

# **High Level Indicators in Road Asset Management**

**A brief report from WG 2 of PIARC TC D1**

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## Road Asset Management

**“Providing the best answers to all road stakeholder’ expectations with the smallest budget”**



**But...**



**Who are the road stakeholders ?**

**What are their expectations ?**

**How can we ranked them ?**

**How can we measure the relevancy,  
the quality of the answers ?**

**How can we measure  
the stakeholders'  
satisfaction ?**

**→ Indicators**

...



# Working Group D1.2 : Management indicators

**Technical characteristics of road asset are measurable : evenness, rutting, texture, skid resistance...**

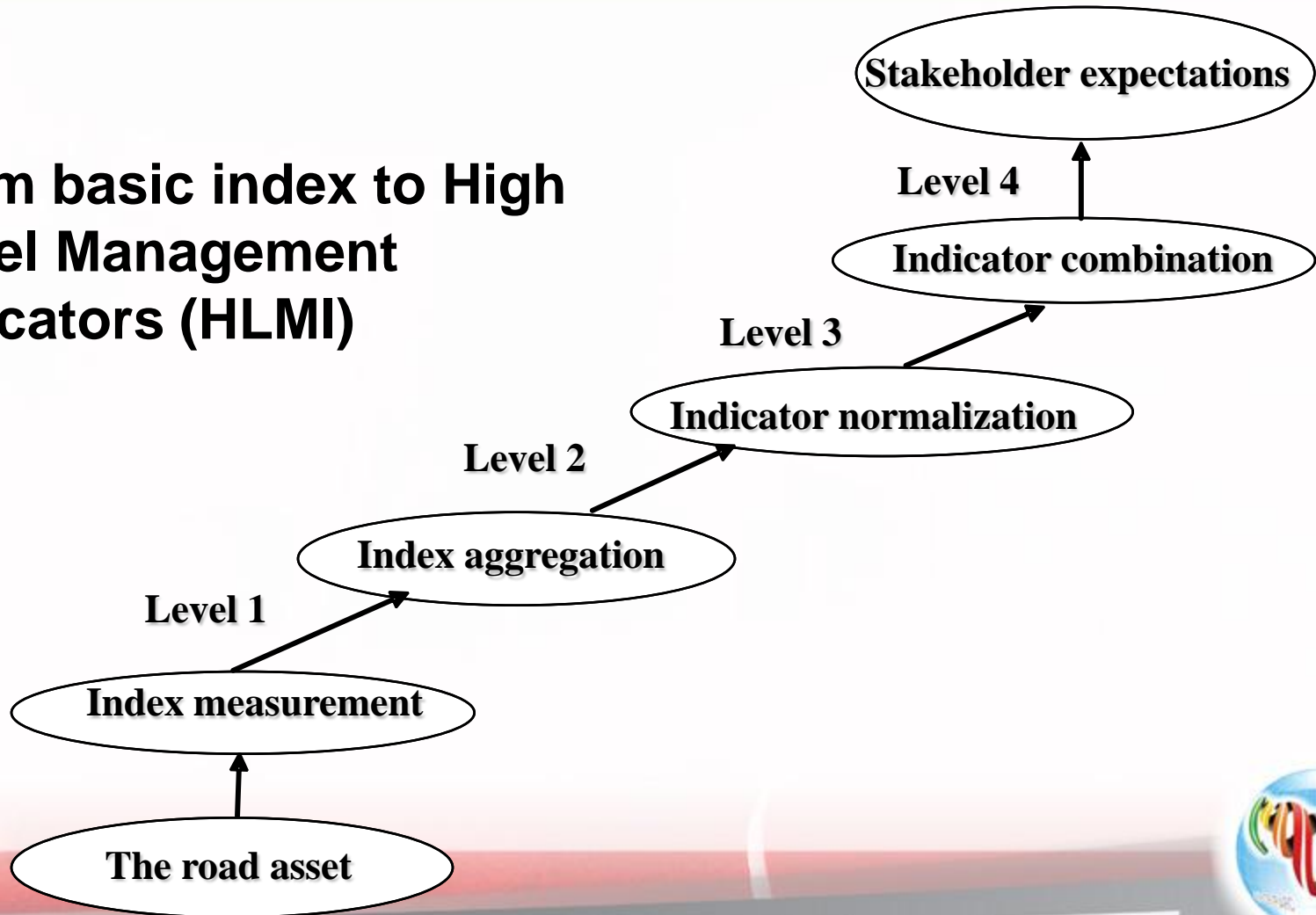
**Some performances can be assessed too : mean speed, congestion, safety, noise emissions...**

**But stakeholders' satisfaction ?  
The network is safe ; comfortable ;  
efficient and reliable; sustainable...**

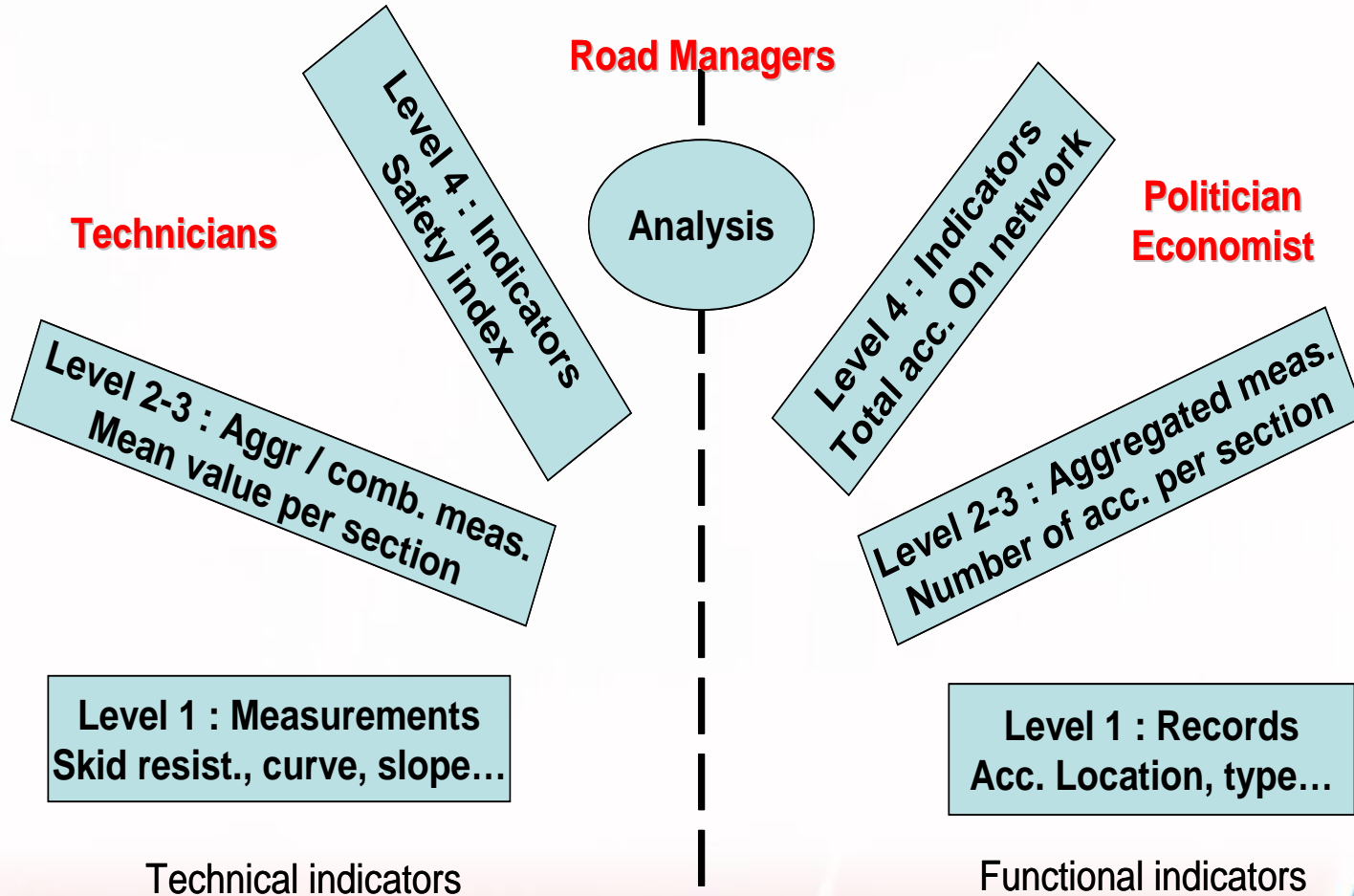


# Working Group D1.2 : Management indicators

## From basic index to High Level Management Indicators (HLMI)



# Working Group D1.2 : Management indicators



## The WG 2 approach

- 1 – Identify and classify the stakeholders**
- 2 – Inventory and explicit their expectations**
- 3 – Rank these expectations per stakeholder**
- 4 – For the expectation with the higher rank**
  - search for existing indicators**
  - if none, propose new indicators**



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## 1 - Stakeholders

### **Road users**

Daily users, Truck & Bus, Tourist, Vulnerable user

### **Road neighbours**

Resident, Commercial business, Industries, Users of public areas

### **Financial institutions**

Banks for development, Shareholders, Public financing organisms, Insurance companies

### **Society**

Developed countries, Countries in (economic) transition, Developing countries

### **Road owners**

Public owners, Private owners

### **Road operator:**

Road directorate, Concessionaries, Local project managers





## 2 - Expectations

### Expectation regarding safety

- Improving road safety for users, neighbours

### Expectations regarding operation efficiency

- Improving traffic fluidity, reliability of travel time, accessibility, public parking facilities

### Expectations regarding road “quality”

- Improving riding comfort, services, information, aesthetics and cleanliness

### Expectations regarding “Socio economic development”

- Society’s development
- Socio-economic efficiency



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## 2 - Expectations

### **Expectations regarding network profitability**

- Return / risk on investment
- Business growth opportunities
- Efficiency of managers

### **Expectations regarding sustainable development**

- Preserving environment / (natural) resources
- Not contributing to Climate change
- Taking care of Public Health

### **Expectations regarding human life framework**

- Heritage preservation
- Natural disasters prevention

### **Expectations regarding technical management and asset condition**

- Managing, improving asset
- Asset value
- Budget allocation



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## 3 - Expectations per stakeholder Importance and priority

WG 2 proposes to use tables to define which expectations have a high priority, for which stakeholders.

Users	Travel time	Reliability Fluidity Mobility	Accessibility intermodality	Consumption	Safety	Comfort services	Esthetics and cleanness
Truck, bus	1	1	3	1	2	2	5
Daily users	1	1	1	2	1	3	5
Tourists	3	3	4	5	2	1	1
Vulnerable users*	5	5	2	5	1	2	2

One indicator per cell, called “High Level Management Indicator” (HLMI)



## 4 – Search for existing indicators...

The WG tried to gather:

- Information from members expertise and knowledge
- Information from the bibliography
- Indicators already considered by the former PIARC committee C4
- List of existing Indicators
- ...



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## An example: Indicators on operation efficiency

Domain	Expectations	Stakeholders	Indicators
Operation efficiency	Traffic fluidity	Users/Owners	Travel time from A to B (mean value)
			Travel time from A to B (variability)
			Length of congestion between A and B, at time T (total)
			Length of congestion between A and B, at time T (variability)
	Consumption	Society	Vehicles consumption (modelled starting from average travel time, etc.)
	Facilities	Users/ neighbours	Parking facilities: number of parking places for residents, for employees, for others...
	Accessibility		Accessibility



## 4 – ... Or define new ones

**For each couple [stakeholder ; expectation], WG2 proposes:**

- **A selection of basic technical indicators which could / should be used to build the “High Level Management Indicator” (HLMI)**
- **A method (inspired from COST 354 and other sources) to aggregate and combine these technical indicators in HLMI**



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## An example: Network efficiency for users

→ Mean speed is preferred to travel time, as it can be aggregated over the network

Low level indicator

Normalisation

Combination

Speed

$$5 \times \frac{S_L - S_M}{S_L} \rightarrow [0-5] = N_s$$

$\sigma(\text{Speed})$

FHWA as reference

$$5 \times \frac{\sigma(\text{Speed})}{S_M} \rightarrow [0-5] = N_{\sigma s}$$

COST354 as reference

$$N(t) = a \times N_s + b \times N_{\sigma s}^*$$

Where

$S_L \rightarrow$  Speed limit

$S_M \rightarrow$  Mean speed



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## A general methodology

### General methodology

1. Identify stakeholders
2. Identify expectations
3. Allocate priorities
4. Search for existing HLMI or build new ones

1. List and analysis of stakeholders

2. List and analysis of expectations per stakeholders

3. Tables of expectation priorities per stakeholders

4a. List of existing Indicators

4b. Method to build new relevant indicators (HLMI)





## Conclusions

### Potential benefits of applying such a methodology

- Carry out a rational, step by step, approach
- Adapt this general approach to each specific context
- Select or define the HLMI that are really needed in this context

### And, as a consequence, avoid to

- “Miss the goal”
- Fill up the data base with useless data
- Spend money for to collect these data
- ...



**Thank you for your attention**

