Road Asset Management à la PIARC and its implementation à la Sweden

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Major Road Administration (exemplified by Sweden)

The actual implementation of the Road Asset Management must be adjusted to specific conditions of the organisation (administrative & business arrangements).

Sweden:
Land area: 450 000 km2 (major variations in the density of population)
Population: 9 million people
2000 km north to south (major variations in climate conditions)

Swedish roads:
- **100 000 km state roads**
- **40 000 km communal roads**
- **300 000 km private roads (1/4 with state subsidies)**

The Road Administration (SRA):

Tasks
- **Management of state roads**
- **”Responsibility” for road transport sector**

Parliament & Government steer the SRA
- **Transport-political Goals + Long-term Plan 2004-2015**
- **Annual directives: mainly money + reporting demands**

Staff: HQ + 7 regions
Employees (excl result units) 2600
- Only road management (road works and consulting outsourced)

Annual budget (2005)	**Million US$**
• **Administration, Sector & Authority tasks**	**100**
• **Operations & Maintenance**	**950**
• **Investments (new roads & improvements)**	**750**

Road Asset Management

The value chain of the Road Administration:

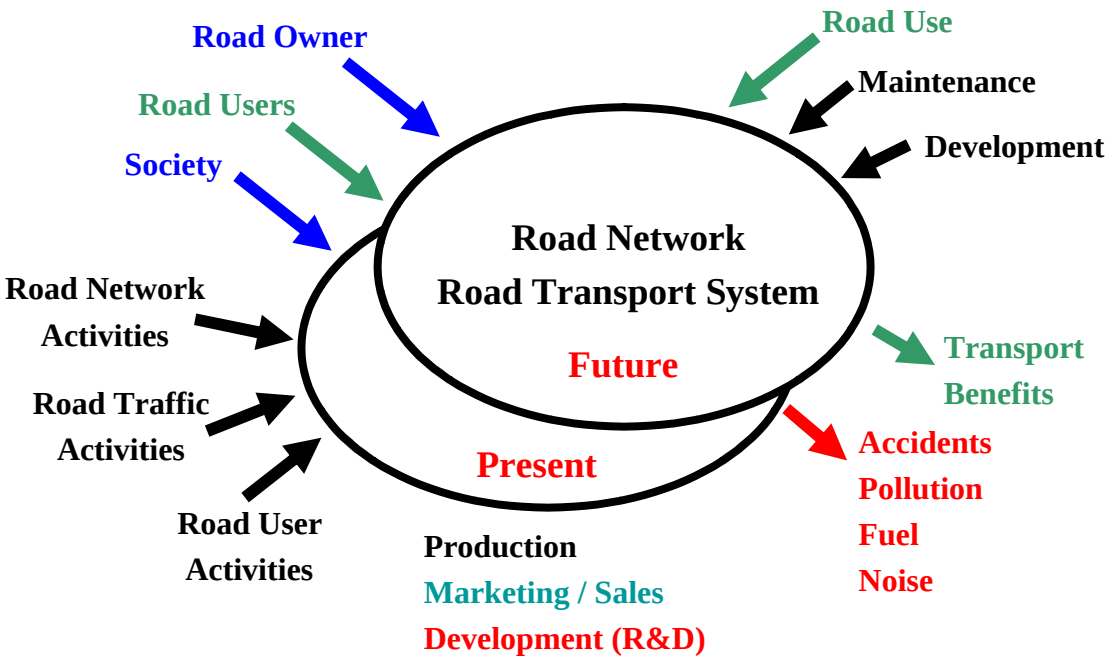
Holistic approach -> Effectiveness -> Customer Benefits

The RAM is defined as the **holistic approach**:

- An integrated, systematic, business improvement approach based upon evaluation of a road network from technical and functional perspective (preservation and use).
- Management of roads covering use, operation, maintenance and development through improvement or construction of new roads.

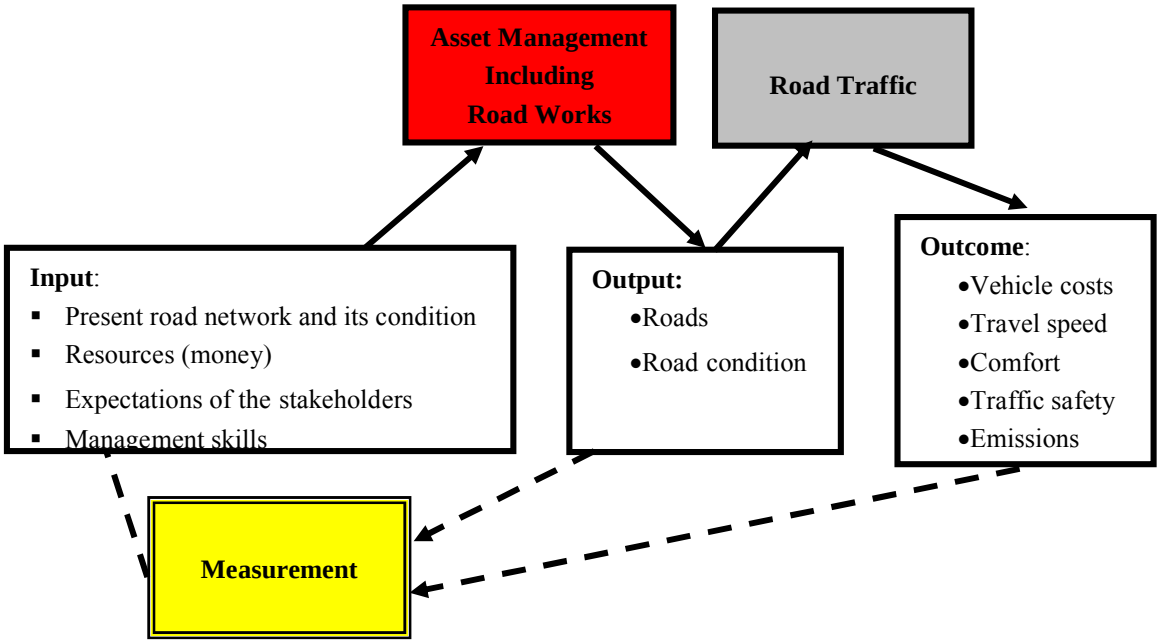
A holistic approach requires **common definitions** consequently used.

Perspectives of Road Asset Management



Results of Road Asset Management

Road Asset Manager uses the input to produce output by means of road works. Road Traffic uses the road network and experiences the outcome in terms of traffic effects. Road manager can sometimes to some extent control the traffic.



Output is measured to assess deliveries of internal units and contractors. It should be objective, detailed, but it need not be understandable for the public.
Outcome is measured to assess deliveries to the public. It should be understandable and relevant for the public.

Road Network Management: Operations, Maintenance, Development

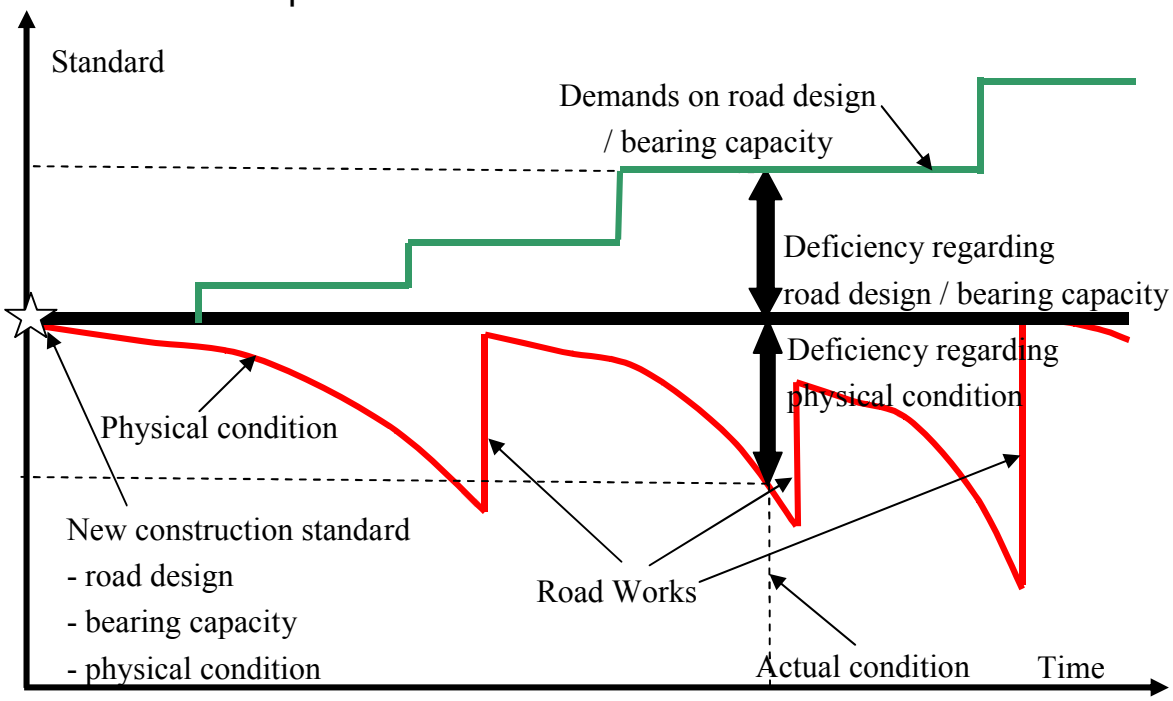
Road Network Management

The road works are divided in operations, maintenance and development.

The objective of the road operations is delivery of suitable condition to present road users. Resulting condition has a lifetime less than one year. It is expressed in terms of “operations condition”, meaning actual condition compared to the operations standard (fulfilled or not).

The objective of the road maintenance is delivery of suitable condition to present and future road users. The interests of future road users are satisfied through a controlled deterioration rate. Resulting condition has a lifetime more than one year. It is expressed in terms of maintenance backlog (cost of road works that should have been performed according to the maintenance standard).

The objective of the development of the road network is a permanent functional improvement of the network.



Condition Measures

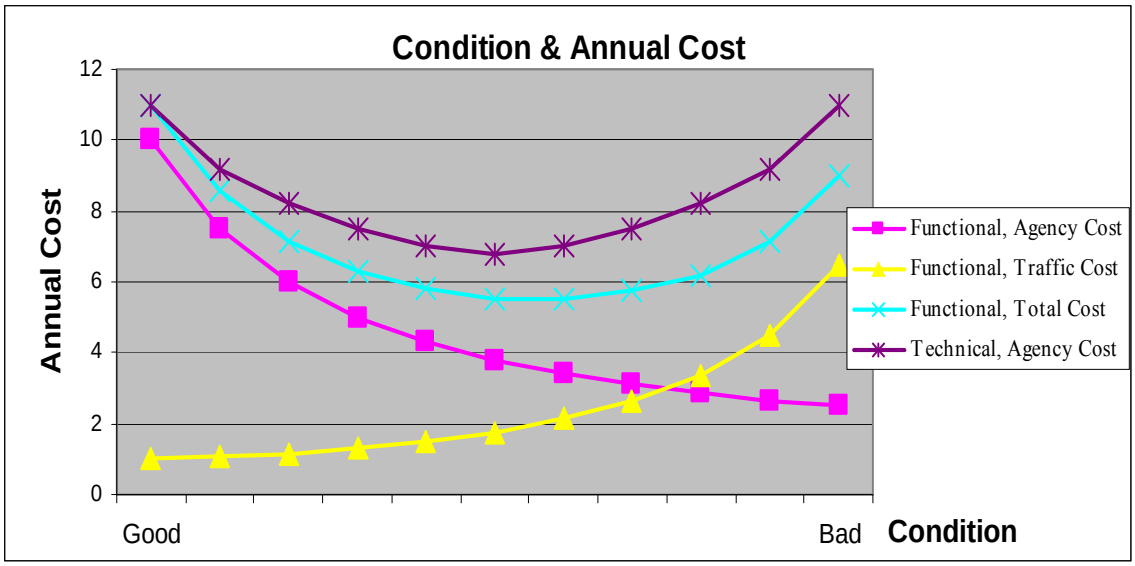
Goals and Measurements

- **"What gets measured gets done".**
- **"What doesn't get measured doesn't get done".**
- **We must monitor the progress towards our goals to achieve them.**

Objectives of Monitoring

- **Our position in respect to the goals to decide our future activities.**
- **Delivery of goals towards the stakeholders.**
- **Effectiveness/accountability (value for money) towards the stakeholders.**
- **Bench-marking of the effectiveness of individual units and contractors.**

Technical & Functional Condition Measures



Maintenance Standard & Backlog

Standard

Condition means actual state of the road network or component.

Standard means promised, aimed to or prescribed condition.

Standard is normally expressed as a set of trigger values for a number of condition variables.

If a trigger value is exceeded some road works should be performed.

The standard is specified using condition variables

Each standard has a corresponding annual cost.

The standard should be "balanced", meaning representing our idea about the best balance among the transport-political goals (= best resource allocation) and user groups.

Backlog

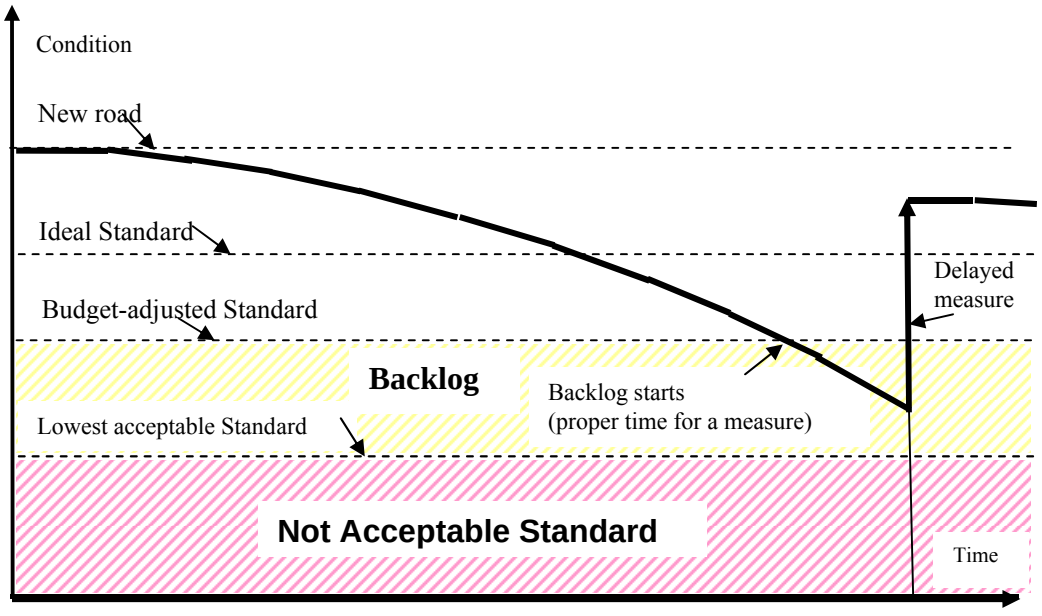
Cost of optimal works required due to the maintenance standard.

It measures compliance to maintenance standard.

It estimates relative road capital value if condition distribution is "reasonable".

If a trigger value of the standard is passed but no works are performed a backlog occurs.

With a significant backlog, many measures are often delayed in spite of passed trigger values. There are usually road segments in the backlog with higher priority.



External and Internal Effectiveness

External Effectiveness: optimal mixture of different customer goals.
Internal Effectiveness (Efficiency): lowest long-term cost for the delivery.

The internal effectiveness measure will be used for:

- **Result reporting to the stakeholders**
- **Budget allocation**
- **Assessment of the goals for SRA:s regions**
- **Benchmarking between SRA:s regions**
- **Analysis of results of research and development**
- **Analysis of results of re-organisations**

The internal effectiveness of road maintenance is defined as

IE/Road Maintenance = Condition Improvement due to Maintenance / (Operations Costs – Cost-influencing factors)

Example (fictive values)

Internal effectiveness of road maintenance	**2004**	**2005**	**2006**
NK (Road deterioration cost) MSEK	2500	2500	2500
ΔESL (Increase of backlog) MSEK	530	510	440
UK (Maintenance cost) MSEK	1950	2010	2000
IE (Internal effectiveness) = (NK – ΔESL) / UK %	101	99	103
ΔIE		-2	4

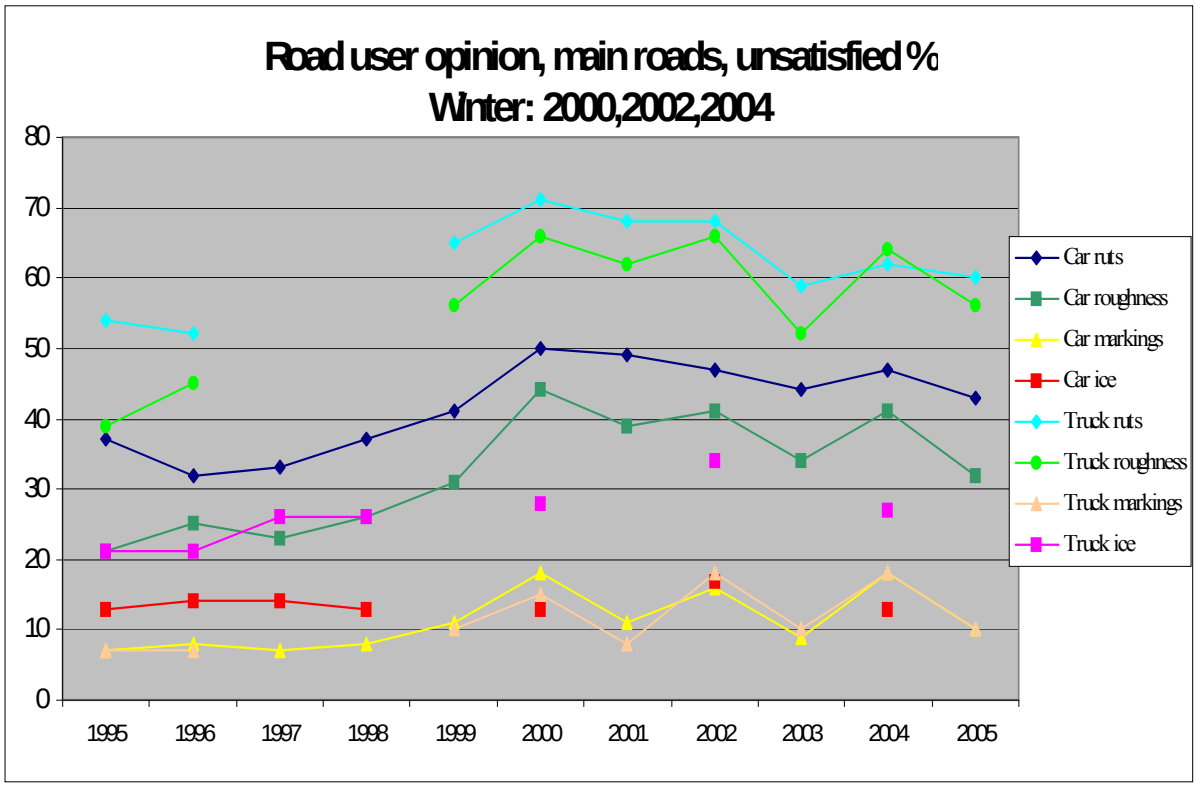
Cost-influencing factors

Following cost-influencing factors are used today:

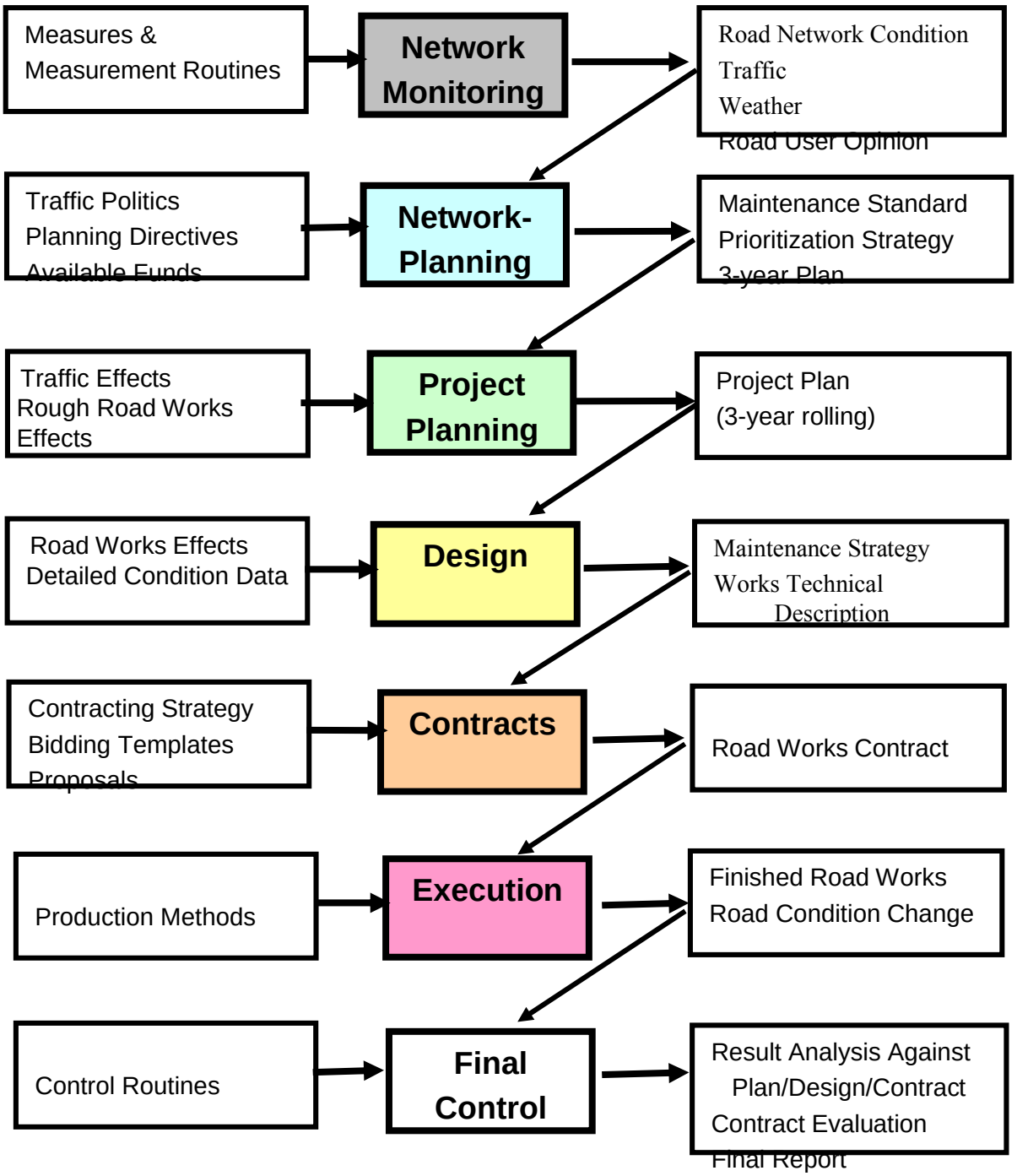
- **New or eliminated road network components** increases or decreases the maintained road network
- **Traffic growth** increases the deterioration rate
- **Synergy effects of road improvement** result in better road condition without maintenance works
- **Changed maintenance standard** determines amount of road works needed
- **Weather variations** has significant influence on deterioration rate and road works costs
- **Changed environmental demands for road works** usually make the road works costs higher
- **Changed traffic safety demands for road works** usually make the road works costs higher
- **Market situation** has significant influence on contract prices
- **Cost development of the input** determines how much of materials and services can be bought
- **Budget restrictions** means selection of suboptimal solutions
- **Internal effectiveness** determines the final result

Users and Residents

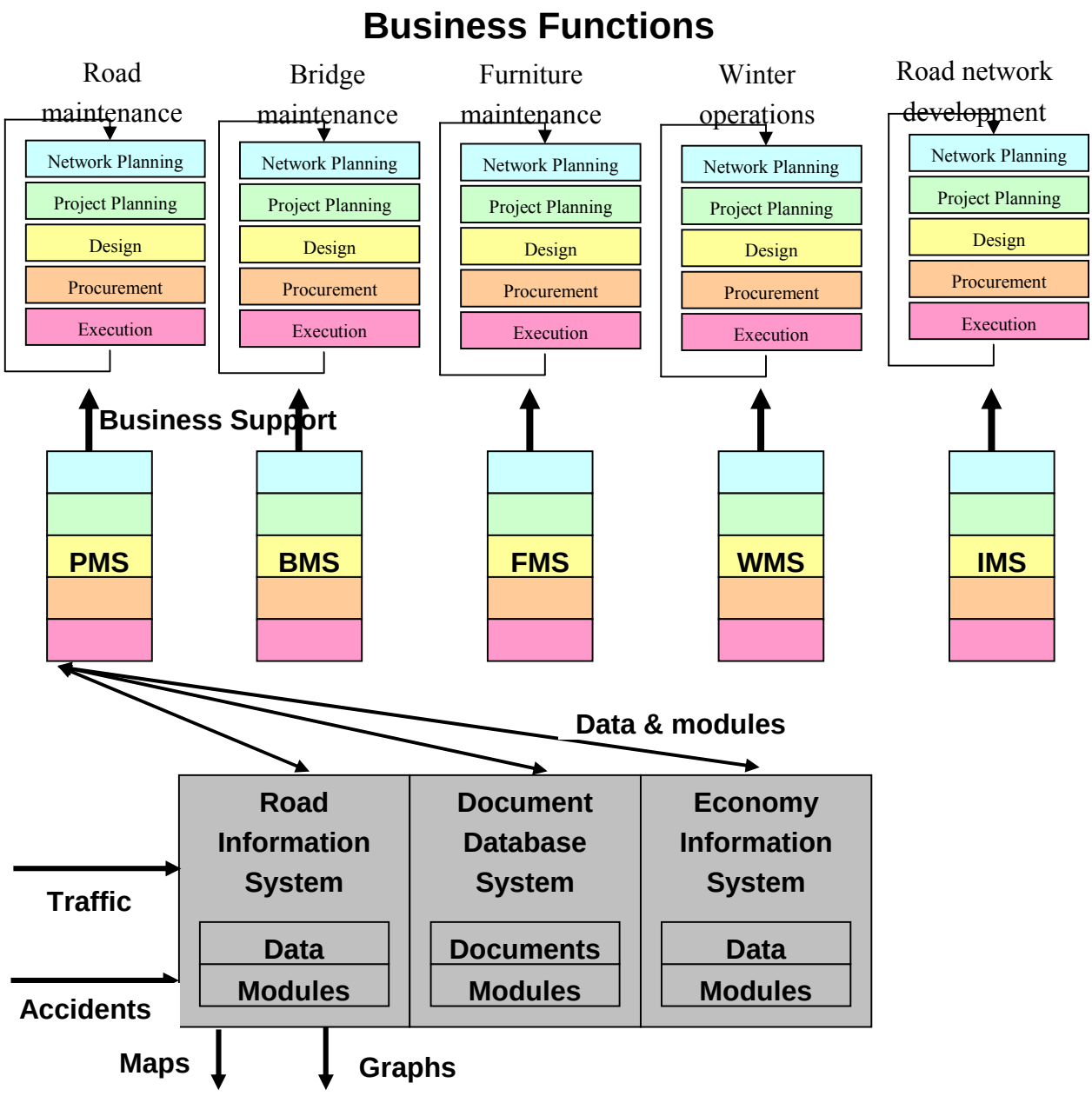
- Regular meetings and discussions with organizations
- Information about actual standards
- Road user opinion about operations and maintenance
- Satisfied Client Index regarding the SRA
- Traffic Effects (outcome) can be estimated using traffic effect models.



Business Process



Road Management System (RMS)



An example: Business-like communication with the government

Government demands

- **The government owns both the road network and the SRA**
- **The transport-political goals stable, but the interpretation is changing**
- **Increasing demands & decreasing budgets & questioned credibility**
- **Demands on regular reports of development of road condition & SRA:s effectiveness**

SRA:s answers based on Asset Management

- **The challenge taken and accountability demonstrated!**
- **Interpretations of demands in measurable terms**
- **Securement of possible data sources and development of estimation methods.**
- **First estimates of measures delivered and their refinement will continue.**

Specific results

- **Pricing of demands: price tag on the demands from the government.**
- **Condition development control: Road network condition is monitored and planned.**
- **Effectiveness development control: Effectiveness development is monitored and planned.**
- **Analysis of results leading to research & development: More effective R&D.**

Consequences

- **Accountability and effectiveness: towards a more business-like relation**
- **Better balance between demands and budget: decreased budget variations**
- **Maintenance has higher priority than development: more stable funding**
- **Holistic view of road maintenace, its marketing and R&D: AM!**