AM4INFRA

deliverable report

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H2020-MG-2015-713793— COMMON FRAMEWORK FOR A EUROPEAN LIFE CYCLE BASED ASSET MANAGEMENT APPROACH FOR TRANSPORT INFRASTRUCTURE NETWORKS

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Project partners:

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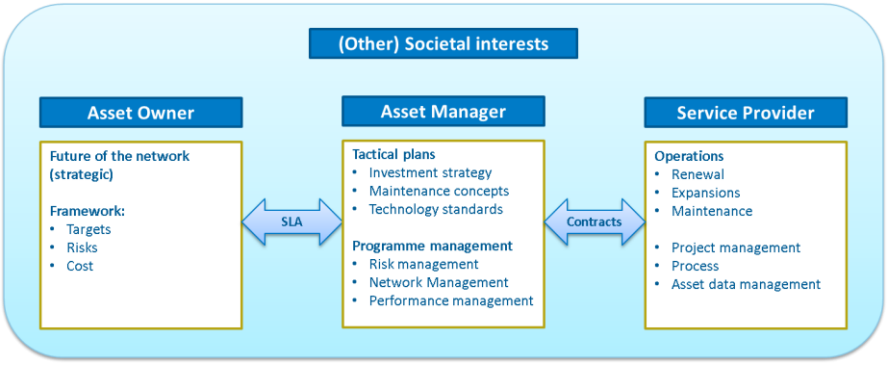
2 - HE – HIGHWAYS ENGLAND COMPANY LTD – UK
3 - ANAS – ANAS SPA – IT
4 - FEHRL – FORUM DES LABORATOIRES NATIONAUX EUROPEENS DE RECHERCHE ROUTIERE – FR
5 - TII – NATIONAL ROADS AUTHORITY – IE
6 - UNR – UNIRESEARCH BV – NL
7 - CERTH – ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS- GR
8 - WI – WUPPERTAL INSTITUT FUR KLIMA, UMWELT, ENERGIE GMBH - DE

Publishable Executive Summary

This document presents the results of the assessment of the replication potential of the AM4INFRA results with key transport infrastructure managers and operators. In their particular role, the infrastructure/asset managers and operators support both the asset owners (through the agreed service levels and performance indicators) and the service providers (through works contracts).



The work and results of the AM4INFRA project has built a common approach for asset management on transport infrastructure networks from the standing practices of five national road authorities that are members of the Conference of European Directors of Road (CEDR). The approach consists of a framework providing:

- ***A common language**:* To learn and grow as European network agencies we need a shared understanding of how we manage networks on the basis of the commonalities in our approaches. This is provided through a common line-of-sight from policy goals of the asset owner to service levels of the asset manager, and operational instructions for the service provider ("from Minister to Market"). This concept provides the '**grammar'** for our common language. and was delivered through D1.1 and D1.2

- ***Supporting tools:*** On a more fundamental level support tools facilitate insights on which decision making takes place. These support tools underpin the whole-life-cost and risk-based reasoning in optimizing the use of our resources. These are the **'words'** for our common language and was developed in D2.1 and 2.2 and D2.3

- ***Sharing data and information**:* Data and information provide the essential foundation to the efficient and effective management of networks Interpretation and understanding of this data and information however t requires structuring and a dictionary for such data, as well as a generic blueprints and business cases. This provides the **alphabet** for our common language. D3.1, 3.2 and 3.3

- ***Learning from each other's strengths:*** On the basis of our common language, (inter as well as intra organizational) learning and growing can take place. The asset management maturity assessments identified key areas to steepen the learning curve.

- ***Learning-by-doing:*** By using our common language, and applying this in a real life context, with a specific focus on the key areas to steepen the learning curve, direct progress can be made. This is demonstrated and verified in the living labs as performed. D1.3

The common approach has been built from the consideration that transport infrastructure networks are highly interconnected, and hence the approach should enable comparison across the modes. The interconnectedness of the infrastructure networks is also reflected by the trend towards building multimodal national infrastructure agencies and authorities e.g. that of the Netherlands, Italy, Sweden, Denmark and Finland.

The project has taken great care to engage with stakeholders through an open dialogue in order to foster a learning environment in which stakeholders would feel fully involved in the building, demonstration and verification of the common approach for asset management. Over its runtime, the project had following key stakeholder events:

- **Open stakeholder setting**
  - ***First stakeholder event in Utrecht (NL), October 2017***. On the first series of deliverables in which the design of the common approach was described (D1.1, D2.1, D3.1).
  - ***Final project event at TRA 2018 in Vienna (AT), April 2017***. On the common approach for asset management, the maturity assessment and on the living labs.
  - ***Webinars from February 2018 until May 2018.***following the living labs and final event. The webinars were initiated in order to maximise the outreach towards the community of infrastructure managers, industry and research.

- **Selected stakeholder setting**
  - ***Living lab launching events: January 2018 (Rome), February 2018 (Antwerp), and March 2018 (Windsor)***. These events were with stakeholders that were directly involved in the local geographical setting of the living labs in Rome, Eindhoven and London.
  - ***Maturity assessment of five national infrastructure agencies***. These were concerned with four of the five national agencies involved in the project and one national manager involved with the project through a living lab from January 2018 until April 2018.
  - ***CEDR EB engagement in June 2017, March 2018 and June 2018***. Presenting and discussing the AM4INFRA results and proposed legacy (in CEDR context).

As a result of these consultations, the AM4INFRA project has delivered a validated common approach for asset management on infrastructure networks. Although it has been built, demonstrated and verified for national road networks in particular, its applicability in essence extends to the supporting regional and municipal networks as well as towards the other modes (rail, waterways).

- *The replication potential for the **road network** is high*. The development of the common approach has been focused on asset management on roads as all of the five national agencies involved manage national road networks. The key driver for replication is the agreement obtained in June 2018 from CEDR's executive board (EB) with the Technical Report on the AM4INFRA results, and with the proposal to launch a CEDR working group on network governance on basis of this Technical Report.
- *The replication potential for the **rail network** is moderate.* None of the five agencies involved in the project are responsible for managing heavy rail networks. Hence, the common approach was not demonstrated and verified on the rail network. However, the concept of the Line of Sight from owner to manager to provider is common to all infrastructure networks. Also, many of the suite of methods and models for whole lifecycle costing and risk management are applicable to rail. Furthermore, from their liaisons with rail infrastructure managers (e.g. RFI, LUAS, Network Rail, and ProRail) the AM4INFRA team managed to include various rail infrastructure related items in the common approach for information and data management (Asset Data Dictionary).
- *The replication potential for the **inland navigation network** is low.* From the onset of the project the focus was primarily on roads and secondarily on rail, as these two networks are more extensive across the European continent than the inland navigation network. Therefore, the many specific structures and activities this network holds, such as locks, aqueducts and dredging have not been considered in the project. However, the concept of the Line of Sight from owner to manager to provider is common to all infrastructure networks.

Living Laboratories

The project has launched three living laboratories in which the key results from the project were demonstrated and verified with selected municipal and regional stakeholders in real practice, geographical settings on the TEN-T network.

The living labs showed that this "learning by doing" approach should be an instrument in replicating the common framework across the transport infrastructure networks across Europe.

The three living laboratories in the project will be sustained as learning environments under the project legacy (CEDR Working Group on Network Governance).

The use of living labs as a learning environment proved to be a valuable, energetic work format as it linked concepts to context specific problems and challenges. The set-up proved to enable inter organizational dialogue and subsequent learning.

One common denominator was that it all starts with getting acquainted with one another, with colleagues at the neighbouring network agency, and finding common ground to make further steps. In this way the living labs provided fruitful ground in making these first steps. The living labs provided stakeholders the opportunity to understand each other's needs and paradigms and get acquainted with their counterparts in neighbouring agencies.

Assessment of organisational maturity

Assessing the organisational maturity provides helpful guidance in learning from each other's strength and practices. In particular when assessments show significant differences on a specific aspect, one would expect benefits from entering into a mutual learning dialogue and hence the potential for replication is strong.

The quick scan method applied in the AM4INFRA project –following the method recommended by former CEDR TG N2- proved itself to be efficient and easy to use. The procedure was a self-assessment followed by a teleconference with the coordinators/consultants in order to verify/validate the results from the self-assessment. Repeating this exercise periodically would help to mark developments in maturity at little cost.

From the maturity assessment performed on the five participating infrastructure managers, it appears that all have at least one best-practise for the others to learn from (although experience shows that many other points of learning are likely to arise during the dialogue when touching on the specific topics):

- **TII:** LCC thinking
- **ANAS:** Connect and join IT systems to useful data for users
- **RWS:** Funding and performance based contracting
- **AWV:** Stakeholder surveys and engagement
- **SIA/ZAG**: Line of sight from Strategy to Directives and Operational plan.

The five organisations participating in the maturity assessment, showed comparable scores. This could imply they are facing the same opportunities and barriers in implementing Asset Management systems in their organisations.

Building the AM4INFRA legacy

The AM4INFRA legacy has been established through the agreement of CEDR with a Technical Report[1] on the project results as a basis to launch a formal CEDR working Group on Network Governance in 2019. In particular, this working group will enable replication across the TEN-T and the relevant municipal and regional networks through the development of a knowledge portal in support of CEDR's members in their (voluntary) efforts to implement asset management systems in their network management. The portal would be centred around an evolving Community of Experts, and providing access to a repository of relevant documents for reference (e.g. guidelines, case examples).

Deployment of the working group activities and deliverables will be guided by senior experts from participating infrastructure managers under oversight and governance from CEDR's EB and GB boards. In particular this includes building learning abilities concerning the (evolving) common approach for asset management through appropriate activities, such as additional living laboratories, communities of expertise, and maturity assessments. This trajectory will bring a dual benefit to the organisations involved:

[1] Technical report 2018-02 Common framework for a European Life cycle based Asset management approach for Transport Infrastructure networks: Final report of AM4INFRA project – To be released in August 2018.

- **"horizontal**" benefit: It would enable organisations to establish a cooperative dialogue on Asset Management from common groundings and methodologies
- "**vertical"** benefit: it would reinforce the capability of involved organisations to compare its (progress in) implementation of a comprehensive Asset Management and Life Cycle Cost approach to a reliable benchmark.

Other infrastructure managers and stakeholders will gradually be involved in these activities. They include the supporting regional and municipal (road) networks, the other modes (rail, waterways, ports), and the grids for data and energy (supporting the implementation of CAD and the greening of transport fuel pool).

In the short term the legacy will focus on implementing the common approach across sections of the TEN-T with an EU-regional transport functionality. The effort is aimed at identifying the key strategic issues for such sections:

- appropriate current and future key performance indicators with a focus on the potential 'performance killers'. These include renewal and rejuvenation in response to the ageing of infrastructures, upgrading of network capabilities in order to accommodate future trends such as Connected Automated Driving (CAD), climate resilience or sustainability outcomes, etc.
- current and future 'cost elephants' with an focus to the opportunities for responding through collaborative investment and innovation.
- (emerging) common risks and opportunities for mitigation measures.

Contents

1. Purpose of the document

This document is an update of the previously released deliverable under the same title (M6) that described the plan to assess the replication potential for the common framework with relevant stakeholders across the modes. In this plan, it was stated that the primary focus would be on road asset managers that are member of the Conference of European Directors of Roads (CEDR). The secondary focus would be on the national rail agencies of the Netherlands, the United Kingdom and Italy.

1.1 DOCUMENT STRUCTURE

Chapter 2 presents the demarcation and methodology followed.

Chapter 3 presents the results

More detail is provided in the Annexes for the maturity assessment (spider diagrams) and the living labs (photo impressions).

1.2 DEVIATIONS FROM ORIGINAL DESCRIPTION IN THE GRANT AGREEMENT ANNEX 1 PART A

1.2.1 DESCRIPTION OF WORK RELATED TO DELIVERABLE IN GRANT AGREEMENT ANNEX 1 – PART A

For each stakeholder, an initial Replication Assessment (D4.5) will be prepared. This will present:

- An initial assessment of the potential for replication of some or all of the common framework solutions
- Existing experiences with asset management and LCC and assessment of the replicability of the approaches planned within the AM4INFRA project (linked to WP1,2 and 3)
- The local state of play regarding asset management
- Existing targets/goals, and plans, financing opportunities, as well as key policy and legislation frameworks affecting asset management solutions
- Key questions/issues which the common framework should help to answer

The Replication Assessment will be prepared by Month 6. Support will be provided by TII, HE and ANAS to all stakeholders in the development of their replication assessments.

1.2.2 TIME DEVIATIONS FROM ORIGINAL PLANNING IN GRANT AGREEMENT ANNEX 1-PART A

The description of work (DoA) in Annex 1 –Part A indicates that the replication assessment should be prepared in Month6, i.e. at the same time that the three deliverables establishing the conceptual model of the framework were due (deliverables D1.1, D2.1, and D3.1), and prior to the guidelines for application of this conceptual model. This planning constituted an aberration in the project proposal as it would precede any significant result and demonstration/verification activity from the project.

Therefore and in agreement with the EC project officer, Mr. Sergio Escriba, it was decided to have the first issue of this deliverable present the PLAN to assess the replication potential based on an initial assessment. Once the project would be in its concluding stage, this deliverable would be subsequently updated with the outcomes of the replication assessment.

1.2.3 CONTENT DEVIATIONS FROM ORIGINAL PLAN IN GRANT AGREEMENT ANNEX 1 – PART A.

No deviations on content have occurred.

2. Demarcation and methodology

2.1 THE NATIONAL TRANSPORT INFRASTRUCTURE MANAGERS IN EUROPE ARE PIVIOTAL TO REPLICATION

The group of stakeholders involved with transport infrastructure management and operation consists of thousands of bodies across the subsidiary levels.. Owing to the volume of potential stakeholders the AM4INFRA project focused on a group of national transport infrastructure managers. The following considerations are of note :

- The AM4INFRA project builds a common asset management framework from the standing practices of five national road infrastructure agencies that are member of the Conference of European Directors of Road (CEDR). They, as well as their peers from the CEDR community, are responsible for management and operation of virtually the entire TEN-T road network and significant parts of the rail and inland navigation infrastructure networks. This provides a trans-European setting for this replication assessment across the TEN-T comprehensive network.

- In the wider extents, CEDR and its members also provide a strong central link to regional and municipal infrastructure asset owners/managers. This reinforces the replication potential as in practice, the national asset managers set the guiding example for their subsidiary levels. Hence, assessing the replication potential in the group of national asset managers would provide a good proxy for the replication potential within a country.

- The national infrastructure network managers are well organized in the European arena, such as through the Conference of European Directors of Roads (CEDR) in which almost all national road network managers in Europe are represented. In addition, an increasing number of their members are multimodal infrastructure managers or have close working relations with their sister network managers from rail and inland navigation. Furthermore, CEDR holds an MoU with the association of European Rail Infrastructure Managers (EIM), which in combination with CEDR's multimodal members extends the project's outreach across significant sections of the European rail infrastructure network.

2.2 FOSTERING AN ENVIRONMENT FOR LEARNING FROM EACH OTHER

2.2.1 STAKEHOLDER ENGAGEMENT

The project has taken great care to engage with stakeholders through an open dialogue in order to foster a learning environment in which stakeholders would feel fully involved in the building, demonstration and verification of the common approach for asset management. Over its runtime, the project had following key stakeholder events:

- **Open stakeholder setting**
  - ***First stakeholder event in Utrecht (NL), October 2017***. On the first series of deliverables in which the design of the common approach was described (D1.1, D2.1, D3.1).
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→ **Selected stakeholder setting**

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- ***Maturity assessment of five national infrastructure agencies***. These were concerned with four of the five national agencies involved in the project and one national manager involved with the project through a living lab from January 2018 until April 2018.
- ***CEDR EB engagement in June 2017, March 2018 and June 2018***. Presenting and discussing the AM4INFRA results and proposed legacy (in CEDR context).

2.2.2 LIVING LABORATORIES

In considering the replication potential of the project is was concluded that this could be best served by providing 'hands on' experience to other infrastructure managers by demonstrating and verifying the common approach on appealing real practice situations. This was achieved through three living labs demonstrating the three elements of the common asset management approach on representative sections of the TEN-T network.

The living labs were designed to cover three major themes of the project, namely cross-asset, cross-network, cross-border optimization in terms of performance, risk and cost. These three themes correspond with the three work packages, where Work Package 1 covers cross border issues, Work Package 2 the cross network issues in terms of life cycle management and risk based approaches, and Work Package 3 the cross asset issues. In practical terms the responsible institutions for each of the work packages managed the set-up and organization of the respective Labs:

Living Lab	Focus	Cross Asset	Cross Mode	Cross Border
E34 (Antwerp-Venlo)	WP 1	**No**	**Yes** (road, rail, waterway)	**Yes** (Belgium/Flanders-Netherlands
M4-M25 (London-Heathrow)	WP 2	**Yes**	**Yes** (Road-Metropolitan)	**Yes** (public-private; national-metropolitan)
A90 (Rome Ring way)	WP 3	**Yes**	**No**	**Yes** (public-private; national-metropolitan)

The Rome and Eindhoven living labs were both held as one-day events. The London living lab was a two day event. The London living lab was scheduled back-to-back with the Executive Board of the CEDR which allowed many executives to join this living lab. As this was the third living lab in the series, it also provided the opportunity to share the results of the previous labs (Rome and Eindhoven) with the board members of CEDR and other participants.

By participating in the respective living labs, the respective national, regional and local stakeholders were enabled via open dialogue to verify the applicability of the common framework on their network management. Deliverable D1.3 presents the three living labs in more detail. In total approximately 100 participants joined the living labs, representing over 20 infrastructure agencies or affiliate organizations.

2.2.3 ASSESSING ORGANISATIONAL MATURITY

A key aspect of the project is the replication potential for the common approach. The AM4INFRA team considered that assessment of such potential would be underpinned by an organizational maturity assessment, in particular when the assessment outcomes are perceived as relative to that of other organisations and hence were for guiding a process of inter-organisational learning.

Maturity measurements can support organisations in identifying their strengths and weaknesses in relation to their intended goals. This enables organisations not only to find out what to do but also how to operate their primary processes efficiently. It can support organisations to link their strategic processes with processes on a tactical and operational level, and therefore connects the asset owner (e.g. the national government), with the asset manager (e.g. the national highway agency), the service providers (e.g. a contractor or professional service firms) and the asset users (e.g. the car owner).

	Maturity Level	Description	*Equivalence to IAM*
1	Initial / Entry	The agency either has not recognised the need for this requirement or if it has recognised it, there is no evidence of intent to progress it.	*Levels 0 & 1*
2	Basic / Marginal	The agency has identified the way to achieve the requirements and can demonstrate some progress in achieving them. Procedures however may not be clearly set out or repeatable.	*Level 2*
3	Competent / Proficient	No formal ISO system applied but the agency can demonstrate that it achieves relevant requirements set out in ISO55001 in a systematic and consistent way.	*Level 3*
4	Excellent / Optimized	The agency has deployed and can demonstrate that it achieves all requirements set out in ISO55001, exceeds some of them and that is systematically looking for optimizations in its Asset Management practice, maximizing value from the management of its assets.	*Level 4 & 5*

Based on the previous work developed by the Institute of Asset Management and the Global Forum on Maintenance & Asset Management (GFMAM), the CEDR N2 Task Group developed a maturity scale and established four generic maturity levels as described in the Figure.

The maturity tool is made up of five themes which combined cover the majority (but not whole) spectrum of asset management. These five themes are:

- Asset Knowledge and Information
- Strategy & Planning
- People and Organisation
- Stakeholders
- Risk Management

For a more detailed description of the sources used and the road towards the CEDR maturity matrix please consult the Asset Management TG Final Report 2017[2].

The procedure was a quick self-assessment followed by a teleconference with the coordinators/consultants in order to verify/validate the results from the self-assessment. Repeating this exercise periodically would help to mark developments in maturity at little cost.

The final result of this maturity assessment exercise is given in Annex I.

[2] See also CEDR: http://www.cedr.eu/download/Publications/2017/CEDR_TR2017-06-Asset-Management.pdf

3. Conclusions

The project has developed a common approach for Asset Management on transport infrastructure through a series of deliverables. The approach builds from a Line of Sight framework, "from Minister to Market", that distinguishes between the asset owner, the asset manager, and the service provider. This framework was underpinned by tools such as whole life costing, risk based approaches, data dictionary and business blueprint for understanding and applying the data for management of the networks.

The project also succeeded in establishing its legacy with the CEDR context. This was achieved through a series of open and invited stakeholder events such as living labs and webinars. This has resulted in CEDR's agreement with the results (through a Technical Report) and the proposal to launch a CEDR working group on network governance.

As a result of these stakeholder consultations, the AM4INFRA project has delivered a validated common approach for asset management on infrastructure networks. Although it has been built, demonstrated and verified for national road networks in particular, its applicability in essence extends to the supporting regional and municipal networks as well as towards the other modes (rail, waterways).

- *The replication potential for the road network is high.* The development of the common approach has been focused on asset management on roads as all of the five national agencies involved manage national road networks. The key driver for replication is the agreement obtained in June 2018 from CEDR's executive board (EB) with the Technical Report on the AM4INFRA results, and with the proposal to launch a CEDR working group on network governance on basis of this Technical Report.
- *The replication potential for the rail network is moderate*. None of the five agencies involved in the project are responsible for managing heavy rail networks. Hence, the common approach was not demonstrated and verified on the rail network. However, the concept of the Line of Sight from owner to manager to provider is common to all infrastructure networks. Also, many of the suite of methods and models for whole lifecycle costing and risk management are applicable to rail. Furthermore, from their liaisons with rail infrastructure managers (e.g. RFI, LUAS, Network Rail, and ProRail) the AM4INFRA team managed to include various rail infrastructure related items in the common approach for information and data management (Asset Data Dictionary).
- *The replication potential for the inland navigation network is low*. From the onset of the project the focus was primarily on roads and secondarily on rail, as these two networks are more extensive across the European continent than the inland navigation network. Therefore, the many specific structures and activities this network holds, such as locks, aqueducts and dredging have not been considered in the project. However, the concept of the Line of Sight from owner to manager to provider is common to all infrastructure networks.

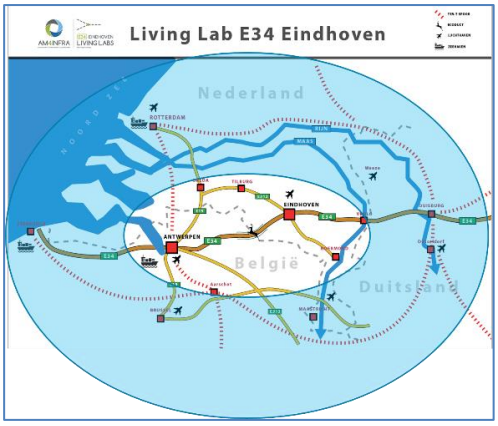
3.1 STAKEHOLDER ENGAGEMENT

The project has taken great care to engage with stakeholders through an open dialogue in order to foster a learning environment in which stakeholders would feel fully involved in the building, demonstration and verification of the common approach for asset management.

Over its runtime, the project had organised a number of Open stakeholder setting events - First stakeholder event, Final project event and a series of Webinars following the living labs and final event. Additionally, also Selected stakeholder setting events were held - Living lab launching events, Maturity assessment of four of the five national agencies involved in the project and one national manager involved with the project through a living lab, and CEDR EB engagement.

Following these engagements, the CEDR EB has agreed on the CEDR Technical report in June 2018. In addition, The CEDR agreed on the proposal to launch a formal working group on network governance, for which the mentioned technical report is the foundation.

3.2 LIVING LABORATORIES



The common asset management approach has been demonstrated and verified in three living labs on appealing sections of the TEN-T: E34 (Antwerp-Venlo) on the results from WP1 (stakeholder objectives/LoS); M4-M25 (London-Heathrow) on the results from WP2 (whole life cycle and risk based methods and models); A90 (Rome Ring way) on the results from WP 3 (data and information management).

In total around 100 participants joined the three living labs, representing over 20 infrastructure agencies or affiliate organizations.

The use of living labs proved to be an inspiring work format as it linked abstract concepts to context specific problems and challenges. As the format involved lively dialogues, the results did at the time cover a wider array of topics than initially conceived. In general however, valuable feedback was gained from the interaction with and between participants. The Living Labs provided stakeholders the opportunity to understand each other's needs and paradigms and getting acquainted with their counterparts in neighbouring agencies.

Overall the application of living labs provided a mechanism for strengthening the cooperation between infrastructure agencies and building a converging growing path. They provided inspiration, stimulated mutual learning and paved the way to a common language.

3.2.1 LIVING LAB ROME – A90

The first of three AM4INFRA Living Lab was held on 31st January 2018 at the Sala Situazioni Nazionale, ANAS Headquarters in Rome, Italy. This Living Lab was concentrated on a 70 km stretch of the Rome Ringway A90.

The main scope was to:

- Demonstration and validation of the applicability and practicality of the asset data management approach;
- Recommendations for further improvement of asset data dictionary and Business Blueprint;
- Dissemination and outreach of the AM4Infra initiative.

3.2.2 LIVING LAB – EINDHOVEN E34.

The second of three Living Lab events was held on 21st February in Antwerp, Belgium. The focal point of the Eindhoven Living Lab was cross-border optimisation. This motorway is a major artery connecting Antwerp and wider Flanders with the Netherlands and Germany further to the west.

The main scope was to demonstrate and verify the applicability and practicality of the guidelines and establish if any further improvements are needed.

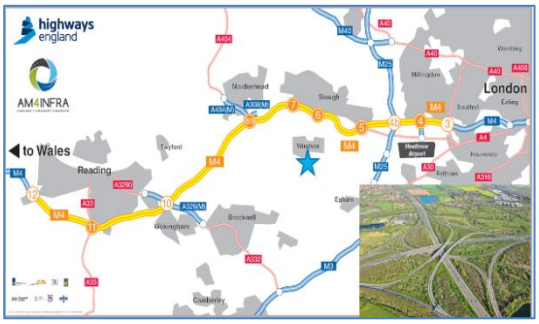
3.2.3 LIVING LAB – LONDON M4-M25.

The third London Living Lab took place in Old Windsor, close to London's Heathrow airport on 8-9th March 2018. This living lab was concentrated on the M4 (London - Wales) motorway - the main strategic route between London, the west of England and Wales.

The main scope was to verify and demonstrate the common framework of the life cycle and risk-based management element.

3.2.4 CONCLUSIONS FROM THE THREE LIVING LABS:

- The living labs proved to offer a good hands-on opportunity for the parties involved to get acquainted with each on a deeper relational level. From this position the parties will be more open to discuss detailed topics and to learning from each other, and eventually determine a shortlist of priorities (or even a joint mapping of issues and opportunities) and required participants for follow-up sessions of the Living Labs.
    - Attention should be paid to institutional asymmetry (mandate, responsibility, work culture etc). This is interrelated with language and semantics (meaning and terminology).
- Building awareness and understanding of higher level management level/strategic systems is important as these have a profound influence on the effectiveness of asset management as well i.e. it is not just about bringing together the operational and tactical levels in a living lab setting.



- Cross-border issues easily propagate deep into (the other's) national networks. Follow-up actions on the E34 for cross-border alignment are:: Planning of renovation works; future functionality of the trajectory, and lorry parking facilities.
- From the LL M4-M25 the take-away has been that the is understanding of the practical links between the six building blocks (data, systems/tools, organisations and WLC and manging risk)
- From the A90 LL, some 2-3 specific suggestions were captured related to the ontology map that has been included in the final report:
    - **Ontology Map:** "Risk" concept to be connected to Maintenance Works and LoS, introducing a double view for risk (asset-oriented and road user-oriented).
    - **Asset Data Dictionary:** new datasets to be introduced in the asset inventory data group, considering elements related to telecommunication and ITS systems installed on the network.
- The road itinerary based on a common AM-LCC approach:
    - The agreement on the corridor and criteria of the case study.
    - A first identification of constraints/threats with respect to the common approach.

3.3 ASSESSING ORGANISATIONAL MATURITY

Following the recommendations of former CEDR TG N2 on Asset Management, following authorities participated in the maturity assessment:

- ANAS – Italy
- AWV – Belgium/Flanders
- RWS – The Netherlands
- SIA – Slovenia
- TII – Ireland.

Annex I provides the spider diagrams that resulted for each of the five themes.

The quick scan method applied in the AM4INFRA project –following the method recommended by former CEDR TG N2- has proven itself to be efficient and easy to use.

From the maturity assessment performed on the five participating infrastructure managers, it appears that all have at least one best-practise for the others to learn from (although experience shows that many other points of learning are likely to arise during the dialogue when touching on the specific topics)::

- **TII:** LCC thinking
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- **RWS:** Funding and performance based contracting
- **AWV:** Stakeholder surveys and engagement
- **SIA/ZAG**: Line of sight from Strategy to Directives and Operational plan.

The five organisations participating in the maturity assessment, showed comparable scores. This could imply they are facing the same opportunities and barriers in implementing Asset Management systems in their organisations.

The three living laboratories mentioned will be sustained as learning environments under the project legacy (proposed CEDR Working Group on Network Governance). As implementation of the common framework inevitably will have to support and sustain the specific organisational setting of the infrastructure manager(s) involved it is envisaged that over the years to come, more living labs will be initiated driving a growing number of communities of practice across Europe. By expanding the scale of application of living labs the legacy of AM4INFRA will be leveraged, and more importantly the learning curve to optimize EU networks will be steepened in a broader sense.

Key conclusions are:

- Maturity assessment can support organisations in identifying own strengths and weaknesses.
- Maturity assessment enables organisations to operate their primary processes efficiently, linking them with processes on a tactical and operational level.
- Assessment of potential for the common approach could be underpinned by an organizational maturity assessment, in particular when perceived as a guiding tool of inter-organisational learning.
- The quick scan method applied in the AM4INFRA project proved itself to be efficient and easy to use.
- The five organisations participating in the maturity assessment, showed comparable scores and it appears that all have at least one best-practise for the others to learn from.

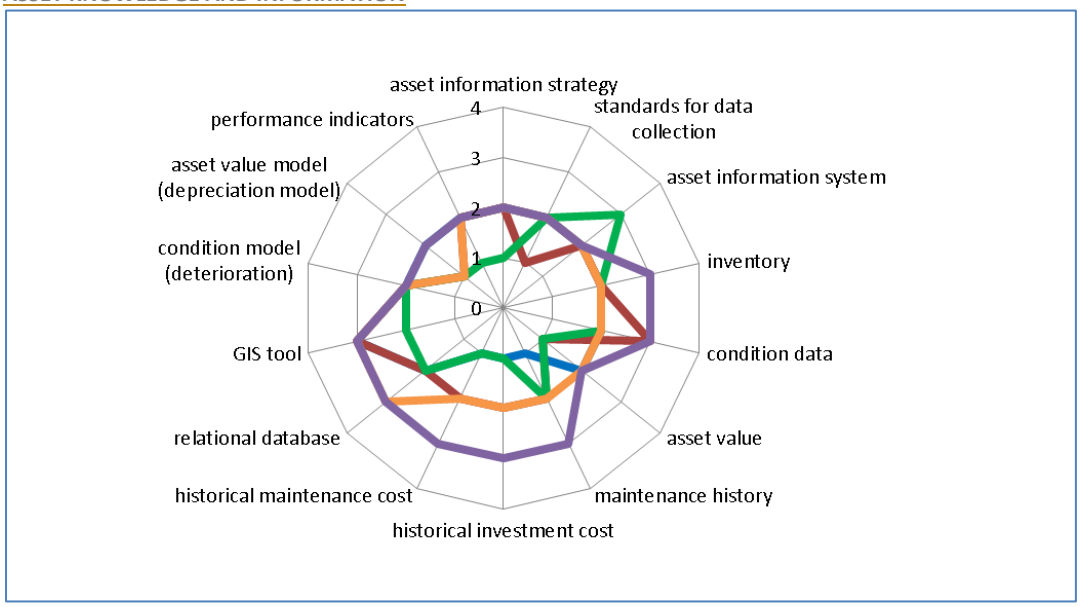
4. Acknowledgement

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 713793.

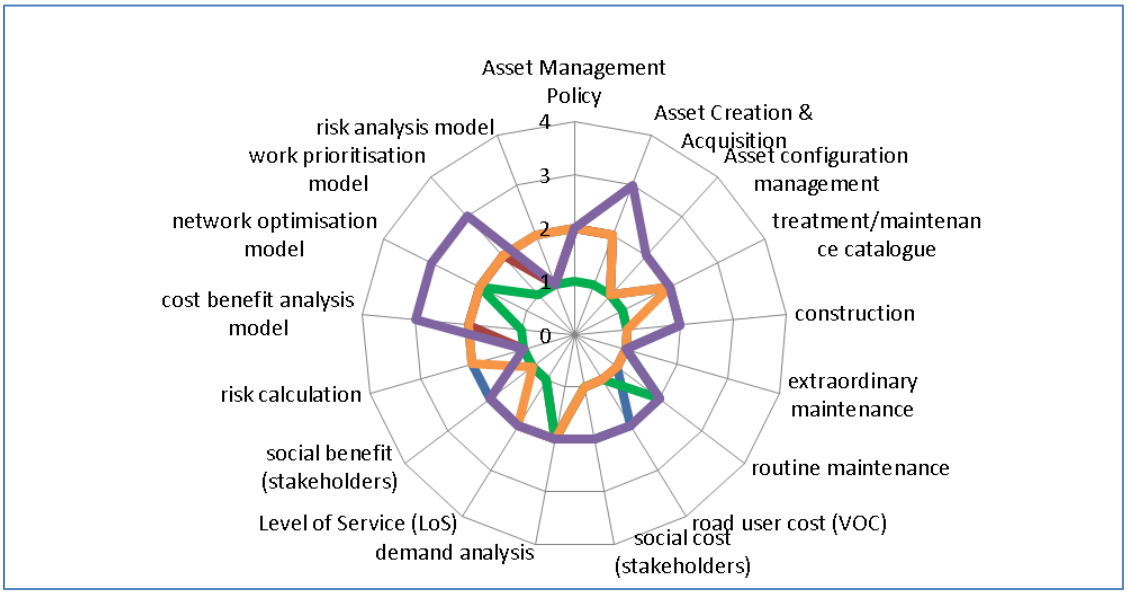
Annex I – Maturity assessment

The following authorities participated in this comparison: ANAS – Italy; AWV – Flanders (Belgium); RWS – The Netherlands; SIA – Slovenia; TII – Ireland.

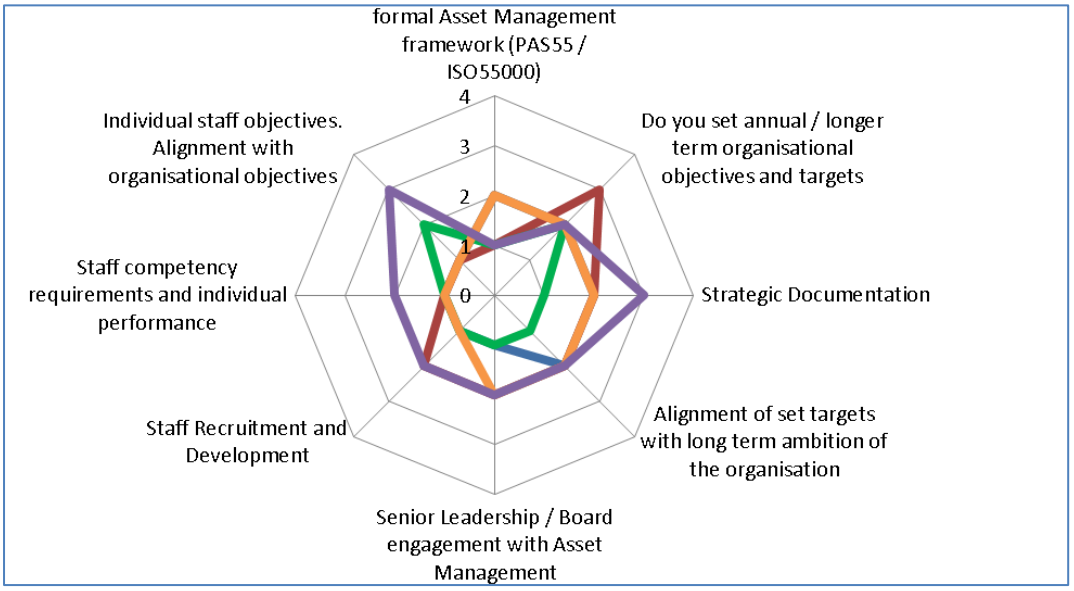
ASSET KNOWLEDGE AND INFORMATION



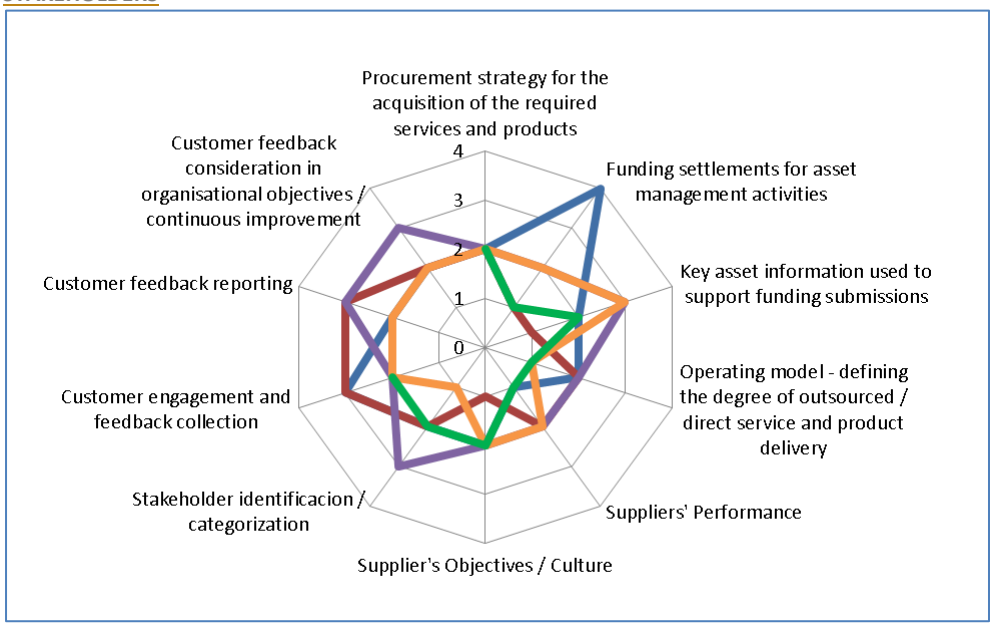
STRATEGY AND PLANNING



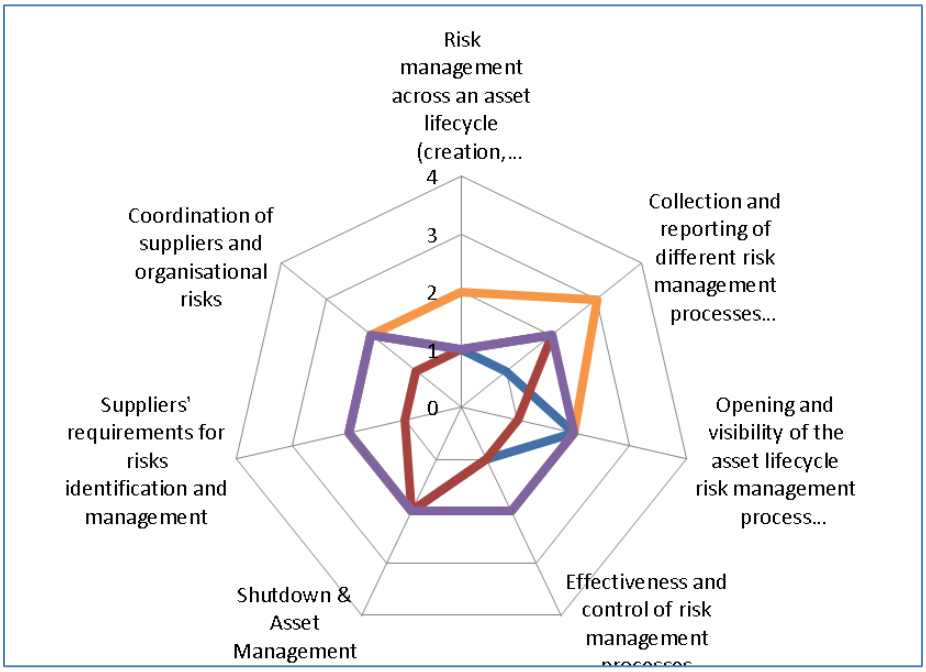
PEOPLE AND ORGANISATION



STAKEHOLDERS



RISK MANAGEMENT



Annex II – Living LABS

PHOTO IMPRESSION LIVING LAB EINDHOVEN


AM4INFRA
E34 EINDHOVEN
LIVING LABS

PHOTO IMPRESSION LIVING LAB LONDON

PHOTO IMPRESSION LIVING LAB ROME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