2009 to 2011.

»2009 → 4,8
»2010 → 5,4
»**2011 → 6,5**



Thanks for your attention!!

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