

# Urban Traffic Management – Approaches to Achieve Sustainability



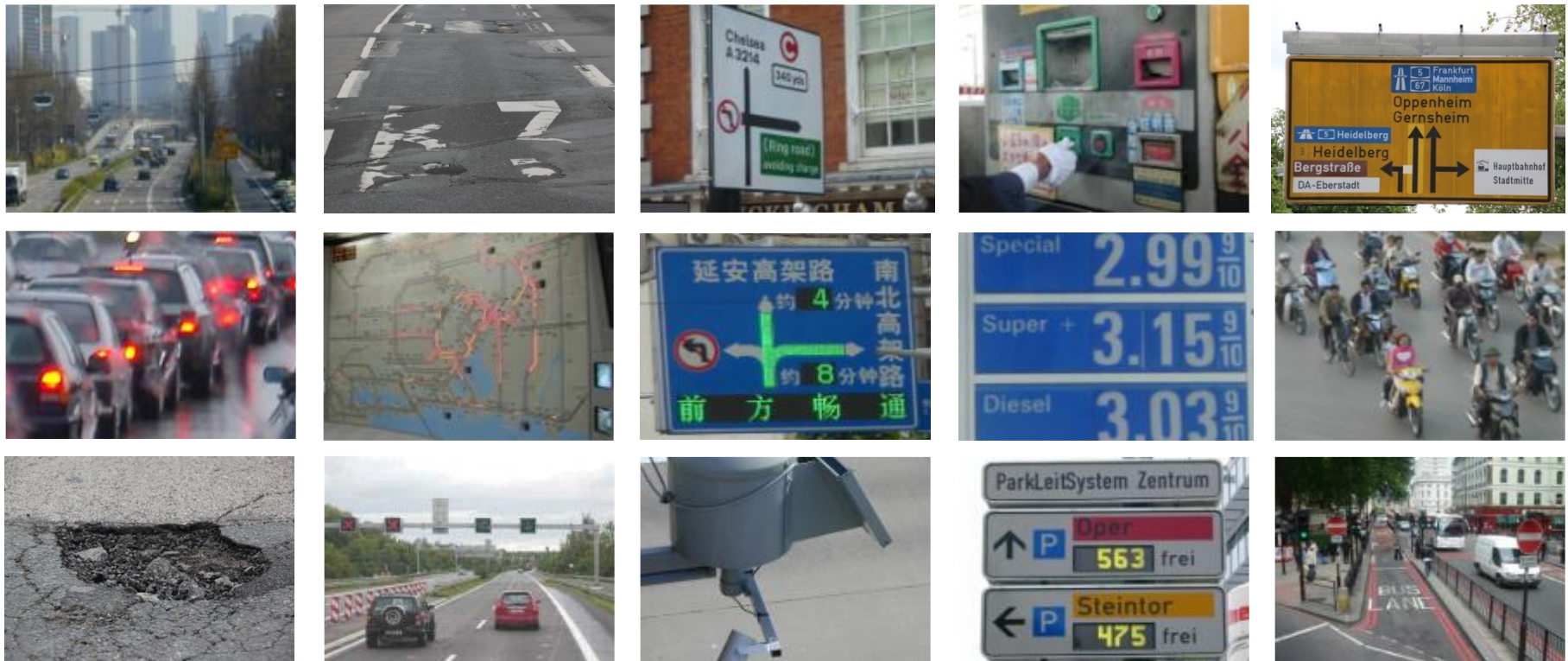
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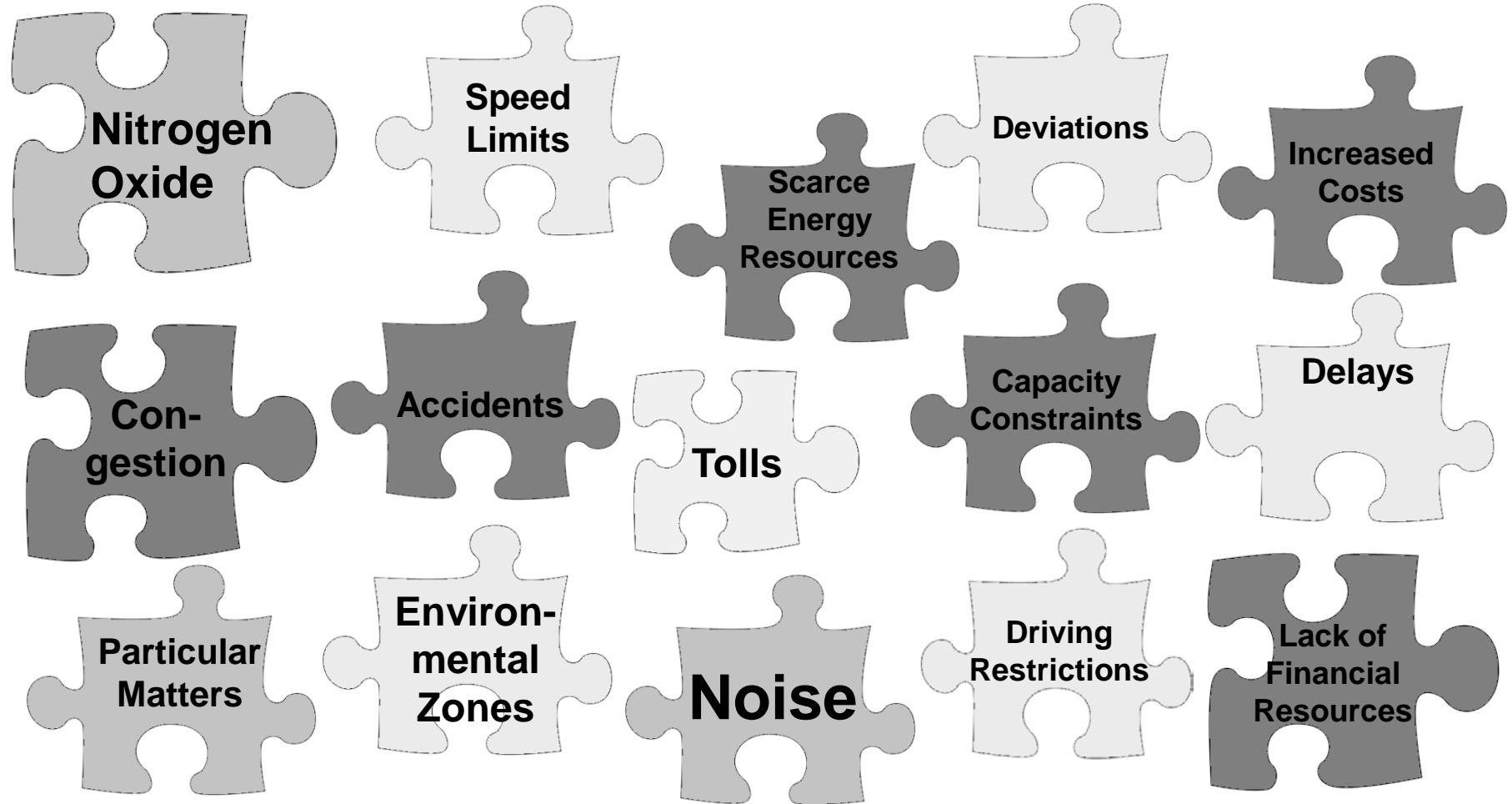
Transport Planning and Traffic Engineering, Technische Universität Darmstadt

Conference „The Future of Traffic Management in Malta – Innovative Mobility“

The Exchange Buildings, Valletta, 30 October 2014



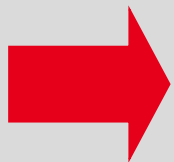
# Transport Problems Need Attention



# Need for Traffic Management



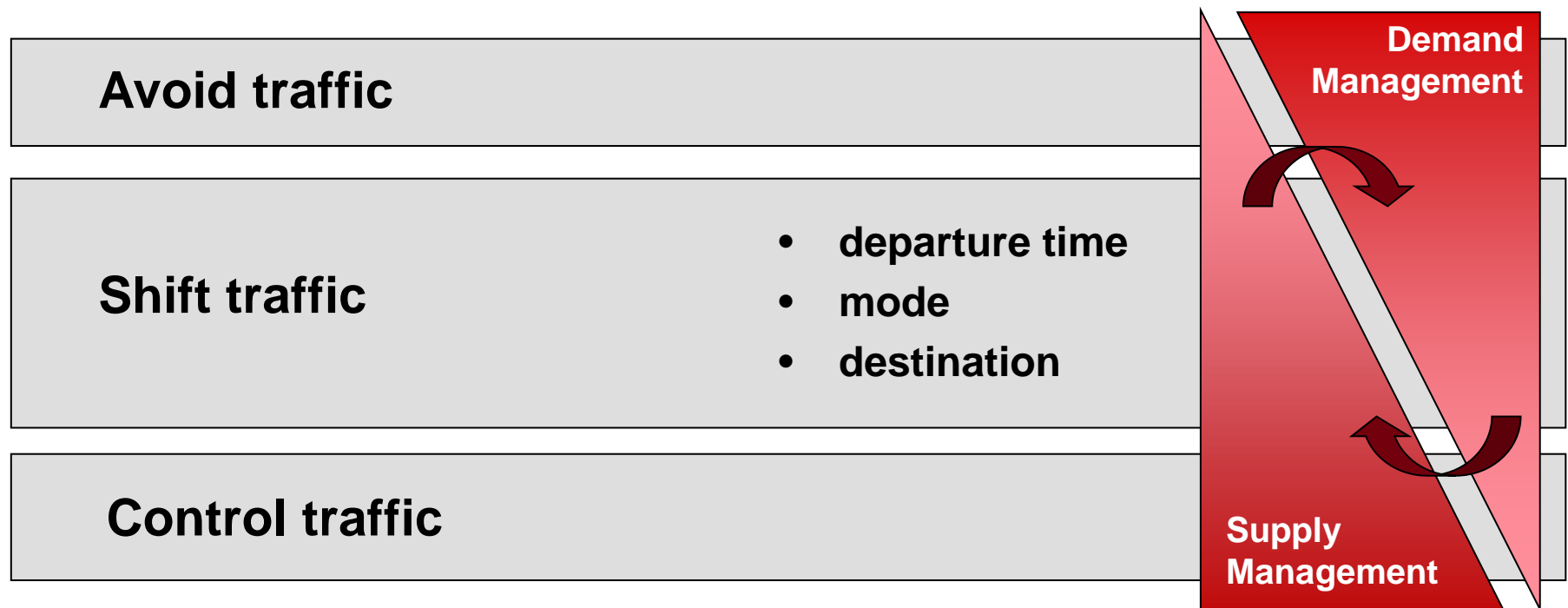
- **Mobility** is a major value for people in our society, and it should not be restricted.
- **Travel demand** continues to increase.  
(Needs a differentiated look in details!)
- **Appropriate infrastructure** is important.  
But infrastructure alone cannot solve the problems.
- **“Capacity”** is not to be defined by traffic flow characteristics, only.  
Instead, it must consider also other aspects such as accepted levels of noise and air pollution along an infrastructure.



**The need to balance travel demand and transport supply will increase.**

# Traffic Management – Definition and Principle Objectives

**Traffic management** influences the supply of traffic and transport systems as well as the demand for travel and transport through a bundle of measures with the aim to optimize the positive and negative impacts of traffic and transport.



# Demand Management as an Integrated Part of Traffic Management

	Passenger Transport	Freight Transport
Influence of traffic supply	Provision and operation of transport infrastructure	
Influence of traffic demand	Mobility management	Freight transport demand management

**Mobility Management** (Travel Demand Management) influences the demand for passenger transport by implementing a bundle of measures with the aim to optimize the positive and negative impacts of traffic and transport.

**Freight Transport Demand Management (FTDM)** aims at influencing the demand for freight transport by implementing a bundle of measures with the aim to optimize the positive and negative impacts of traffic and transport.



## Introduction

# Increasing Acceptance of Restrictive Measures



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“The most important limitation to the transport development in the near future seems to be the decreasing acceptance of negative side effects of transport.”

Translated from LÜBBE, H.: Mobilität - vorerst unaufhaltsam. Internationales Verkehrswesen 11(1993)



## Approach 1

# Control transport demand.

- **Capacity of transport systems** cannot be extended according to demand.
- **Land-use control** is a most powerful tool, but usually limited to long-term effects.
- **Control demand** with accurate aims:  
Influence departure time, transport mode, route, destination ...
- **Information systems** will contribute significantly to optimize the distribution of travel demand by time and location.
- Influencing demand must address not only passenger transport (***Mobility Management***) but also freight transport (***Freight Transport Demand Management***).



## Approach 2

# Control modal choice.



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### ■ “Push and Pull”



- **Clear priorities** for preferred modes. (e.g. pedestrian zones, bicycle routes, separate bus lanes, priority at traffic signals, ...)
- **Attractive alternatives.** (e.g., public transport must allow shorter travel times and/or significantly lower costs compared with individual motorised transport)
- **Allow intermodal travel.**  
(e.g. Park+Ride, Bike+Ride, bike transport in buses and trains, ...)
- **Important “push” measures:**
  - access control
  - parking management
  - road pricing





### Approach 3

# Use the instruments of mobility pricing to control demand.

- **Congestion is the worst instrument** to control demand!
- **Pricing** must be understood not just as an instrument for financing but also as **a most efficient tool to control demand**.
- **Many examples!** (vehicle and fuel taxes, city tolls, parking fees, public transport tariffs, student / job tickets for public transport, ...)
- **Variable prices** adapted to current demand should be used in public transport, for parking, and also in road pricing.
- **Road pricing** must not only influence mode choice and spatial distribution of traffic but also the **distribution of departure times**.  
In this regard, simple pricing systems such as paying a flat rate per year or even per day cannot help much.



## Approach 4

# Operate transport infrastructure dynamically and situation-responsive.



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- Major aim is the **efficient use of the infrastructure** under conditions which are changing by time and location.
- Available resources in public transport and in individual transport must be used in a flexible way, **depending on time and situation**.

**Examples:** Tidal flow systems, actuated traffic signal control, dynamic speed limits, dynamic route signs, on-demand public transport services, ...

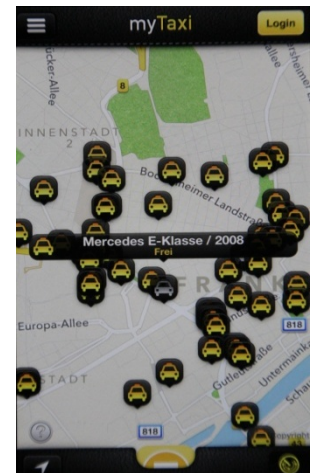
- **Detection of the current situation** and effective control are only feasible by using advanced technologies.
- **Congestion** should be consequently avoided, at least counter-actions shall be taken quickly.
- **Dynamic strategies** for traffic management must be **planned in advance**, evaluated and agreed upon by all involved institutions.



## Approach 5

# Promote new concepts of mobility.

- **Individual value systems** and **mobility behaviour** are changing, specifically in the younger generation.
- **New technologies** enable changes.  
Internet, smart phones, satellite navigation, and new applications (“Apps”) are playing a major role.
- They allow an easy, spontaneous access to **individualised information and services**. (e.g. traffic information services, multimodal routing services, car rental, car sharing, bike rental, ride sharing, taxi sharing, pedestrian navigation, ....)
- The **flexible, situation-responsive behaviour** reduces traffic problems and should be supported.

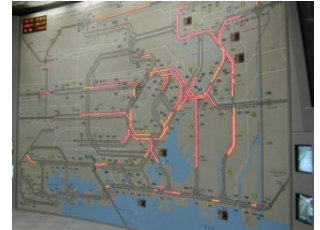


## Approach 6

# Promote the application of ITS.

ITS = Intelligent Transport Systems

- **New technologies** allow changes in mobility behaviour.  
They support a safe, efficient and environment-compatible operation of traffic and transport systems.
- **Many systems** are already implemented by different stakeholders and for different purposes.
- Sustainability in this context addresses the **integration of systems and their compatibility**.
- Efficient deployment of ITS needs a **supportive political framework**.
- A **multimodal ITS vision** and a **multimodal framework architecture** must be provided.





## Approach 7

# Pay attention to traffic safety and environmental impacts.



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- **Traffic Safety** remains a most important issue.  
The number of **fatalities due to traffic noise and air pollution** may beat the number of traffic accident fatalities, by far.
- **Many measures** to protect from noise and air pollution.  
(e.g. heavy vehicle bans, environmental zones, speed limits, prioritisation at traffic signals, ...)
- BUT: Restrictive measures can have **significant disadvantages** for mobility and freight transport!
- **Traffic management must be dynamic and environment-responsive.**
- **Low emission vehicles** (e.g. electrical vehicles) bear a good perspective for environmental compatibility. But sufficient market penetration will need time.



## Approach 8

# Provide sufficient and sustainable financing for transport.

- **Asset erosion and reduced functionality** of the infrastructure must be avoided.

**Financing of public transport** must be secured and sustainable.

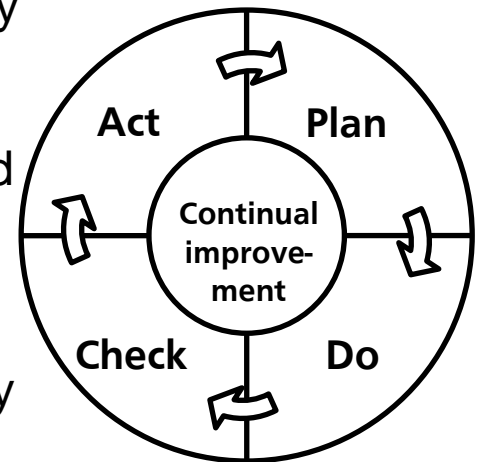
- **Additional payments** only seem to be acceptable to travellers, if such new income is clearly used to improve the transport system and not compensated by cutting other financial sources.
- There are some options, to involve not only the users of the transport systems in financing but also **other beneficiaries**.  
(e.g. commerce in the neighbourhood)
- **Road pricing** is a powerful and adequate instrument for financing in many aspects.
- The impacts of pricing instruments must be **carefully assessed** and balanced in each case.



## Approach 9

# Make the quality of traffic transparent and improve it continuously.

- Very often, the real **quality of traffic is not known**, specifically in urban traffic. (e.g. average delay, travel speed, duration until resolving a failure, etc.)
- The interrelations between used resources and traffic quality are **not transparent**.
- **Performance measurements** in traffic and transport should be conducted by independent parties. Execution and supervision should be separated, also in road operations.
- **Frequent quality reports** should prove the achieved quality and support decisions to allocate resources.
- The principles of **quality management** should be applied throughout all fields of traffic and transport!



## Approach 10

# Create the right institutional framework for intermodal traffic.

- Traffic and Transport must be understood as an **holistic system**.
- The supplies of different traffic and transport systems must be closely **coordinated** to allow mobility and transport in every situation.

**Example London:** Road traffic and public transport are managed by “Transport for London”. To optimise the whole urban transport system also cross-financing is used.

- **Associations of public transport authorities** may provide a good starting point for further development.
- Need for an **integrated traffic management authority** which brings together the competences in public transport and road network operation, not only on a local but on a regional level.





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1. Control transport demand.
2. Control modal choice.
3. Use the instruments of mobility pricing to control demand.
4. Operate transport infrastructure dynamically and situation-responsive.
5. Promote new concepts of mobility.
6. Promote the application of ITS.
7. Pay attention to traffic safety and environmental impacts.
8. Provide sufficient and sustainable financing of transport.
9. Make the quality of traffic transparent and improve it continuously.
10. Create the right institutional framework for intermodal traffic.