UIC Asset Management
Global Conference 2015

Assessment of your current asset management practices: presentation of the UIC's self-assessment tool

Andy Kirwan & GianPirero Pavirani
WG AM UIC

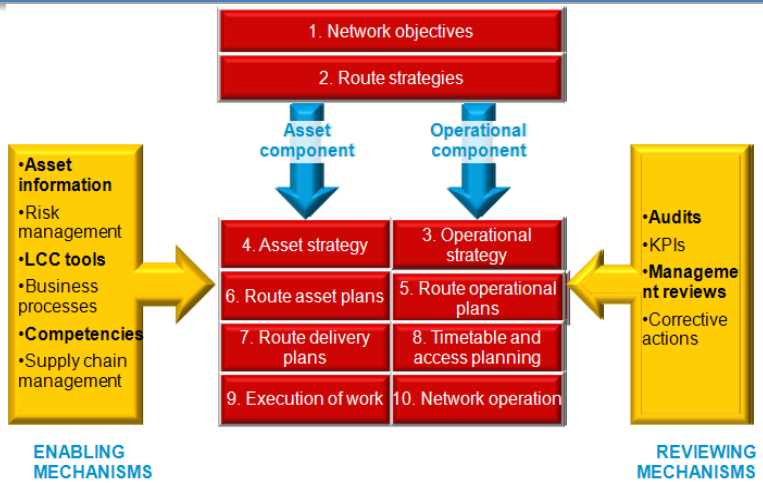
Session II –Monday 12th October

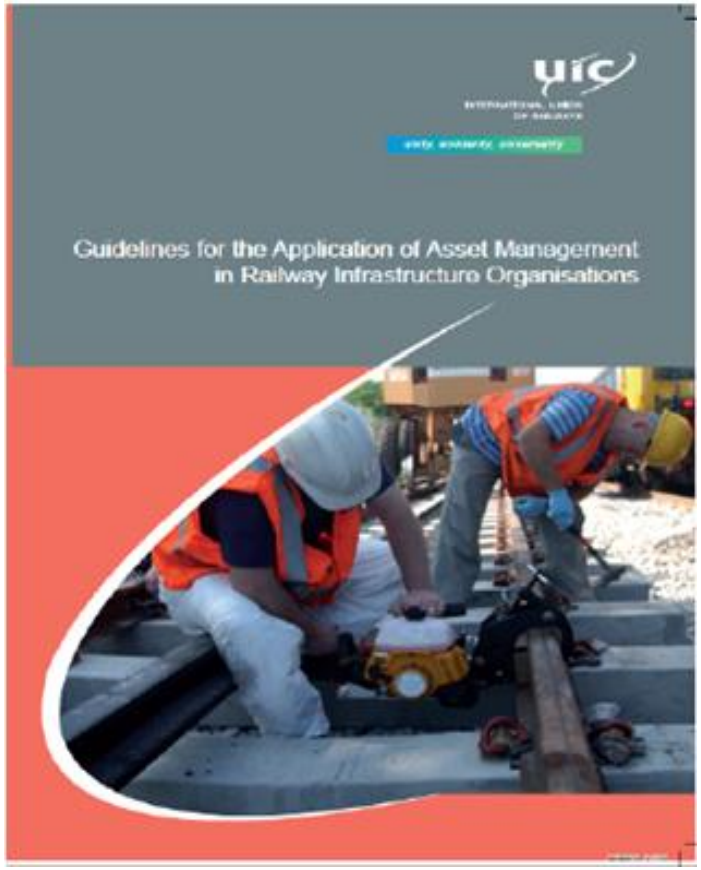
Putting your assets on the right track

Document UIC AM WORKING GROUP

UIC AM Guidelines published September 2010

- Scope of asset management
- Eight key steps defining an AM system for railway infrastructure asset
- Definition of an AM Framework components
- Cross Reference to PAS 55





Railway infrastructure AM maturity Self Assessment

The members of the AMWG agreed to assess the AM activities of their own organizations within the scope of framework stated on guide lines by means of a self assessment questionnaire.

The AMWG has analyzed a number of self assessment approaches but realized that are not sufficiently address the specific needs of rail Infrastructure Managers.

Subsequently, it was decided, that a tailor-made **questionnaire** would best serve the needs .

PROJECT OBJECTIVES

- Enable a self-assessment of the management of rail infrastructure assets in order to identify the level of maturity of the processes applied within the UIC asset management framework.
- Enable the rail Infrastructure Managers to optimize its processes and activities to deliver the performances requested by its customers, funders and other stakeholders .
- Facilitate to benchmark against others
- Improve comparability between the execution of core activities as defined by the asset management framework, and enable Infrastructure Managers to Improve their own approach by learning from other Infrastructure providers

The road map for the AM Maturity self assessment questionnaire

The methodology to fill in the questionnaire is based on the following 4 steps:

1. definition of framework **components**;
2. definition of core **processes** for each component; with description;
3. definition of assessor questions;
4. definition of possible answers, fine tuned on 6 maturity level of Asset management.

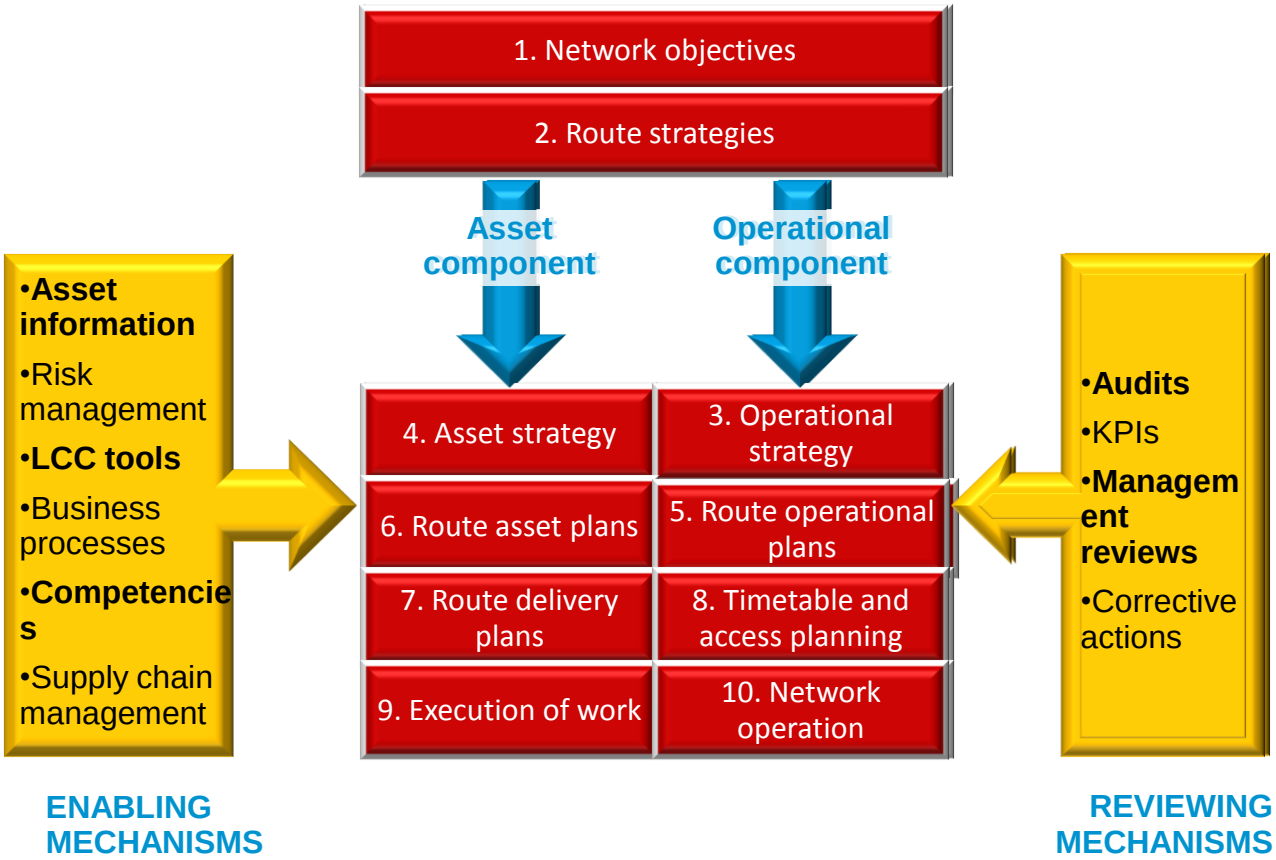
At the last has been introduced the concept of maturity to evaluate the growth and development of framework components and their activities or actions.

1. Definition of framework **components**

❖**components** of framework are macro elements of analysis.

❖The framework reference is defined on Guide lines publishes by UIC.

❖Framework **components** have a logical order as numbered in the graphical chart.



2. Definition of main processes for each component with description

The main process characteristics for each component are defined.
The specified processes are micro analyzed.
The processes addressed applying the following principles:

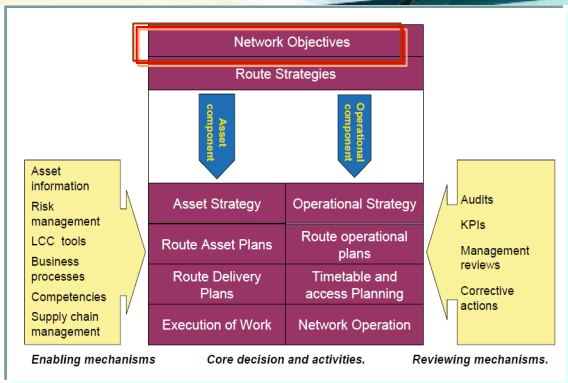
- Component definition given on the UIC AM guide line;
- Based on own organization experience.
- Based on customization derived from logical order of each component (e.g.) :
    - Fix starting Point;
    - Define referring targets;
    - develop alternative strategic approaches and evaluate them
    - decide on strategic approach to pursue;
    - derive action.

2. Definition of main processes for each component with description

The process is described trough its relevant characteristics.
For that, is useful to compare every single process with of review/enabling mechanism.

ASSET STRATEGY PROCESS	REVIEWING / ENABLING MECHANISMS: Asset information	Risk management	LCC tools	KPIs	Corrective actions
Fix starting point	Data on asset condition available?				
Define strategic targets		Decision taken on target # of incidents, level of punctuality etc.?			
Develop alternative strategic approaches and evaluate approaches			Do you have the capability to simulate effects on lifecycle (costs) of asset, if one or the other decision should be taken?		
Decide on strategic approach to pursue				Do you measure target achievement and how?	
Derive actions					Do you derive concrete actions based on strategy and do you moni-tor the execution?

1. Network Objectives



Fix what sort of railway does the country want and is prepared to pay for

Inside there are **5** processes:

1.1 Engagement with customers and other stakeholders

Establishes whether there is agreement between stakeholders on future requirements for network capacity and performance, whether there is a strong business case and whether there is a confirmed source of funding. (Program contract with government shareholder)

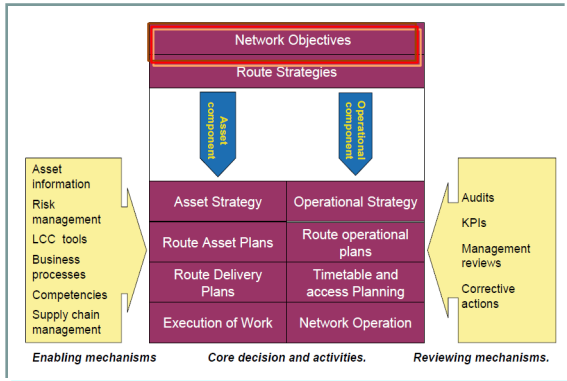
3 questions

1.2 Infrastructure safety, punctuality, capability and environmental sustainability

Establishes whether the safety, punctuality, capability and sustainability requirements have been specified, linked to the future demand for freight and passenger train services, e.g. maximum axle load, track gauge.

2 questions

1. Network Objectives



1.3 Network capacity

Establishes whether the capacity requirements have been specified, linked to the future demand for freight and passenger train services.

3 questions

1.4 Network segmentation

Differentiate network according to train service characteristics (high speed, passenger, high density, commuter line, freight)

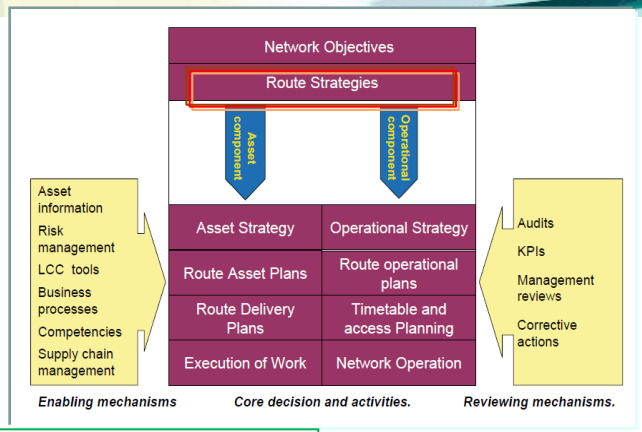
1 question

1.5 Financial objectives

Establish indicative budgets from funder linked to infrastructure output objectives.

1 question

2. Route Strategy



technical and economic performances per route: capacity, traffic density, budget

Inside there are **6** processes:

2.1 Establish Route Capability

Establish whether the capability requirements of the route have been specified, linked to the future demand for freight and passenger train services, e.g. tunnels clearance, length of platforms in the station, max admissible train length, permissible axle load, line speed and uniform load per m on bridges on tracks, kinematic design of lines.

1 questions

2.2 Define Route capacity

Establish whether the capacity requirements of the route have been specified, linked to the future demand for freight and passenger train services e.g. establish number of train.

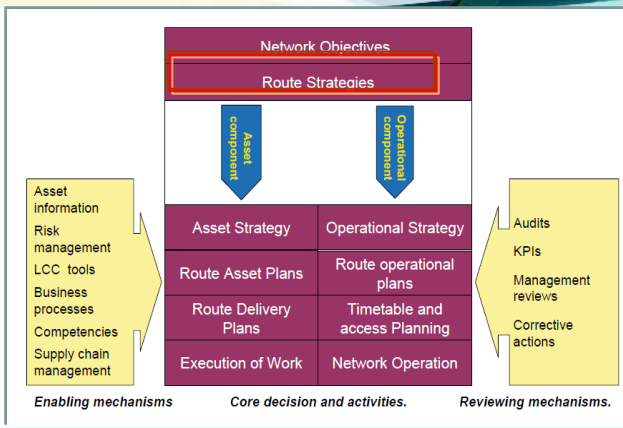
2 questions

2.4 Establish Route performances. Set of route targets

Establishes route performances (e.g. availability, punctuality, safety, environmental impact: key Performance Indicators). Localization of the critical sub-routes where the organization has to dedicate more sources and effort to achieve the objectives.

2 questions

2. Route Strategy



2.5 Gather data from Train Operator

Gather the characteristics of vehicle (e.g. brake weight, acceleration etc. and passenger flows).

1 question

2.6 External factors e.g. 3rd party activities

Gather and manage data of particular activities near the line e.g. 3rd party activities which potentially could affect trains service (road crosses, over pass, buried services etc.).

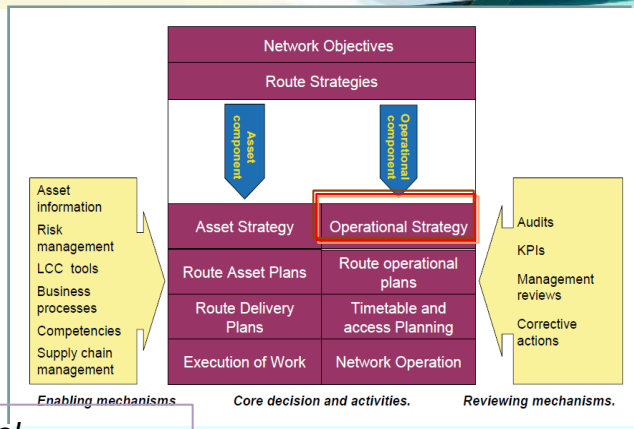
1 question

2.7 Funding resource

Funding for maintenance and renewal of the route based on long term planning at least 10 years.

1 question

3. Operational strategy



Operations and control of the network.
Network access optimization for Trains Operators

Inside there are **3** processes:

3.1 Future configuration of the infrastructure, e.g. the number of signaling centers and the degree of automation.

Define the present and future general requirements for network operation, based on traffic development (scenarios), technology targets

2 questions

3.2 Develop approaches for providing access to the network in order to allow maintenance, renewal and improvements works to be undertaken.

Establishes the network capacity and the timetabling process and optimized implementation of time slots for lines possession to be used for maintenance, renewal and improvements of infrastructures, based on the network performances requirements.

2 questions

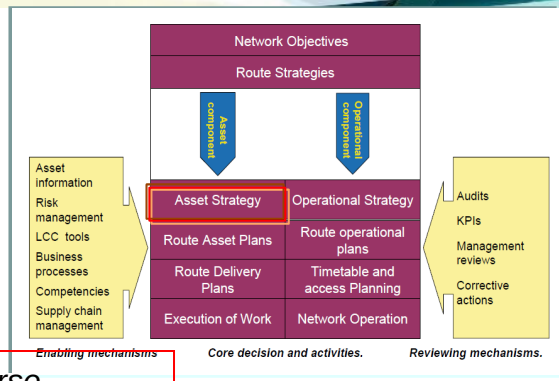
3.3 Derive actions to implement and facilitate train operator access regime

Establish process for facilitating network access for train services e.g. new freight services, interoperability

3 questions

4. Asset Strategy

- ***definition of the maintenance optimization parameters (optimization between maintenance and renewals)***
- ***technical choices on components***
- ***definition of the inspections frequencies***



Inside there are **7** processes:

4.1 Compile asset register (static data)

Collation of asset data from potentially diverse sources, including asset types, technology, asset volumes, location, configuration and interfaces (with other assets and the operational railway).

2 questions

4.2. Define asset hierarchy and assign criticality to sub-asset types

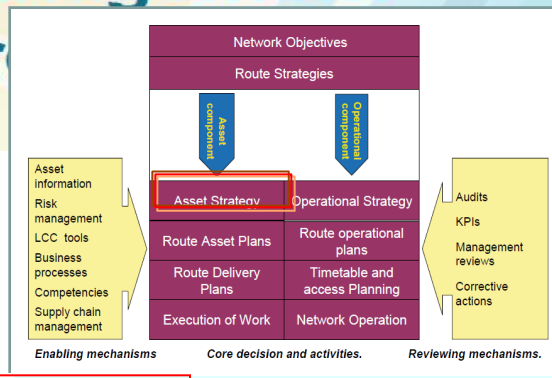
Construct asset hierarchy showing parent-child relationships of sub-asset types e.g. track circuits as a sub-asset type of the signalling asset. Assign criticality to sub-asset types based on their impact on safety, train performance and cost. The criticality will depend on both the function the asset performs and its location on the network e.g. if it is on a high speed, high density route.

2 questions

4.3. Analyze current and historical asset costs, risks and performance

Develop understanding of current asset state based on historical trends in key performance indicators e.g. age, condition, duty, reliability, impact on safety and train performance, maintenance history etc. Establish baseline against which improvements can be measured.

4 questions



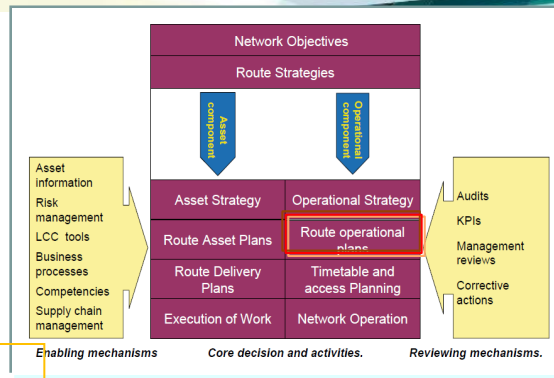
4. Asset Strategy

4.4. Determine future asset requirements	*Define how the assets need to perform in the future to meet the requirements defined under network objectives and route strategies, e.g. targets for safety, capability, capacity, reliability, availability, maintainability, etc.*	1 question
4.5. Identify life-cycle management options for delivering future requirements	*Specification of different ways of maintaining, renewing and enhancing the assets. Includes the current approach and alternatives that maybe have lower costs or improved performance.*	3 questions
4.6. Evaluate the costs, performance and risks at asset portfolio and whole system level	*For the life-cycle management option with the lowest whole life costs, determine its cost of implementation, the level of infrastructure performance and risks. Ensure that decisions made on one asset type have acceptable impact on other assets.*	1 question
4.7. Understand implications and uncertainties associated with implementation of the asset strategy	*Develop the interface between the asset strategies and the route asset plans. Includes assignment of accountabilities, specification of competence requirements, assessment of supply chain capability etc. Also includes assessment of uncertainties and risks associated with implementation of the asset strategies.*	4 questions

5. Route Operational plans

Taking into account Train Operators needs (number of slots, trains frequency) 6 maintenance possessions needs

Inside there are **3** processes:



5.1 Translate demand of train operators (passenger, cargo) for running service into detailed capacity plans for number and type of train paths per route

Figure out medium term and long term demand for running services of train operators per route incl. details about train types, service types etc., marshalling yards (number of trains and wagons per day) and service facilities.

5 questions

5.2 Carry out detailed capacity planning per route, per station, etc. (medium and long term)

'Derive detailed capacity plans per route for the medium term and long term

2 questions

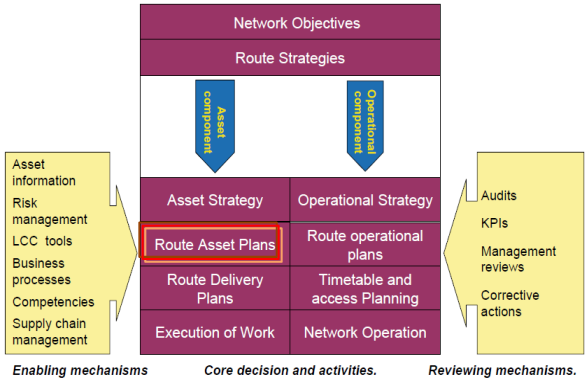
5.3 Consider possession for maintenance and renewal in capacity planning per route.

Evaluate the need for possession to undertake maintenance and renewal work on the infrastructure and evaluate alternatives for these timeslots regarding impact on scheduled traffic, cost, punctuality etc. Adjust the need for possession to undertake maintenance and renewal work on the infrastructure with route assets plans.

3 questions

6. Route Asset Plans

Definition of route performance
Definition of the number of maintenance and renewal operations and their costs
Planning of renewal operation ,important maintenance and enhancement work



Inside there are **4** processes:

6.1 Overview of the route section

Acquiring and management of all the necessary data of the process for long-term planning: the historical works (installation and modifications), the status of the asset (faults, diagnostics etc.), costs (WO and NTW), any change of use (changes performance of use).

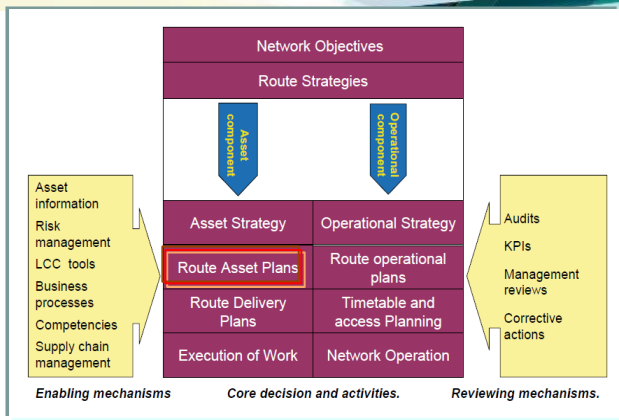
4 questions

6.2 Long term planning

Asset Plans localize the specific location renewal work banks e.g. replacement of a life-expired section of track, and the maintenance regime e.g. typology and frequency of maintenance task. The work banks and maintenance regime are specified as the tactical component of a strategic plan, in which the longer-term elements are typically derived from modeling tools. Define and gather data on: 1-route condition (the characteristics of an effective route asset plans are renewal work and enhancements specified for a long term period), 2-performance targets, 3-work history (definition of data flow and work data base update- on the route) establish condition and performance trend (define, document, implement & maintain a process of planning all extraordinary maintenance activites, and continually improve its effectiveness).

4 questions

6. Route Asset Plans



6.3 Maintenance and renewal work prioritizes. Define the need of track possession and slow-down action, volumes and costs resulting from application of the asset strategy based on funding availability

Optimize the delivery of maintenance, renewal and enhancements, grouping work spatially and combining work to be delivered at the same time. Assessment of the risks to the plan delivering its objectives.

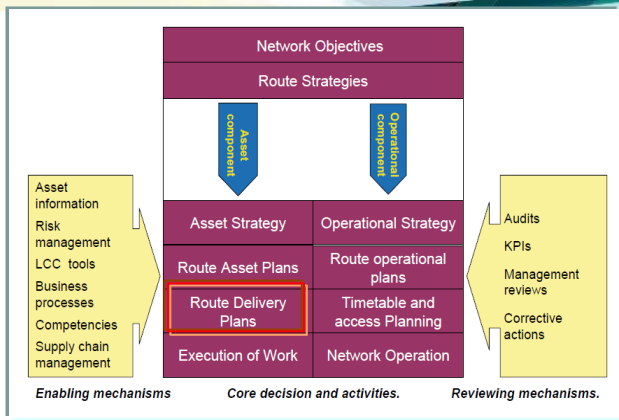
2 questions

6.4 Investiment & Upgrade Planning

Optimize the delivery of maintenance, renewal and enhancements, grouping work spatially and combining work to be delivered at the same time. Assessment of the risks to the plan delivering its objectives.

2 questions

7. Route Delivery Plans

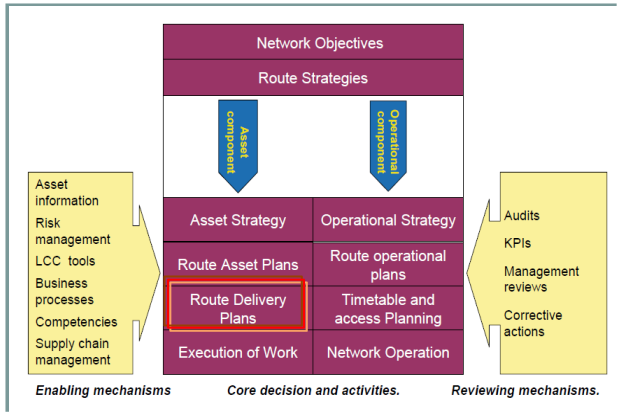


Optimization of operation organization (M&R)
Confirmation of work condition (possessions, budget, assessed detailed projects)

Inside there are **7** processes:

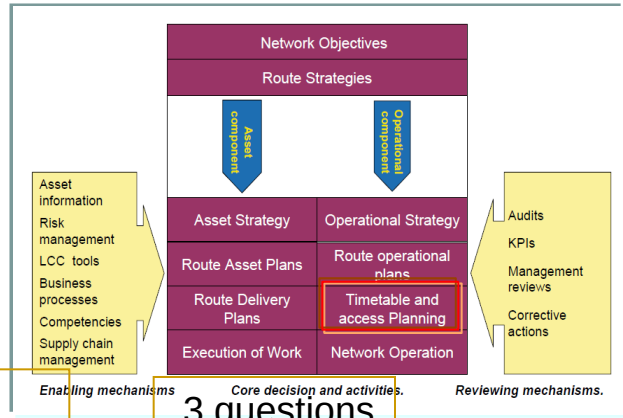
7.1 Make or buy	*Should be considered at more strategic level (one of enabling components)*	1 question
7.2 Planning of equipments and materials	*Define the supplier and material and verify the availability of yellow machines and tools.*	1 question
7.3 Management of Suppliers & Contractors	*Manage the qualification of contractors, suppliers and contracts.*	1 question
7.4 Medium-Term maintenance works Planning	*Optimize the delivery of maintenance, renewal and enhancements, grouping work spatially and combining work to be delivered at the same time.*	3 questions

7. Route Delivery Plans



7.5 Medium-Term investments and enhancement works Planning	*Optimize the delivery of investments and upgrade and enhancements, grouping work spatially and combining work to be delivered at the same time.*	1 question
7.6 Resource Supply Management	*Provide a detailed design for construction projects. Confirm the availability and source of founding,*	1 question
7.7 Supply Chain & Spare Parts Management	*Align the delivery program with the local track access regime and the delivery capability of suppliers.*	1 question

8. Timetable and access planning



Manage the impact of track possession with the slots demand, time table constructions

Inside there are **4** processes:

8.1 Prepare track access arrangements and possessions

Plan the capacity which is needed for M&R activities and investments, upgrades.

3 questions

8.2 Draft timetable

1-gather all data necessary for timetabling e.g. :
- headway times,
- speed profile,
- axle load,
- type of allowed rolling stock;
2-describe the process of time table;
3-define basic frame;
4-define exception driven train services.

5 questions

8.3 Timetable refining phase

1 Finalize timetable;
2 manage conflicts between demand and offer;
3 check timetable robustness and quality.

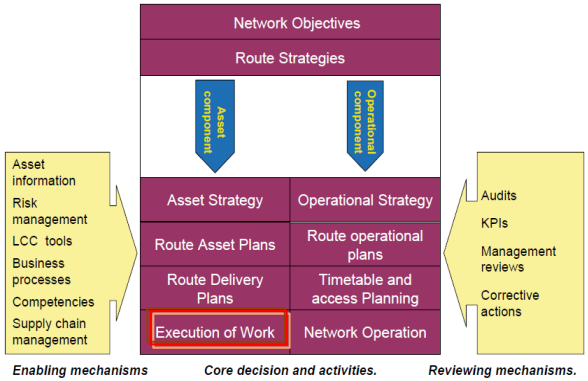
5 questions

8.4 Short term timetable adjustments

Manage risks linked to route capability

3 questions

9. Execution of work

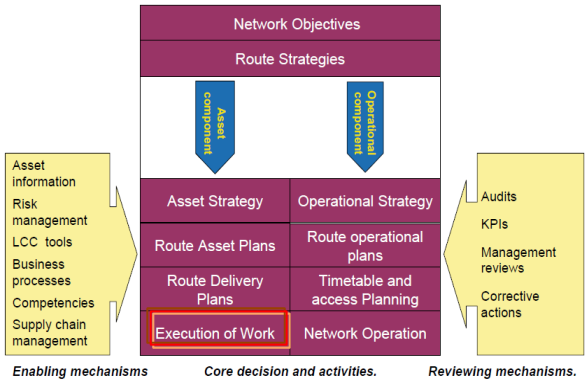


Realization of operation, planning execution,supply chain, realizations of the works ,tests, acceptance of works start the service

Inside there are **7** processes:

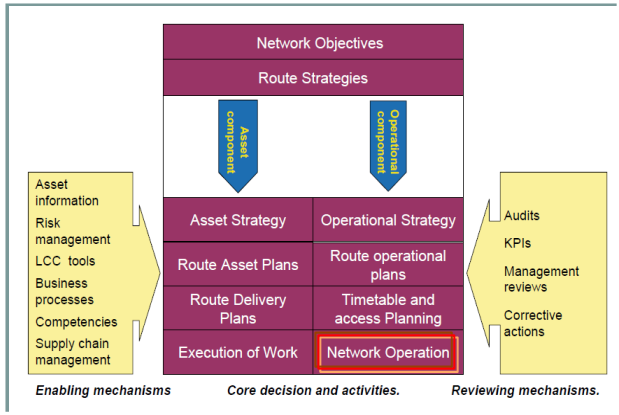
9.1 Project management and work scheduling	*Assign project manager. Provide briefing of the project. Scheduling of resource, booking of possessions and define detailed steps of work.*	3 questions
9.2 Facilities management	*The provision of yellow machines, equipment and tools.*	1 question
9.3 Management of staff: skills & competencies.	*Management of competencies, aptitudes and behaviors required by individuals and teams. Ongoing training and certification*	1 question
9.4 Construction	*Standard of typical work application.*	2 questions

9. Execution of work



9.5 Certification of regular execution work	*Management of methodology applied to verify and certify regular work execution (assessment and testing). Feedback of the execution works about improvement activity.*	2 questions
9.6 Operation enabling (risk analyze NS 352, compliance with TSI, certification)	*Management of third part certification.*	1 question
9.7 Update the asset registers and cost management systems as a result of changes to the infrastructure	*Management and analysis of data to change in the infrastructure register and monitoring the costs and performance benefit produced by infrastructure change.*	2 questions

10. Network operation



Real time

Inside there are **4** processes:

10.1 Real Time traffic Management	*Manage the traffic and set the route for trains.*	3 questions
10.2 Real Time Capacity Allocation	*Allocate capacity and timetable for unplanned journey.*	1 question
10.3 Track Possession Management	*Manage the track possession for planned works.*	1 question
10.4 Contingency management	*Manage the traffic and the track possession / degraded mode during incidents and urgent works*	3 questions

4. Definition of possible answers characteristics, fine tuned on 6 maturity level of AM

At this step we formulate the appropriate questions related to the each item.

For every question are defined 6 different answers for each maturity level most compliant with railways organization.

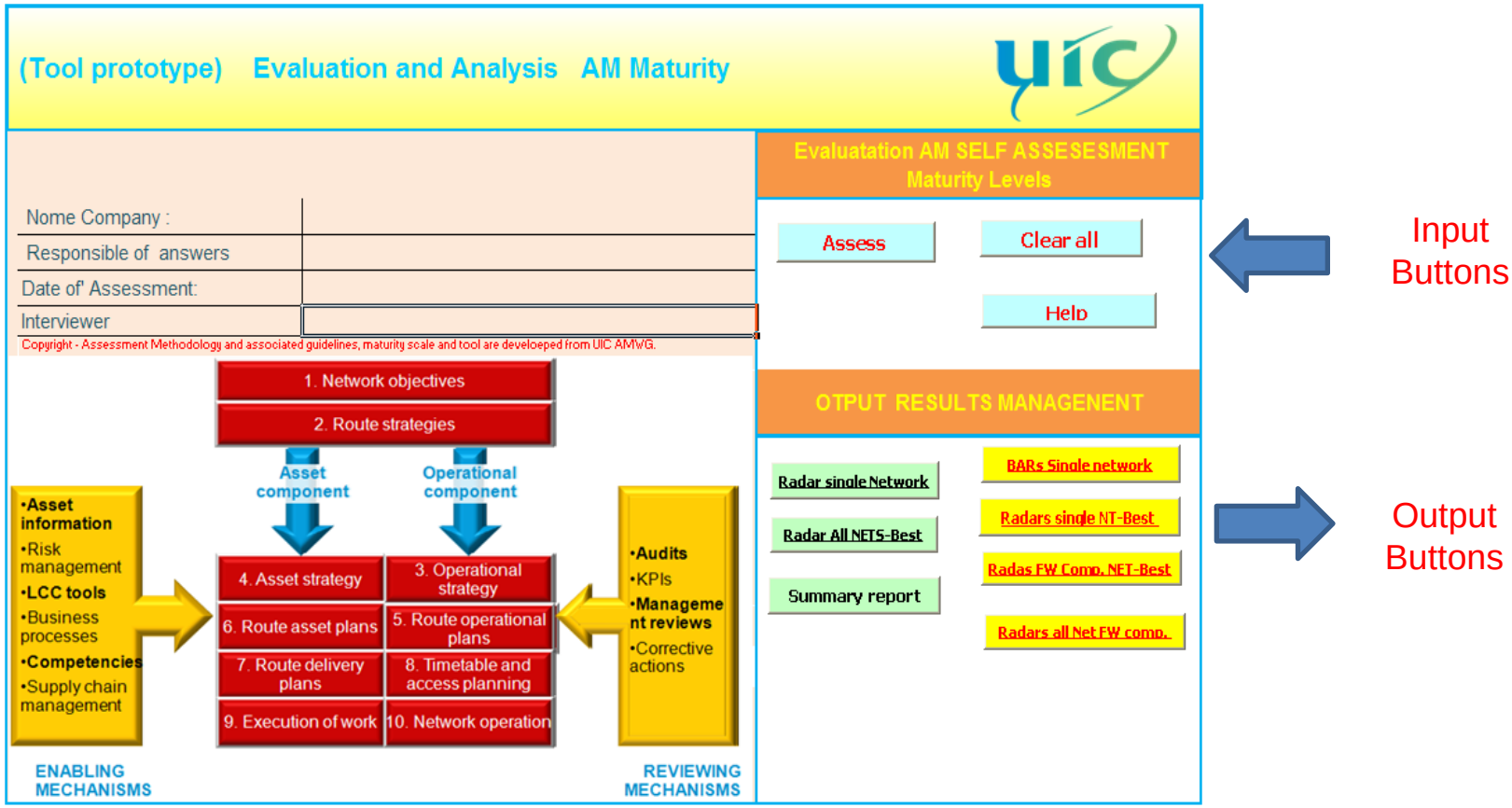
In the Chart a guide to find the right answers are descript the adopted structure for maturity levels.

Proposed structure and definition for maturity levels

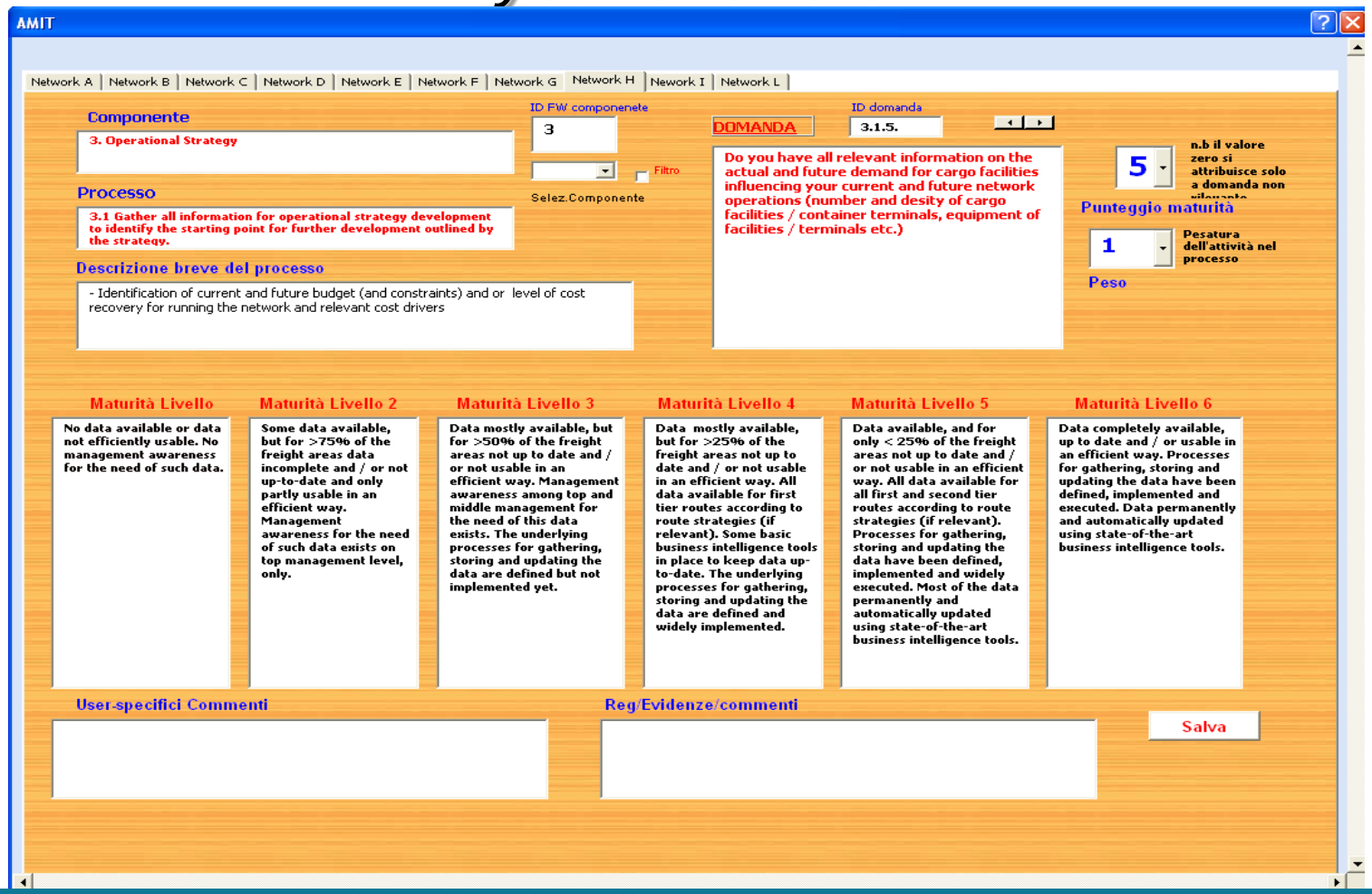
	1 Immature / Unpredictable	2 Basic	3 Defined	4 Partly managed	5 Fully managed	6 Sustainable
Awareness for process definition	No	Top management only	Top & middle management only	Management and parts of organisation	Management and whole organisation	Management and whole organisation
Process definition	None	Some	Defined, not implemented	Defined, imple-mentation close to completion	Defined and implemented	Defined, implemented and continuously adapted
Process guidance	None	Limited	Management orders, no tracking	Widely managed for most parts of organisation	Fully managed for whole organisation	Fully managed for whole organisation, incl. continuous improvements
Target setting & monitoring	No targets set	Some targets set isolated from process design	Most targets set, but not monitored	All targets set but not monitored	All targets set and monitored	All targets set, monitored and used for improvement
Definition of roles and fields of responsibility	Not defined	Only the scope of some fields defined, roles not clear	The scope of most fields defined, most roles not clear	The scope of all fields defined, little clarity about roles	The scope of all fields defined , roles clearly defined, work not in all cases executed	The scope of all fields defined, roles are clearly defined, work executed
Process-relevant competences & know-how	Non-existent and/or not monitored	Existent but not monitored. Level unknown	Level mediocre, only selectively monitored	Level advanced and widely monitored	Level high and systematically monitored	Level outstanding, systematically monitored and further developed
Quantitative scoring	0%	0% - <25%	25% - <50%	50% - <75%	75% - <100%	100%

The Excel Tool

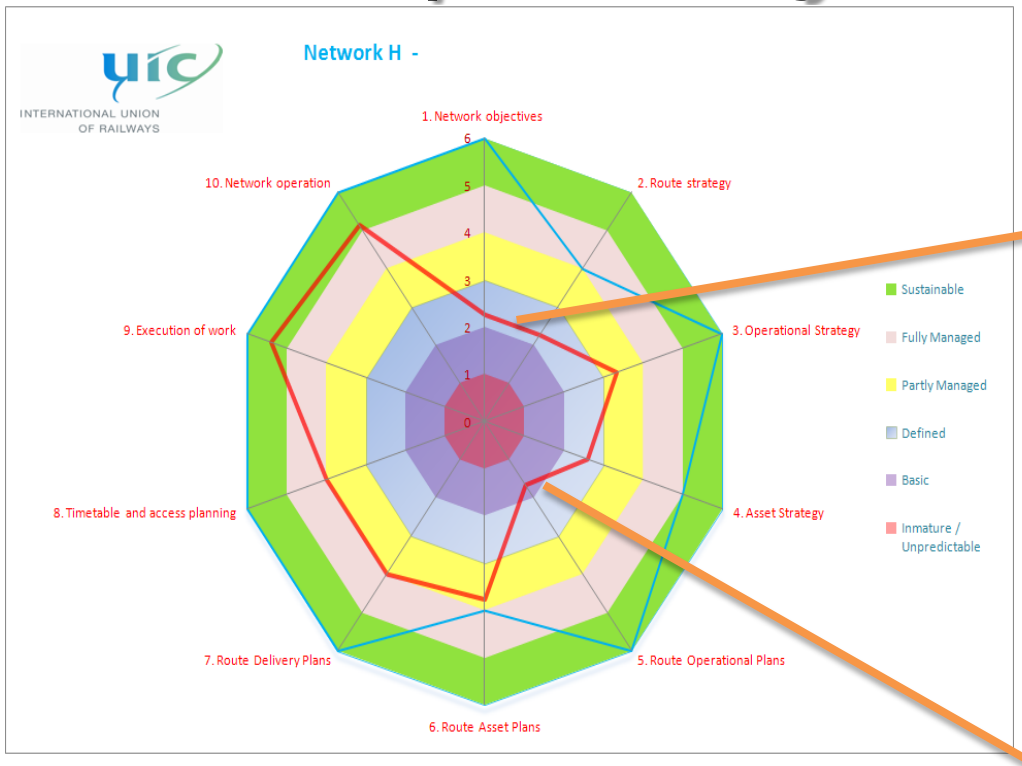
A form to manage input and output data

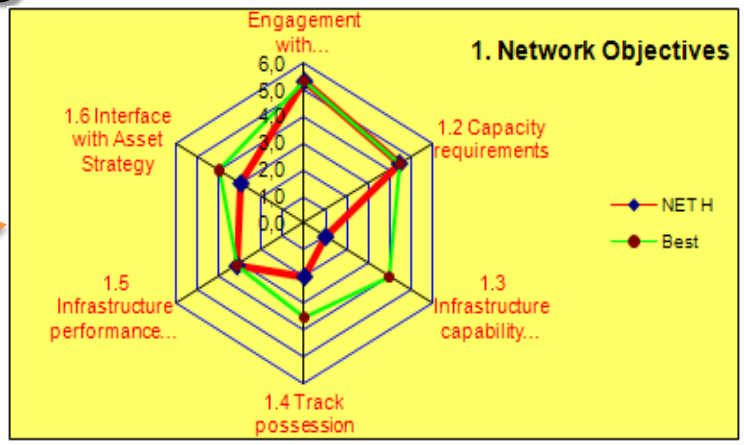


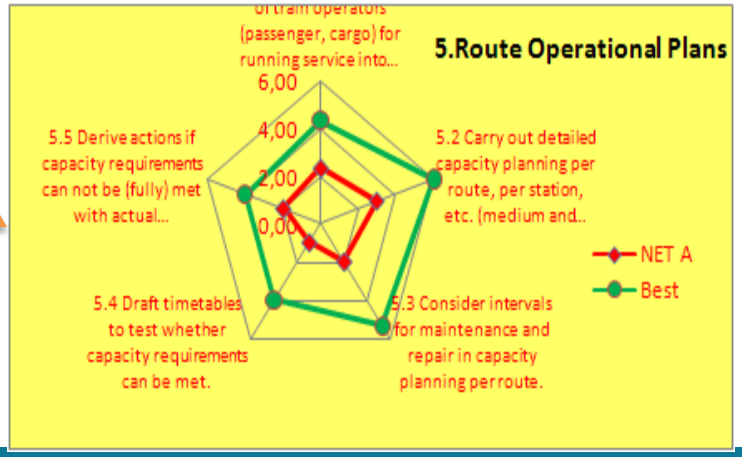
A form multipage for read the questionnaire and evaluate your answers



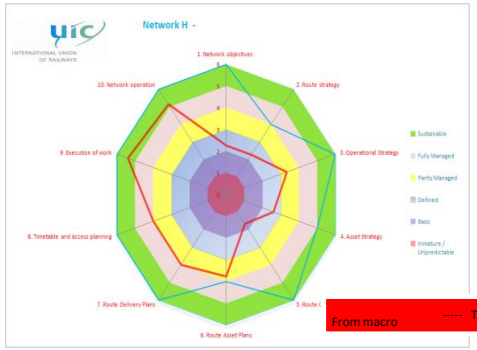
Output analysis eg. Network H



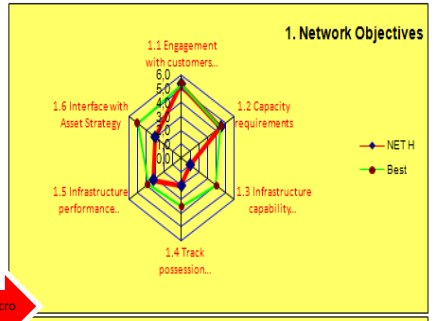


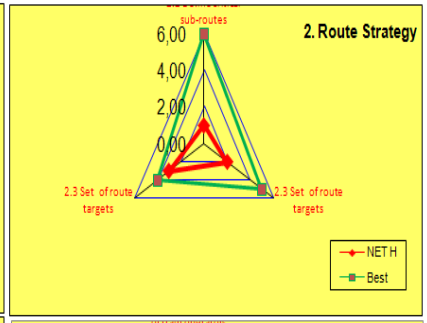


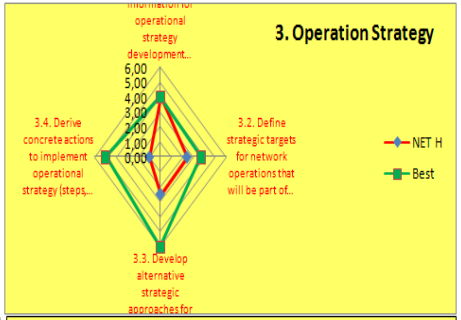
Network H "analysis from macro to micro"

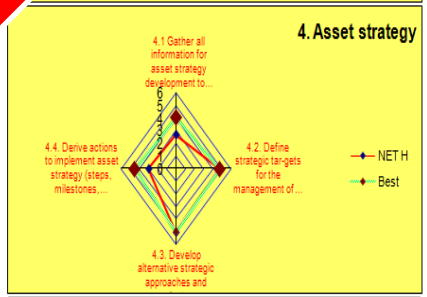


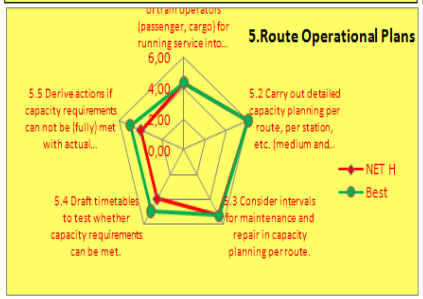
From macro ----- TO micro

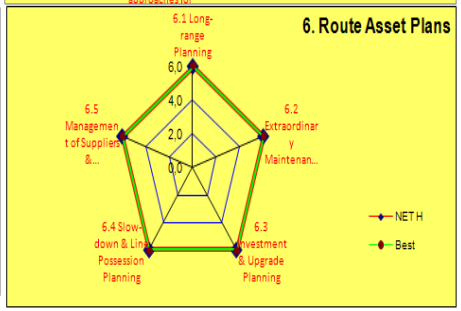


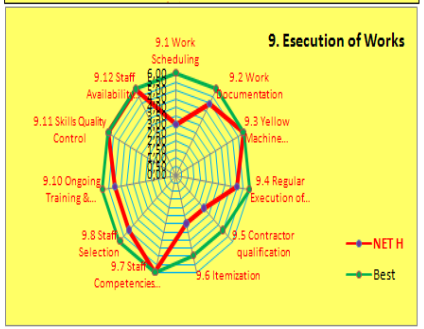


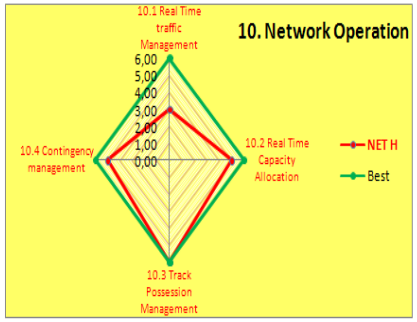












NET H

ASSESMENT PAG.

Output for macro benchmark