EUROPEAN UNION AGENCY FOR RAILWAYS

Making the railway system
work better for society.

Full Impact Assessment

European Vehicle Register

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1.1	23/02/2018	Complete Impact Assessment Report (amended following RISC81)

Contents

1. Context and problem definition

1.1. Problem and problem drivers

Problem: The optimal **degree of centralization for the future European Vehicle Register (EVR),** which would best support the provisions of the Interoperability Directive (Article 47(5)) regarding the adoption of the technical and functional specifications for the EVR, **is not sufficiently clear**.

The main **drivers** of this problem include:

- Limited clarity on the content/specification of a **harmonized interface** for the registration of vehicles and data management
- Potential for **administrative burdens and undue costs** for stakeholders without high degree of centralisation
- Existence of **local IT tools** and Member State specific functions
- **System specification could lock the EVR** with respect to the degree of centralisation

1.2. Main assumptions

The adoption of technical and functional specifications for the EVR, following a cost-benefit analysis, is **mandated by the Interoperability Directive** - Article 47(5):

"With a view to reducing administrative burdens and undue costs for Member States and stakeholders, by 16 June 2018, the Commission, taking into account the result of a cost-benefit analysis, shall adopt by means of implementing acts the technical and functional specifications for the European Vehicle Register, which would incorporate the national vehicle registers with a view to providing a harmonised interface to all users for the registration of vehicles and data management".

This Impact Assessment looks therefore to collect evidence on the optimal degree of centralization for EVR and **does not question the need for a European Vehicle Register**, which had been already answered by the Interoperability Directive.

1.3. Stakeholders affected

Category of stakeholder	*Importance of the problem*
NSAs	4
Railway undertaking	4
Railway Infrastructure Manager	3
Railway Manufacturer	3
Railway Entity in Charge of Maintenance (ECM)	4
Railway Vehicle Keeper	4
Railway Vehicle Owner	4
Intergovernmental international organization	4
ERA	4

1.4. Evidence and magnitude of the problem	As a follow up to the RVRR recommendation, the EVR Working Party representatives reported on the problems of the current context for vehicle registers across Europe. A total of 14 WP members provided inputs representing a broad range of perspectives including NSAs and the railway sector. The possible consequences if the technical and functional specifications of EVR are not fully clear may result in **higher administrative burden for stakeholders in terms of cost or time for application/registration** of vehicles, as well possible **duplicative IT related costs**. For all stakeholders unclear technical and functional specifications of EVR could result in important difficulties for the users and **high reputational issues for the Agency**.
1.5. Baseline scenario	The baseline would mean the continuation of the current framework without any change (i.e. applying the specifications in force of NVR). In particular, no change would be foreseen with respect to number of countries using sNVR and custom NVR for accessing ECVVR (currently the split between sNVR and custom NVR is 58 % and 42%). This baseline would mean among other aspects: › Different ways (interface, language, etc.) across Member States for the submission of applications › Suboptimal data quality › Suboptimal system/data availability (no defined SLA, instability of links/repositories) › Limited use of reference data › Difficult maintenance (many decentralised tools), heterogeneous IT environments, many entities in charge) It should also be underlined that the Baseline would be breaching the Interoperability Directive (Article 47).
1.6. Subsidiarity and proportionality	As such there is a specific article included in the Interoperability Directive (Article 47 of Directive (EU) 2016/797) requiring the Commission to adopt by means of implementing acts the technical and functional specifications for a European Vehicle Register thereby addressing the issue of **subsidiarity**. Moreover, in terms of costs, since the ongoing efforts of operating and maintaining the respective registers belong preponderantly to the Agency, **transferring this responsibility to the Member States would generate additional administrative burden, while affecting the effectiveness of the registers**. Since the specifications for NVR are already regulated at EU level, their incorporation within a European register should follow the same pattern so as to ensure a harmonized approach. Indeed, the specification of options regarding the degree of centralization are incremental exactly in the spirit of **proportionality principle**.

2. Objectives

2.1. Strategic and specific objectives	**Strategic objective(s) of the Agency** with which this initiative is coherent: ☐ Europe becoming the world leader in railway safety ☐ Promoting rail transport to enhance its market share ☒ Improving the efficiency and coherence of the railway legal framework ☐ Optimising the Agency's capabilities ☒ Transparency, monitoring and evaluation ☐ Improve economic efficiency and societal benefits in railways ☐ Fostering the Agency's reputation in the world The project's **general objective** is to *identify the optimal degree of centralization for the EVR in view of supporting the definition of the technical and functional specifications*. A set of **specific objectives** are defined in order to support the achievement of the general objective: › To provide a clear harmonised interface for the registration of vehicles and data management › To reduce administrative burden and avoid undue costs › To facilitate the possible reuse of the existing IT tools and the compatibility with Member State specific functions › To ensure a high level of system flexibility in order to accommodate future changes regarding the extent of centralization These objectives are mainly derived from the provisions in the Interoperability Directive (Article 47(5)).
2.2. Link with Railway Indicators	The project's results are linked to the following Railway Indicators: RI 4.1 – Data completeness in the Agency's registers and databases RI 4.3 – Usability of the Agency's IT tools for registers and databases RI 4.5 – Degree of satisfaction of the various users RI 4.6 – Fulfilment of use cases by registers, databases, telematic TSIs

3. Options

3.1. List of options

A number of additional options were initially considered but were not retained. The following options have been retained for further assessment.

- **Option 0. Baseline (Decentralised application, approval and data)**
- **Option 1. Centralised (application, approval, data)**
- **Option 2. Centralised application. Centralised or decentralised approval and data.**
- **Option 3. Centralised or decentralised application, approval and data.**
- **Option 4. Decentralised application, approval and data**

Notes:

1. Throughout the EVR documents (Impact Assessment, Accompanying report), the term 'option' is interchangeable with the term "scenario".

2. Although Options 0 and 4 are both decentralized regarding how application, approval and data are handled, they are not identical. Option 4 has two features not present in Option 0, i.e. reference data available and harmonised e-form in all local parts of the EVR.

3.2. Description of options

Below, the retained options are briefly described in terms of the extent of centralization of EVR with respect to application, approval and data. Further details are available in the accompanying report:

Description	Baseline	Option 1	Option 2	Option 3	Option 4
Application	Decentralised	Centralised	Centralised	Decentralised or centralised	Decentralised
Approval	Decentralised	Centralised	Decentralised or centralised	Decentralised or centralised	Decentralised
Data	Decentralised	Centralised	Decentralised or centralised	Decentralised or centralised	Decentralised
Common reference data & harmonised e-form	Not included	Included			

Option 0. Baseline (Decentralised application, approval and data)

Pre-condition: The vehicle was firstly authorised for placing in service in a Member State. The Keeper proceeds to the application for registration of the vehicle in such Member State.

Description:

1. The Keeper fills in the application for registration form and submits it to the RE.

2. RE inputs the data and registers the vehicle in the vehicle register.

Post-condition: The vehicle is registered in the National Vehicle Register of the selected Member State and the data can be consulted by authorised users via the centralised search engine. An EVN is assigned to the vehicle.

Option 1. Centralised (application, approval, data)

Pre-condition: The Keeper has selected the Member State where to register the vehicle among the list of Member States in the area of use of the vehicle (as stated in the authorisation for placing on the market).

Description:

Step	Description
1	The Keeper fills in the application for registration in the centralised electronic form and submits the application to the RE of the selected Member State.
2	The RE reviews the application in the central tool and registers the vehicle in the vehicle register (of the selected Member State) hosted in the central tool. The process ends

Post-condition: The vehicle is registered in the centralised vehicle register of the selected member state and the data can be consulted by authorised users via the centralised search engine. An EVN is assigned to the vehicle. The RE may optionally download a copy of their data to a national tool.

Option 2. Centralised application. Centralised or decentralised approval and data.

Pre-condition: The Keeper has selected the Member State where to register the vehicle among the list of Member States in the area of use of the vehicle (as stated in the authorisation for placing on the market).

Description:

Step	Description
1	The Keeper fills in the application for registration in the centralised electronic form and submits the application to the RE of the selected Member State. The selected Member State has chosen either the centralised management of applications and data (step 2a) or the decentralised management of applications and data (step 2b).

2a	The RE reviews the application in the central tool and registers the vehicle in the vehicle register (of the selected Member State) hosted in the central tool. The process ends.
2b	The RE reviews the application in the national tool and registers the vehicle in the vehicle register (of the selected Member State) hosted in the national tool. The process ends.

Post-condition: The vehicle is registered in the centralised or decentralised vehicle register of the selected Member State and the data can be consulted by authorised users via the centralised search engine. An EVN is assigned to the vehicle. In case of centralised workflow, the concerned RE may optionally download a copy of their data to a national tool.

Option 3. Centralised or decentralised application, approval and data.

Pre-condition: The Keeper has selected the Member State where to register the vehicle among the list of Member States in the area of use of the vehicle (as stated in the authorisation for placing on the market).

Description:

Step	Description
1	The Keeper fills in the application for registration in the centralised electronic form in case the Member State has chosen the centralised option and submits the application to the RE of the selected Member State. Go to step 2.
1’	Alternatively the Keeper fills in the application for registration in the decentralised electronic form in case the Member State has chosen the decentralised option and submits the application to the RE of the selected Member State. Go to step 2’.
2	The RE reviews the application in the central tool and registers the vehicle in the vehicle register (of the selected Member State) hosted in the central tool. The process ends.
2’	The RE reviews the application in the national tool and registers the vehicle in the vehicle register (of the selected Member State) hosted in the national tool. The process ends.

<table>
<tr><td></td><td>Post-condition: The vehicle is registered in the centralised or decentralised vehicle register of the selected Member State and the data can be consulted by authorised users via the centralised search engine. An EVN is assigned to the vehicle. In case of centralised workflow, the concerned RE may optionally download a copy of their data to a national tool.

Option 4. Decentralised application, approval and data

Pre-condition: The Keeper has selected the Member State where to register the vehicle among the list of Member States in the area of use of the vehicle (as stated in the authorisation for placing on the market).

Description:
<table><tr><th>Step</th><th>Description</th></tr><tr><td>1</td><td>The Keeper fills in the application for registration in the standard electronic form hosted in the national tool of the selected Member State and submits the application to the RE.</td></tr><tr><td>2</td><td>The RE reviews the application in the national tool and registers the vehicle in the vehicle register (of the selected Member State) hosted in the national tool.</td></tr><tr><td>3</td><td>End.</td></tr></table>
Post-condition: The vehicle is registered in the decentralised vehicle register of the selected Member State and the data can be consulted by authorised users via the centralised search engine. An EVN is assigned to the vehicle.</td></tr>
<tr><td>3.3. Uncertainties / risks</td><td>There is limited evidence on the number of Member States that voluntarily would transfer in the short/medium term to the centralised part of EVR.</td></tr>
</table>

4. Impacts of the options

4.1. Impacts of the options (qualitative analysis)

The assessment is focused on determining the most effective degree of centralization for the EVR taking into account the outlined objectives and the different stakeholder perspectives.

Category of stakeholder		*Option 0*
Registration holders / applicants	Positive impacts	No changes
	Negative impacts	No changes
Registration entities / NSAs / Member States	Positive impacts	No changes
	Negative impacts	No changes
Vehicle register users (other than applicant; notably RUs and keepers)	Positive impacts	No changes
	Negative impacts	No changes
Agency	Positive impacts	No changes
	Negative impacts	No changes
Overall assessment *(input for section 5.1)*	Positive impacts	No changes
	Negative impacts	No changes

Category of stakeholder		*Option 1*
Registration holders / applicants	Positive impacts	Centralised e-form and single point for application should support the application process and likely to result in reduced administrative burden
	Negative impacts	Applicants / registration holders accustomed with existing NVR would need to be familiarized with new central tool (although likely to be of limited importance)
Registration entities / NSAs / Member States	Positive impacts	Significant operation and maintenance cost reductions with this degree of EVR centralisation. Registration process is realized by functions in a single environment (managed by ERA)
	Negative impacts	No reuse of existing NVRs within the EVR.

		Member States cannot add additional workflow steps
Vehicle register users (other than applicant; notably RUs and keepers)	Positive impacts	Unique centralized point for the search and consultation of data + increase of data quality should lead to significantly enhanced useability of the EVR. Data availability not subject to availability of remote repositories
	Negative impacts	Users familiar with the existing NVR, to be retrained in the new central tool (although likely to be of limited importance)
Agency	Positive impacts	No complex interface to manage Integration with other registers / tools kept by ERA
	Negative impacts	One-off and ongoing IT costs for implementation, operation and maintenance of the EU tool One-off: complex user interface to design because of different requirements.
Overall assessment *(input for section 5.1)*	Positive impacts	Strong user benefits both with regard to the application and the search / consultation. Likely to lead to a significant reduction in administrative burden and other costs
	Negative impacts	No reuse of existing NVRs within the EVR. One-off for implementing the EU tool for the Agency + ongoing costs for operation and maintenance

Category of stakeholder		*Option 2*
Registration holders / applicants	Positive impacts	Centralised e-form and single point for application should support the application process and likely to result in reduced administrative burden albeit with different tools
	Negative impacts	Applicants / registration holders accustomed with existing NVR would need to be familiarized with new central tool (although likely to be of limited importance)
Registration entities / NSAs / Member States	Positive impacts	Member states can add additional workflow steps, if using the national tool
	Negative impacts	Limited reuse of existing NVRs within the EVR.

		Increase of maintenance costs from the management of complex interfaces
Vehicle register users (other than applicant; notably RUs and keepers)	Positive impacts	Unique centralized point for the search and consultation of data + increase of data quality should lead to enhanced useability of the EVR
	Negative impacts	Data availability (partially) subject to availability of remote repositories and availability of connections to such repositories.
Agency	Positive impacts	Integration with other registers / tools kept by ERA
	Negative impacts	Complex interface for pushing applications in decentralized tools Likely to involve higher ICT costs
Overall assessment *(input for section 5.1)*	Positive impacts	Benefits are likely to be incurred by applicants and users while Member States gain flexibility regarding content of national tools
	Negative impacts	Overall increase in system complexity and hence ICT costs

Category of stakeholder		*Option 3*
Registration holders / applicants	Positive impacts	Harmonised centralized or decentralized e-form
	Negative impacts	Different tools / separate authentication and different registration processes across the EU
Registration entities / NSAs / Member States	Positive impacts	Migration to central tool is possible Reuse of existing NVRs with this degree of centralization of the EVR.
	Negative impacts	Member States cannot add additional workflow steps, if using the central tool
Vehicle register users (other than applicant; notably RUs and keepers)	Positive impacts	Unique centralized point for the search and consultation of data + increase of data quality should lead to enhanced useability of the EVR
	Negative impacts	Data availability (partially) subject to availability of remote repositories and availability of connections to such repositories.
Agency	Positive impacts	Central tool may be largely realized reusing existing tools
	Negative impacts	Medium / high complexity of interfaces
Overall assessment *(input for section 5.1)*	Positive impacts	Member States can realise benefits in terms of cost savings by moving to central tool. Allows Member States to keep current tools as part of the EVR.

	Negative impacts	Medium / high complexity of interfaces and different registration processes across the EU

Category of stakeholder		*Option 4*
Registration holders / applicants	Positive impacts	Applicants / registration holders accustomed with existing NVR would not need to be familiarized with a new central tool (although likely to be of limited importance). Otherwise no positive impacts foreseen.
	Negative impacts	Decentralised e-form. Different tools. Separate authentication. No central point for handling application. As a result one possible driver for reduction in administrative burden is not available with this degree of centralization.
Registration entities / NSAs / Member States	Positive impacts	If the central tool is offline, REs are still able to perform registrations (provided the local tool is online) High extent of reuse of existing NVRs for the EVR.
	Negative impacts	Increase in the number of subsystems. Costs for operation and maintenance of these will not be reduced.
Vehicle register users (other than applicant; notably RUs and keepers)	Positive impacts	Unique centralized point for the search and consultation of data + increase of data quality should lead to enhanced useability of vehicle registers
	Negative impacts	Data availability subject to availability of remote repositories and availability of connections to such repositories
Agency	Positive impacts	None expected
	Negative impacts	High complexity of interfaces resulting in relative high cost and effort
Overall assessment *(input for section 5.1)*	Positive impacts	Reuse of existing NVR with this degree of centralization.
	Negative impacts	Limited user benefits (in terms of smaller reductions in administrative burden) as well as higher costs from increase in number of subsystems and higher level of complexity of the EVR.

4.2. Impacts of the options	The quantitative analysis (the specific assumptions on parameter values are included in **Annex EcoEv 1**) includes in particular:

(quantitative analysis)	› Cost impact for the Agency:
	  ○ one-off costs for the central tool - the cost estimate would vary depending on the chosen option for EVR
	  ○ recurring costs per annum for central tool - the cost estimate would vary depending on the chosen option for EVR
	› Cost impact for the registration entities / NSAs
	  ○ one-off costs - the main cost changes concern any savings generated by moving to the central tool (one-off savings by avoiding replacement of IT hardware and software)
	  ○ recurring costs (per annum) - the main cost changes concern any savings generated per annum by moving to the central tool
	› Potential time savings for registration entities per annum (in monetary terms)
	
	Notes:
	› For all categories the estimated quantitative impacts measure the change in **mill. Euros** relative to the baseline (Option 0 or Do-Nothing). For the cost impacts positive values imply increased costs, while negative values imply decreased costs (compared to the baseline). For the values for time savings a positive figure would imply reduced time (for registration).
	› In the case of one-off impacts the values are assumed to be incurred in a single year only (Year 0 in the CBA calculation).
	› For recurring impacts the values shown are incurred each year over the assumed lifetime (10 years).
	› The values given for cost impacts for registration entities / NSAs are expressed per NSA. Therefore, in order to determine the total impact these values would need to be multiplied by the number of NSAs affected.
	› The estimation of benefits does not take into account the possible advantages for those stakeholders using the EVR for search and consultation purposes given that the changes are likely to be relatively modest compared to the baseline.
	› These are estimates based on the input collected from the NSAs and the sector, grounded on assumptions and can therefore not be considered as being accurate measurements.

Category of stakeholder	*Mln euro*	*Option 0*	*Option 1*	*Option 2*	*Option 3*	*Option 4*
Agency	One-off cost changes	0,0	0,60	1,20	0,78	0,20
	Recurring cost changes / year	0,0	0,12	0,24	0,12	0,10
NSAs using central tool	One-off costs changes, per NSA	0,0	-0,0	-0,0	-0,0	0,0
	Recurring costs changes / year, per NSA	0,0	-0,015	-0,015	-0,015	0,0
NSAs using local tool	One-off costs changes, per NSA	0,0	0,0	0,0	0,0	0,0
	Recurring costs changes / year, per NSA	0,0	0,0	0,0	0,0	0,0
Overall at EU level	**One-off costs changes**	**0,0**	**0,43**	**1,10**	**0,68**	**0,28**
	Recurring costs changes / year	**0,0**	**-0,29**	**-0,01**	**-0,13**	**0,10**
Registration entities	Monetised time savings / year	0,0	0,08	0,08	0,08	0,03
Overall at EU level	**Monetised time savings / year**	**0,0**	**0,08**	**0,08**	**0,08**	**0,03**

The NPV and B/C figures are calculated using a **4% discount rate** (in accordance with the EC Better Regulation Guidelines, 2017).

	Option 0	*Option 1*	*Option 2*	*Option 3*	*Option 4*
***NPV** (input for section 5.2)*	*0*	*2,5*	*-0,5*	*1,0*	*-0,9*
***B/C ratio** (input for sec 5.2)*	*n/a*	*2,6*	*0,9*	*1,5*	*0,2*

Break-even (recovery) period in years:

› Option 1: 1,2
› Option 2: 13,7
› Option 3: 3,4
› Option 4: N/A

Further details of the quantitative modelling of impacts are provided in **Annex EcoEv 2**.

5. Comparison of options and preferred option

5.1. Effectiveness criterion (options' response to specific objectives)

In this section the effectiveness of the five options will be assessed in terms of their response to the specific objectives, as broken down in the following criteria:

(1) Harmonised interface for the registration of vehicles and data management

› Harmonised interface for search, consultation

› Usability for keeper, harmonised interface for application, multilingual support, same look and feel, common tool, standard process, comfort of users, single place for search and apply, one stop shop for application

(2) Reduced administrative burden / costs

› *Data quality, no double input, data validation, data availability, timeliness*

› *Operating costs including IT maintenance costs, management of access rights, reference data, workflow etc.*

(3) Reuse of the existing IT tools and compatibility with MS specific functions

› *Implementation burden IT costs, data migration and change management*

› *Capability to interface other systems (non-EU OTIF NVRs, OSS, ERATV, TAF TSI, RSRDs etc.)*

› *Compatibility with MS specific needs, national workflows and tools.*

(4) High level of system flexibility in order to accommodate future system changes

› *a high level of system flexibility in order to accommodate future changes regarding the extent of centralisation*

In the following table there are for each specific objective rows in accordance with the number of criteria used. The numbers in the cells reflect how each option perform with respect to the different sub-criteria.

These scores take values from 1 to 5 with 1 representing the lowest performance and 5 being the highest performance.

	Option 0	*Option 1*	*Option 2*	*Option 3*	*Option 4*
(1) Harmonised interface for the registration of vehicles and data management	1	5	3	3	2
	1	5	4	3	2
(2) Reduced administrative burden / costs	1	5	3	4	2
	2	5	1	4	2

(3) Reuse of the existing IT tools and compatibility with MS specific functions	5	1	1	3	4
	1	5	3	3	1
	5	1	3	4	5
(4) High level of system flexibility	1	1	3	5	1
Overall score	17	28	21	29	19
Effectiveness (average score)	2,1	**3,5**	2,6	**3,6**	2,4

Full details are provided in **Annex EcoEv 3** regarding the effectiveness assessment.

5.2. Efficiency (NPV and B/C ratio) criterion

On the basis of the findings from section 4.2, the **overall efficiency** of the various options is rated as follows. The following principle for the scoring is adopted:

- 1 if B/C ratio <1 or NPV <=0
- 5 if B/C ratio >1 and NPV >0

	Option 0	*Option 1*	*Option 2*	*Option 3*	*Option 4*
Efficiency	1	5	1	5	1

5.3. Summary of the comparison

In the following table the comparison of options is summarized taking into account both the effectiveness and efficiency dimensions.

	Option 0	*Option 1*	*Option 2*	*Option 3*	*Option 4*
Effectiveness	2,1	**3,5**	2,6	**3,6**	2,4
Efficiency	1	5	1	5	1
Overall rating	1,55	**4,25**	1,80	**4,30**	1,70

5.4. Preferred option(s)

Selecting the preferred option(s) is supported by the table below showing: (1) the effectiveness score; B/C value and NPV value.

	Option 0	*Option 1*	*Option 2*	*Option 3*	*Option 4*
Effectiveness	2,1	**3,5**	2,6	**3,6**	2,4
B/C ratio	n/a	**2,6**	0,9	1,5	0,2
NPV (mill. Euros)	0	**2,5**	-0,5	1,0	-0,9

Option 1 and **Option 3** perform comparatively better than any of the other ones considered. For the qualitative assessment (effectiveness)

	the two options achieve almost the same rating with **Option 3** having a slightly better result. On the other hand the quantitative assessment clearly shows that **Option 1** performs better in terms of the B/C ratio and the NPV value compared to Option 3. For both **Option 1** and **Option 3** the B/C ratio is above 1 (corresponding to a NPV>0). Sensitivity analysis has confirmed the robustness of the B/C ratios with respect to the possible increase in implementation costs while retaining the B/C ratio above 1: for Option 1 a cost increase of more than 400% is permitted, whereas for Option 3 the implementation costs can increase by 120%. Below, the key advantages and disadvantages of these two options are summarised: **Option 1:** *Main advantages* › One single system for the registration across EU. One single IT system to operate and maintain. No interfaces to maintain › Optimisation of savings for Member States when moving their registers to the central tool of EVR *Main disadvantages* › Limited compatibility with the specific needs of some Member States, particularly those whose vehicle registers have different scope › Member States cannot choose the optimal timing from their perspective for migrating to the central tool **Option 3:** *Main advantages* › It allows Member States who wish so to keep their current tools, provided that a harmonised interface component is developed and deployed as part of the EVR › System flexibility: it has the capability to evolve towards a fully centralised EVR *Main disadvantages* › The need for designing and maintaining interfaces for those Member States not choosing to migrate to the central tool › Reduced scope for cost savings compared to Option 1 unless all Member States choose the central tool › Parallel registration systems across EU On this basis, Options 1 and 3 provide feasible, efficient and effective approaches for supporting the provisions of the Interoperability Directive (Article 47(5)) on the European Vehicle Register.
5.5. Further work required	No further work is foreseen for the impact assessment itself. However, in case Option 3 would be selected, it would be important to monitor the return of experience in order to prepare the possible future migration towards the full centralisation.

6. Monitoring and evaluation

6.1. Monitoring indicators	It could be relevant to survey frequently and in-depth the user experiences during the transition from NVR to EVR in order to assist towards a smooth implementation. This would be relevant for Option 1 but in particular in the case of Option 3 in order to ensure that the combination of a central tool alongside several local tools is working properly for the users. In addition, the Agency is also monitoring the railway indicators: › RI 4.1 – Data completeness in the Agency's registers and databases › RI 4.3 – Usability of the Agency's IT tools for registers and databases › RI 4.5 – Degree of satisfaction of the various users › RI 4.6 – Fulfilment of use cases by registers, databases, telematic TSIs
6.2. Future evaluations	N.a.

Annex EcoEv 1

Parameters used in the assessment of costs and benefits		Value	Unit
Agency one-off costs for central tool (under full centralisation)		600	K€
Coefficient for Agency one-off costs for central tool (under optional centralisation)		30	%
Coefficient for Agency one-off costs for central tool (under complex optional centralisation)		100	%
Agency recurring costs for central tool/year		120	K€
One-off cost savings per NSA / RE by avoiding replacement of IT hardware and software by using central tool		6	K€
Recurring cost savings per NSA / RE by using central tool/year		15	K€
Average salary/day (not including IT development effort)		200	€
Average time saved by RE per registration (first registration)		5	Minutes
Average time saved by RE per registration (updated registration)		1	Minutes
Coefficient for time savings under decentralied EVR		0.33	
No. first registrations/year		6000	
No. updated registrations/year		55000	
Proportion of registration entities moving to central tool		60	%

Annex EcoEv 2

Quantitative assessment of retained options

EVR CBA - Output Sheet		(Figures are in mln Euros)											
Lifetime		10											
Discount factor		0.04											
Option 1	0	1	2	3	4	5	6	7	8	9	10		
Costs	0.60	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12		1.57 €
Benefits	0.17	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48		4.09 €
Net-benefits	-0.43	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36		
Break-even period	1.2												
NPV	2.52 €		B/C Ratio	2.60									
Option 3	0	1	2	3	4	5	6	7	8	9	10		
Costs	0.78	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12		1.75 €
Benefits	0.10	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32		2.70 €
Net-benefits	-0.68	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20		
Break-even period	3.4												
NPV	0.95 €		B/C Ratio	1.54									
Option 0	0	1	2	3	4	5	6	7	8	9	10		
Costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00 €
Benefits	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00 €
Net-benefits	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Break-even period	#DIV/0!												
NPV	0.00 €		B/C Ratio	#DIV/0!									
Option 2	0	1	2	3	4	5	6	7	8	9	10		
Costs	1.20	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24		3.15 €
Benefits	0.10	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32		2.70 €
Net-benefits	-1.10	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08		
Break-even period	13.7												
NPV	-0.45 €		B/C Ratio	0.86									
Option 4	0	1	2	3	4	5	6	7	8	9	10		
Costs	0.28	0.100	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10		1.10 €
Benefits	0.00	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03		0.20 €
Net-benefits	-0.28	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08	-0.08		
Break-even period	N/A												
NPV	-0.89 €		B/C Ratio	0.19									

Annex EcoEv 3

Qualitative assessment of retained options

(Each option is scored according to its performance with respect to the different sub-criteria where scores can take values on a scale from 1 to 5 – 1 representing lowest performance and 5 the highest performance)

Criteria	Sub-criteria	Option 0 - baseline	Option 1	Option 2	Option 3	Option 4
Harmonised interface for the registration of vehicles and data management	Harmonised interface for search, consultation	1 Centralised search and consultation. No unique user account	5 Centralised search and consultation.	3 Centralised search and consultation. User synchronization.	3 Centralised search and consultation. User synchronization.	2 Centralised search and consultation. User synchronization.
	Usability for Keeper harmonised interface for application, multilingual support, same look and feel, common tool, standard process, comfort of users, single place for search and apply, one stop shop for application ...	1 Standard paper form	5 Centralised e-form and single point for application	4 Centralised e-form and single point for application. Different tools.	3 Harmonised centralised or decentralised- e-form. Different tools. Separate authentication.	2 Decentralised e-form. Different tools. Separate authentication.

Criteria	Sub-criteria	Option 0 - baseline	Option 1	Option 2	Option 3	Option 4
Reduced administrative burden/costs	Data quality no double input, data validation, data availability, timeliness	1 No e-form generally available. Availability subject to connection stability and availability of decentralised repositories. Data searched in real-time	5 Input via centralised e-form. Centralised repository. Data searched in real-time	3 Input via centralised e-form. Remote single point for application. Centralised and decentralised repositories. Data searched in real-time	4 Input via centralised or decentralised e-form. Centralised and decentralised repositories. Data searched in real-time	2 Input via decentralised e-form. Availability subject to connection stability and availability of decentralised repositories. Data searched in real-time
	Operating costs including IT maintenance costs e.g. maintenance of IT tools and interfaces, management of access rights, reference data, workflow, etc.	2 Multiple systems to operate and maintain. Interface maintenance requires high effort and cost	5 One single system to operate and maintain. No interfaces to maintain.	1 Reduced number of systems to operate and maintain. Interface design and maintenance requires very high effort and cost	4 Reduced number of systems to operate and maintain. Interface design and maintenance requires average effort and cost.	2 Multiple systems to operate and maintain. Interface maintenance requires high effort and cost.
Reuse of the existing IT tools and compatibility with MS specific functions	Implementation burden IT costs, data migration and change management	5 Already implemented. Data migration not needed. No changes	1 Development of central tool. Migration of data needed. High process reengineering	1 Need to develop the central tool with the centralised e-form including the interface to decentralised tools. Data migration needed. Medium process reengineering	3 Need to develop the central tool and the centralised e-form and decentralised e-forms. Data migration needed. Minor process reengineering	4 Need to develop the decentralised e-forms. No data migration. Minor process reengineering

Criteria	Sub-criteria	Option 0 - baseline	Option 1	Option 2	Option 3	Option 4
	Capability to interface other systems (non-EU OTIF NVRs, OSS, ERATV, TAF TSI RSRDs, etc.)	1 Decentralised solution. High complexity of interfaces	5 Centralised solution, Medium/Low complexity of interfaces	3 Hybrid solution, half centralised half decentralised. Medium/High complexity of interfaces.	3 Hybrid solution, half centralised half decentralised. Medium/High complexity of interfaces.	1 Decentralised solution. High complexity of interfaces
	Compatibility with MS specific needs, national workflows and tools	5 Decentralised tool and data. High compatibility with MS specific needs.	1 Centralised tool and data. Low compatibility with MS specific needs.	3 Centralised or decentralised tool and data, with centralised e-form. Medium compatibility with MS specific needs.	4 Centralised or decentralised tool and data. Medium compatibility with MS specific needs.	5 Decentralised tools and data. High compatibility with MS specific needs.
High level of system flexibility in order to accommodate future system changes	High level of system flexibility in order to accommodate future changes regarding the extent of centralisation	1 Low in-built system flexibility as the system in terms of application, registration is decentralised	1 Low in-built system flexibility: fully centralised system	3 The application is centralised but has some system flexibility of the overall EVR structure	5 Strong system flexibility: it has the capability to evolve towards a fully centralised EVR	1 Low in-built system flexibility as the system in terms of application & registration is decentralised
	Average:	*2,1*	*3,5*	*2,6*	*3,6*	*2,4*