OUTLINE

• THE CONTEXT

• RAILWAYS IN NAPLES AND CAMPANIA BEFORE THE YEAR 2000

• OBJECTIVES AND STRATEGIES OF THE PROJECT

• THE METRO SYSTEM IN NAPLES AND CAMPANIA 2000-2012

• THE VALUE OF BEAUTY
RAILWAYS IN NAPLES AND CAMPANIA BEFORE THE YEAR 2000

The metropolitan area of Naples

The metropolitan areas centred around Naples with 3.5 millions inhabitants has one with the highest residential density in the world (1900 inh./kmq)

RAILWAYS IN NAPLES AND CAMPANIA BEFORE THE YEAR 2000

Metropolitan areas in the world: population and residential densities

Metropolitan areas centred around Naples with 3.5 millions inhabitants has one with the highest residential density in the world (1900 inh./kmq)

The metropolitan areas centred around Naples with 3.5 millions inhabitants has one with the highest residential density in the world (1900 inh./kmq).

Font: Eurostat
LUZ: an area with a significant share of the resident commute into the city
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The railway history in Campania

1889: the Cumana, the second metropolitan railway in the world after that of London

THE REGIONAL METRO SYSTEM OF CAMPANIA

“Direttissima” Pozzuoli - Gianturco

1925. Opening of the “Direttissima” Pozzuoli - Gianturco
RAILWAYS IN NAPLES AND CAMPANIA BEFORE THE YEAR 2000

Railways in Naples and Campania before the year 2000

<table>
<thead>
<tr>
<th>N. of stations</th>
<th>340</th>
</tr>
</thead>
<tbody>
<tr>
<td>N. of public operators</td>
<td>4</td>
</tr>
<tr>
<td>FS</td>
<td>943 Km</td>
</tr>
<tr>
<td>SEPSA</td>
<td>47 Km</td>
</tr>
<tr>
<td>Circumvesuviana</td>
<td>101 Km</td>
</tr>
<tr>
<td>Alifana</td>
<td>88 Km</td>
</tr>
<tr>
<td>total current extension fo the railways network</td>
<td>1179 Km</td>
</tr>
</tbody>
</table>

Transportation system

- Fragmentary, degraded infrastructure
- Lack of attention to the impacts on the territory
- Un-coordinated design process (company based decisions); lack of system/global vision of the regional railways system
- Very-long construction times (30 years and more)
- The only new, post-war railways infrastructure in Naples: 4 km of the line1 Naples Metro

Land-use system

- increasing urban sprawl and increasing car use
- location choices based on “car accessibility”
Railways in Naples and Campania Before the Year 2000

Infrastructures as generators of negative impacts: (1980-1990)
OBJECTIVES AND STRATEGIES OF THE PROJECT

The planning process, started in 1996 in Naples and extended in 2001 to the whole region is based on the idea that only a highly integrated and extended railways system can provide sustainable mobility in an area with densities such as those of the central area of Campania.

OBJECTIVES AND STRATEGIES OF THE PROJECT

• improving level of services of transportation system and the liveliness of the city
  – “car as an option not as a necessity”
  – integrated services

• improving accessibility to urban areas and areas of cultural interest and tourist attractions

• promote sustainable urban development (transit-oriented developments)

• improve urban quality through high quality architectural and aesthetic standards for railways stations and surrounding area (station renaissance)
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Infrastructures and rolling stock

• National Railway
• Regional Railway
• Urban Metro
• Cable cars
• Bus: feeder network
• Nodes: access and interchange places

Public transport services

• High frequencies
• Even-spaced timetables (easy-to-remember)
• Rende-vouz between rides of different lines
• Integrated fares
• High accessibility to stations
• Integration with other modes and land-use
### The Metro System in Naples and Campania 2000-2012

#### Number of Subscriptions

<table>
<thead>
<tr>
<th>Year</th>
<th>Subscriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>10,758</td>
</tr>
<tr>
<td>2004</td>
<td>30,898</td>
</tr>
<tr>
<td>2005</td>
<td>50,325</td>
</tr>
<tr>
<td>2006</td>
<td>57,316</td>
</tr>
<tr>
<td>2007</td>
<td>62,241</td>
</tr>
<tr>
<td>2008</td>
<td>69,640</td>
</tr>
<tr>
<td>2009</td>
<td>75,080</td>
</tr>
<tr>
<td>2010</td>
<td>78,778</td>
</tr>
</tbody>
</table>

#### % Variation wrt Previous Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>187%</td>
</tr>
<tr>
<td>2005</td>
<td>63%</td>
</tr>
<tr>
<td>2006</td>
<td>14%</td>
</tr>
<tr>
<td>2007</td>
<td>9%</td>
</tr>
<tr>
<td>2008</td>
<td>12%</td>
</tr>
<tr>
<td>2009</td>
<td>7.8%</td>
</tr>
<tr>
<td>2010</td>
<td>4.9%</td>
</tr>
</tbody>
</table>

*Fonte: Consorzio Unico Campania*
The project 2015

The infrastructures network: invariants + options
(zoom on the central area)

THE METRO SYSTEM IN NAPLES AND CAMPANIA 2000-2012

At the end of the project 60% of Neapolitans won’t be more than 500 metres from a station
Regional metro system

<table>
<thead>
<tr>
<th>Year 2000</th>
<th>Completed</th>
<th>Construction</th>
<th>Design</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Railways (km)</td>
<td>1.179</td>
<td>54</td>
<td>50</td>
<td>66</td>
</tr>
<tr>
<td>Stations (numb.)</td>
<td>340</td>
<td>29</td>
<td>30</td>
<td>33</td>
</tr>
</tbody>
</table>

Naples metro system

<table>
<thead>
<tr>
<th>Year 2000</th>
<th>Completed</th>
<th>Construction</th>
<th>Design</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Railways (km)</td>
<td>62</td>
<td>26</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Stations (numb.)</td>
<td>40</td>
<td>27</td>
<td>14</td>
<td>12</td>
</tr>
</tbody>
</table>

source: Centro Studi ACaM (2010)

Investment costs

<table>
<thead>
<tr>
<th>Total cost (M€)</th>
<th>Already spent (M€)</th>
<th>Other available resources (M€)</th>
<th>To be raised (M€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7,957</td>
<td>2,800</td>
<td>2,000</td>
<td>3,157</td>
</tr>
</tbody>
</table>

The strategy of “beauty”

The new stations of the Regional Metro System:

- modern architectural places designed by international architects and enriched by art works.

- not only functional for travel, but also symbols of the new transportation system. Aggregation centres, nice to see and comfortable to pass through.

- Opportunity of urban renewal of the neighbouring areas.
Architectural quality of stations and renewal of the surroundings

The architects

Gae Aulenti  
Mario Botta  
Silvio d’Ascia  
Peter Eisenman  
Massimiliano Fuksas  
Zaha Hadid  
Anish Kapoor Futue Systems  
Hans Kollhoff  
Vittorio Magnano Lampugnani  
Francesco e Alessandro Mendini  

Nicola Pagliara  
Loris Rossi  
Dominique Perrault  
Boris Podrecca  
Karim Rashid – Sergio Cappelli  
Richard Rogers  
Uberto Siola  
A. Siza Vieira – E. Souto de Moura  
Oscar Tusquets Blanca  
Benedetta Tagliabue

S. Rosa station (before and after)  (by Alessandro Mendini)
S. Rosa station (by Alessandro Mendini)

Dante station (before and after) (by Gae Aulenti)
Architectural quality of stations and renewal of the surroundings

Dante station (by Gae Aulenti)

Architectural quality of stations

Vanvitelli station (by Capobianco)
Architectural quality of stations

Materdei stations (by Atelier Mendini)

Architectural quality of stations

Museo station (by Aulenti)
Montesanto (before)

Montesanto after (Silvio D’Ascia)
Montesanto (station)

Scampia

Stazione Scampia
Scampia (Nanu)

Stazione di Giugliano (Raffone)
Stazione Università (Karim Rashid)  
Opened in 2011

Toledo Station  
Opened in 2012

Achille Cevoli  
Bob Wilson
Toledo Station *Opened in 2012*

Architectural quality of stations and renewal of the surroundings

New designed stations: **Municipio station** - Work in progress
Architectural quality of stations and renewal of the surroundings

New designed stations: **Municipio station** - Work in progress

Architectural quality of stations and renewal of the surroundings

New designed stations: **Municipio station** (by Alvaro Siza e Souto Moura)
Architectural quality of stations and renewal of the surroundings

New designed stations: Garibaldi station (by Perrault)
Impact evaluation (estimated/measured)

- 110 ktep / year - 250.000 t / year CO2

4 % Reduction of road fuel consumption

Pax/yr on Naples railways

Δ (2009 – 2000) : +75%

Transit modal share

Napoli: 43% (+11% wrt 1996)
Average large Italian cities: 28%


Napoli: -6% Italia: +6%

source: Centro Studi ACaM

Modal share public transport in motorised trips

<table>
<thead>
<tr>
<th>City</th>
<th>Metropolitan area</th>
<th>Suburbs – main city</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stockholm</td>
<td>40,0%</td>
<td>55,0%</td>
</tr>
<tr>
<td>Greater London</td>
<td>39,2%</td>
<td>39,2%</td>
</tr>
<tr>
<td>Helsinki</td>
<td>64,0%</td>
<td>38,0%</td>
</tr>
<tr>
<td>Paris – Île-de France</td>
<td>63,6%</td>
<td>29,4%</td>
</tr>
<tr>
<td>Madrid Community</td>
<td>63,5%</td>
<td>49,8%</td>
</tr>
<tr>
<td>Bilbao</td>
<td>60,0%</td>
<td>44,2%</td>
</tr>
<tr>
<td>Barcelona</td>
<td>59,1%</td>
<td>40,8%</td>
</tr>
<tr>
<td>Praga</td>
<td>57,0%</td>
<td>-</td>
</tr>
<tr>
<td>Naples (*)</td>
<td>42,8%</td>
<td>35,0%</td>
</tr>
<tr>
<td>Berlin</td>
<td>41,0%</td>
<td>-</td>
</tr>
<tr>
<td>Frankfurt</td>
<td>40,0%</td>
<td>18,0%</td>
</tr>
<tr>
<td>Torino</td>
<td>37,2%</td>
<td>26,7%</td>
</tr>
<tr>
<td>Brussels</td>
<td>36,0%</td>
<td>23,0%</td>
</tr>
<tr>
<td>Vienna</td>
<td>34,0%</td>
<td>31,9%</td>
</tr>
<tr>
<td>Roma Province</td>
<td>32,4%</td>
<td>26,8%</td>
</tr>
<tr>
<td>Oslo Region</td>
<td>31,7%</td>
<td>21,6%</td>
</tr>
<tr>
<td>Amsterdam</td>
<td>28,0%</td>
<td>12,8%</td>
</tr>
</tbody>
</table>

SOURCE: EMTA BAROMETER OF PUBLIC TRANSPORT 2007
EMTA: EUROPEAN METROPOLITAN TRANSPORT AUTHORITIES
(*) SOURCE: CAMPANIA REGION
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THE VALUE OF BEAUTY
What is the value of esthetics in public transportation? What are the effects of esthetics in transportation choices?

In the RMS project
- a quantitative analysis of perceived aesthetic value of stations for railways travel as compared to other quality variables such as travel time, access time, service frequency and monetary cost

Real life laboratory experiment in the Aversa – Napoli corridor. There are some OD pairs with:
- two services in “competition” with respect to LOS attributes
  - Rainbow Line + Line 1 (HQR) vs. Trenitalia Line + Line 2 (TR)

<table>
<thead>
<tr>
<th>LOS attributes (average values)</th>
<th>Rainbow Line + Line 1</th>
<th>Trenitalia Line + Line 2</th>
<th>% var.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fare (integrated)</td>
<td>€ 0.8</td>
<td>€ 0.8</td>
<td>0.0%</td>
</tr>
<tr>
<td>Num. of transfer</td>
<td>1</td>
<td>1</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total waiting time</td>
<td>15 min.</td>
<td>13 min.</td>
<td>-13.3%</td>
</tr>
<tr>
<td>Total on board time</td>
<td>45 min.</td>
<td>43 min.</td>
<td>-4.4%</td>
</tr>
<tr>
<td>Access + egress + transfer time</td>
<td>38 min.</td>
<td>36 min.</td>
<td>-5.3%</td>
</tr>
<tr>
<td>Total travel time</td>
<td>98 min.</td>
<td>92 min.</td>
<td>-6.1%</td>
</tr>
</tbody>
</table>
The main differences between the two alternatives are the aesthetic quality of the new stations.

**THE VALUE OF BEAUTY**

The value of aesthetics: effects in transport choices

**RP survey results**

*The OD demand from Aversa center to Napoli historical center*

- 908 one-way trips/day (*measured*)

<table>
<thead>
<tr>
<th>Service</th>
<th>Pass./day</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainbow + Line 1</td>
<td>717</td>
<td>79%</td>
</tr>
<tr>
<td>Trenitalia + Line 2</td>
<td>191</td>
<td>21%</td>
</tr>
<tr>
<td>Total</td>
<td>908</td>
<td>100%</td>
</tr>
</tbody>
</table>
THE VALUE OF BEAUTY

The value of aesthetics: differences in perceptions

RP survey results

A significant “context effect” was observed:

- Users of HQR overestimate service quality indicators with respect to "objective" measures while users of TR do the opposite
  - 10% differences in perceived in-vehicle time
  - 43% differences in perceived access/egress time
  - 59% differences in perceived service regularity
  - 31% differences in perceived waiting time

Estimation results

- The value of waiting time for TR is 32% larger wrt HQR (4.00 euro against 3.04 euro)
- 35 Euro cents per trip is the economic value of aesthetic quality for a student
  - Equal to 6 minutes of waiting time
  - Equal to 9 minutes of access/egress time. This means that the perceived basin influence area of an HQR station is greater than a TR one (the RP survey confirm this results)
Some references:

- Cascetta E. (2005); La sfida dei trasporti in Campania. Mobilità integrata e sviluppo sostenibile; Electa Napoli.