

# **Understanding the effects of transport infrastructures. Optimizing mobility without adverse effects.**

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# **Sustainable traffic management**

**Have traditional transportation planning methods  
solved and mitigated problems  
or  
have they enhanced the problems in transport?**

**If they have produced the problems –  
what was the reason?**

# Today

**Measures and fields of professional and political interest:**

**Traffic flow of cars**

**Congestion mitigation**

**Road pricing**

**Public transport subsidies and heavy solutions (Metro)**

**Telematics (ITS)**

**Urban and land use planning on assumptions, promises and hopes**

# **Dominant „planning philosophy“**

**Planning in transport has cut its historical, local and cultural roots during the last century.**

**Transport Planning has left the human scale in the 19<sup>th</sup> and even more in the 20<sup>th</sup> century. Today it follows the demand of car traffic.**

**Urban planning is influenced by simplified formal misconceptions about cities and human life.**

**What is good for the west is good for everybody.**

**US standards are applied via World Bank everywhere.**

# **Problem solving or problem producing transport planning?**

**Is the technical mobility  
as it is organised today a  
contribution to life which is  
dependent  
on life-supporting systems,  
physical, social, cultural  
– or not?**

# **Today's effects**

**Increasing transport problems, accidents.**

**Increasing deficits in PT and in community budgets.**

**Increasing air pollution.**

**Ideology instead of rationality.**

**Populism instead of responsibility.**

# Delhi solutions

**Existing situation**

**Comments**

**Flyover  
Road widening**

**Cutting the city into pieces –  
Expensive**

**Metro**

**Expensive – money goes into  
private pocket**

**Parking**

**Private – seperated from system**

**Public Transport**

**Bus – poor buses**

**Rikshaw**

**Not considered**

**Pedestrian**

**Not considered**

# Today

## Attributes of the transport policy of today:

- Helplessness
- Increasing in-sustainability
- Cost-ineffective
- Basic ignorance



# History

Man: 6 – 8 Million years as a biped on the globe  
...the only mode we are really familiar with



# Evolution of Technology

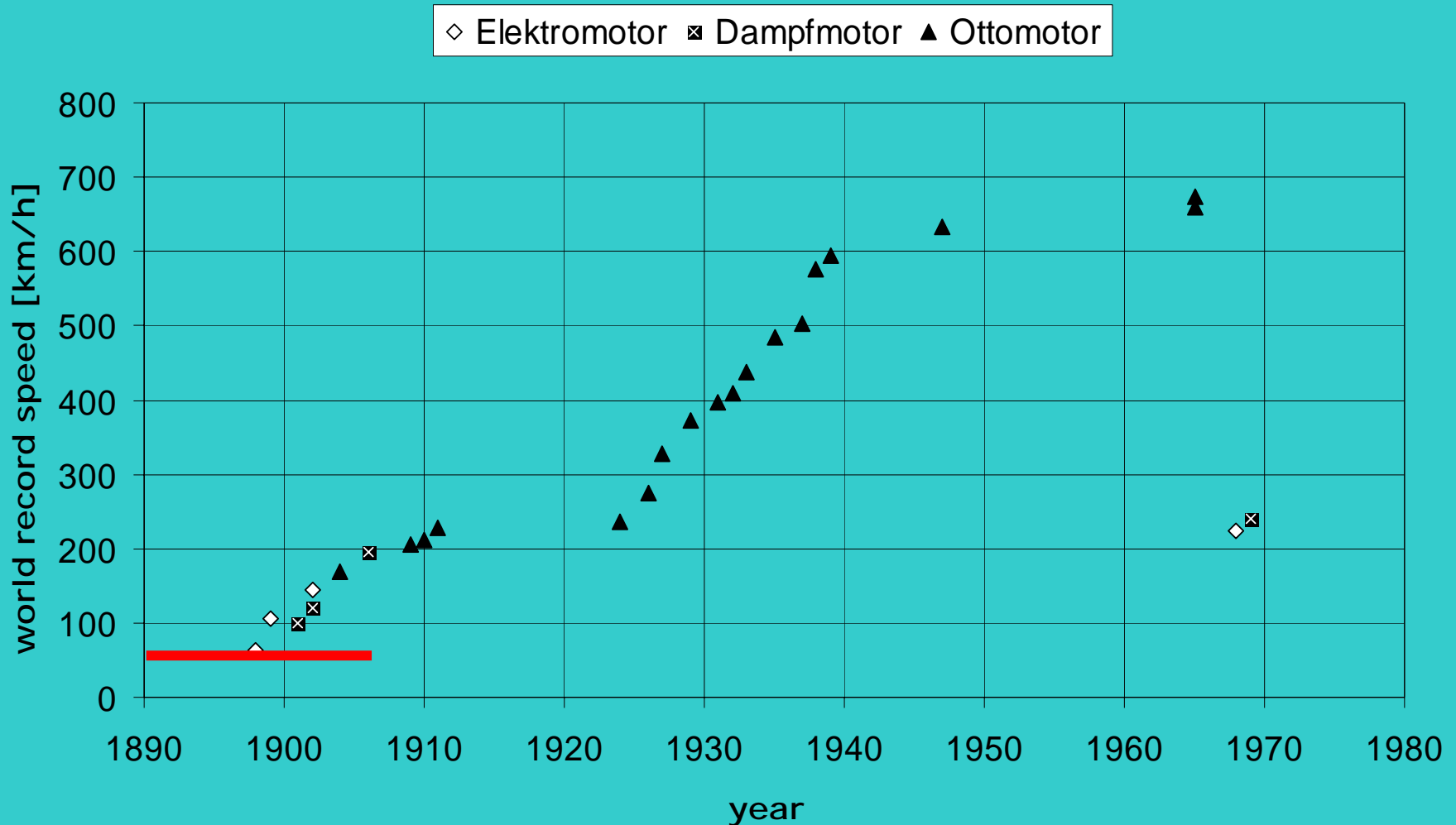
- abt. 10,000 years – settlements (cities), boats, horses
- 200 years – cyclists (1817/1707)



Pryor Dodge, Faszination Fahrrad, 1997, S. 14

- abt. 150 – years railway
- 100 years – cars and airplanes
- 50 years – TV
- Since few decades – telecommunication

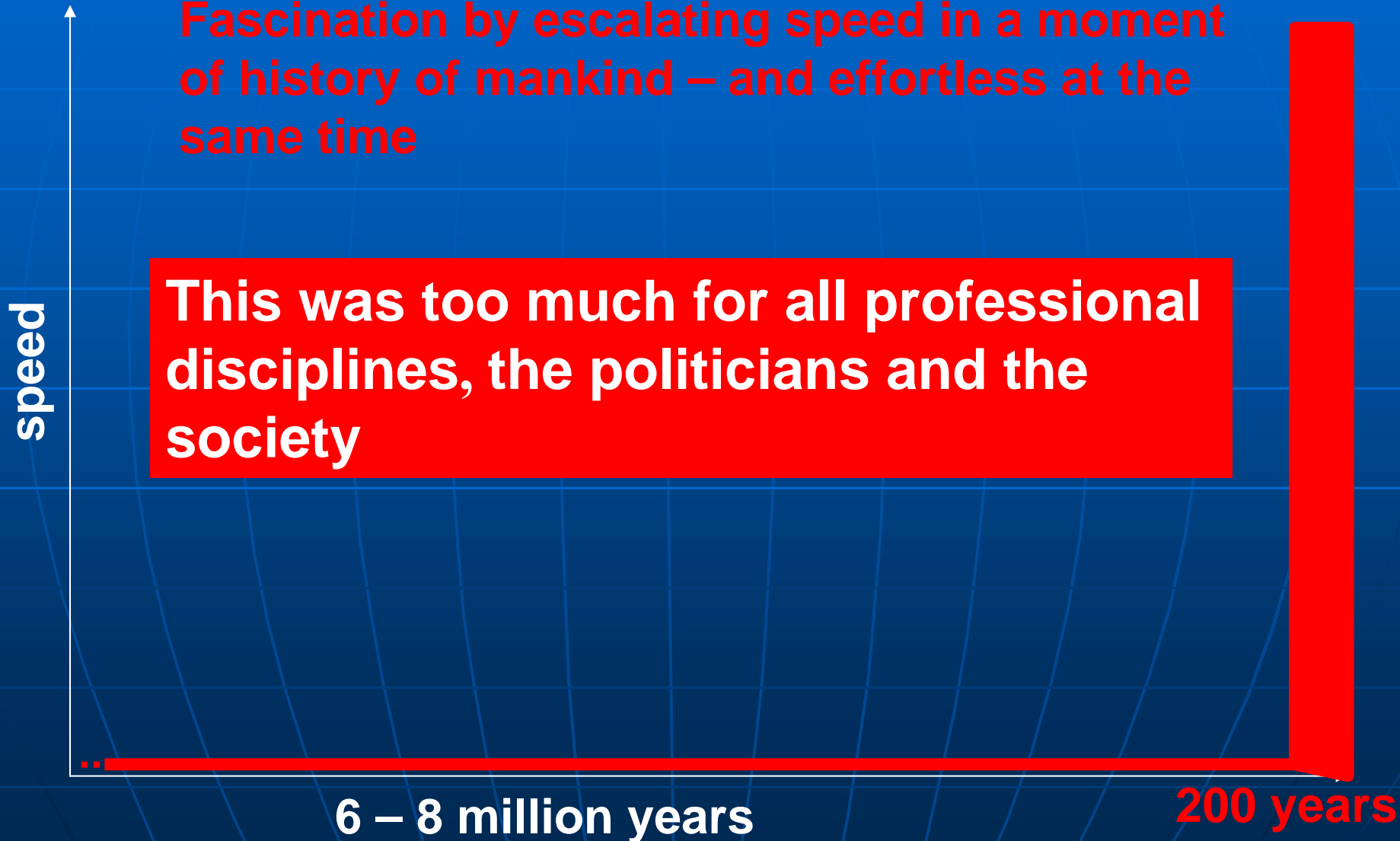
# Car and speed – the fascination of speed



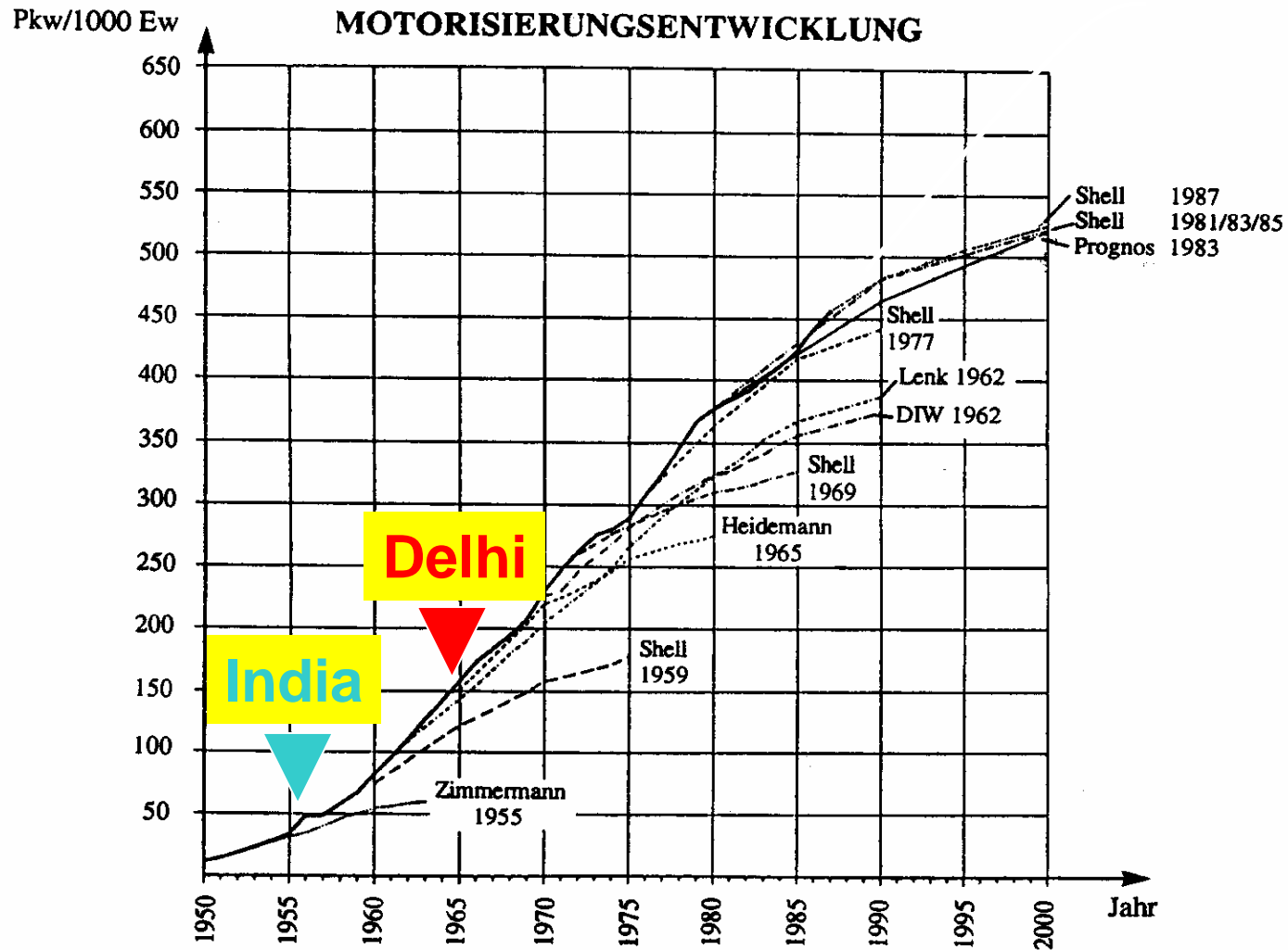
# Evolution of travel speed

Fascination by escalating speed in a moment of history of mankind – and effortless at the same time

This was too much for all professional disciplines, the politicians and the society

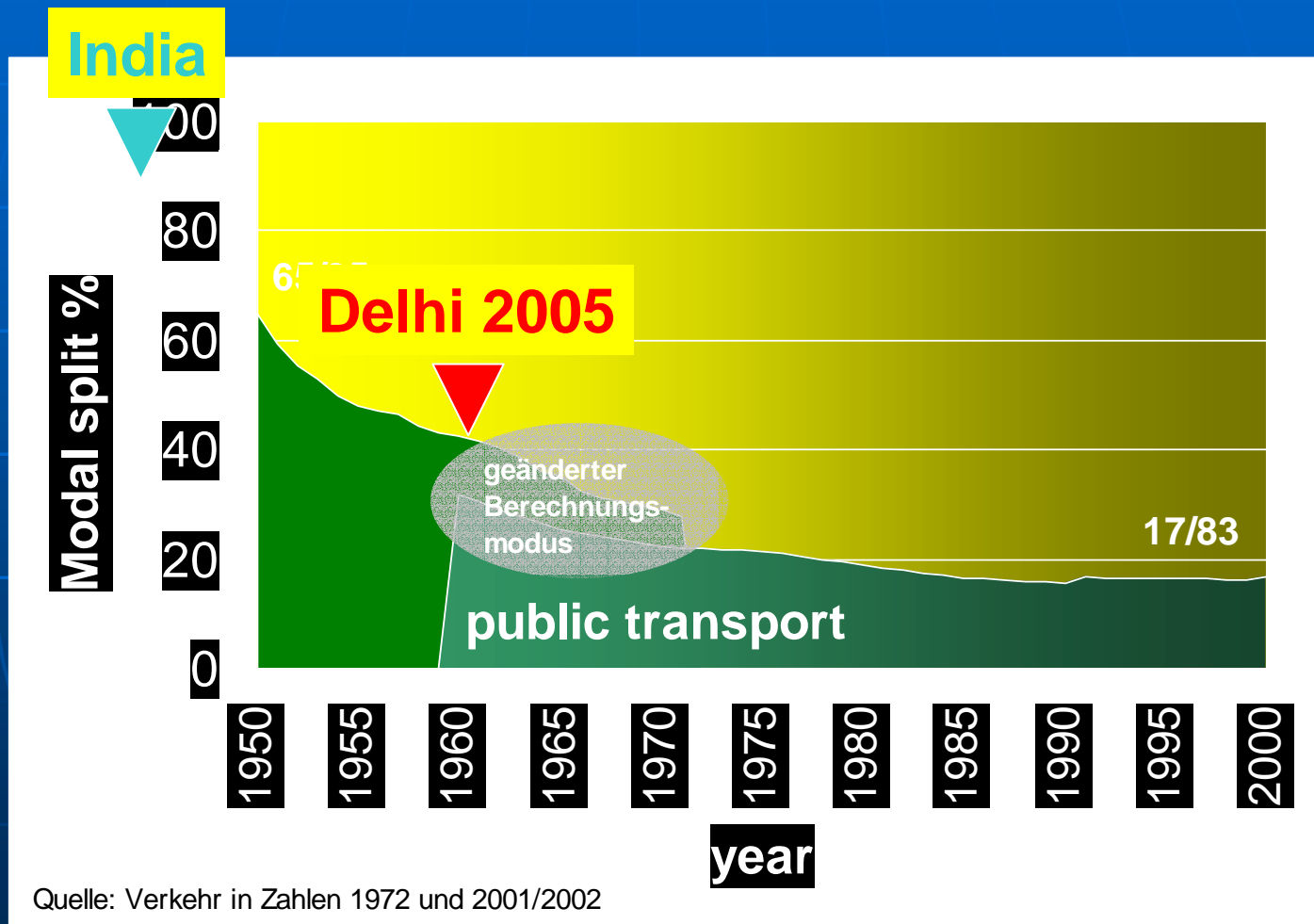


# Motorization in Germany



... this was not „development or growth“, it was the result of transport policy, planning and finance!

# Damage of market of PT in Germany



# Excuse

The development of technical means of transport and transport indicators like speed were so fast, that nearly nobody – at least in the professional arena – has understood

what happened with

- the transport system,
- the cities,
- the settlements,

what happened with

- the families and
- the man

# Hypothesis

## Hypothesis:

**100 years of car use are not long enough to produce sustainable quality of life with mechanical transport means.**

## Indicators:

- 1h driving a car costs about 40min and more life time in the system.
- 1h daily use of cars by car drivers produces 24h of noise and air pollution .
- 1h of comfort for 24h of pain does not provide the right C/B ratio.

*Space and energy indicators point into the same direction*

**The Ecological Footprint of this kind of mobility is too big!**



# Development

**Key question  
for all countries with  
low degree of motorization:**

**How can countries  
optimize the mobility without  
all the negative effects seen  
in highly motorized countries?**

# Traditional perception of the transport system

Only the mechanical modes were seen, the car was the only mode for decades.

The focus was and still is on – Traffic Flow.

Lack of understanding of system effects.

Personal experiences in the new environment were taken as system effects.

The profession put assumptions into a set of dogmas: Dogmas replaced knowledge.

# Basics of traditional transport planning

The professional world in transport is working with a kind of „Axioms“ which seem so obvious that they have been out of question.

These are:

- **Growth of mobility**
- **Time saving by increasing travel speed**
- **Freedom of mode choice**

# Traditional perception of the system: city + transport

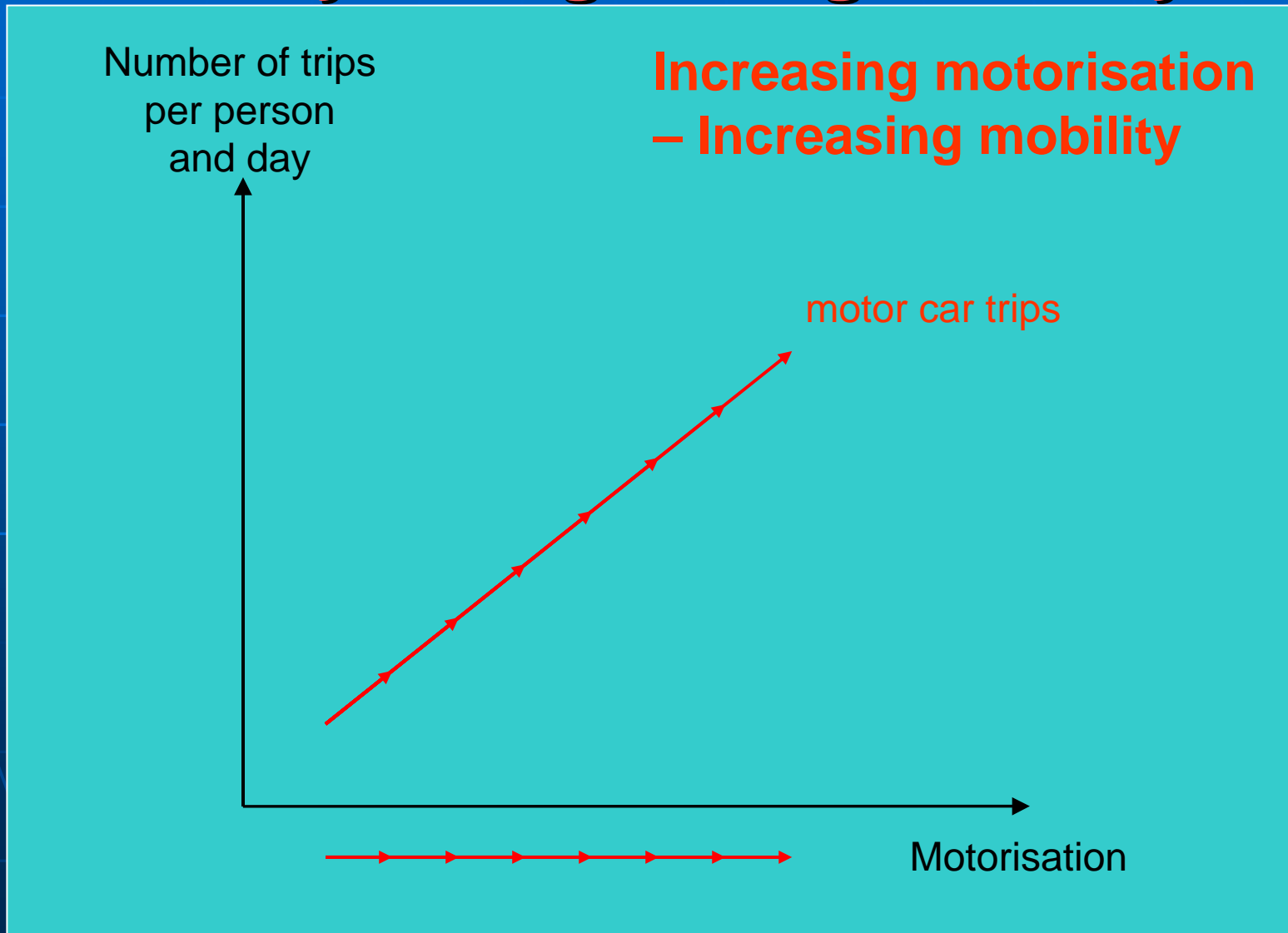
## Traditional perception of the transport system:

- Restricted to the mechanical parts, sometimes to the automobiles only
- Lack of understanding system effects
- Personal experiences were taken as system behaviour

## Parts of the system have been optimised with terrible effects on the whole:

- Car traffic
- Monofunctional quarters (housing, work etc.)
- Urban Logistics ...

# Causes of misunderstanding: The myth of growing mobility



# Only a shift of trips from one mode to another occurs

Reality

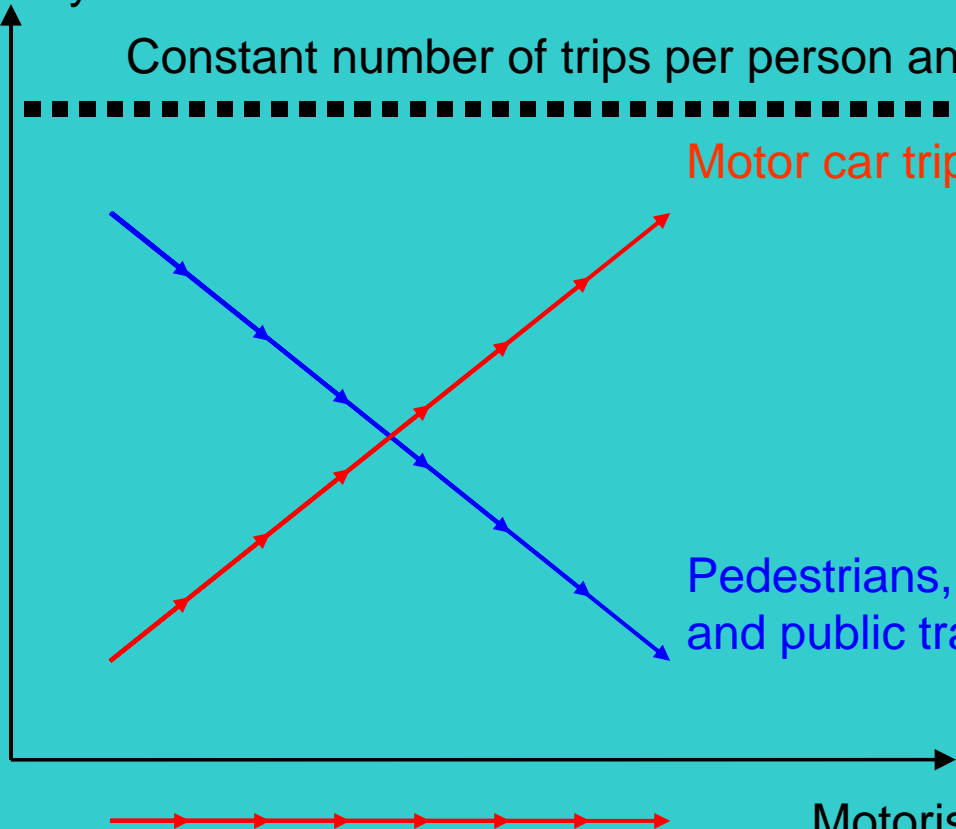
Number of trips  
per person  
and day

Constant number of trips per person and day

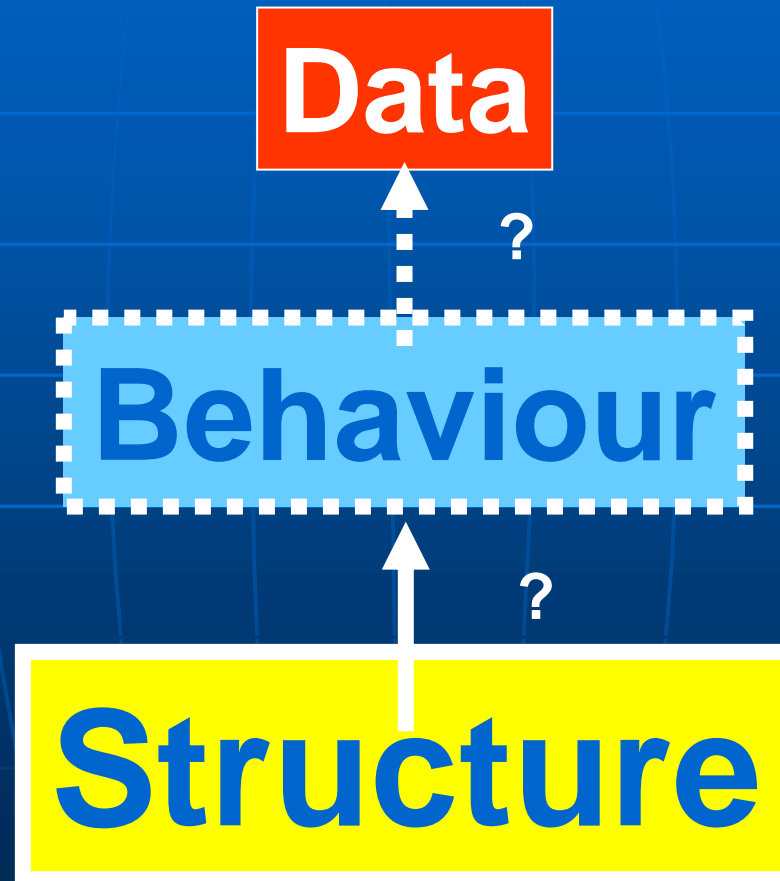
Motor car trips

Pedestrians, cyclists  
and public transport

Motorisation



# Meaning of data



# Changes are possible

If we want to have other Data

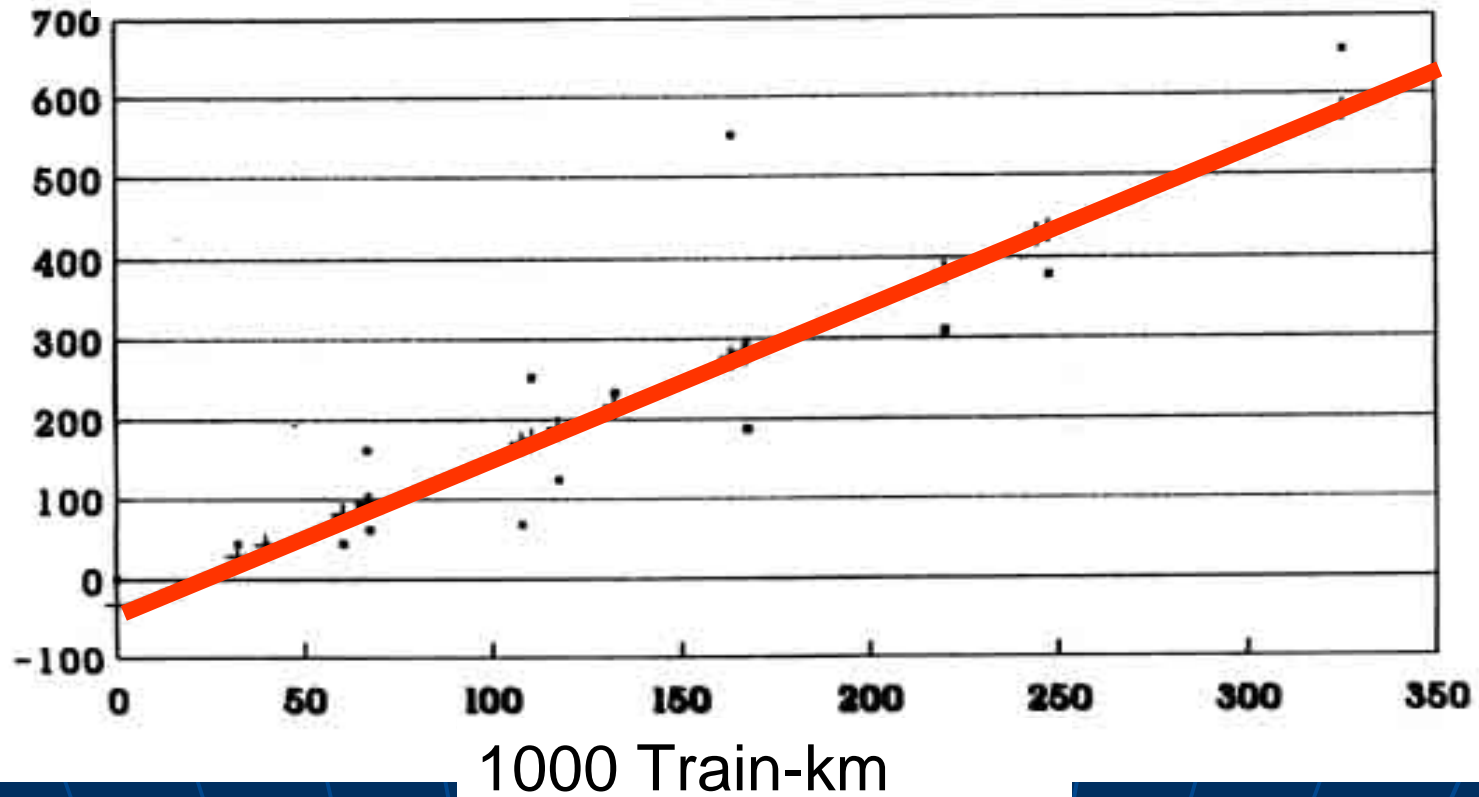
It makes no sense to complain about  
behaviour

We have to change the behaviour-causing structures

...and this is possible, as real examples show!

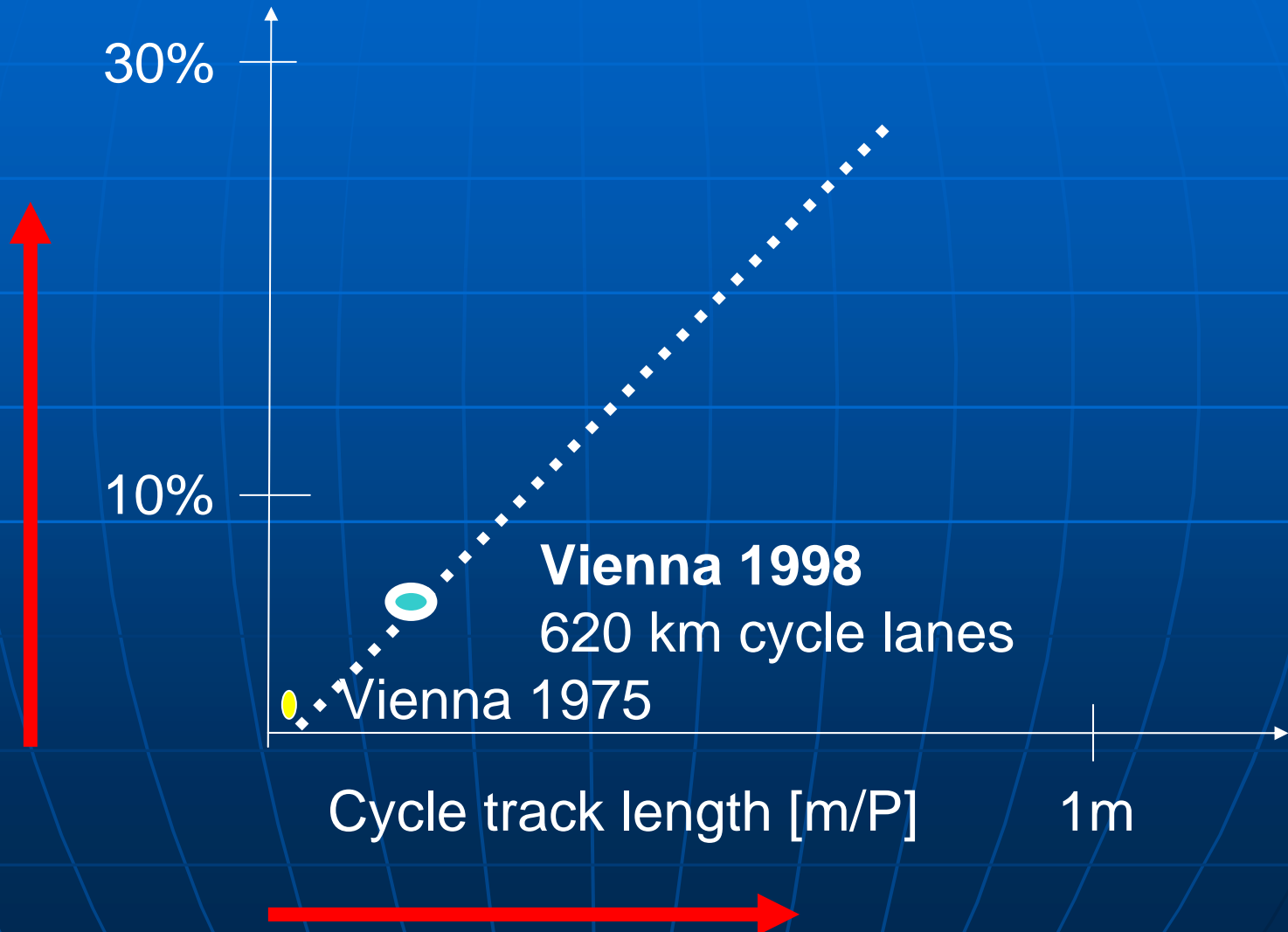


# More trains – more passengers (if circumstances allow)



**More trains – more positive stimulation – more passengers  
– if the circumstances allow it!!!**

# More cycle friendly environment – more cyclists – less ...



**Eisenstadt before: 10,000 cars,  
6,000 pedestrians per day**



# Eisenstadt after: 30,000 pedestrians per day plus ...





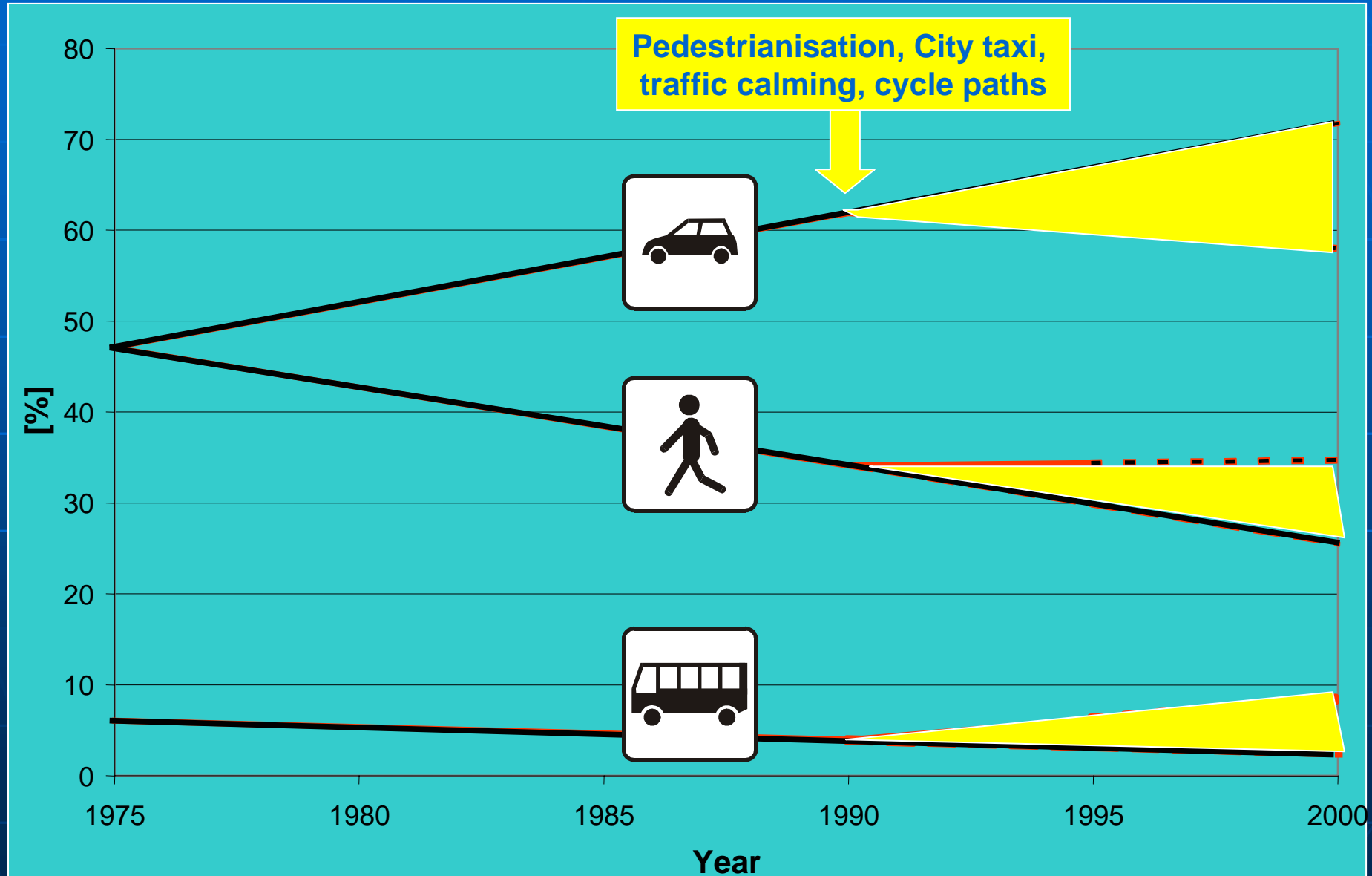
# Before: a parking place



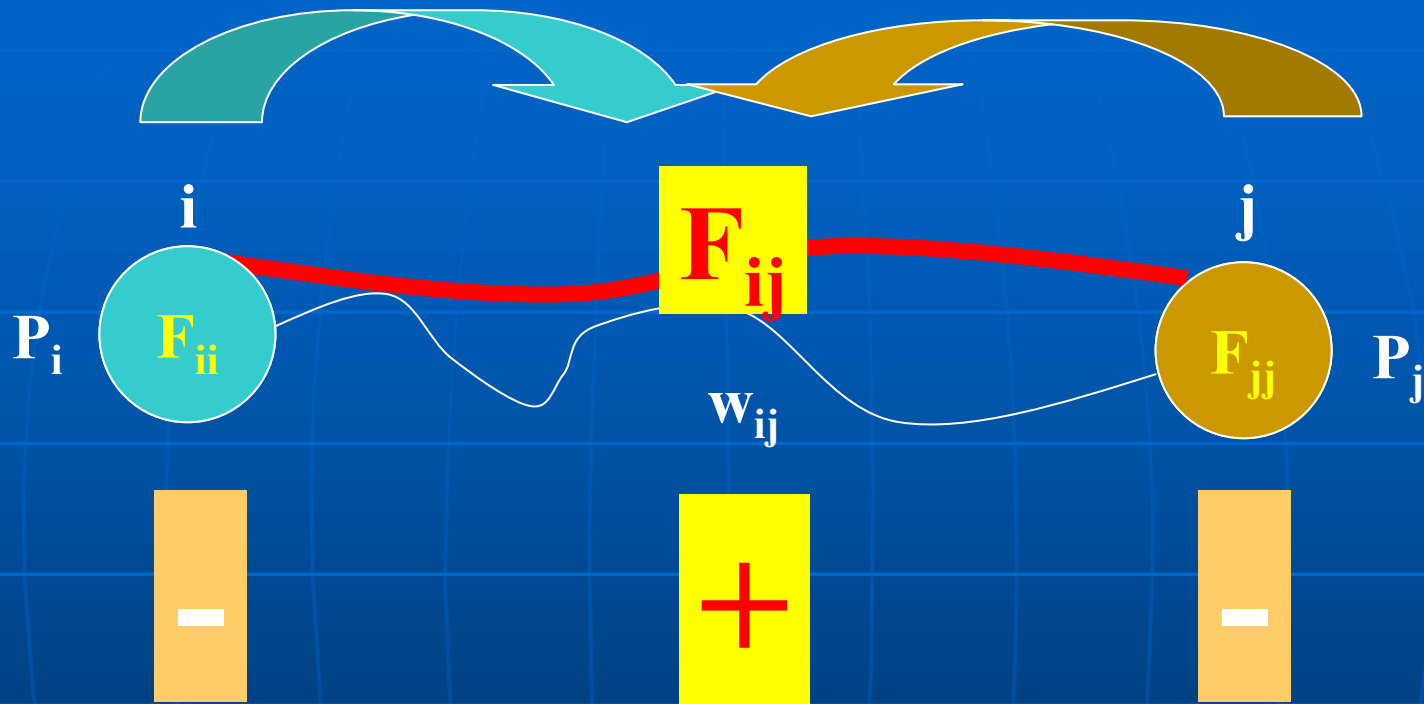
**After: more business, social contacts,  
culture, etc.**



# Eisenstadt – 10,000 inhabitants



# Growth outside = decay inside



$$\delta F_{ij} = - \delta(F_{ii} + F_{jj})$$



# **Mad-man syndrome**

## **Important facts:**

**There is a reality and there is a perception of reality.**

**If somebody has a shift of his perception from the real world (system), he or she is called mad-man or mad-woman.**

**If somebody has a shift of perception which endangers the members of society, he will be hospitalized.**

# **Facts and missing conclusions**

**The transport system of today is killing thousands of people every year in every country and injures hundreds of thousands of them.**

**The transport system is a man-made system and planned by experts – if they have a shift of perception away from the real system behaviour, they are mad.**

**To protect the society from this kind of experts, they have to be hospitalized.**

# **Conclusion – mobility**

**There is no „growth of mobility“  
in the system.**

**Only a shift from one mode to  
others is happening.**

**If somebody believes in „growth  
of mobility“ – he is mad!**

**Cause: time saving from speed increase**

**All decisions for investments for faster transport are based on the assumption of time saving**

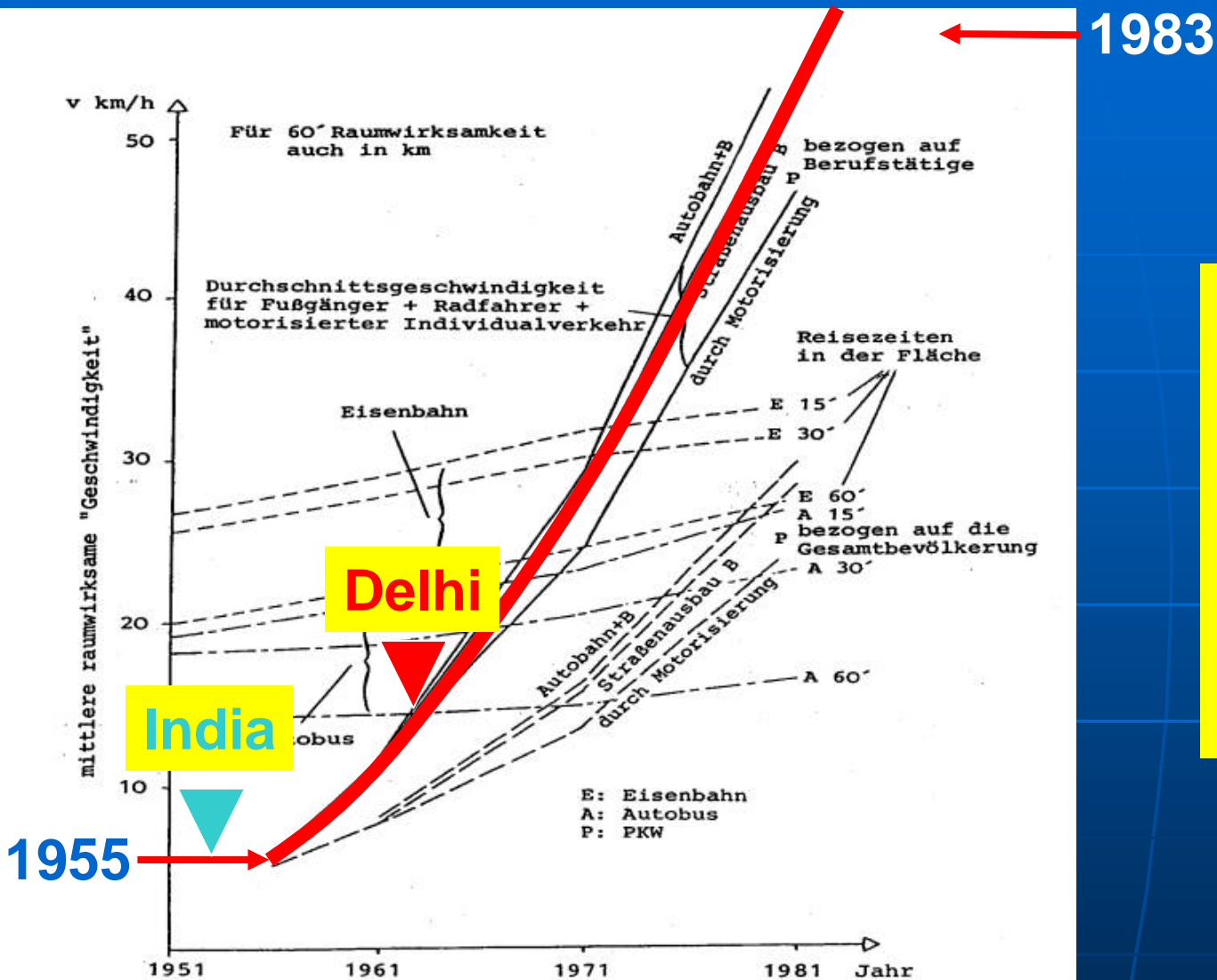
**If this would be real – societies with fast transport systems must have  
PLENTY OF TIME**

# Speed needs space

One flyover  
= 3-10 ha  
= lifespace of  
1,200-4,000 people



# The fascination of motorisation



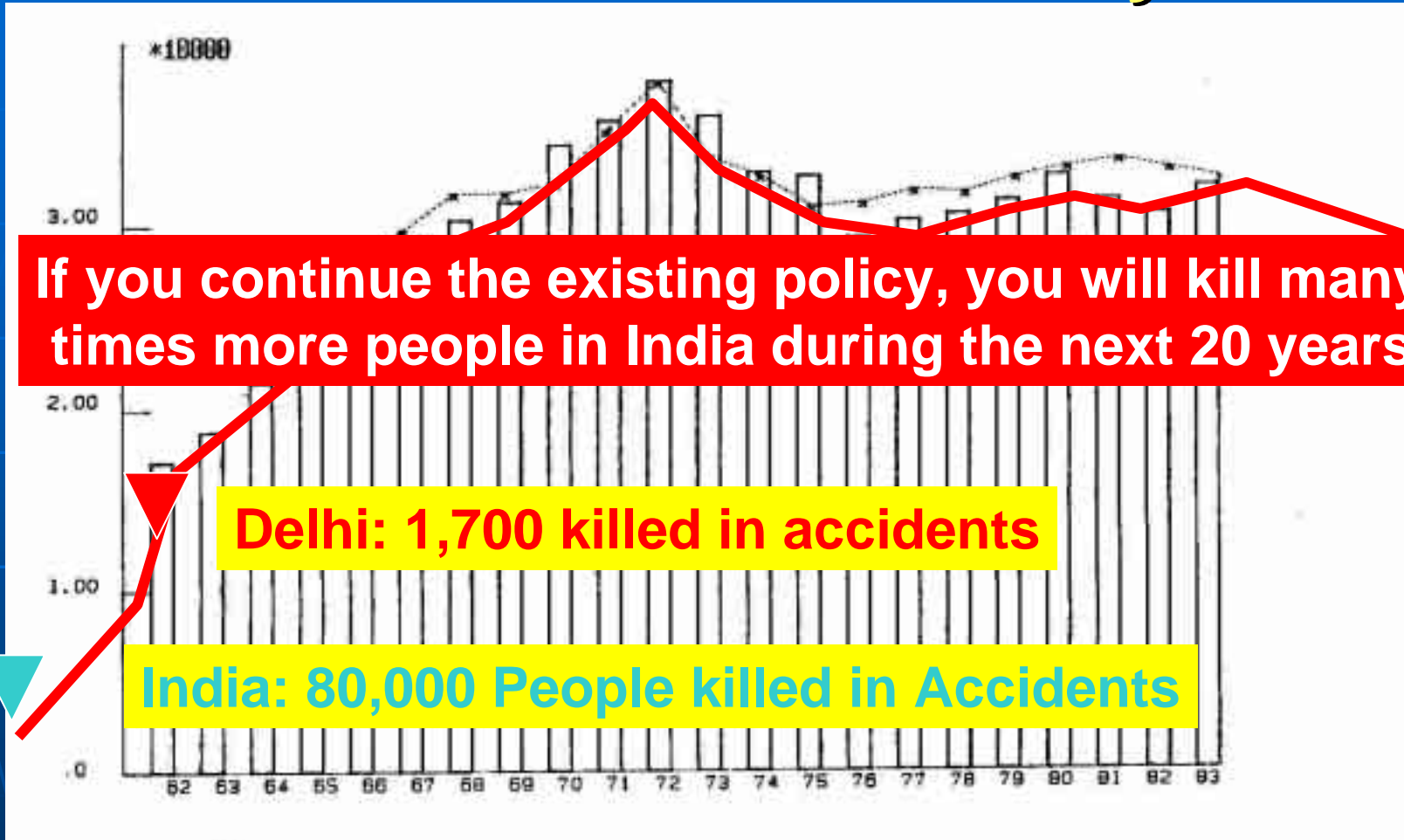
In 30 years,  
ten times  
faster ...

... but where  
was time  
saved left?

Abb. 12: Vergleich der Entwicklung der räumlichen „wirksamen“ mittleren Reisegeschwindigkeiten von Bahn, Bus, Pkw (Reisegeschwindigkeiten der Gemeinden; aus KNOFLACHER, H., GATTERER, W., GROSS, R., WINKELBAUER, S., und ZUKAL, H., 1985)

Entwicklung der „flächenwirksamen“ Geschwindigkeiten für den Individualverkehr, die Eisenbahn und den Busverkehr.

# India is a traffic-safe country – still



India	1,000 mil	.....	80,000 killed in Traffic accidents
Europe	300 mil	.....	40,000 killed
USA	200 mil	.....	50,000 killed

25,000 on today Indian level

16,000 on today Indian level

you have to go through about 0.5 – 0.8 mil per year



# Travel time distribution of different modes – no difference

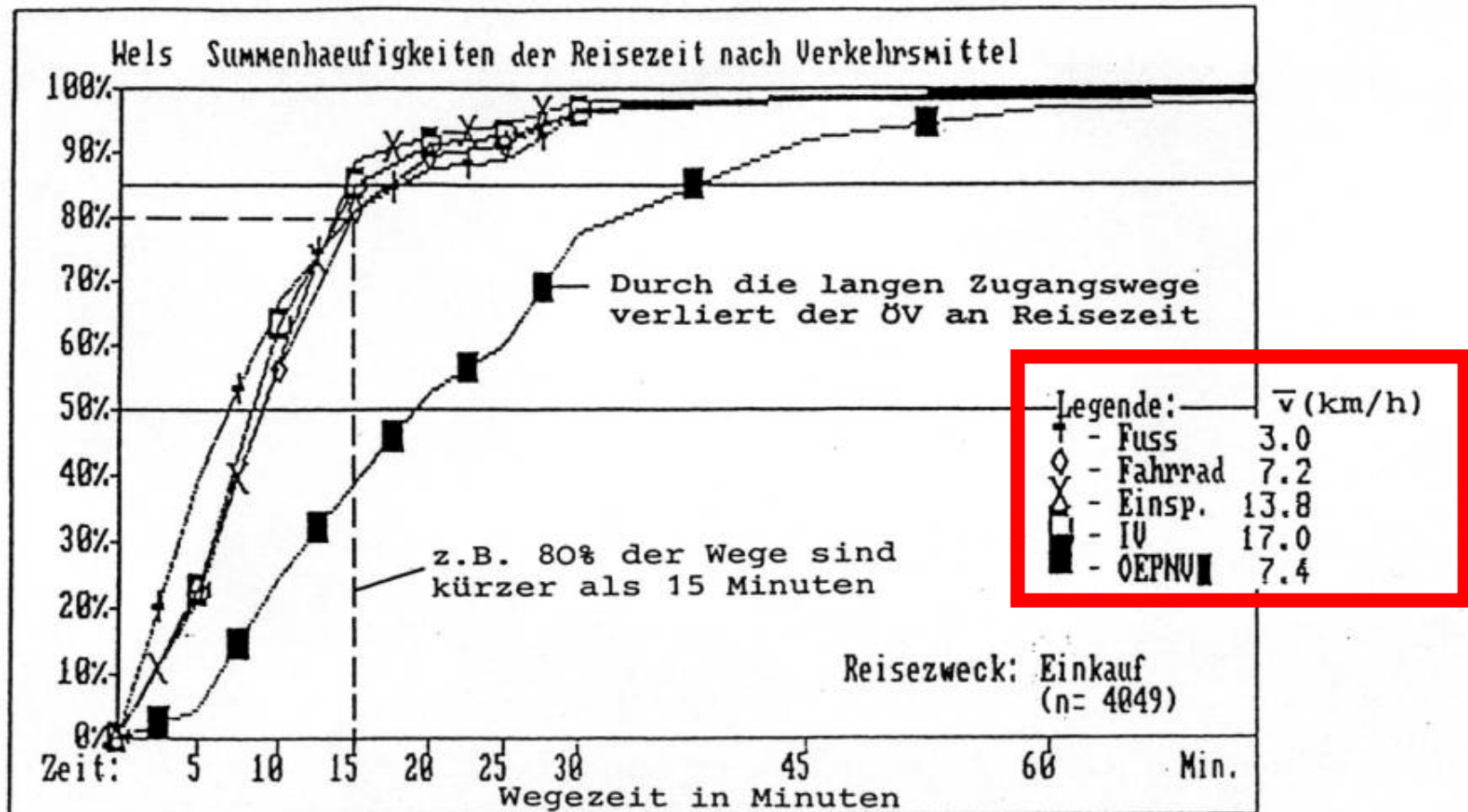
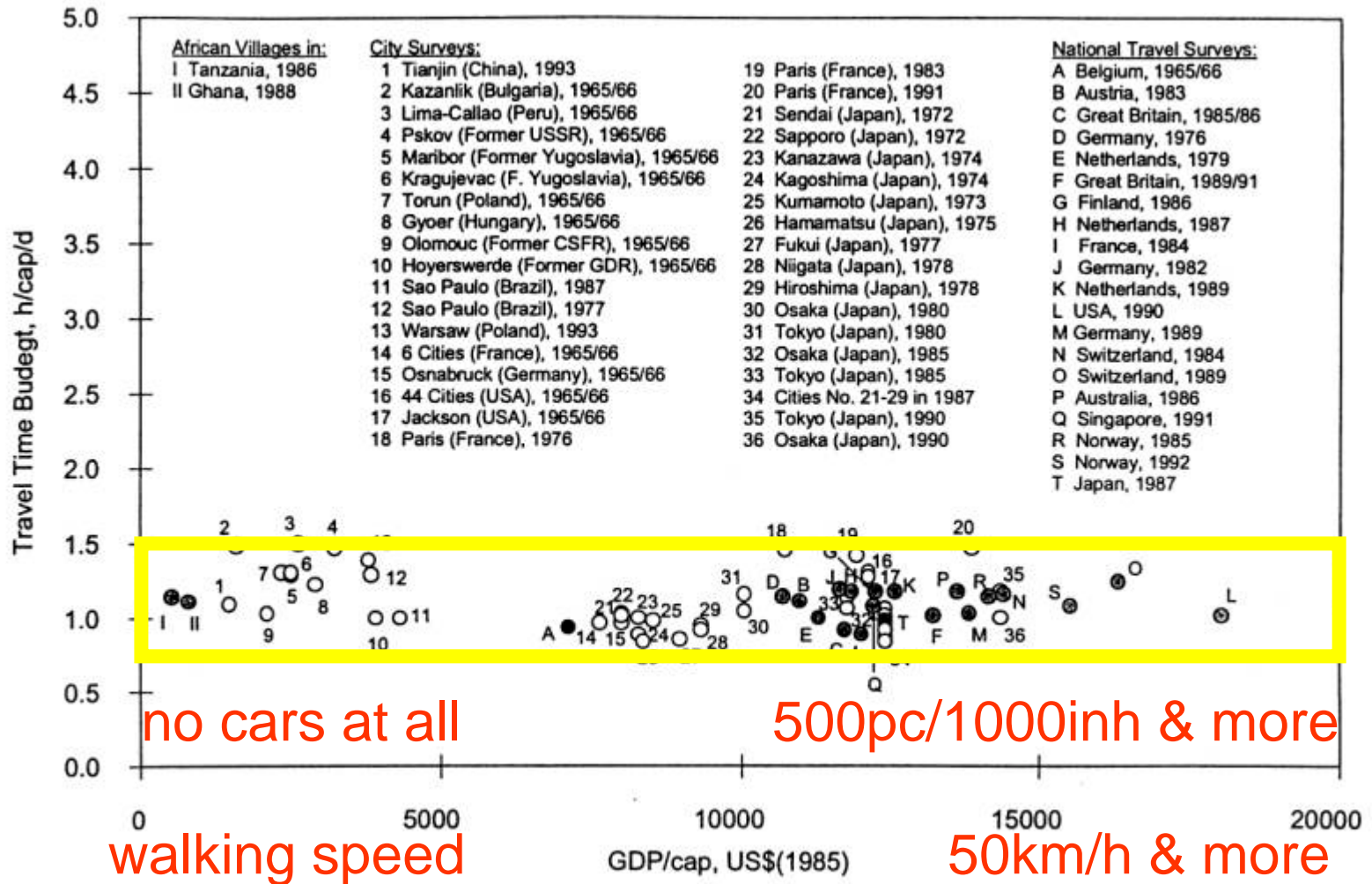


Abb. 13: Wels – Reisezeitverteilungen von Wegen mit verschiedenen Verkehrsmitteln (aus KNOFLACHER, H., 1989)

Da die Zahl der Wege konstant bleibt, interessiert der Zeitaufwand. Die Abbildung zeigt, daß alle Verkehrsteilnehmer, die sich individuell bewegen, die gleiche Verteilung der Reisezeiten zeigen. Zeiteinsparung ist daher nicht möglich. Zeit „verlieren“ die Benutzer des öffentlichen Verkehrs.

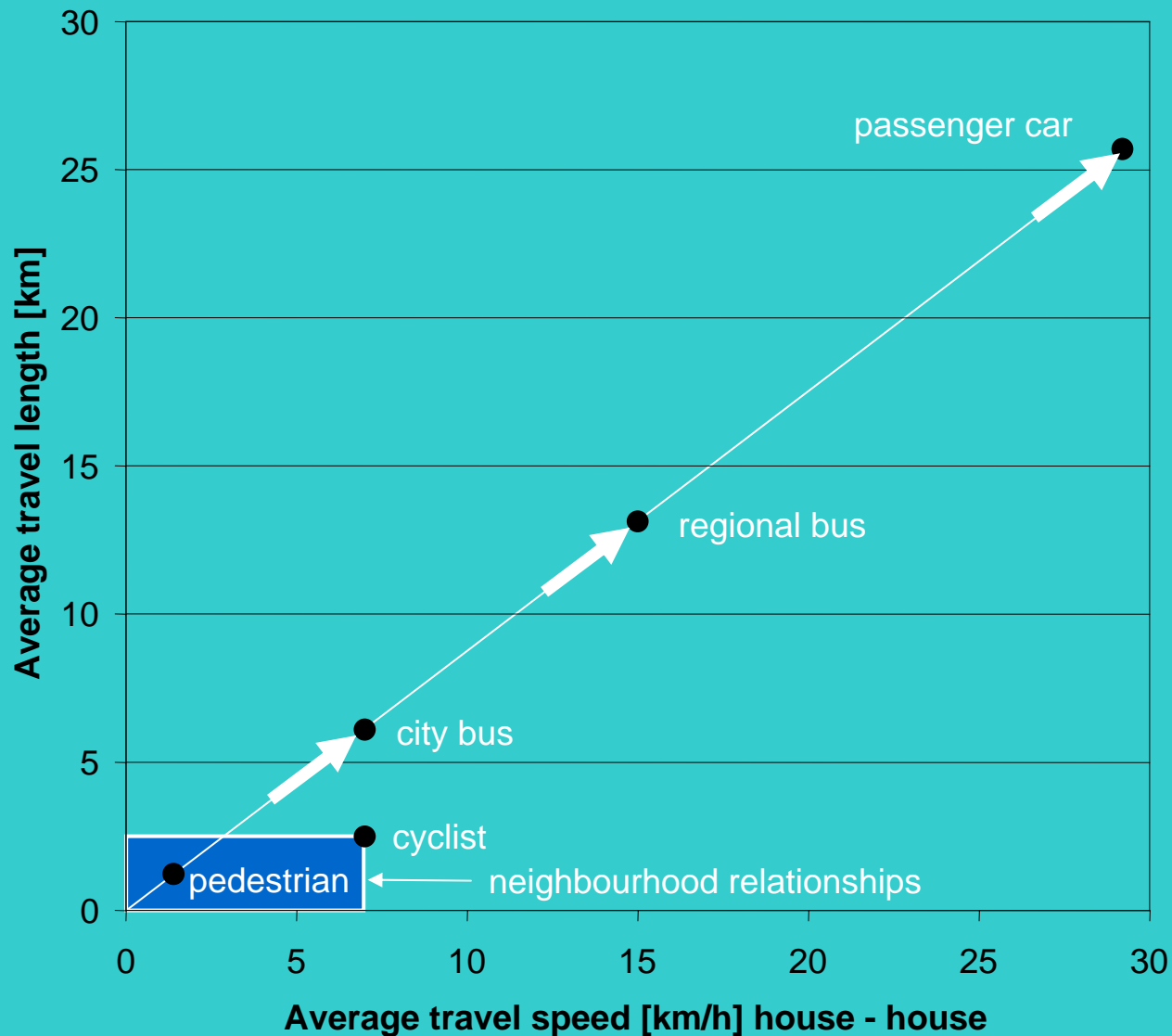


# Nowhere in the world ...

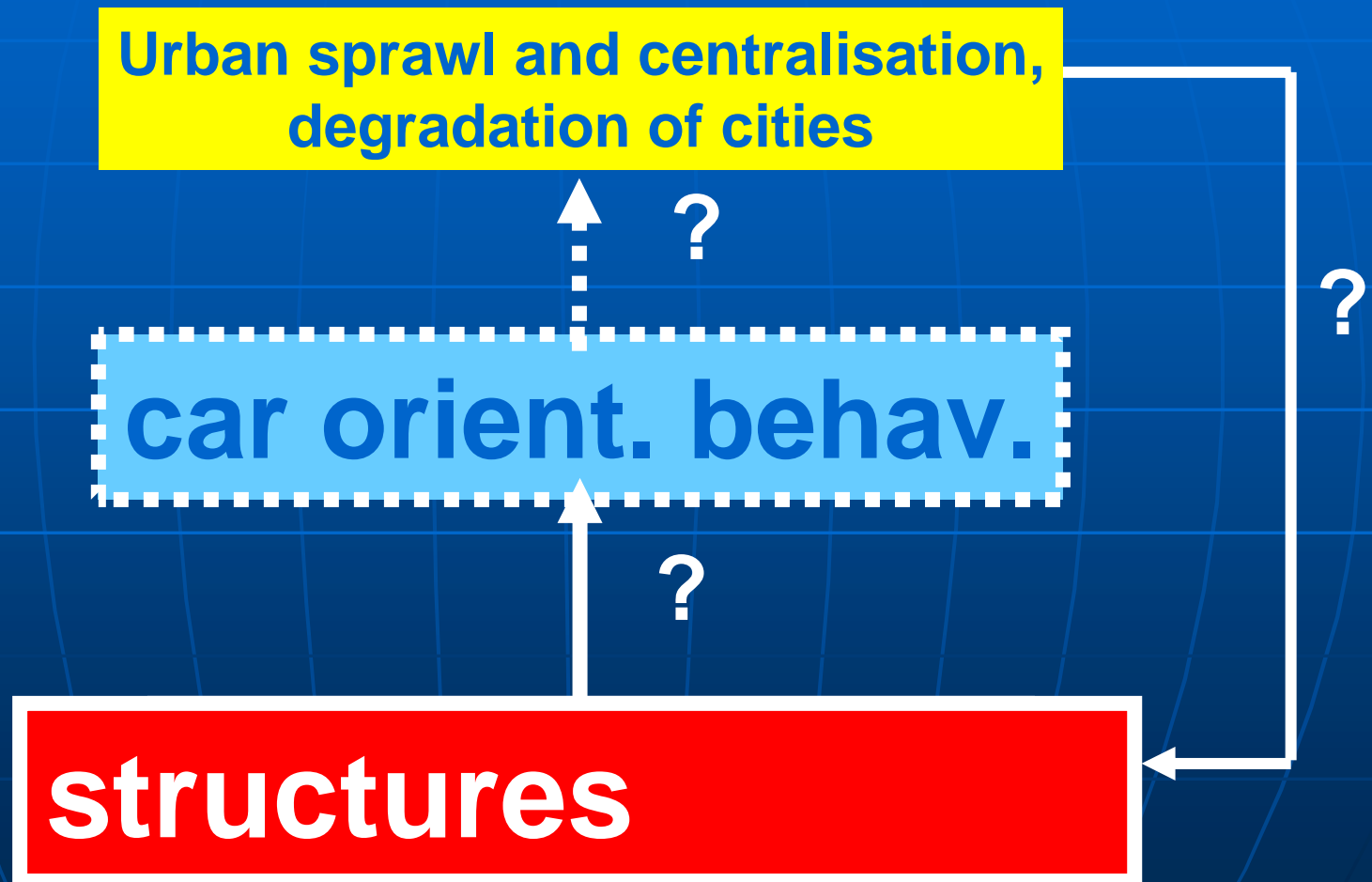


Everywhere in the world the travel time budget is the same!

# Increasing speed increases only the distance!



# Structures for cars destroy our cities



# ... and this changes the settlement structures fundamentally!

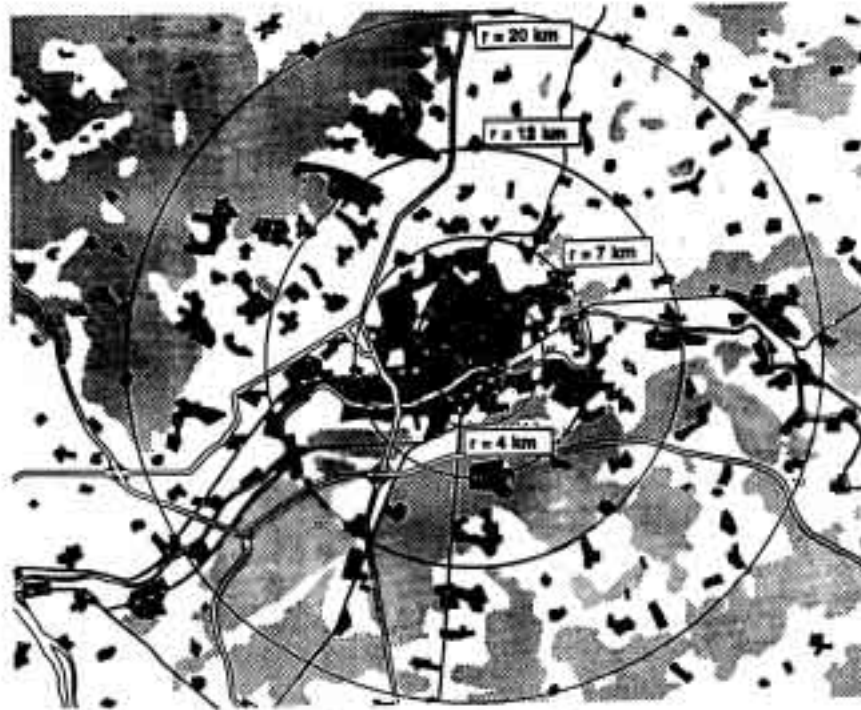
Increasing  
speed



The city around 1900 (horse tramway)



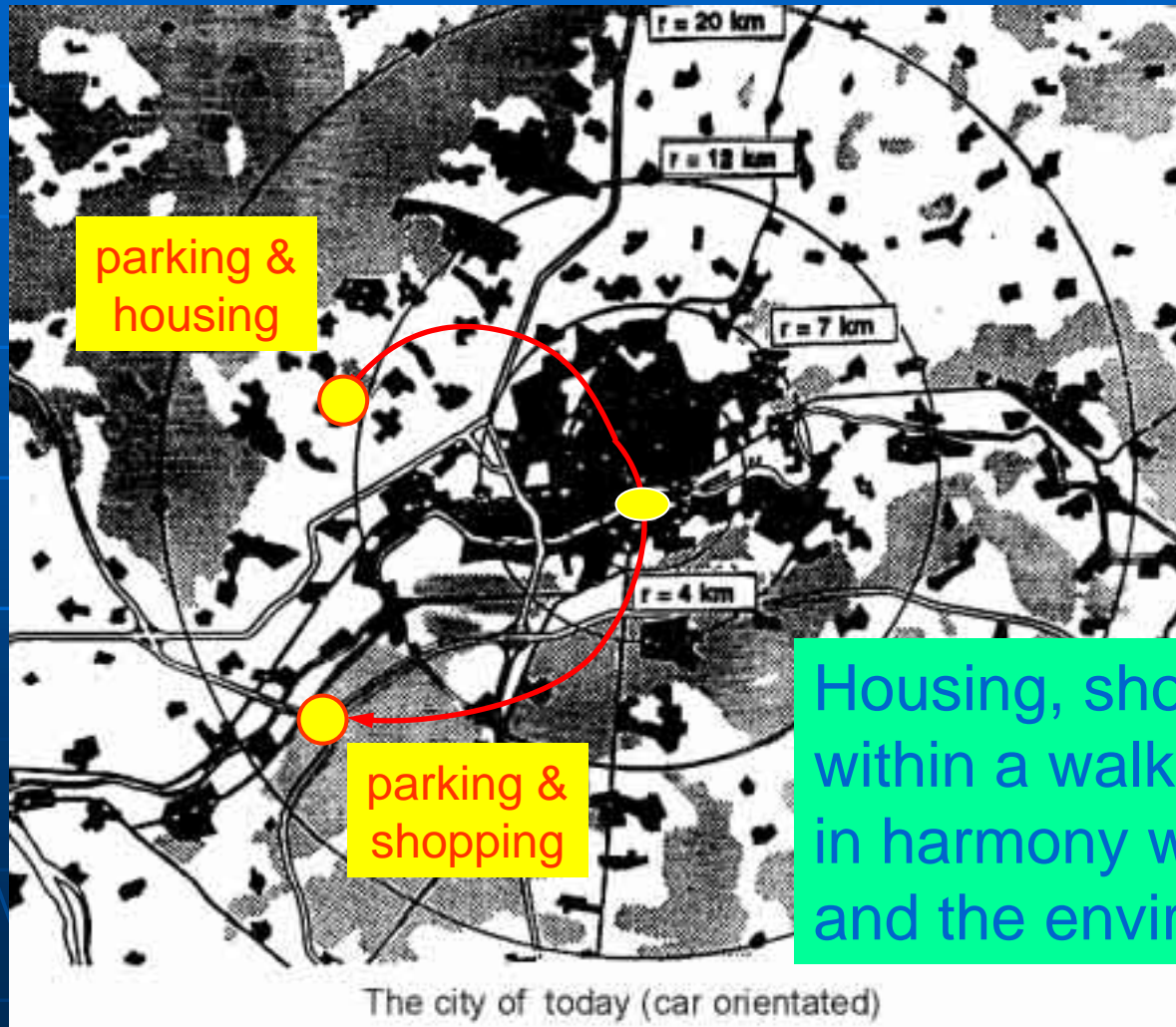
The city around 1950 (tramway)



The city of today (car orientated)

Increasing  
distance

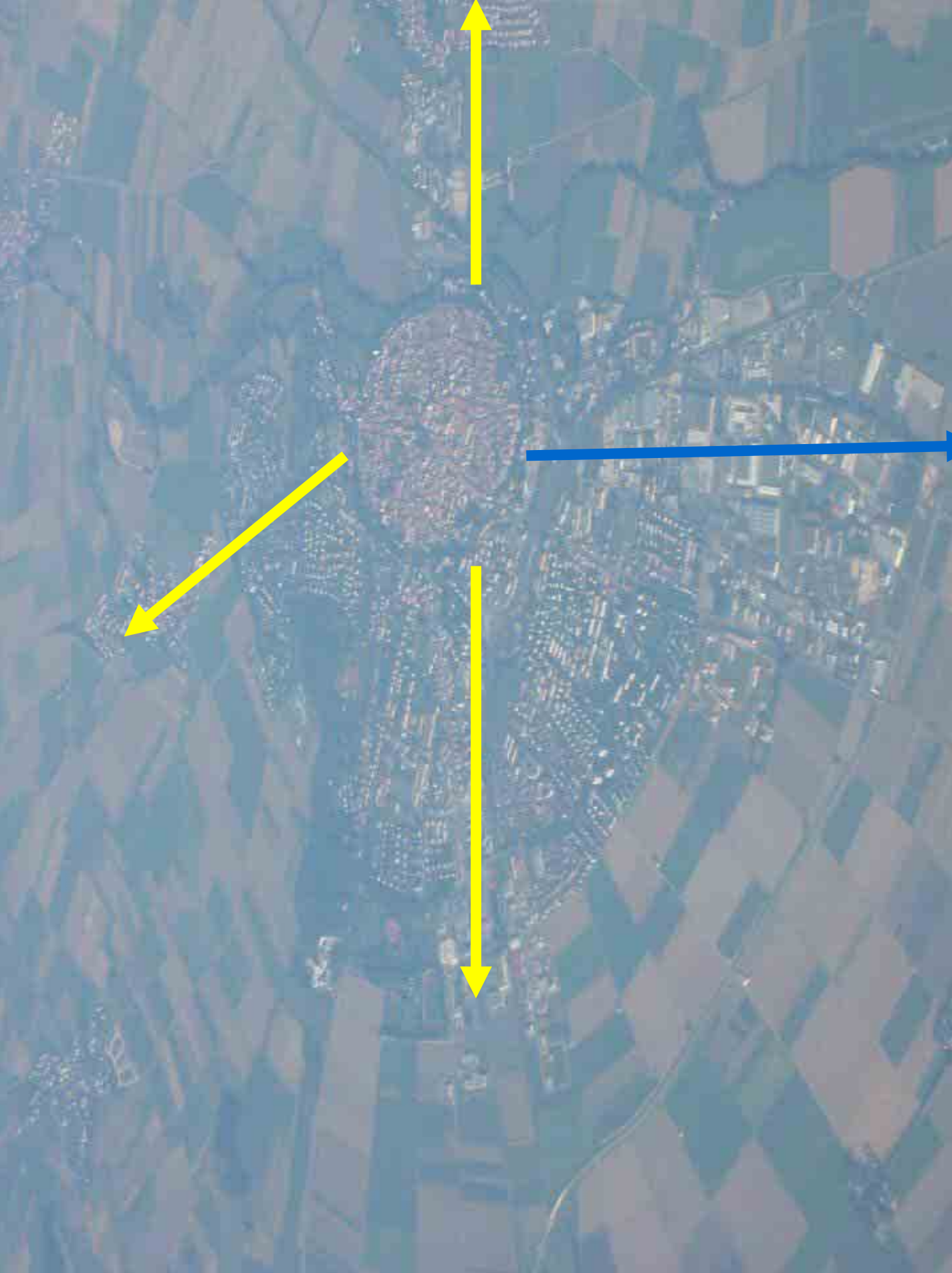
# The example of living and shopping



The  
effect:  
**city  
sprawl**

Housing, shopping etc.  
within a walking distance,  
in harmony with the city  
and the environment.





# Conclusion

**In Transport, no time saving is possible by increasing travel speed.**

**If speed is increased, the travel time in the system remains the same but the distances are increased – the structure will change.**

**If experts believe in time savings they are mad.  
If they calculate effects based on time savings they are criminals!**

# **Dogma**

**Freedom of choice  
between different  
modes.**



# **Time and time**

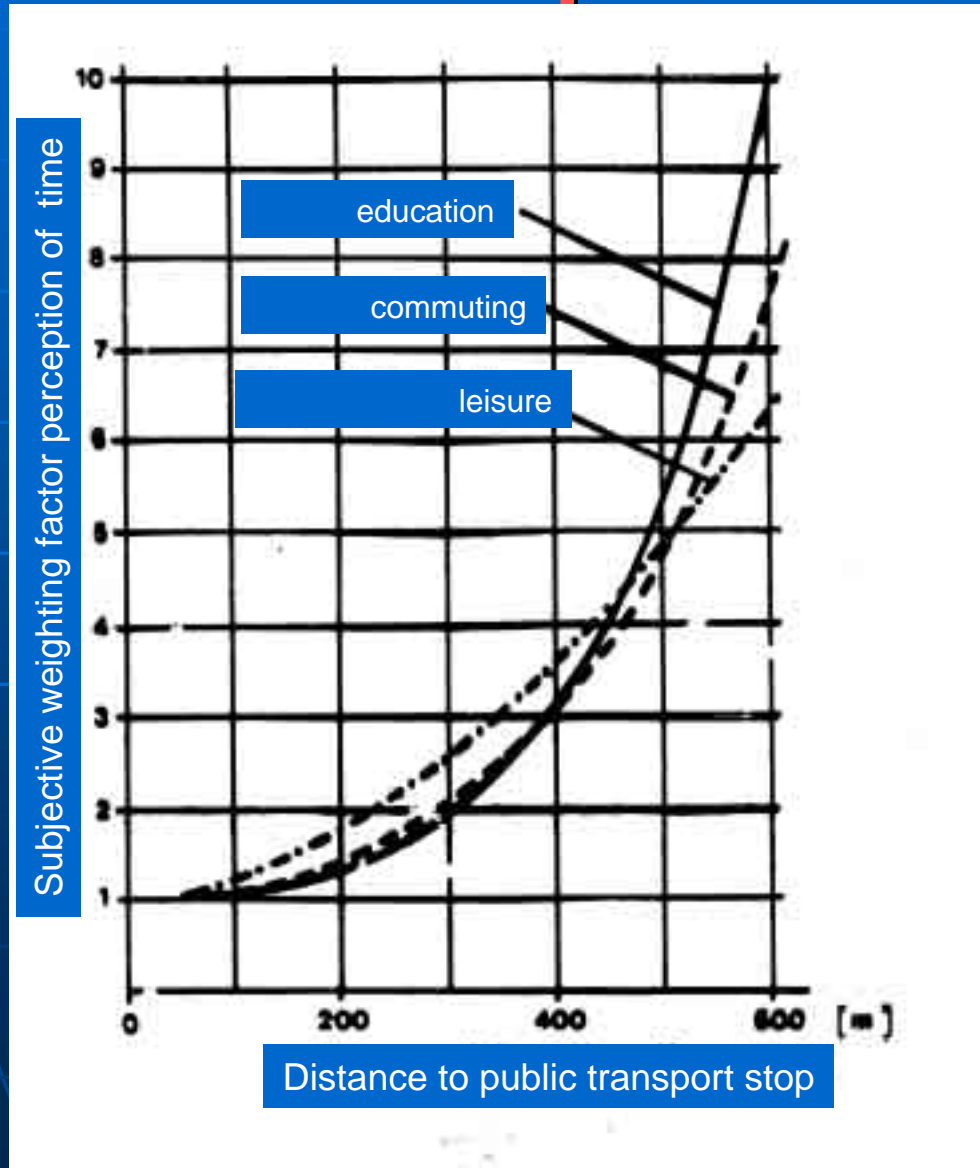
**Time for planers and economists is measured in seconds, minutes and hours.**

**But what is the effect of this time on the transport system in the city?**

**Is 1 minute of walking the same as 1 minute of driving a car, or riding in a bus or train?**

# It is not only the measured time – it is the time perceived

The effective  
time is not  
the measured  
time ...



... it is the  
time  
perceived.

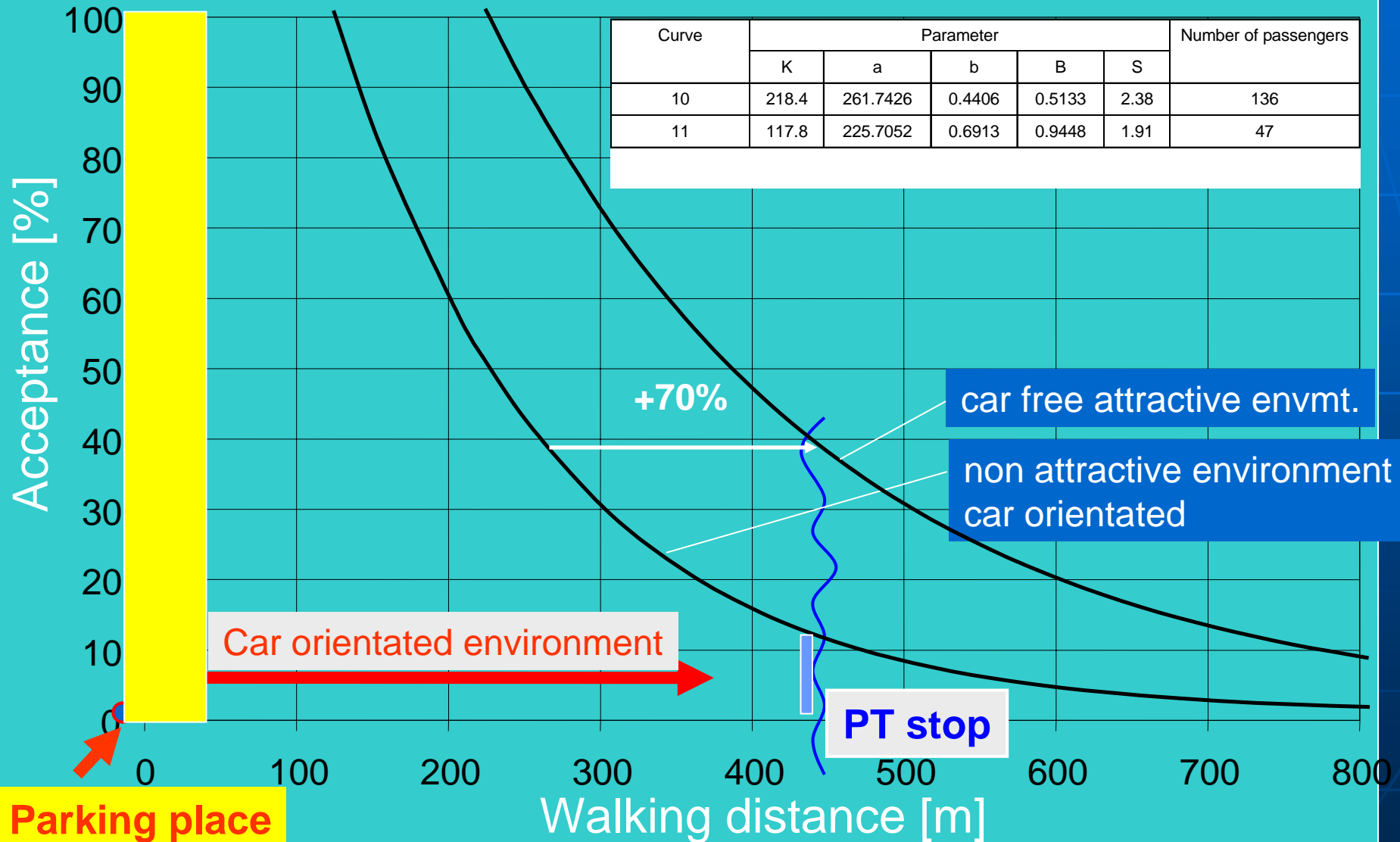
# Time perception

**Walking time has a much higher value than the riding time (or driving time)**

The **Value** is dependent on the **Walking Distance** –  
and the **Quality** of the **Environment**.

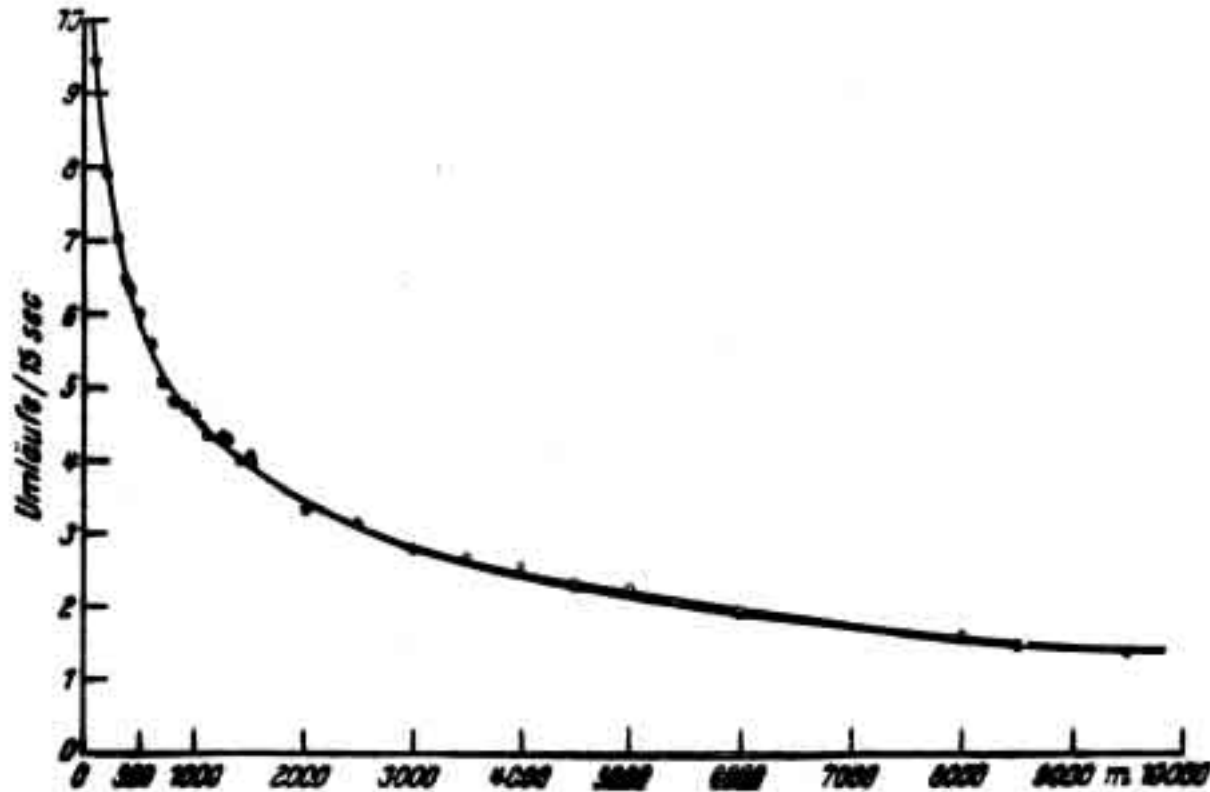
**What is the effective time?**  
**The time measured or the time perceived?**

# Empirical facts

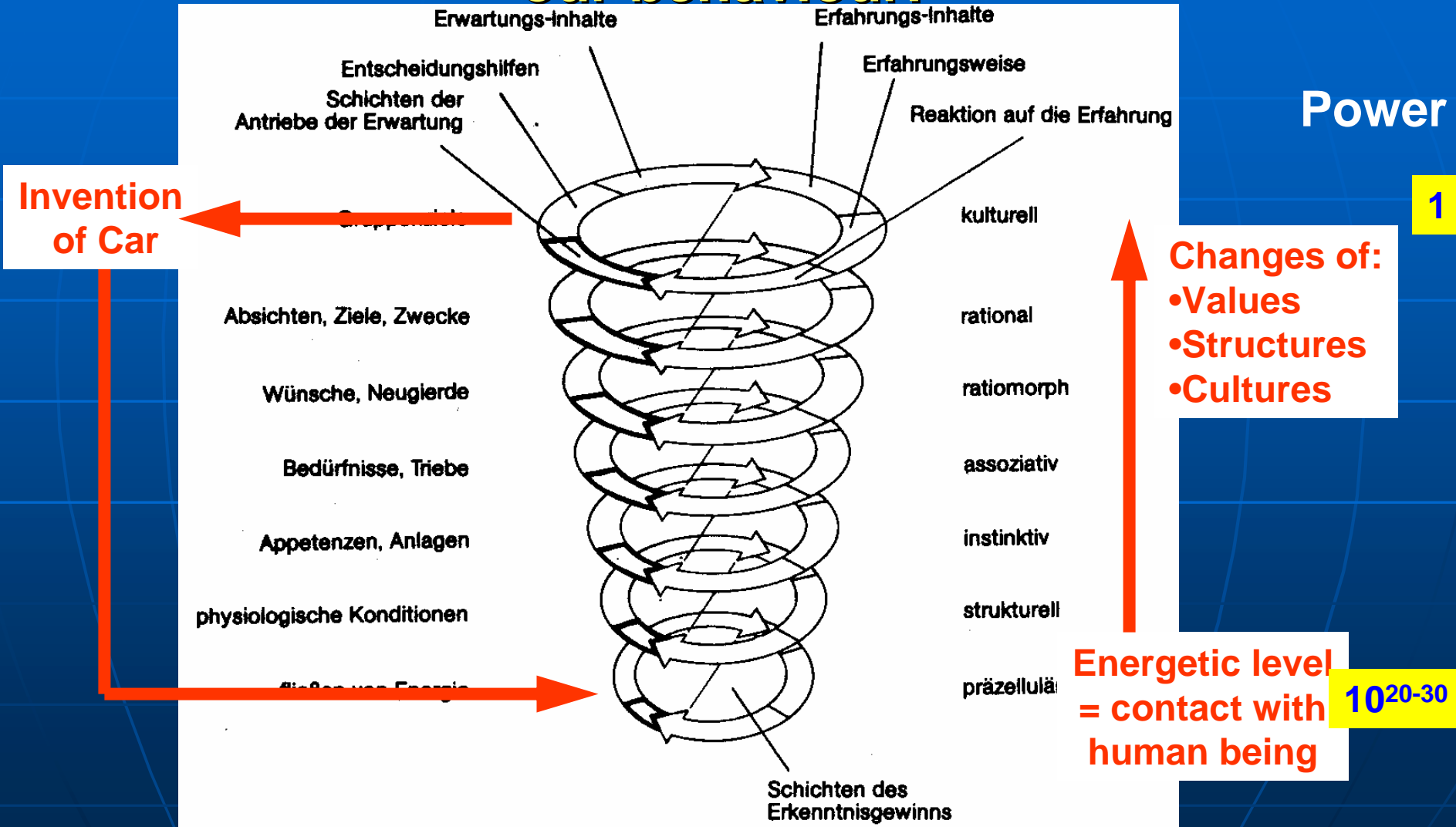


# People and bees behave in the same manner

The cause for this behaviour?



# Inventions from the last evolutionary level have effects on the lowest and most powerful levels of our behaviour!



Source: Die Spaltung des Weltbilds, R. Riedl, 1985

# Body energy is the powerful regulator of the system

body energy		kcal per minute	relation to car
walking	4 km/h	4.3	2 !!!
walking	6 km/h	6.5	3 !!!
running	12 km/h	12.6	6 !!!
running	20 km/h	24.2	12 !!!
driving a car		1.8 - 2	1

# This changes everything

Fundamental change  
of values, goals and  
policies

politics

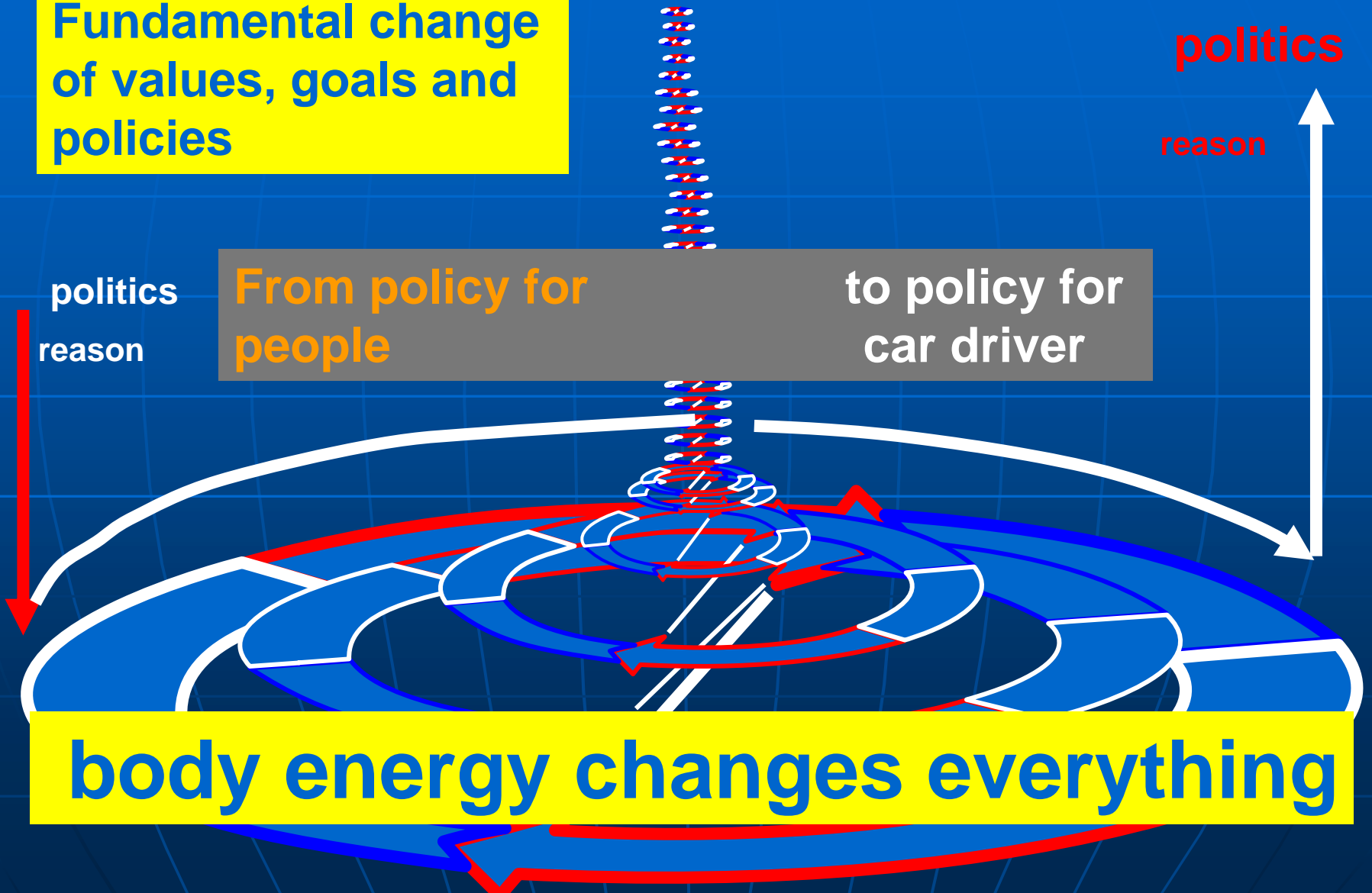
reason

politics  
reason

From policy for  
people

to policy for  
car driver

body energy changes everything

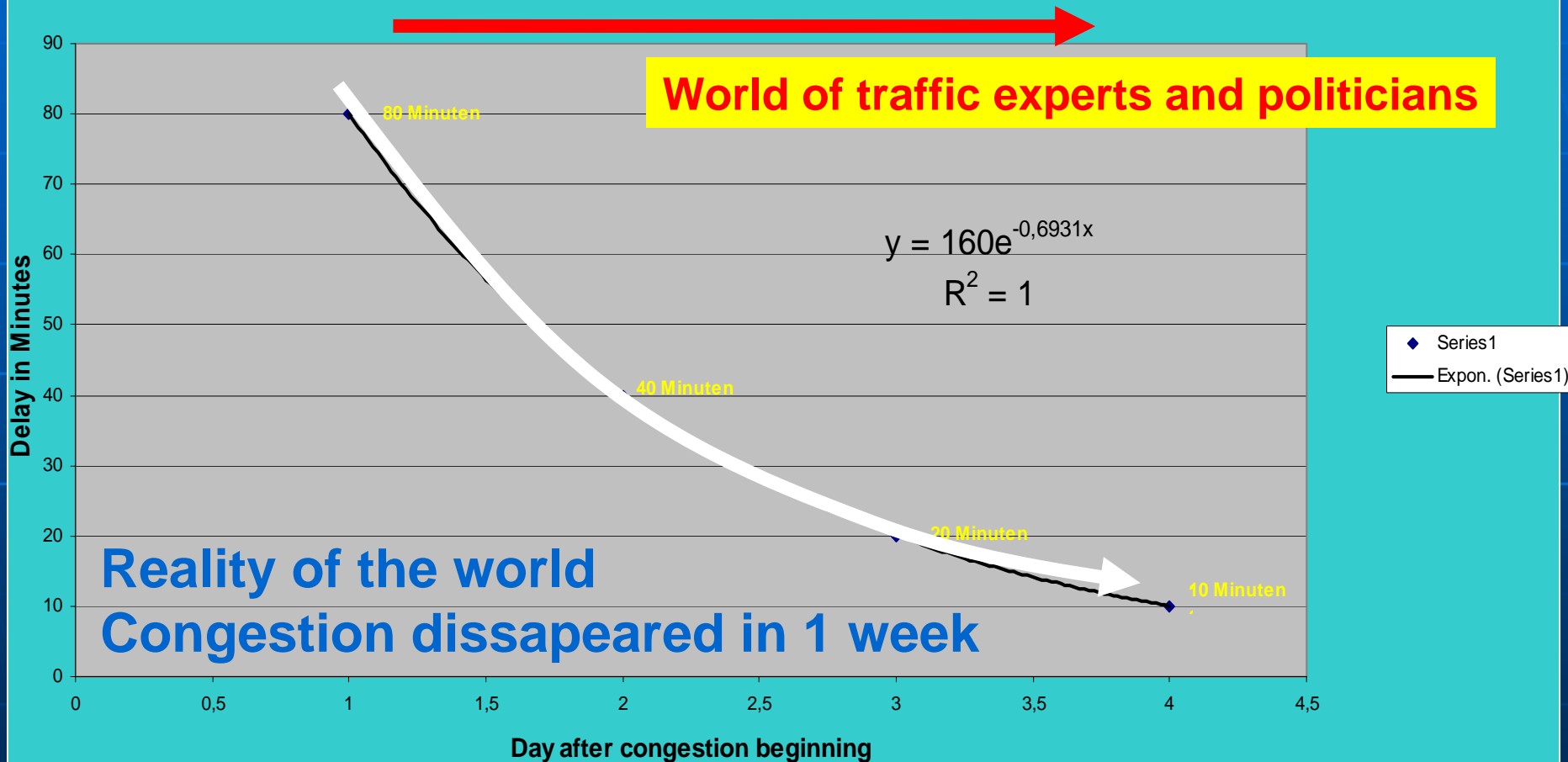




**Congestion  
a  
problem?**

# The fiction of congestion as a problem!?

Development of congestion times in Klosterneuburg, Austria after closure of street „Buchberggasse“

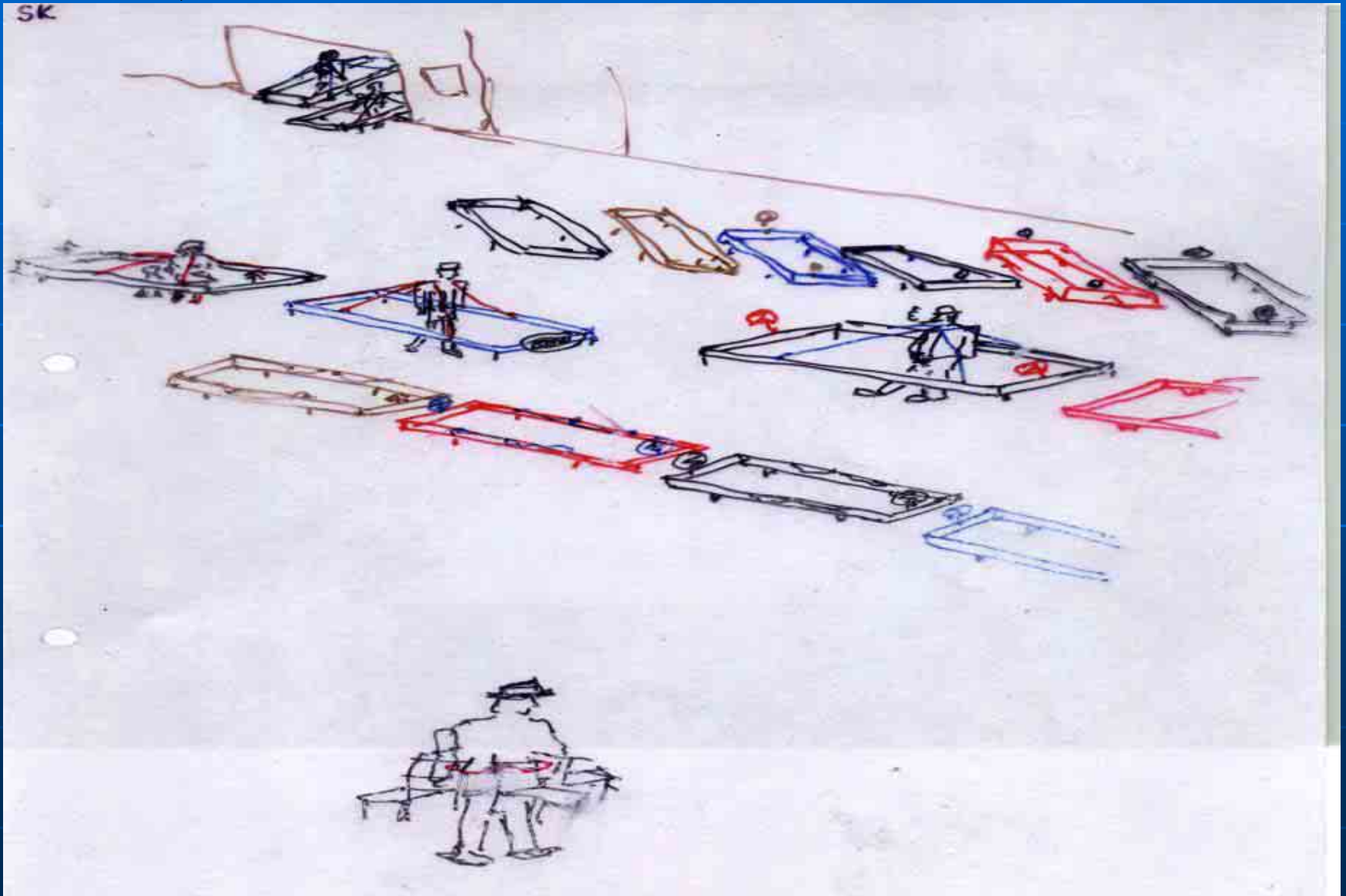


Each system adapt to a new equilibrium, depending on the system structures

**„Tell us you want a car.“**



**If we do the same as pedestrians as car users, the nonsense becomes obvious.**





**A pedestrian with a „walking tool“  
is called crazy by our society.**





**This is the „congestion problem“ in  
GB, A, D, I, ... EU and in India??!!!!**







... and this is the „parking problem“





**... finally!**



**This habit is seen as a serious problem the society has to solve, by providing public space and taxpayers' money.**

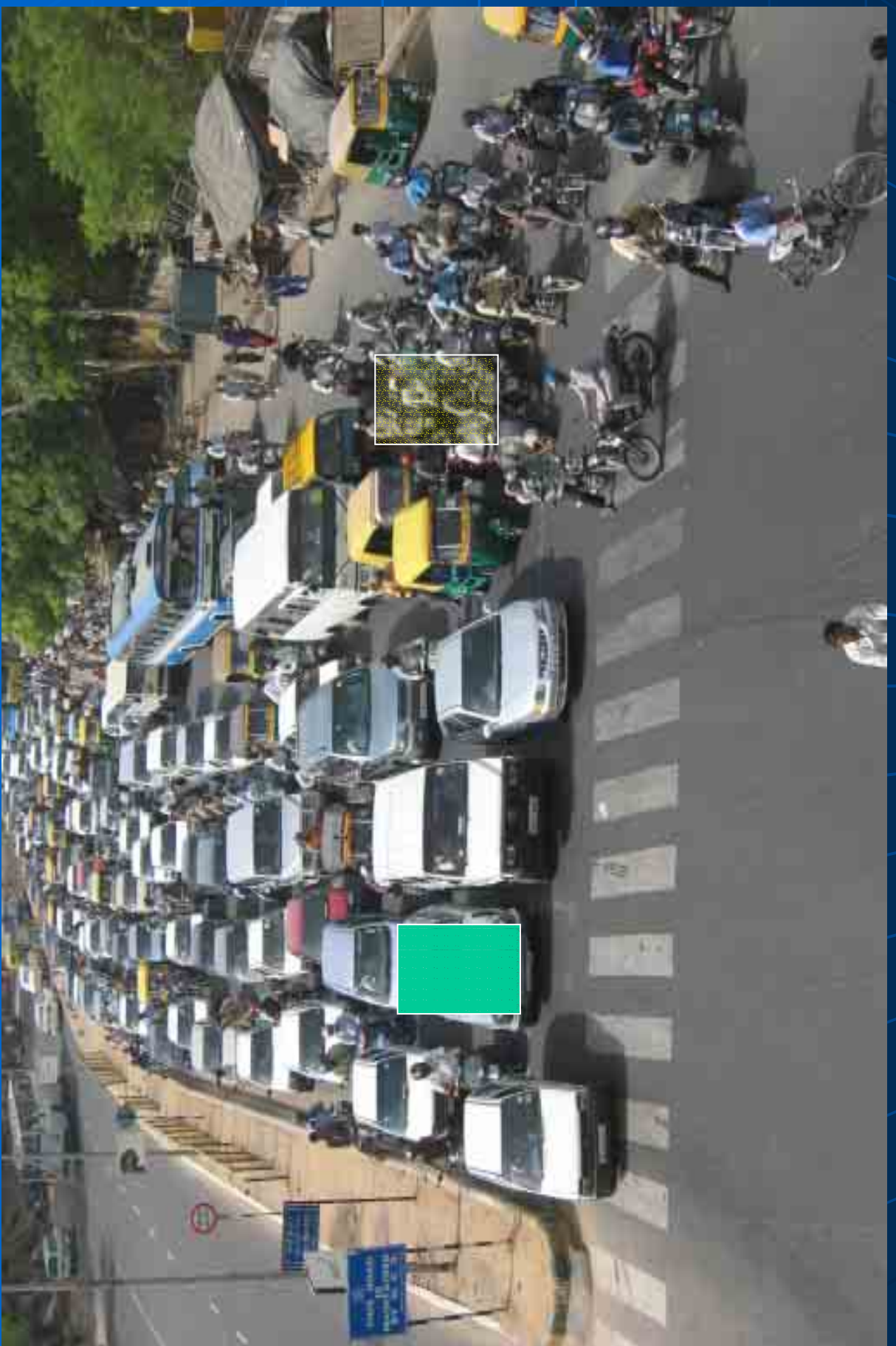




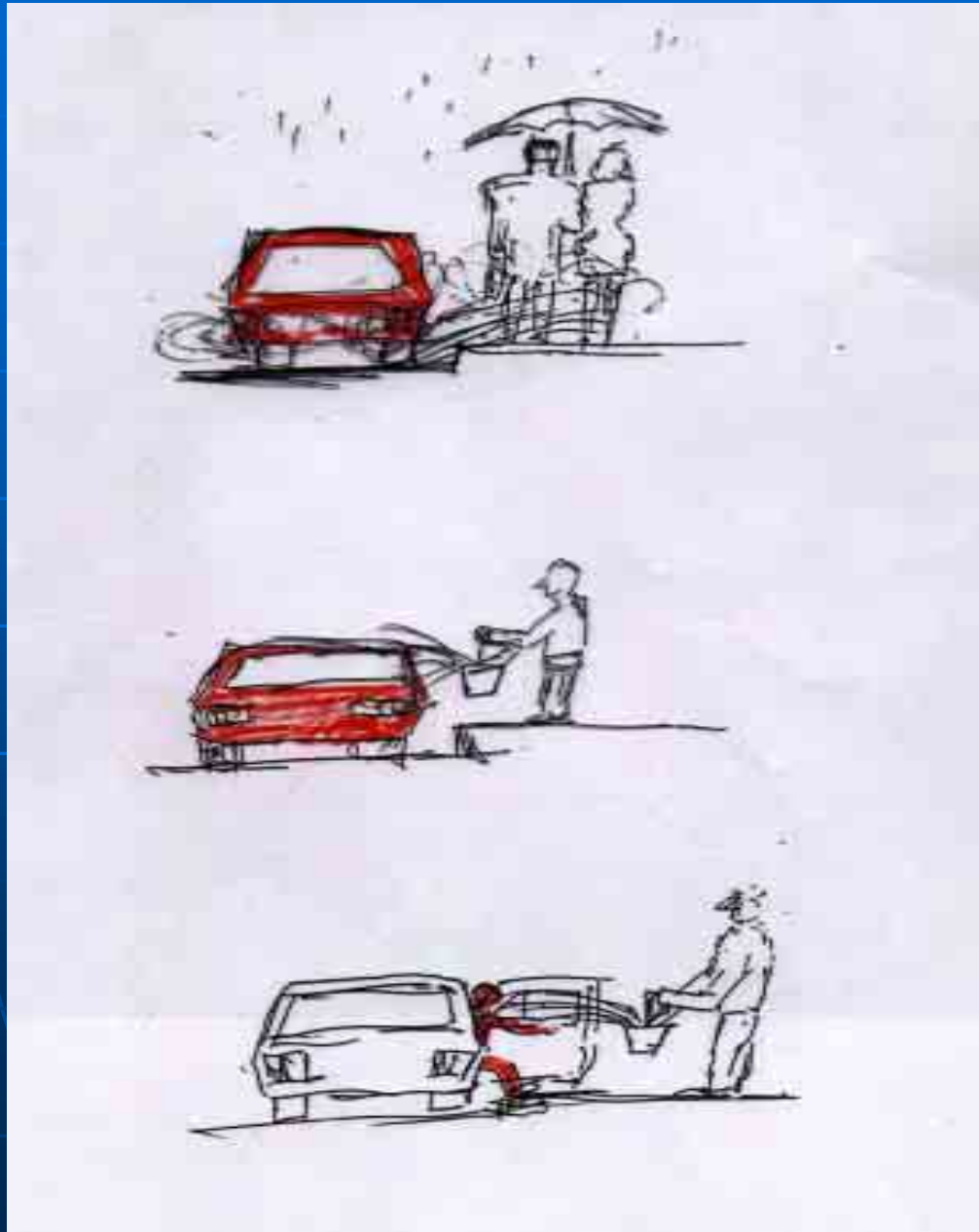
**The real experiment**





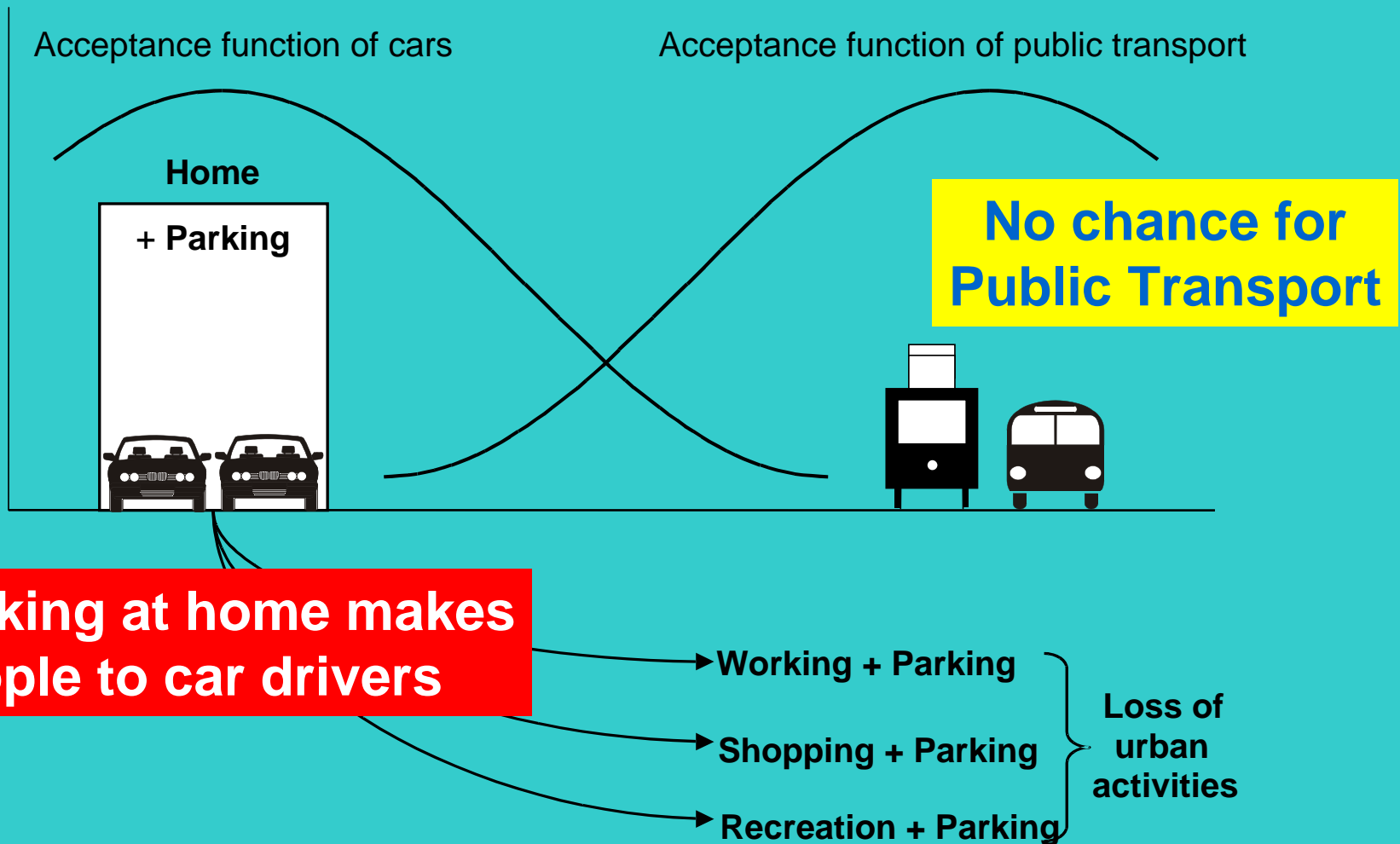


# Effect on values





# Separation of activities is the result of individual optimisation of parking



**Parking at home and at destinations destroys all human scale structures and activities.**

**house +  
garage**



A diagram showing a yellow rectangular box containing the text "house + garage". A vertical yellow line extends downwards from the bottom center of this box, crossing a horizontal yellow bar that represents a motorway.

**motorway**



A diagram showing a horizontal yellow bar representing a motorway. A vertical yellow line crosses this bar from the top to the bottom. The text "motorway" is written in blue on a yellow rectangular background to the right of the intersection.



Der Parkraum muß, wenn Chancengleichheit angestrebt wird, mindestens soweit entfernt wie die Haltestelle liegen

Hier liegt der fundamentale Fehler

Damit wird die Chancengleichheit an der Quelle zerstört

garage

housing

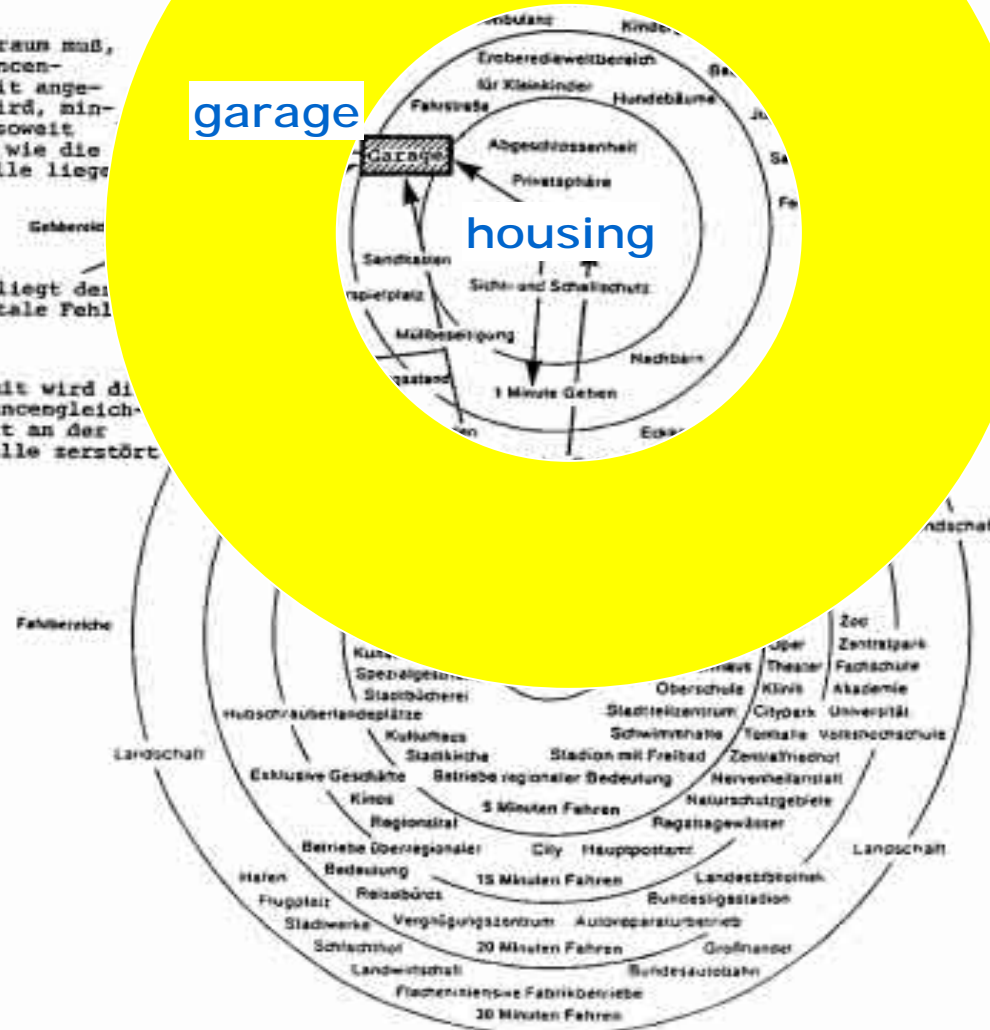


Abb. 37: Bei formalen Prinzipien kann man leicht fundamentale Fehler begehen (aus LEHMBROCK, J., und FISCHER, W., 1979)

# Urban sprawl



**... and traffic problems**

**Solution?**

# Solution

The problem has to be treated where it occurs – at the source.

This is man, before he or she becomes a car driver.

The solution therefore can not be found by treating traffic flow, also not in road pricing, or in the tariffs of Public Transport.

The intelligent solution is the reorganisation of origins and destinations of all trips – a radical change of the organisation of parking.

# Key element

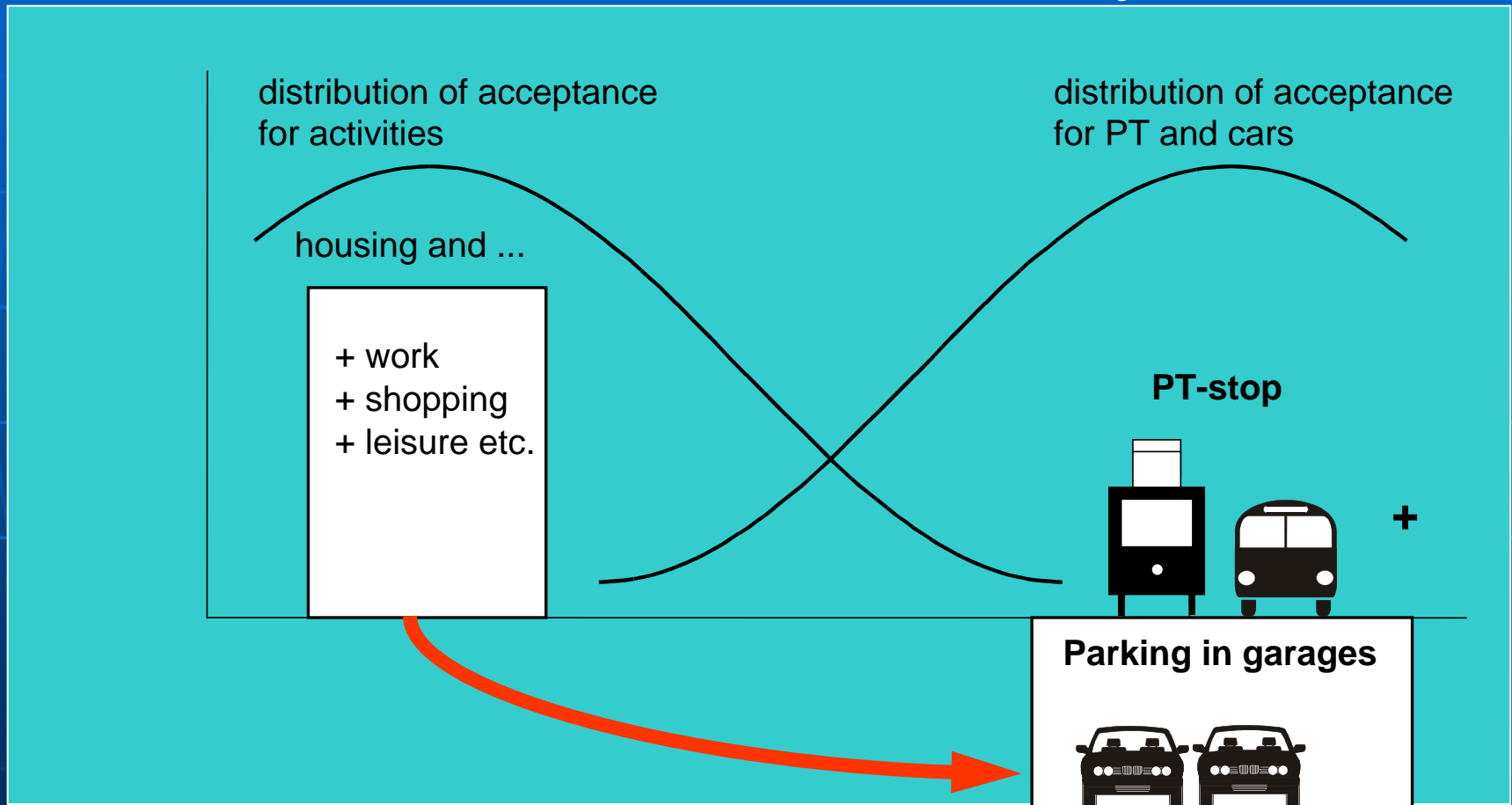
The key element is **not** the traffic flow.  
**Mad experts only try to solve problems  
in traffic flow.**

Traffic flow is only the symptom  
and not the cause.

**The key for the solution is:  
parking organisation**

# Key for the solution: new organisation of parking

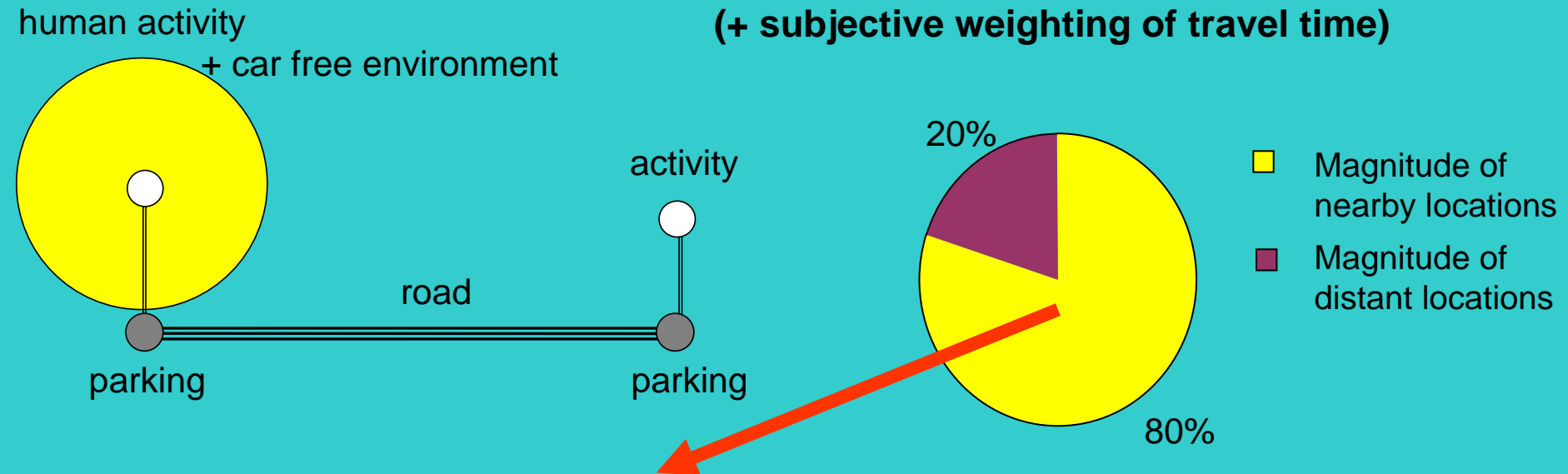
Precondition for a liveable city:



**Equidistance to the parking place and the Public Transport stop (PP = PTS)**

# Real effects, taking into account **real** human behaviour

Parking provision in a distance  
to activity location  
(+ subjective weighting of travel time)



**Real effects, taking into account human behaviour:  
up to 80 % of the city is revitalised and the same amount  
of traffic problems is solved.**

# Implementation difficulties

**Stake-holders are captured by the existing system**

**Politicians**

**Business**

**Media**

**Experts in transport and city planning**

**The public**

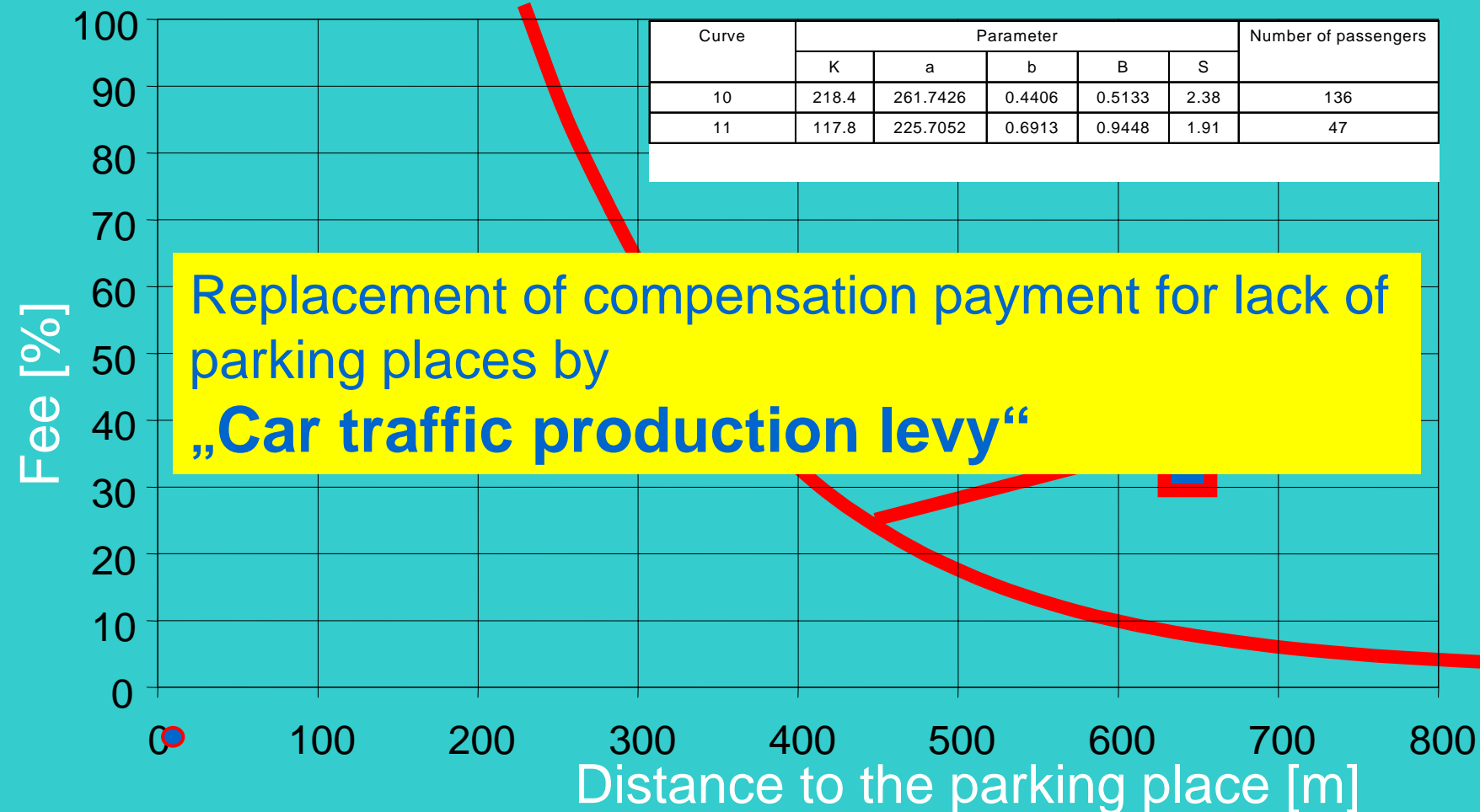


# **Financial structures have to be changed**

**„The money is on the parking places – and on the roads“**

**But it is unfair to provide the society first with a physical structure which forces people to use the car – and punishes this behaviour later on, by introducing financial barriers like road pricing etc.**

# Parking fees must reflect the value of the parking place



# Financial structure

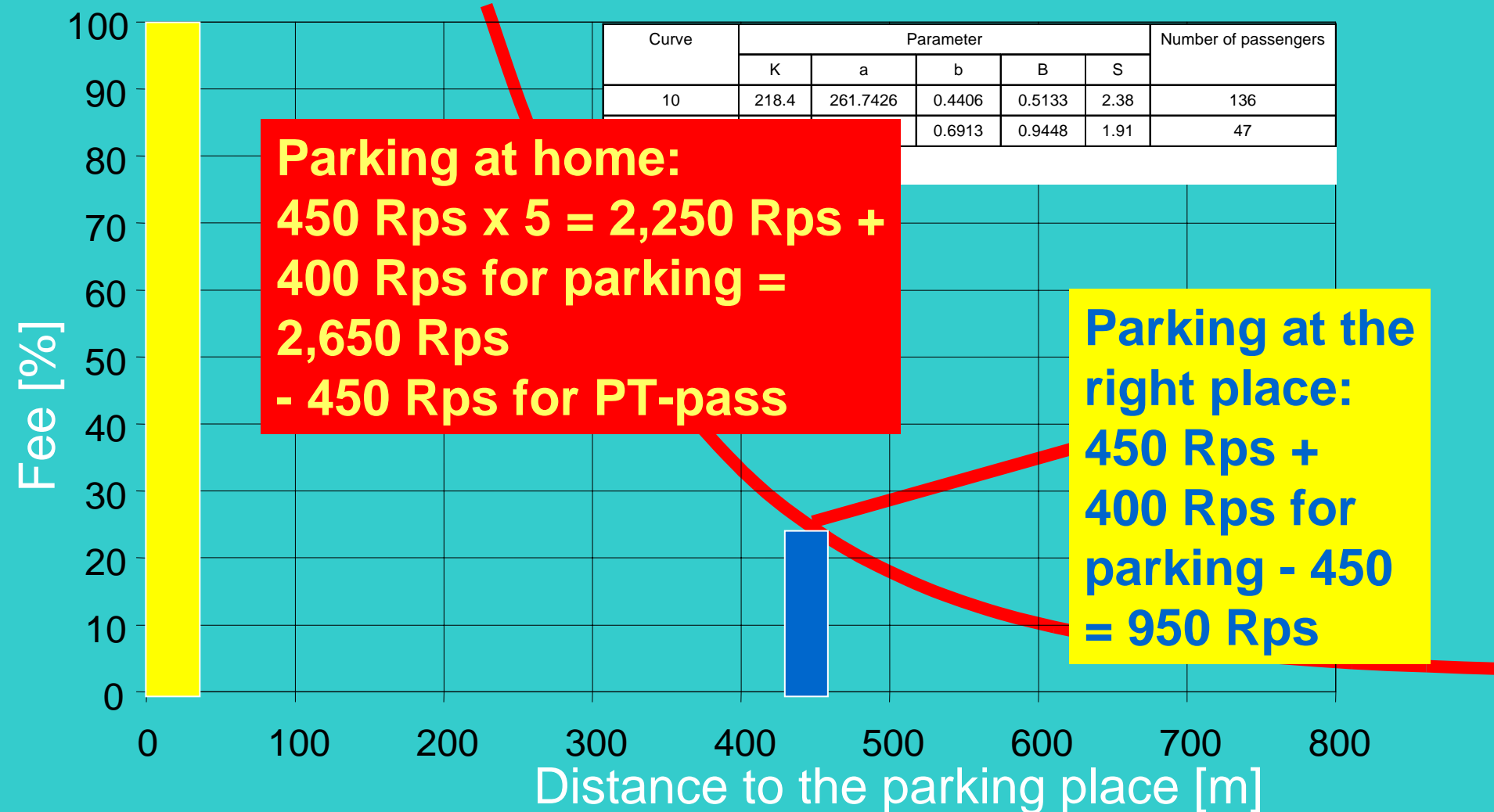
Who parks his car at a distance equal to the distance to the public transport stop has to **pay a fee equal to the annual PT-ticket which he gets too.**

Who **parks at home** or in front of his house **has to pay** according to the attractiveness curve  $x > 1$  **times the annual PT-ticket – but he gets only one.**

The **same** has to be introduced at the destination = origin of the trips, **at working places, shops, recreation and business areas.**

# Parking fees must reflect the value of the parking place?

## Example for monthly parking fees:



# Delhi:

How much money is on the street?

About 1 mil cars in Delhi?

**Traffic problem production payment from wrong parking:** about 2-4 billion Rps per month  
+ about 1 billion for PT

# **Minimum solution for the transitional phase in Europe**

**Today:**

**Parking fees are related to the ownership of the land – but not to the function of the parking place.**

**Parking fees for private parking at shopping centres must be charged at the same rate as those for parking in commercial areas.**

**Example: Shopping centre with 1,000 places  
open 10h per day**

**Parking fee: 1 Euro/h – daily payment: 10,000 Euro**

**The money has to be used for compensation of  
different spatial conditions of economic activities.**

# Conclusion

The main mistake in traditional transport system was:

**Transport was not organised as a system.**  
Interlinked parts have been optimised singularly without taking into account effects on the whole system.

**The worst mistake was and is:**  
**Optimisation of parking at the individual level.**  
**If this happens, no optimisation of the system is possible any more.**

Parking places in our market economy have to be treated in accordance with the reality of human behaviour:

- Equidistance to parking and Public Transport stop.

and the basic principles of the market economy:

- The price has to reflect the real value – or privilege.



# Organisation has to be changed

**Parking is not a private affair.**

**Parking organisation is a public affair.**

**Provision of parking has to be done**

**by an organisation**

**equal to the organisation for Public Transport**

**... in accordance with the goals of the system  
and the reality of human behaviour.**

**If one of these facts is neglected:**

- **Physical structure**
- **Financial structure**
- **Organisation structure**

**... no Solution for a sustainable future of a city and/or the traffic problem can be achieved.**

# **Delhi opportunities**

- **Introduction of sound parking regulation, based on the right physical, financial and organisational structure.**
- **Parking revenue for rehabilitation of transport mistakes.**
- **Remove wrong urban planning principles.**
- **Introduce Indian knowledge for city planning.**
- **Revenue will create high employment in local economy.**
- **Develop a future oriented PT-System**
- **Overtake the period of high accident rates.**

**Thank you very much  
for  
your kind  
Attention!**