Impacts of Large Urban Regeneration Projects: The case of the New Athens Intercity Bus Terminal

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Presentation Outline

1. The Urban Regeneration Concept
2. The project
3. Objectives
4. Methodology
5. Results
6. Conclusions
7. Challenges
Urban Regeneration Concept

- **Upgrade** of the area and its surrounding
- **Multimodal** transport

- **Various impacts**
  - Social
  - Economic
  - Environmental

- Traffic conditions **improvement**

- Transportation projects can lead to **urban regeneration**
The project

- **Full project name:**
  - Management, Organisation, Development and Planning of a Multi-Operation System for the Development of the Interurban Bus Central Terminal at Eleonas (KSYL)

- **Contracting Authority and Funding**
  - Cooperative “Athens Interurban Central Bus Station”

- **Technical Coordinator**
  - Attiko Metro S.A.
Objectives

- Assessment of the **impact** of large transport projects on **mobility, traffic, transit operations and environment**

- **Subobjectives**
  - Develop a **repository** of multimodal information
  - Establish **accurate predictions** of demand (multiple modes and interacting projects) in future long term horizons
  - Develop a **macroscopic multimodal simulation** tool to test scenarios of future transit demand and traffic demand evolution
  - Establish **efficient traffic management strategies** to enable sustainable growth of the new project
Current Situation -1

- **Intercity bus terminals in Athens**
  - Kifisos Terminal – Terminal 1
  - Liosion Terminal – Terminal 2

- **Terminal 1**
  - Serves most of the passenger demand
  - Lack of public transport connection
  - High use of private cars and taxis
  - High congestion levels and long queues

- **Terminal 2**
  - Significant lower passenger demand
  - Accessible by public transport
  - Higher percentage of PT use
Current Situation -2

- No space for parking in the terminals
  - Illegal parking
  - Frequent stops
  - Deterioration of the already overloaded road network

- Road network around the terminals
  - Low capacity
  - Insufficient geometric characteristics
  - High demand cannot be served

- High demand consists of
  - Users of the intercity busses
  - Passing through traffic
  - Intercity buses
The New Terminal

- Service point of all trips
- Multimodal transportation center

- **High PT accessibility and use**
  - 17 public transportation lines
  - 5 new PT lines will be constructed
  - Underpass connection with metro station

- **Parking facilities**
  - Parking garages
  - Park&Ride facilities
  - Kiss&Ride areas
The Near Area Regeneration

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Now:
- Degraded, risky
- Abandoned construction sites
- Abandoned factories
- Low land use exploitation

After:
- Economic and social upgrade
- Area redevelopment
- Construction of hotel, cafes, commercial facilities
Methodology

- Define the **influence area** of the new project

- Data collection

- **Passenger Demand Prediction** and Urban Traffic Prediction → ARIMA modeling

- Traffic **Simulation model** and Capacity analysis → AIMSUN MODEL
Study Area

Three study areas:

- Kifisos Bus Terminal (Terminal 1)
- Liosion Bus Terminal (Terminal 2)
- New Bus Terminal
Data collection -1

Study Areas: Terminal 1 and Terminal 2

- Typical day and public holiday
- Morning and evening peak hour
- Passenger demand
- Number of intercity buses
- Mode choice (personal interviews)
- Traffic counts at the entrance and exit of the terminals
  - Passenger cars
  - Taxis
  - Trucks
  - Motorcycles
Data collection -2

Study Area: Near and greater area of the new terminal

- Detector data
  - 74 loop detectors
  - Volume, speed, density
  - Typical weekdays and Sunday
  - May and August

- Traffic counts
  - 23 intersections
  - Typical day
  - Morning and evening peak hour
  - Three vehicle classes (passenger cars (incl. taxis), heavy vehicles, motorcycles)
Passenger Demand Prediction

- Factors influencing passenger demand
  - Economic crisis
  - Increased unemployment rate
  - GDP

- Indicator I
  - Ration of passenger demand to GDP per capita

- Historic passenger data

- ARIMA (p,q,d) model
  - Best model ARFIMA (0,0.14,0)
  - MAPE 3.9%

- Passenger demand prediction
  - 2020, 2030, 2040
Results – Terminal 1

- **Traffic generated by terminal operation - Entrance**
  - 8% during morning and evening peak hour
  - Up to 16% during morning peak hour on a non-typical day

- **Traffic generated by terminal operation – Exit**
  - 39% during morning peak hour on a typical day
  - 47% during morning peak hour on a non–typical day
  - 43% during evening peak hour on a typical day
  - Low percentage during evening peak hour on a non–typical day
    - traffic management measures and police enforcement
Results – Terminal 1

- Increased share of private passenger cars

- Taxi share can be up to 30%

- Taxi share above 50% during evening peak hour on a non-typical day

- Adverse traffic conditions at terminal exit – LOS E
Results – Terminal 2

Traffic generated by terminal operation – Entrance
- More than 70% during morning and evening peak hour on a typical day
- Over 80% during morning peak hour on a non–typical day
- Around 50% during evening peak hour on a non-typical day

Traffic generated by terminal operation – Exit
- Around 30% during morning peak hour on a typical and non-typical day
- Around 40% during evening peak hour on a typical and non-typical day
Results – Terminal 2

- **Increased** share of private passenger cars
- **Significant** share of taxis and motorcycles concerning the traffic due to terminal operation
- **Good traffic conditions** at the terminal exit and entrance – LOS B
Results – Near and Greater Area

Traffic model development in AIMSUN software

- Traffic volumes (passenger cars, taxis, heavy vehicles)
- Bus routes, schedules and volumes
- Mode choice of additional traffic due to
  - Terminal operation (passenger demand)
  - Other facilities (hotel, commercial center, etc)
- Model calibration
  - GEH Indicator
- 17 different scenarios
  - Horizons 2017, 2020, 2030
  - Morning/Evening peak hour/holidays
  - Changes in road segments and infrastructures
  - Intercity bus routes
  - Traffic management strategies (changes in signal plans)
Results – Near and Greater Area

- Traffic analysis of the 17 scenarios
  - Delays in all 23 intersections
  - LOS in all 23 intersections

- Comparison with current situation
  - Differences in delays
  - Change in LOS

Best scenario identification

- Volume maps for the 17 scenarios
Conclusions

- Transportation projects and urban regeneration and redevelopment actions lead to:
  - Areas upgrade
  - Accessibility levels upgrade
  - Traffic and environmental conditions enhancement

- New intercity bus terminal in the city of Athens:
  - Improve traffic conditions around the existing terminals
  - Shift towards public transportation
  - Improvement of traffic conditions around the new terminal
  - Implementation of changes in signal plans in critical intersections
Challenges

- New project will bring **massive change** in the urban dynamics → prediction of traffic and passenger demand is challenging

- Need for an **inclusive transport modeling** approach (larger influence area will accommodate more meaningful interactions and will improve predictions)

- **Holistic scenarios** that take into consideration not only adjacent changes but also city level interventions
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