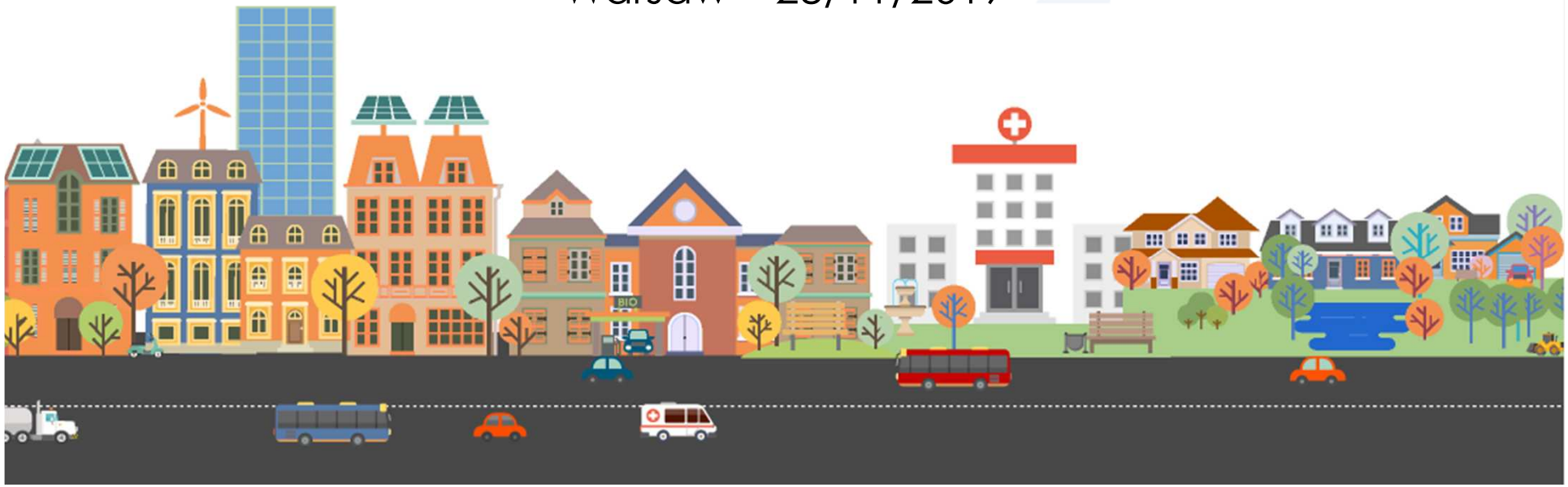
Sustainable Urban Mobility Plans (SUMP)
Workshop – Analyse mobility situation

Fit for purpose transport modelling for a SUMP

Warsaw – 28/11/2019



Paul Riley

Jaspers
Joint Assistance to Support Projects in European Regions

Content

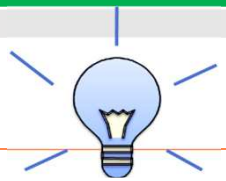
1. Why a transport model / limitations ?
2. What is a transport model ?
3. What modelling do I need for a SUMP ?
4. The importance of good data for a transport model
5. Procuring, operating and maintaining transport models
6. Examples of existing models in Poland
7. Conclusions

1. Why a transport model / limitations ?

- To quantify and present current and future parameters of transport demand and supply
- Fill in gaps in measurements and turn demand drivers into traffic
- Good for transport O-D relations, volumes, perceived travel time + costs, high level bottleneck assessment
- Useful for analysing problems and potentials, shaping measures/scenarios and evaluating their impacts and quantifiying indicators.
- Cannot quantify everything however, no panacea !

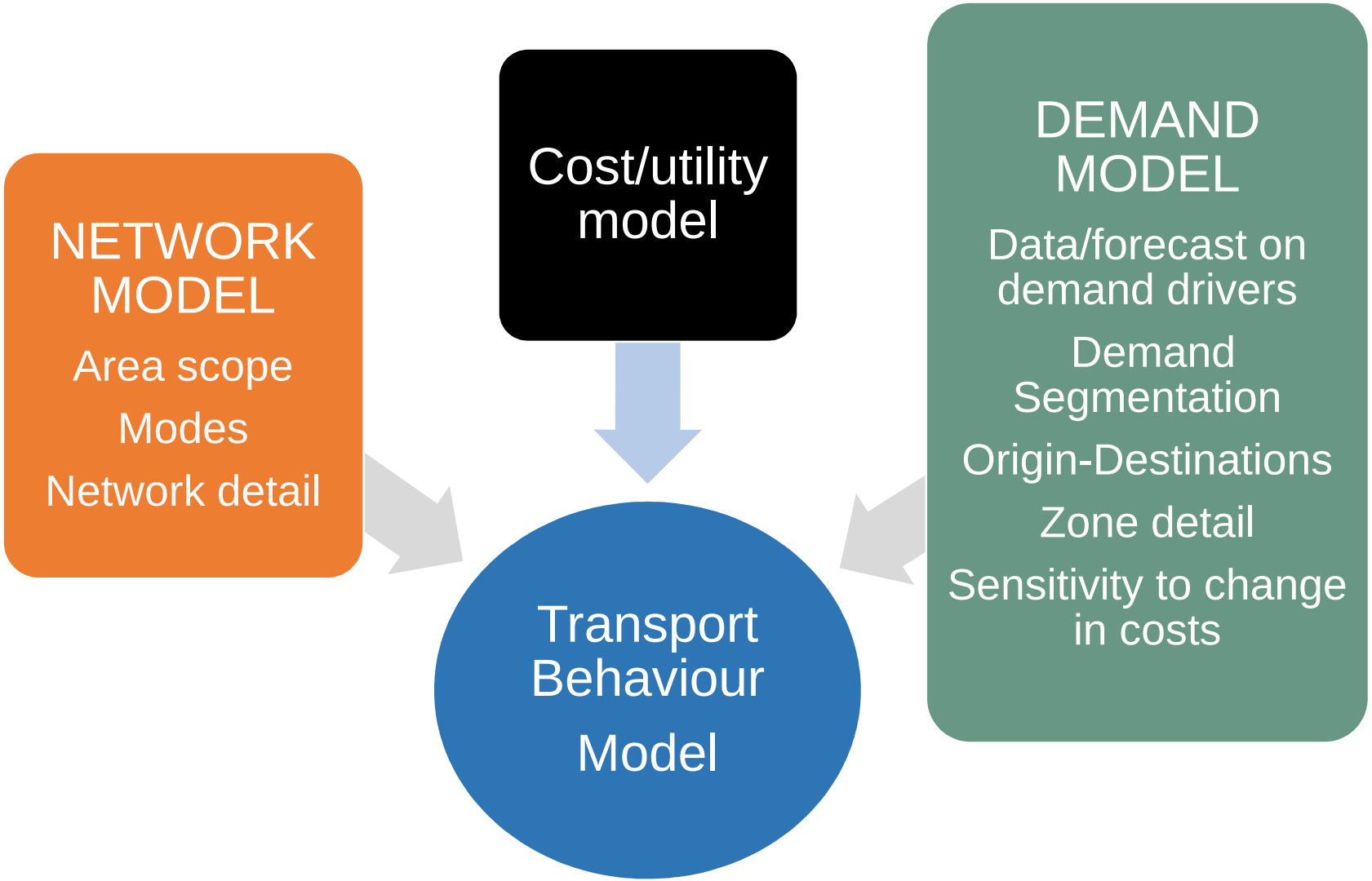
Functional / problem / potential analysis

Development and appraisal of measures and scenarios



2. What is a transport model ?

Basic concepts



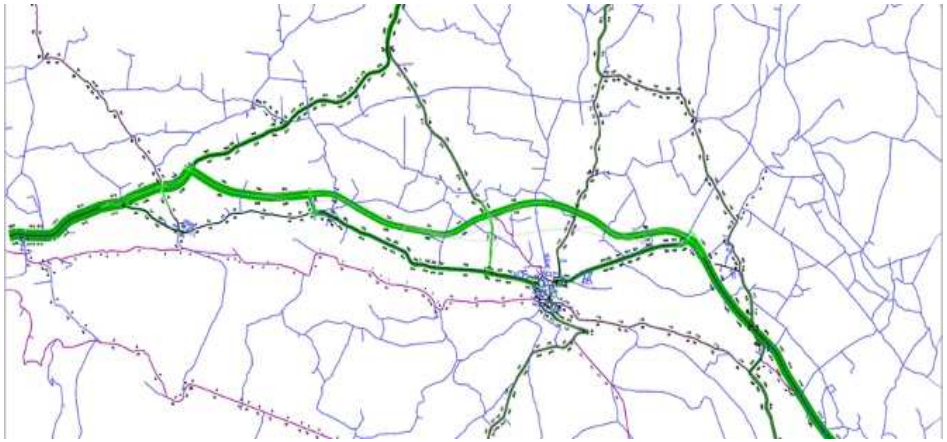
2. What is a transport model ? Scope

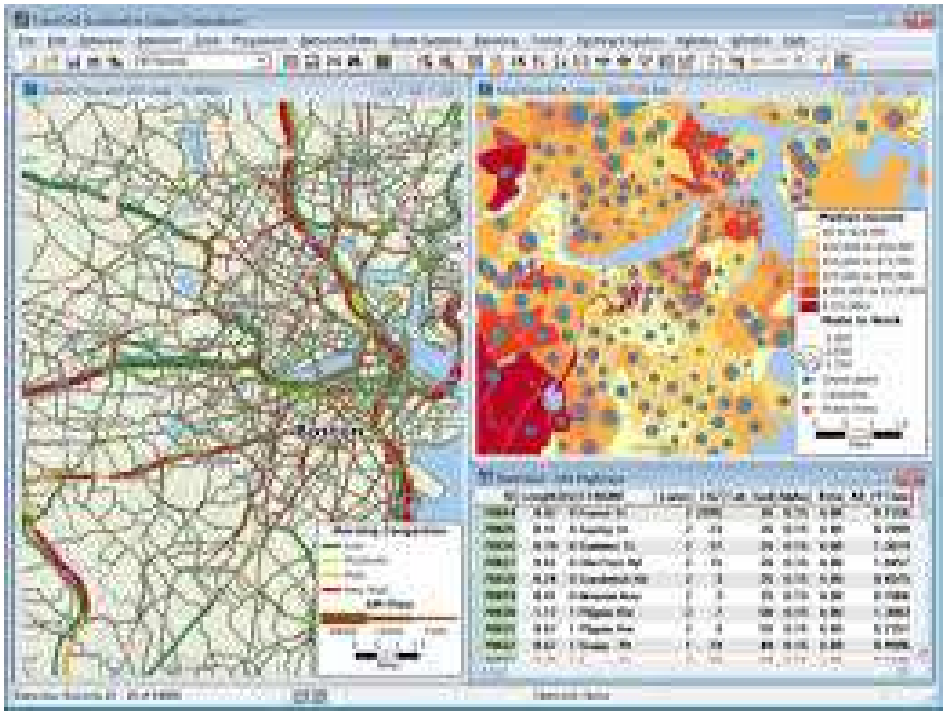
Many types of model for different scope of impacts

Main Scope	Junction / Small area	Section / Corridor	Network
Mono-modal	Junction modelling software OR Simulation model	Spreadsheet with O-D matrix / section paramters, flows and costs *OR* Mesoscopic/simulation model	Macroscopic mono-modal transport network model
Multi-modal		Section/Corridor Model + Mode shift elasticity model	Mono-modal network models + Mode shift elasticity model OR **4 Phase multi-modal model** OR **2 Phase multi-modal model**

2. What is a transport model ?

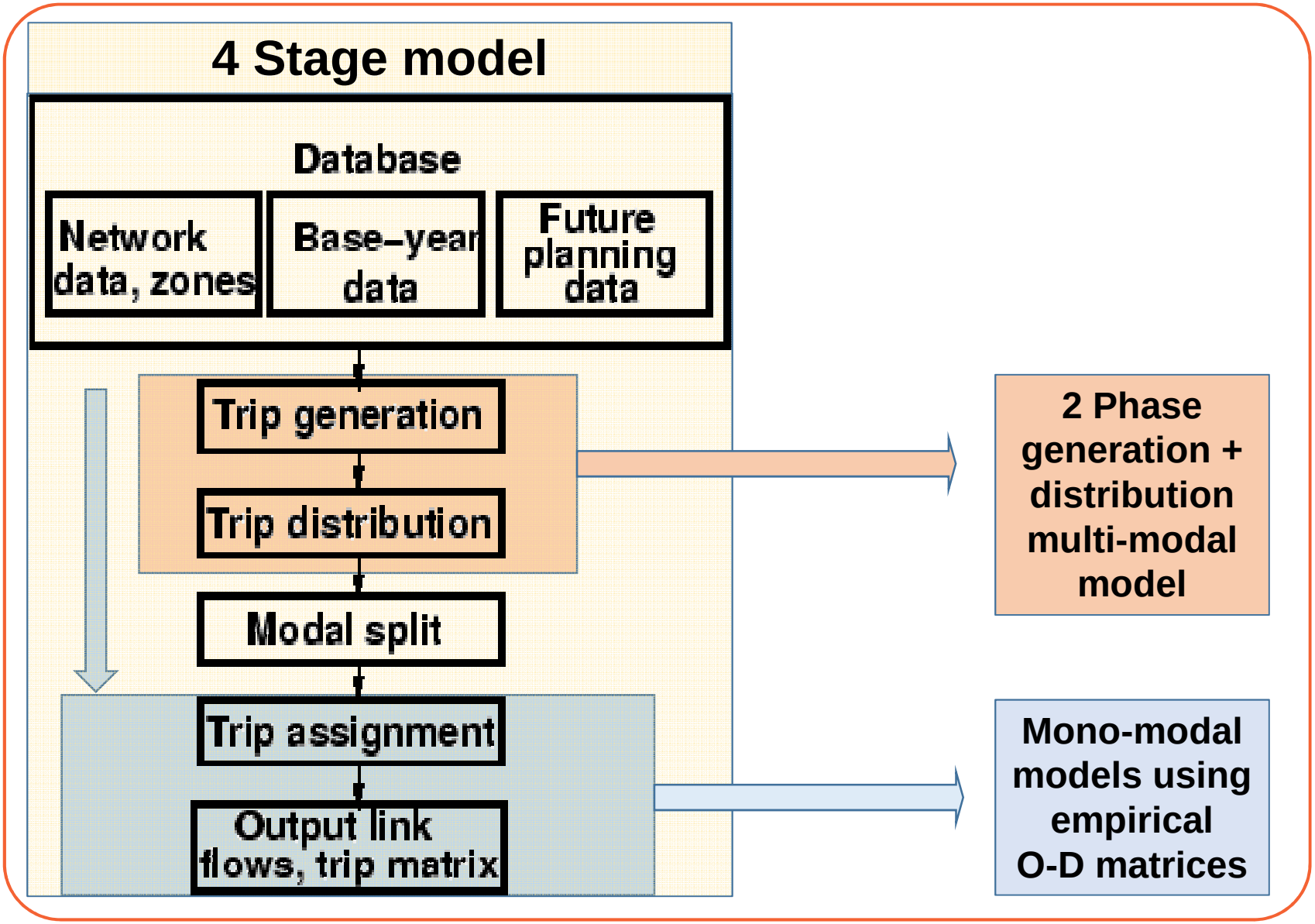
Graphic examples





2. What is a transport model for a SUMP ?

Model types explained



3. What modeling do I need for a SUMP ?

Model functionality : Type of model

Capabilities/Implementation issues	High level 2 – phase generation/distribution model	Unimodal PT or car model	Parallel Car + PT models with simple mode share model	4 – phase multi-modal model
Forecasting demand precisely	+++	++	++	+++++
Impact of natural and planned land-use changes	++++	++	++	+++++
Modal split assessment (consider changes in travel time/cost)	o	++	+++	+++++
Assessment of O-D functionality (directions and purpose)	++++	+++	+++	+++++
Assessment of travel times or generalised costs (accessibility)	++	+++	++++	+++++
Assessment of traffic volumes + related bottlenecks/emissions	o	++	++++	+++++
Predicting land-use reaction to transport offer	o	o	o	o
Active mode assessment	o	o	o	++
Difficulty to build, demand on data, cost	Medium	Medium	Medium/High	Higher
Computational demands	Low	Medium	Medium	Higher

3. What modeling do I need for a SUMP ?

Typical needs per city size

City size/type - orientational only	Quantitative demand data and forecast assessment	High level 2 – phase multi-modal model		Unimodal PT and Car model (s) incl. forecast		4 – phase multi-modal model incl. forecast	
Smaller town < 50 000	Smaller mobility behaviour survey for at least global understanding of travel behaviour for key mobility indicators, traffic data to understand key hot-spots + assessment of forecast drivers	✓	Might be valuable if focus on land-use : transport relationship scenarios	✓	Car and/or PT models might be valuable if used for further modal operational optimisation/planning		
Medium sized town/city 50 000 - 80 000	Mobility behaviour survey, reasonable understanding of main aggregated O-D patterns, traffic volumes across the network + assessment of forecast drivers	✓		✓		✓	Could be valuable if major changes in car and PT systems planned (time and cost impact)
Larger city 80 000 - 250 000	Larger mobility behaviour survey, reasonable understanding of main aggregated O-D patterns, traffic volumes across the network + assessment of forecast drivers	✓		✓	PT+Car model with mode shift model might be sufficient if limited changes in car and PT systems expected (time and cost)	✓	Usually strongly recommendable
Large cities and metropolitan areas > 250 000	Comprehensive mobility behaviour survey, reasonable understanding of main aggregated O-D patterns, traffic volumes across the network + assessment of forecast drivers	✓				✓	Essential

3. What modeling do I need for a SUMP ?

Planning

2. Review Existing Model(s) – are they sufficient/available ?

1.a

Functional area/Modal/Market Scope of Impacts

Modelling Scoping Plan

with Data Plan

Calibrated Current Model

Future Model (s)

1b. Problems/Potentials expected

Significant Changes to Assess

Future developments

e.g. policy/land-use ?

1c. Types of Plan Scenarios / Measures Tested

Need to evaluate indicators ?

3. What modeling do I need for a SUMP ?

Forecasting the future

Jaspers
Joint Assistance to Support Projects in European Regions

Model Reaction to local strategic measures/scenarios and BAU developments

Key External Variables

GDP, car ownership development,

BAU developments of Os+Ds (population changes+land-use/economic policy etc.)

Technology developments

Rational Demand Forecast

Demand scenarios to deal with uncertainty

Longer-term : less precise

Model Reaction to External Measures

External mobility factors and assumptions such as :

National rail infrastructure / operations developments / taxes

Demand Impact of External Variables

History-future regression

Expert assessment etc.

4. The Importance of good data for a transport model

1. Model Scope :

Geographical, modal, detail

4. Are existing data

Available/transferable/ sufficient ?

5. Data plan

Standard/statistical Inputs, Other Models

Regular Transport Surveys

Special Plan Surveys

2. Key impacts / sensitivities

Mode shift / New traffic / Rerouting ?

3. Existing data from statistics, surveys, models available ?

5. Procuring, Operating + Maintaining Transport Models

Tendering Models

Models + data closely specified in SUMP ToR with sufficient expertise required

Allow enough time and resources in study

Embed ownership/3rd party access rules in contract

Institutional Rules

Institutionalize required regular data collection / guidance / modelling

Models (+data) owned by the public sector

Make models and data available to 3rd parties

Institutional Capability

Buy/develop know-how to specify models/surveys if necessary

Building in-house competence is advisable

Outsource model building and maintenance if necessary

Successful procurement and operations

7. Conclusions

Why ?

Appropriate model in SUMP supports quantitative understanding of current and future issues and development of effective measures

Remember however :

Just a tool and you cant quantify everything with a model

Dont let it dominate the SUMP

What is needed ?

Model scope covering planning needs appropriate to specifics and complexity of the situation

Sufficient data/evidence

Forecast with rational basis reflecting uncertainty

Key to institutional success

Develop the right institutional rules and capability

Ensure modeling is well specified in tender

Allow enough time and resources for data collection and modelling

Conclusions

JASPERS

Joint Assistance to Support Projects in European Regions

http://jaspers.eib.org